FOREWORD

The idea of publishing this book was born after realising the difficulty involved in establishing a sound library for the school. This is due to the fact that text books are too expensive to afford if every student is to have access to them.

The school administration and the teaching staff have therefore offered to subsidize the cost of text books in terms of service and materials to allow every student to afford these books.

I therefore thank the teachers so much for their unending endeavors in preparing these books with the aim of facilitating our students' learning.

Thank you indeed.

HEADMASTER
FOR ADMINISTRATION

A **GEOGRAPHY** OF EAST AFRICA, REST OF AFRICA, NORTH AMERICA & RHINELANDS

O' LEVEL GEOGRAPHY (273/1 & 273/2)

EIGHTH EDITION
2017

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1

Mr. Kasujja is greatly indebted to the Almighty Allah for the life, health and wisdom accorded to him in this worldly struggle.

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KASUJJA AHMED
Geography Paper 273/1

2

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SSENDITTA WILSON
Geography Paper 273/2

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HAD YOU KNOWN THESE?

A nation's development and progress depends upon the intellectual and proper training given to the people who live with in its boarders. A nation whose members are lacking an intellectual and proper training should never be expected to develop and progress. More so, National Development only occurs when the nation's people have the same goal. Never can it develop and progress, even though it shows great activity, if some of its members say "black" and others say "white" for the same thing.

***

Civilization means more than scientific advancement, modern means of transportation, ships and living in large cities with skyscrapers. While such things may be adjuncts to civilization, it is improper and unbecoming to identify civilization with them. If a given civilization is not based on morality and virtue and nurtured in the pool of intelligence and conscience, it is no more than a passing flash of illuminations that serves a couple of rich people and excites some thrill seekers. What a pity to those who are misguided by its blinking lights!!

***

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PART ONE
INTRODUCTION TO GEOGRAPHY

DEFINITIONS OF GEOGRAPHY

Geography is defined differently by many geographers: Below are some of the definitions:

1. Geography is the study of man and his surroundings (Environment)
2. Geography is the knowledge which attempts to discover the distribution of facts of the Earth in relation to man.
3. Geography is the study of Earth as a home for man. Etc

REASONS FOR STUDYING GEOGRAPHY

Geography is studied for a number of reasons and here below are some of them:

1. We study geography to learn and understand our environment as environment entails a lot for man's survival.
2. Geography as a subject trains people skills of map reading, observation recording, measuring in field work and these skills are of vital importance in one's life.
3. Through geography man earns a living by learning good soils e.g. loam soil that is good for agriculture.
4. We study geography in an attempt to learn the physical appearance of any landscape for purposes of settlement, road construction etc.
5. We study geography in a bid to pass exams and get employment after acquiring the information.
6. Through geography one is able to conserve his environment.
7. Geography helps to know the type of climate suitable for agriculture.

HOW IS GEOGRAPHY RELATED TO OTHER SUBJECTS

Geography can be related to subjects like mathematics, Chemistry, Physics, Biology etc.

1. Geography to mathematics: In the two subjects there are statistical calculations e.g. bar graphs, pie-charts etc.

2. In geography and Biology, there is a study of Flora (plants) and fauna (animals).

3. In geography and chemistry there is a study of weathering which involves the following processes:

   (i) hydration
   (ii) oxidation
   (iii)reduction
   (iv)carbonation
   (v) hydrolysis

4. Geography in relation to physics, there is a study of the effects of gravitational force on the environment, speed of wind, the Earth's rotation, pressure systems etc.

BRANCHES OF GEOGRAPHY:

There are three major branches of geography and these are;
(i) Physical geography
(ii) Human geography
(iii)Political geography

1. **PHYSICAL GEOGRAPHY**: This branch of geography deals with the study of physical features such as mountains, vegetation, soils, climate etc under this branch there are other studies which include;

(i) Climatology: The study of climate
(ii) Geomorphology: The study of land forms
(iii)Geology: The study of rocks
(iv)Oceanography: The study of Oceans
(v) Pedology: The study of soils
(vi)Astronomy: The study of stars etc.

2. **HUMAN GEOGRAPHY**: This branch of geography involves the study of economic activities such as fishing, mining, transport and other activities related to land use like settlement, urbanization, industrialization etc.

3. **POLITICAL GEOGRAPHY**: This branch of geography deals with defining political boundaries of different countries from other geographical regions e.g. boundaries of Uganda, Kenya, Tanzania, Democratic Republic of Congo, Burundi, Rwanda, Somalia etc. from other regions.

TYPES OF ENVIRONMENT

Environment is the surrounding of man and in environment we have things like vegetation, buildings, mountains, lakes, rivers etc.

There are two types of environments and these are;
(i) Natural environment
(ii) Artificial environment

(i) Natural environment: This is God created environment. In this kind of environment we have things like mountains, valleys, lakes, Oceans, seas etc.

(ii) Artificial Environment: This is man made environment and here we have things like roads, buildings, boreholes etc.

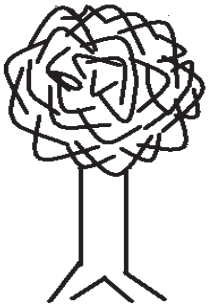
REVIEW QUESTIONS

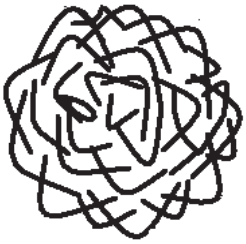
1. Define geography.
2. List down two branches of geography you know
3. Give the relation between geography and subjects like chemistry, Biology etc.

A MAP AND PICTURE

A map is a representation of an object seen and drawn from above, while a picture is a representation of an object seen and drawn from side. And below is the diagrammatic difference between a map and picture:

A picture of a tree **a map of a tree**.





TYPES OF MAPS:

Maps are categorized into two maps and these are;
(i) Relief maps
(ii) Distribution maps

(i) Relief maps: These are maps containing features that show the height of the land. Such features include mountains, valleys, lakes etc.
(ii) Distribution maps: These are maps which show the distribution of population, vegetation, industries, minerals etc.

CHARACTERISTICS OF A GOOD MAP

A good map must have the following attributes:
(i) Title (heading)
(ii) Key
(iii)Compass
(iv)Scale
(v) Frame

(i) **Title (heading) on a map there must be a heading (title)**. This tells the map reader what the map is all about. Without a title it becomes difficult for some one to know what the map is all about.
(ii) **Key**: A key helps to describe all symbols that are used on a map. Without a ***key,*** it becomes very difficult for some one to tell what each symbol used on a map represents.
(iii) **Compass**: This shows the location of the map. A map without a compass is described as a poor map because it becomes hard for some to tell where the map is located.
(iv) **A Scale**: A scale on a map tells the accurate distances in Kilometers, or miles covered by a certain map on the actual ground.
(v) **Frame**: A good map should be framed to show the demarcation of the area occupied by the map.

REVIEW QUESTIONS:

(i) Why do we study geography?
(ii) Define a map.
(iii)Give the difference between a map and a picture
(iv)List down the characteristics of a good map.

MAP READING:

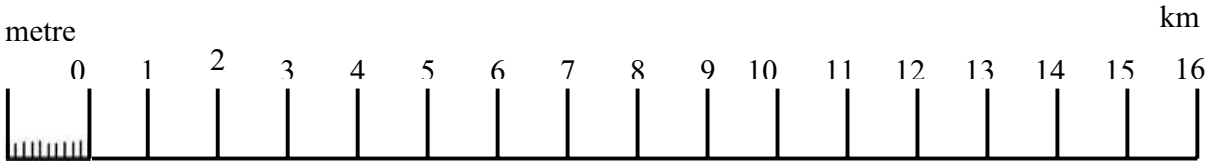
Map reading refers to the physical interpretation and location of features on a map extract. A map of this nature describes the general landscape. These maps show natural and artificial features and they are commonly known as Topographical maps.
In reading a map, a scale is of vital importance.
A scale is a ratio of the size of the map to the actual ground. There are three types of scales normally used in map reading skills and these are;
(i) Statement scale
(ii) Representative fractional scale
(iii) Linear scale.

(i) **A statement Scale**: This is for example 1cm is equivalent to 1km on the actual ground. This means that 1cm on the map represents 1km on the actual ground of the map extract.
(ii) **A representative fractional scale (R.F.S)** This type of scale can be expressed in two ways and these are:

(a) As a ratio for instance 1:50,000
(b) As a fraction e.g. $\frac{1}{50,000}$

The above information means that one unit on the map represents 50,000 of the same unit on the actual ground of the map extract.

(iii)A Linear Scale: This is a line divided into sections and each of which represents a unit of measurement on the ground and in most cases these units are numbered, they are in kilometers or miles. While those small units on left represent decimal points as shown below:



A LINEAR SCALE

A Linear scale above helps to measure distances on a map.
Distance can be defined as the lengths between two points say A – B.

REVIEW QUESTIONS:

(i) Define a scale
(ii) List down any two types of scales you know
(iii)With the help of a diagram draw a linear scale
(iv)As a geographer, explain the importance of a scale on a map.

COLOURS USED ON A MAP EXTRACT

There are a number of colours used on a map extract and these are;
(i) Brown
(ii) Red
(iii)Blue
(iv)Green
(v) Black

(i) **BROWN**: This colour is used to show contours and contours are brown lines used to show areas on the map with the same height.

(ii) **RED**: This colour on a map is used to show roads, boundaries, air fields etc.

(iii) **BLUE**: This colour on a map is used to show water bodies e.g. lakes, rivers, streams etc.

(iv) **GREEN**: This is used on a map to show vegetation cover e.g. forests, swamps, plantations etc.

(v) **BLACK**: This colour is used to show communication routes e.g. roads, railway lines, and even settlements.

BEARINGS AND DIRECTIONS

Directions are based on four main points of a compass or cardinal points and these are;

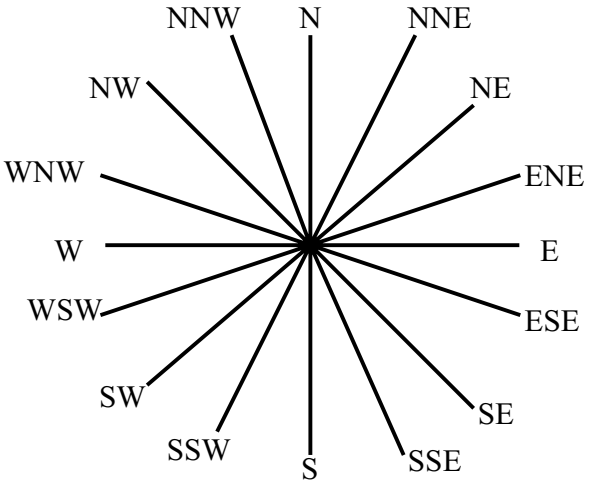
1. South direction
2. East direction
3. West direction
4. North direction

On advanced maps three norths are shown and these are shown as follows:

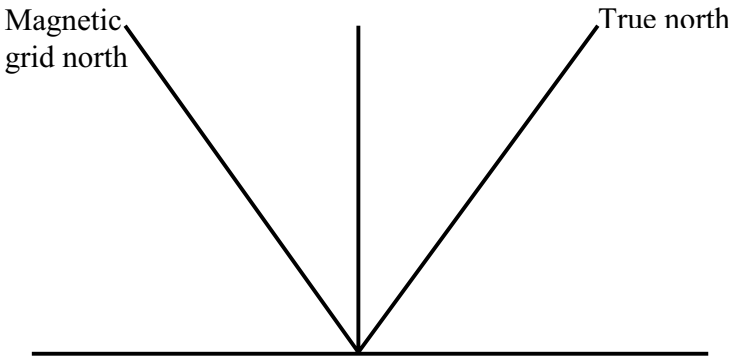
(i) The true North: This is based on the North pole
(ii) The grid North: This is based on the grid system of the map.
(iii)The magnetic North: This is based on the direction in which the compass needle points.

A compass itself has 16 directions but the main cardinal points are four (4) and these are;
1. North
2. East
3. South
4. West

Below is a diagrammatical illustration of a compass with its 16 directions

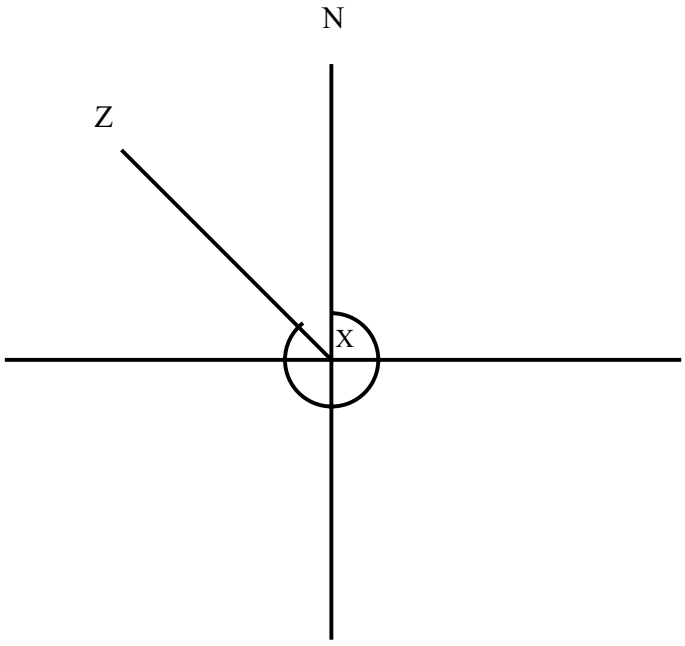


The diagram below shows the true norths of a compass:



BEARINGS:

Directions may be measured as an angle or bearing and they are always expressed in degrees in a clockwise direction from North. For example if one was to find the direction of point 2 from X. He or she is supposed to first find the North direction on the map and then draw the four main compass at point X then join the two points with a straight line. After joining the points then measure the degree right away from North clock wise with a protractor till it meets the line which joins the two points as follow:

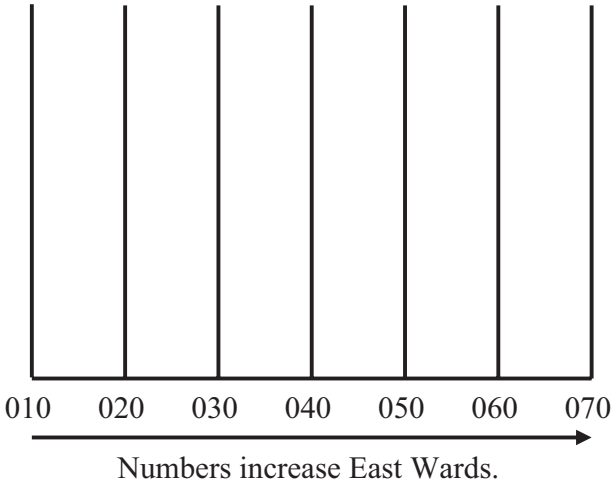


So the bearing of point Z from X as shown above from North as a starting point to the line which joins the two points is 315^0 North West. Important to note bearings are given in three digits even the smallest number which is less than 100^o. If a figure obtained is say 45^0 you write it as 045^0. No mark is given to some one who gives any figure in two digits.

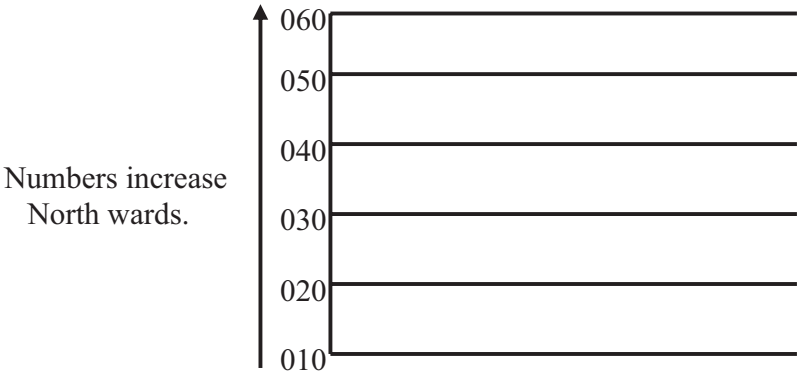
GRID REFERENCE:

This is a geographical way of locating features, areas etc on a map extract. A map of this nature consists of a network of squares called grid squares . A map consists of two kinds of grid lines, called Easings and Northings.

(i) **EASTINGS:** These are grid lines drawn vertically and their values increase East wards as shown below:



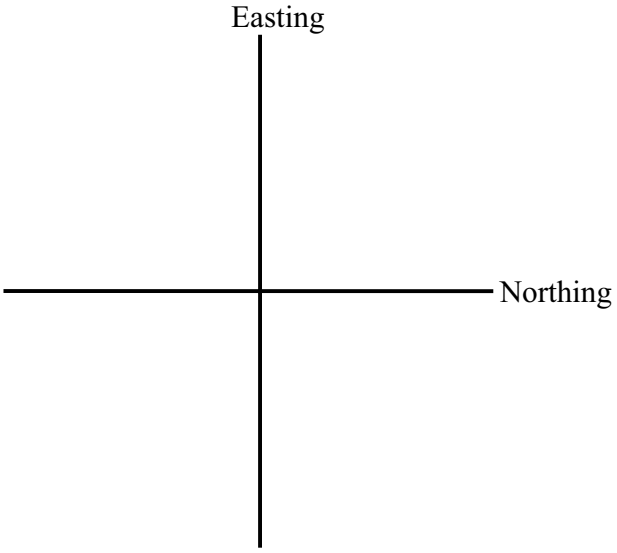
(ii) **NORTHINGS:** These are grid lines on a map grid drawn horizontally and their values increase north wards as shown below:



HOW TO GIVE A GRID REFERNCE

On a map extract Eastings are always read first and then followed by the northings. One must give six map reference figures i.e. three Eastings followed by three northings. The third figure in each case is an estimate of the number of the tenth eastwards for Eastings and North wards for Northings.

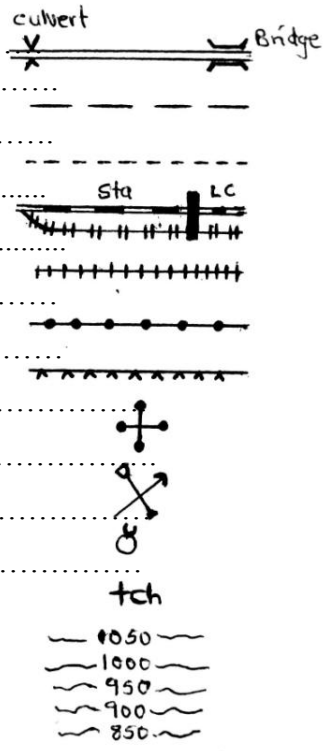
Below is an illustration of Eastings and Northings:



A MAP GRID

As earlier explained that a map of this nature consists of squares; This map consists of features of which are well described on the key of any given map as below:

Dry weather roads ……
Main tracks (motor able) ……
Other tracks and foot paths …….
Railways, station siding, level crossing…….....
Light Railway …….....
Telephone ……
ower Transmission line ……
Antiquity ……
Mineral workings ……
Mosque ……
Church ……
Contours (V.I. 50++) ……



	Pillar	Ground Station
Trigonometrical station:- Primary ……		
Trigonometrical station Secondary …….....		
” ” Other …….....		

Air photo principle point with sortie No. ……

Forest ……..

Thicket ……

Bamboo ……

Plantation ……..

Palms ……..

Papyrus, swamp, Marsh, Bog ……..

Seasonal swamp ……..

Sand or Mud ……

Dam ……..

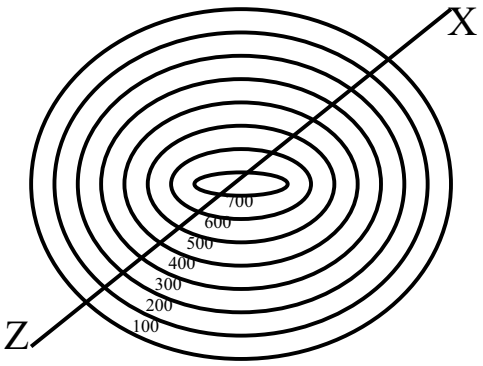
Wind pump ……..

Crater ……

Quarry……

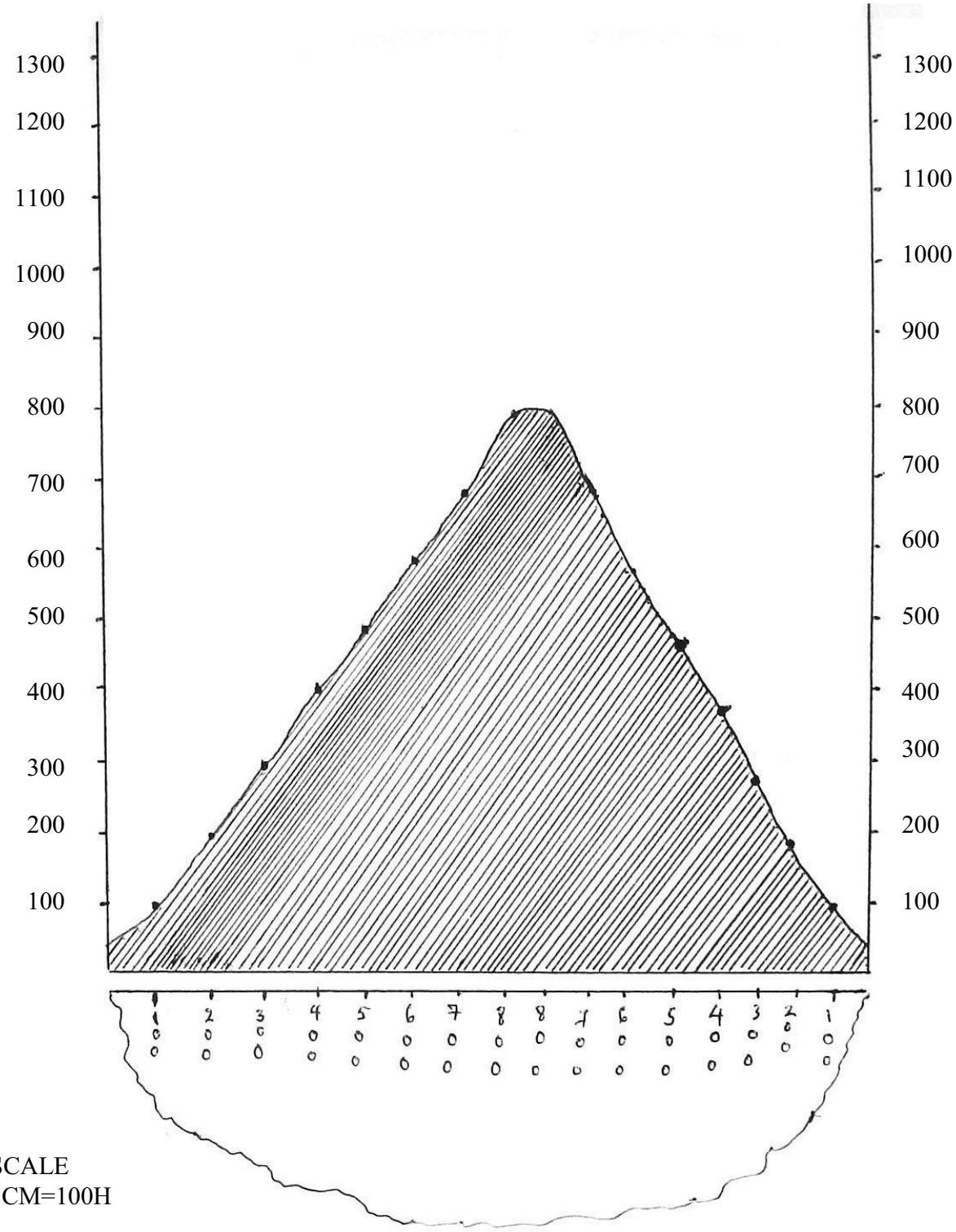
These features and symbols above are not all found on the map but can be found on each key of any map extract. If any symbol or feature is asked and cannot be seen on the map, then check for it from the key provided on the map.
Some features are described by contours drawing a cross-section. Features like escarpments, dissected plateau, ridges, saddle, Col etc.

CONTOURS OF AN ESCARPMENT AND ITS CROSS-SECTION

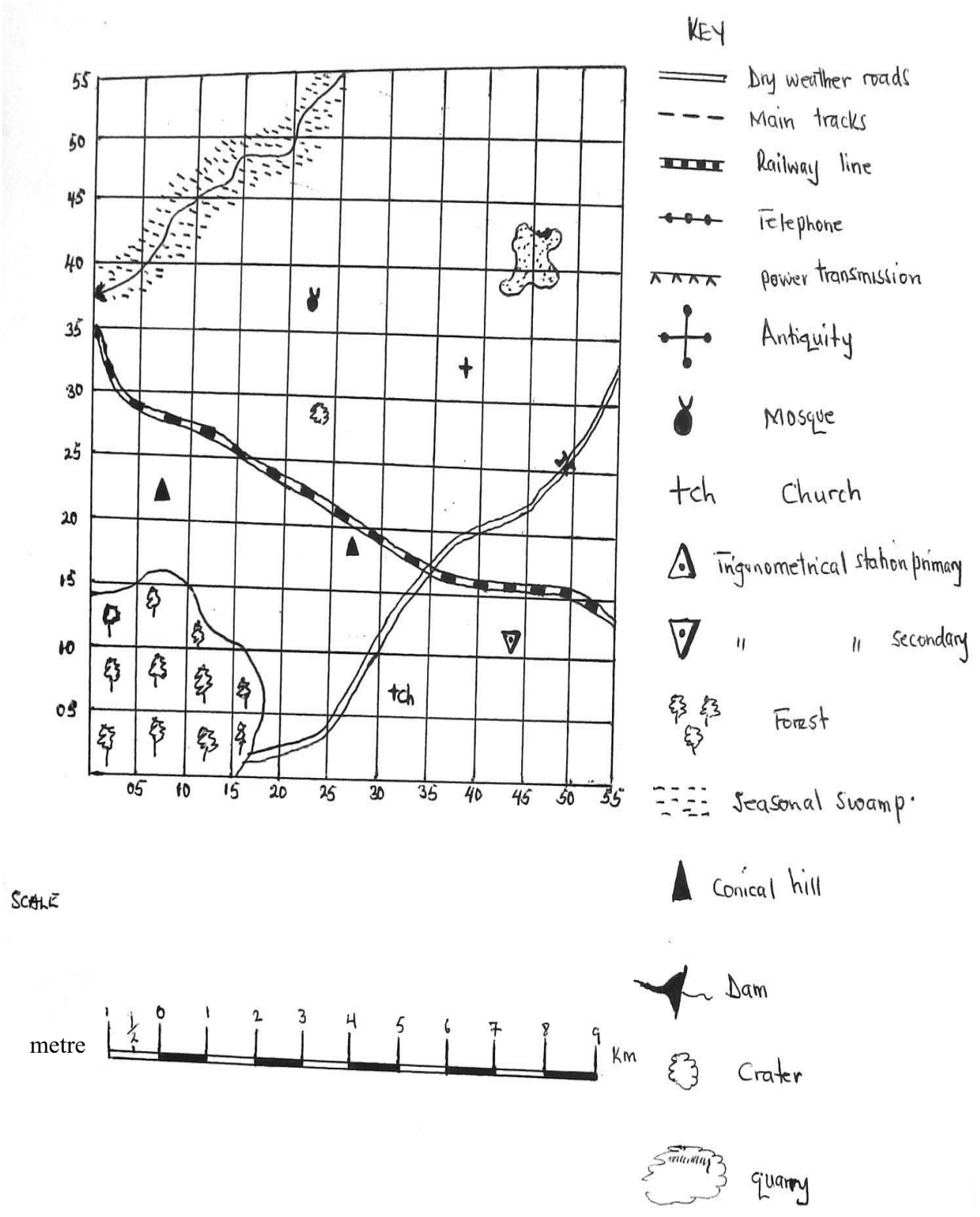


If a cross-section of the area between Z and X is to be drawn, contours are supposed to be studied carefully, then draw a line joining the two points Z and X. Use a piece of paper to mark all contours crossed by the line as below:

A CROSS-SECTION OF THE AREA BETWEEN POINT Z AND X



SCALE
1CM=100H



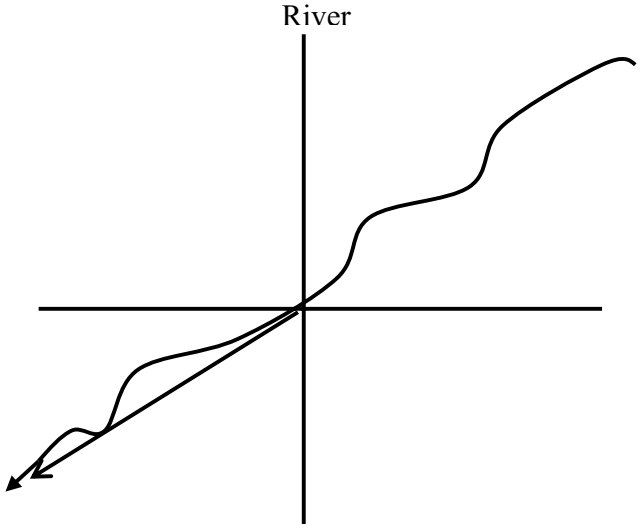
(a) If one was to give the grid reference of say a secondary trigonometrical station on the map above would do the following:

(i) Look for the area enclosed by Eastings 40 and 45 and then Northings 10 and 15

(ii) Inside the square look for the symbol representing a Trigonometrical station secondary which is Δ as per the key. Then write 40 as the figure representing Eastings line, move to the right as you estimate the third figure on the Eastings which is 8. This would give 408 as the first three digits for Eastings. Then put down 10 as the first figure representing Northings line, then

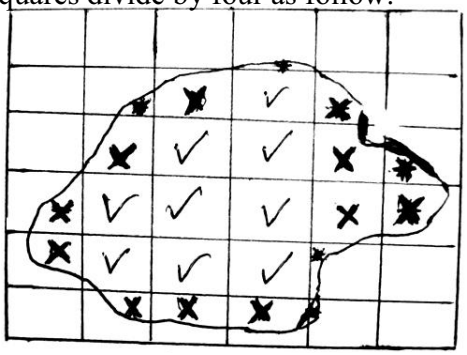
move north wards estimate the third figure corresponding to that feature representing a trigonometrical station secondary which is also 4 thus giving us 104 for Northings. So the trigonometrical station Secondary is located at the grid reference 408104 on the map given above.

(b) If one was to give the direction of the river shown on the map above, he would do the following:
(i) Look for the river asked
(ii) Divide that river into two equal parts with a compass direction as follow then read off the direction.



As per the compass, the river shown above on the map flows South West.

(c) To give the area covered by the lake or a forest on the map, one is required to count the full squares, half squares divide by two then quarter squares divide by four as follow:



To give the area occupied by this Lake we do it as explained above.

(i) Full squares are = 9 = 9
(ii) ½ squares are = $^{12}/_{2}$ = 6

So the total area covered is 9 + 6 = 15 Km^2.

MEASUREING DISTANCE (ROADS OR RAILWAY LINE) ON A MAP EXTRACT

(a) **ALONG A STRAIGHT LINE**: If one was to give or measure any distance along a straight line would do the following:-
(i) Draw a line joining the two points say A and B. Measure the distance AB by the use of a ruler, a piece of paper or a piece of thread for long distances e.g. The actual distance is obtained by covering the distance measured in centimeters or kilometers either by a ratio scale or a linear scale as follow:

(i) **RATIO SCALE:**

1. Distance covered between points A and B which is say 8cm.
2. Ratio scale of the map extract is 1:50,000
3. The ratio scale above means that 1km = 100,000cm

So; $\frac{50,000}{100,000}$ = ½km.

Therefore; 1cm = ½km

Therefore; 8 x ½ = $4km^2$

4. The distance covered between points A and B when converted is $4km^2$.

(ii) **THE LINEAR SCALE:**

If one was to use a linear scale method, in an attempt to measure any distance covered on a map extract, the following would be taken into serious considerations;

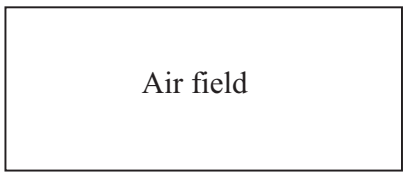
1. Measure the distance between say points A and B by the use of a thread or a piece of paper.
2. Transfer the distance measured to the linear scale graduated in Kilometers or miles.
3. Put the starting point at Zero then read off the end point on the linear scale.
4. Then lastly write down the actual distance in either kilometers or miles as stated on the linear scale.

HOW TO CALCULATE AREAS OF DIFFERENT SHAPES:

Areas of different shapes or figures can be calculated mathematically. Before converting them, one needs to know the formula of some common shapes which may be met in map reading.

(i) Triangle ½ x b x h
(ii) Rectangle or square A = L x W
(iii)Circle πr^2
(iv)Trapezium ½(a + b)h.

Example: If one was asked to calculate the area of an air field below, would first look for its shape. If it is in a shape of a rectangle then would use the would use the formula of a rectangle as shown above.



To calculate the area of the air field above, one would say;

A = L x W
A = 10 x 20
A = 200m.

SETTLEMENT PARTERNS ON A MAP

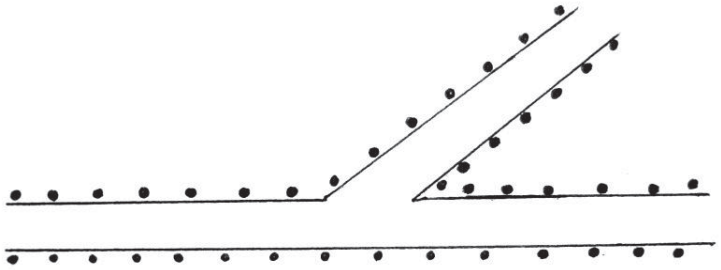
Settlement refers to the way people are distributed in an area. In East Africa, the following are the major settlement patterns that are always shown on the map extract:

(i) Linear or ribbon settlement
(ii) Nucleated or clustered or grouped settlement
(iii)Even settlement
(iv)Scattered or dispersed settlement.

(i) **Linear /Ribbon Settlement:**

In East Africa, Uganda in particular this settlement is commonly found along lines of communication. Lines of communication here include roads, railway lines, rivers etc. Here people settle along these lines for purposes of carrying out trade because it becomes very cheap for them to transport their good to and from market places.

AN ILLUSTRATION OF LINEAR SETTLEMENT



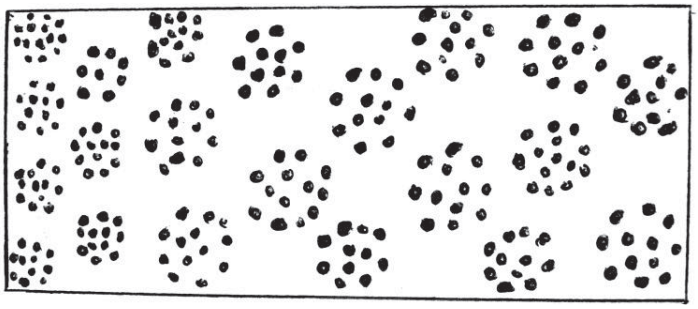
KEY:

•• Built up shops and homes.

(ii) **Nucleated/clutered/compoun settlement:**

This type of settlement is very common in areas which are very fertile and where families do not migrate to other places because of their historical background and reasons. In Uganda this kind of settlement is practiced by the Bakiga people of Kabale. This settlement is characterized by land shortage, land fragmentation, soil erosion, high population etc.

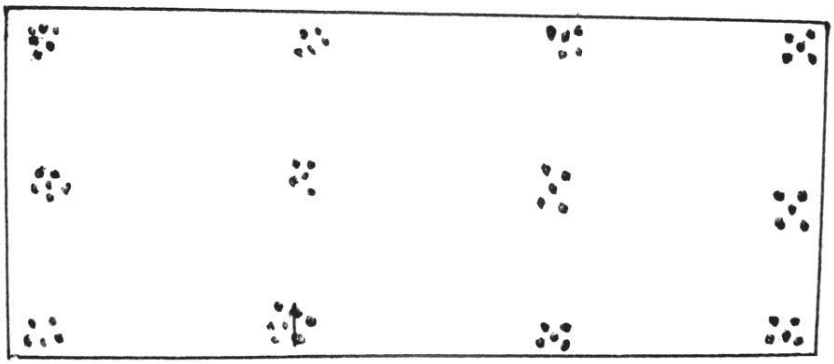
AN ILLUSTRATION OF NUCLEATED SETTLEMENT



(iii) **Even Settlement:**

This type of settlement is found in fairy populated areas where people are neither close nor far apart from one another. It is normally in areas of less economic production or no commercial activities taking place.

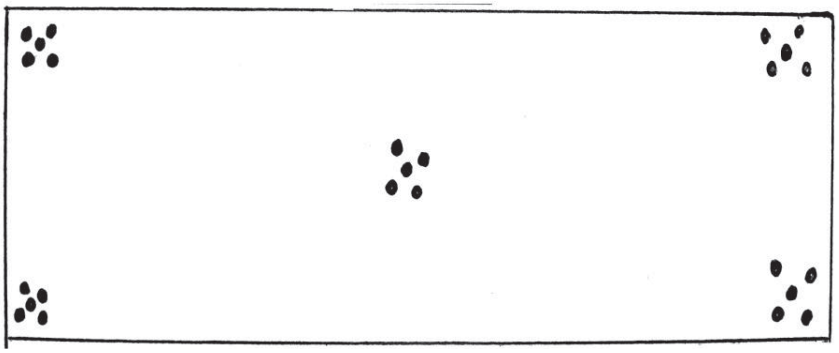
AN ILLUSTRATION OF EVEN SETTLEMENT



(iv) Scattered/ Dispert Settlement:

This type of settlement pattern is found in areas with poor soils and receives un-reliable rainfall. People in these areas are mainly cattle keepers. In Uganda, these areas are in Karamoja. These are areas which are not suitable for farming activities.

AN ILLUSTRATION OF SCATTERED SETTLEMENT



TYPES OF BOUNDARIES ON A MAP

Boundaries differ from country to country: They are either coloured or lined and below are some of the types of boundaries.

(i) International boundaries: These demarcate borders of different countries
(ii) Regional boundaries for regions
(iii)District boundaries for districts
(iv)Municipal boundaries for municipal councils
(v) Sub-county boundaries for sub counties (Gombolola)
(vi)Parish boundaries for parishes (Muluka).
Other boundaries include national parks, game reserves, forest reserves etc.

HUMAN ACTIVITIES (LAND USE)

Land use refers to how land is utilized by man to increase the rate of production and earn man a suitable standard of living. The following are the economic activities carried out by man. These activities on the map extract can be indicated by the following indicators:-

1. **Lumbering:** This is the cutting down of trees for valve timber.On a map there must first be a forest around but this may not necessarily be for the exploitation of timber. If the forest is economically exploited, there must be saw mills and roads leading to the forest.

2. **Mining and quarrying**: A mine is a place or an area where minerals are mined from underground by either open cast or under ground methods, while a quarry is a place where building materials such as sand, marrum, stones, soils etc are dug from underground. Symbols for mining include smelters, roasters, dressing plants etc.

3. **Agriculture:** Agriculture is a wide spread economic activity of the rural population. Small-scale cultivation is carried out at least everywhere. Large scale farming activities are indicated on a map by estates, ginneries, tea factories, maize mills etc.

4. **Pastoralism:** This is a traditional way of rearing animals. Cattle keeping is not easily seen on a map but we can still look for the following indicators for pastoralism – spray race, dip tanks creameries, milk collecting centres etc.

5. **Fishing:** This refers to the extraction of fish from water bodies where it is available. This activity can be identified on the map if the following are well observed. Small coast, lake shore settlement, salt works and pans are normally around the fishing areas. Methods of preserving fish such as smoking, canning, salting etc are all indicators of fishing activities.

6. **Trade:** This can be identified on the map when the following are noticed:-
   (i) Good communication net work
   (ii) Presence of markets, shops, trading centres, are all symbols of trade. Many towns, ports and railway station carry out trade and commerce.

7. **Manufacturing:** Most raw materials need to be processed before their final stage of consumption therefore; factories and processing plants are needed to manufacture them into finished products e.g. ginning, tea and sisal processing plants etc, signs of scheming are all indicators of manufacturing.

8. **Communication:** Roads, railways, air fields, telephone cables etc are symbols of communication and these can easily be identified and noticed on the map.

THE EARTH AND THE SOLAR SYSTEM

Geologists believe that the earth was formed between 3500 – 4500 million years ago. They also believe that the universe is made up of several clusters of heavenly bodies and galaxies which contain billions of stars. Galaxies are systems of stars in the outer space. In the galaxies, there are the solar system, the sun and the planets.
The solar system belongs to one of the smallest of the galaxies called milky way. The sun is one of the 500 billion stars in the milky way. The planets of the solar system move around the sun. The Earth is one of the nine planets in the solar system and it is third (3) in distance from the sun. The earth is located 150 million kilometers in average distance from the sun.

THE SHAPE OF THE EARTH

For many years, people believed that the earth was flat, but many scholars have come up with divergences in idea. Some say the earth is spherical while others believe that the earth is round.

One scholar by the name of Pythagoras in about 530 BC refuted the belief that, the earth is flat but rather spherical in nature and gave reasons.
Three hundred (300) year later another scholar by the name of Eratosthenes (27 – 196BC) the chief librarian at Alexandria calculated the circumference of the earth and said the earth was 252000 Stadia (old unit).

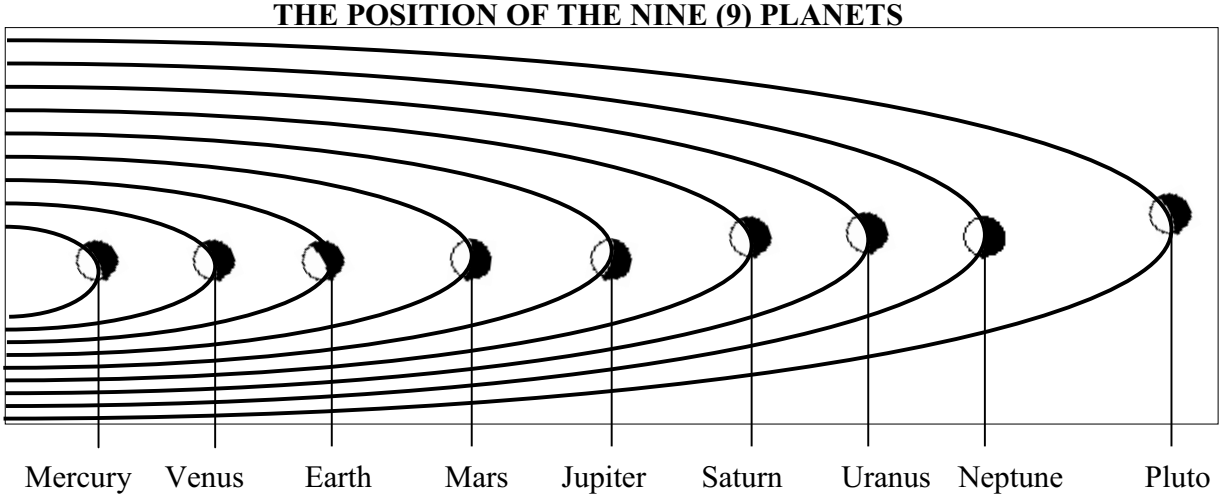
With Magellan, the earth is not flat but globe like and gave reasons.

THE SOLAR SYSTEM

The earth is one of the solar systems. In the centre of the universe or the planetary system is the sun. This planetary system consists of the sun and other nine (9) planets. The following are the nine planets which make up of the universe.

1. Jupiter	2. Saturn	3. Uranus
4. Pluto	5. Mercury	6. Neptune
7. Venus	8. Mars	9. Earth.

THE POSITION OF THE NINE (9) PLANETS

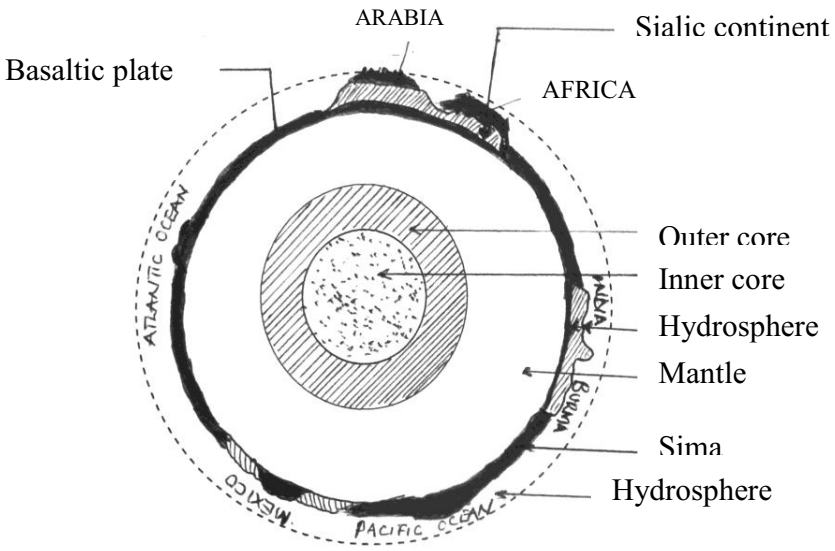


THE CRUST:
The crust is the outer layer of the Earth, it is made up of rocks. The crust is known as the "lithosphere". The rocks which make up the lithosphere are the ones referred to as Sial.

THE MANTLE:
The mantle is part of the Earth which is very hot with temperatures ranging up to 5000^{o}C. It is composed of rocks which are rich in magnesium, Iron and Silicate and it extends to the depth of 2900km.

THE CORE
This is the centre of the Earth which consists of the outer layer and the Inner layer.
The outer layer of core is composed of nickel and Iron while the inner Core contains mainly Iron.

THE STRUCTURE OF THE EARTH



The Earth constitutes of the following:
(i) Atmosphere
(ii) Lithosphere
(iii)Hydrosphere
(iv)Biosphere

a) **THE ATMOSPHERE**:
The atmosphere is a layer of gas which surrounds the Earth. The earth's atmosphere has the following characteristics:
(i) temperature
(ii) density
(iii)Weight
(iv)Prressure

The Earth's atmosphere is a mixture of gases in the following order:
(i) Nitrogen $^4/_5$ of the air of the atmosphere
(ii) Oxygen $^1/_5$ of the air of the atmosphere

b) THE LITHOSPHERE:
The lithosphere is the outer layer of the Earth. It consists of rocks and minerals. Underground the earth's crust are two other deep layers called the mantle and the core. The lithosphere is the most accessible part of the earth's crust which consists of mineral rocks, soils water sources which are of importance to man.

(c) **THE BIOSPHERE**:
This is the world of living organisms which live on land and those in water. Here we have animals and plants.

THE MOVEMENTS OF THE EARTH AND ITS RESULTS
The movements of the earth are categorized into two ways and these are;
(i) Rotational movement of the earth
(ii) Revolutional movement of the earth.

(i) **The Rotation of the Earth**: This movement is where the earth rotates on its axis. It's rotation makes one complete rotation in 24hrs. This movement creates days and nights.
The axis is an imaginary line with two ends of North and South poles. The Earth rotates from West to East and at any particular part of the Earth will pass under the sun and then turn away from the sun.

(ii) **The revolution of the Earth**: This is where the Earth changes its position. This movement of the earth takes about 365¼days (one year) Its path of revolution is known as its Orbit.

The path of the Sun: The equator is an imaginary line drawn round the earth midway between the North and the South poles. The Equator divides the Earth into two equal parts, the North plole and South Pole and it is 0^o. Other imaginary lines include tropic of cancer in the north which is $22½^oN$ and the tropic of Capricorn in the South which is 23^oS.

Length of day and Night: The inclination of the earth's axis and its revolution round the sun are responsible for the varyhing length of day and night in different parts of the world. The sun is over head at the equator when the equal night (verinal equinox) on 21st March and September 23rd (Autumnal Equinox days and nights are equal all over the world. At the equator, days and nights are equal throughout the year. The sun rises about 6:00am and sets about 6:00pm throughout the tropics.

(a) **Northern Summer**: It is between March 21st and 23rd September when the North pole is tilted towards the sun. The days are longer than the nights throughout the Northern Hemisphere

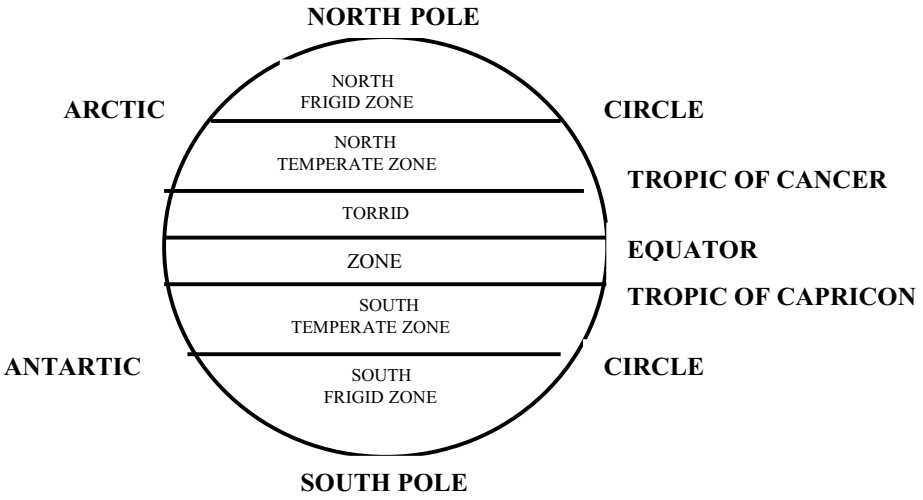
and its from 21st March up to 21st June when the sun is over head at the tropic of cancer. The length of the day increases from the equator towards the North pole. The changes are in the opposite direction from 21st June to 23rd September but the days are still longer than the nights. On 23rd September, the sun's path is similar to that on 21st march. The Northern and Southern Hemispheres experience winter when the sun is in North, South respectively.

(b) **Southern Summer**: It is between 23rd September and 21st March when the sun is in Southern Hemisphere and it is during this time when the Southern Hemisphere is tilted towards the sun. During this time, the days are longer than the nights throughout the Southern Hemisphere and when the sun is in Northern Hemisphere, its winter in the Southern Hemisphere.

LATITUDE AND LONGITUDE:

Latitude is a distance measured in degrees North or South of the equator white longitude is also a distance measured in degrees East or West of the Green Wich (prime meridian). These two latitudes and longitudes are used to show position on the Earth's surface. Longitudes are also used to measure time.

THE TERRESTRIAL ZONES



WEATHER AND CLIMATE

Geographically weather refers to the state of the atmosphere. It may also refer to the total condition of a place studied and recorded for a short period of time where as climate is the total condition of a place studied and recorded for along period of time. This difference between these two terminologies is just time. If one wanted to find out the weather of any given place or area, he or she must first examine the following:

(a) Temperature
(b) Humidity
(c) Pressure
(d) Rainfall
(e) Wind direction and strength
(f) Cloud cover
(g) Sun shine etc.

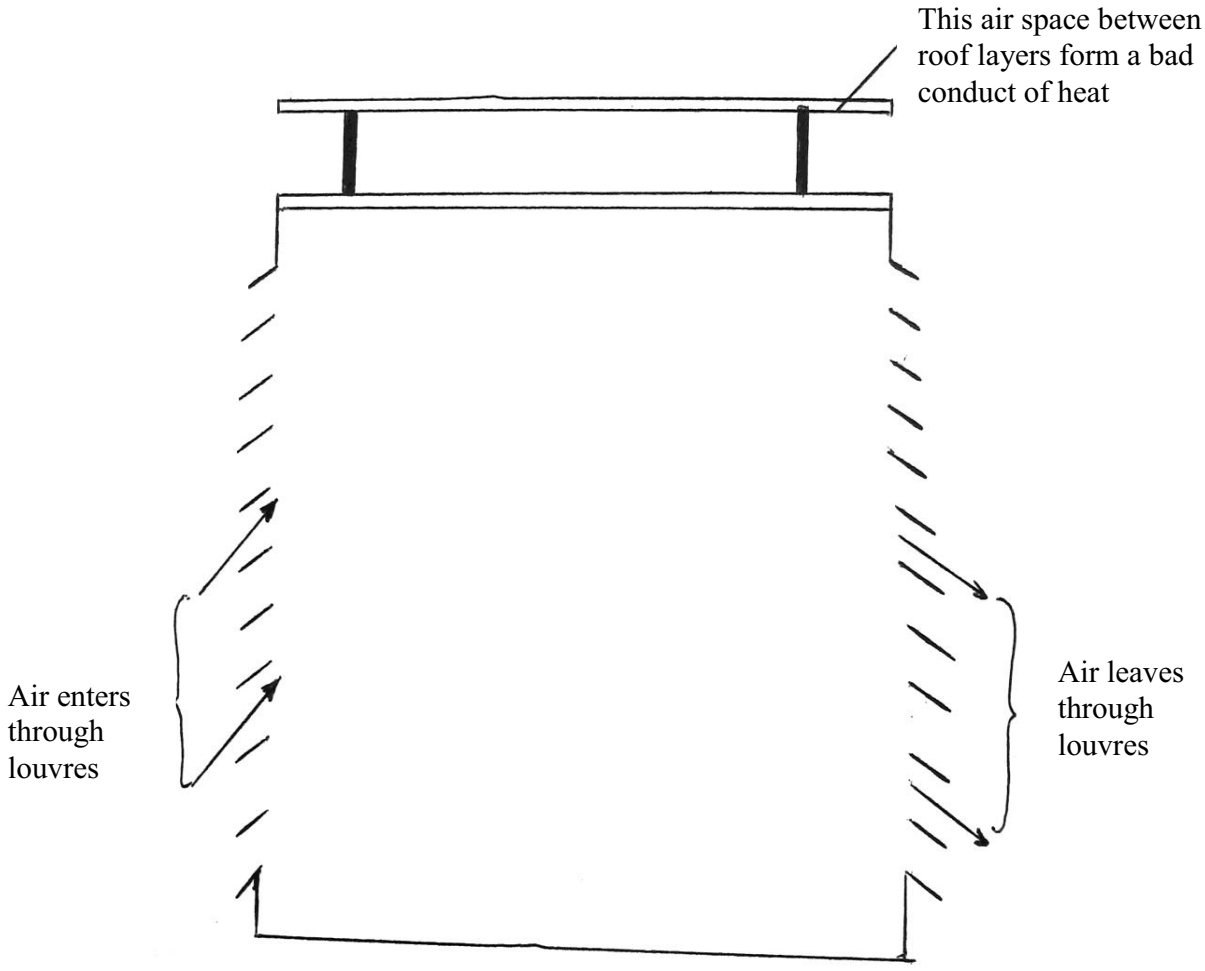
MEASUREMENTS AND RECORDS OF WEATHER ELEMENT

The activities of measuring and recording weather elements are done at a weather station. A weather station is a place where all elements of weather are measured and recorded. At a weather station there is a Stevenson screen. This screen contains four thermometers which are hung from a frame in the centre. These thermometers include;

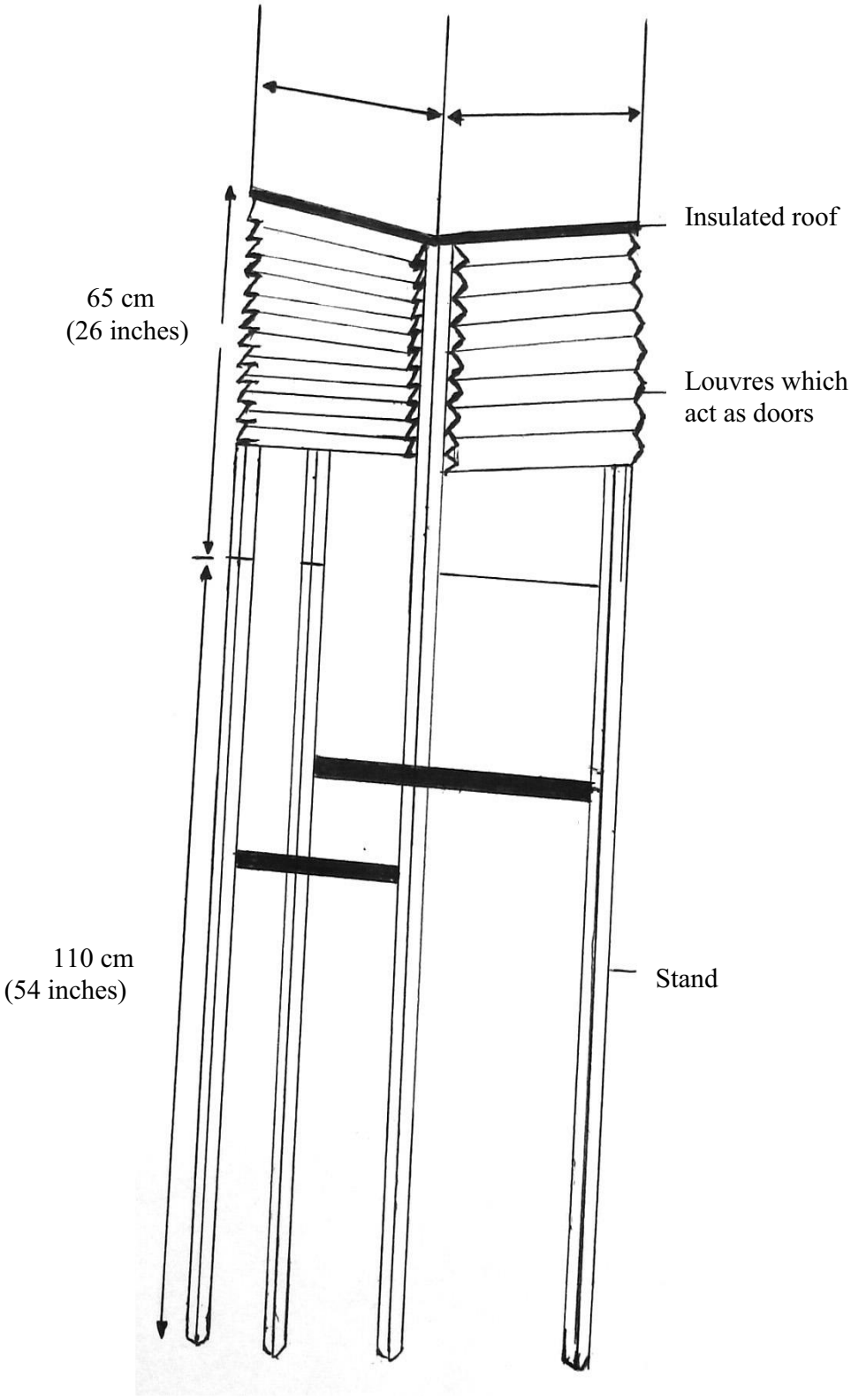
(i) Maximum thermometer
(ii) Minimum thermometer
(iv) Wet bulb thermometer
(v) Dry bulb thermometer.

The screen is built in such a way that the shaded temperature of air can be measured without any external influence to disorganize the internal conditions. A Stevenson screen is a wooden box with four (4) sides which are louvered. The louvers are used to allow free entry of air. The roof of the Stevenson screen is made of double boarding to prevent the sun's heat from reaching the inside of the screen and the insulation is further improved by painting the outside white.

THE STRUCTURE OF THE STEVENSON SCREEN



THE STEVENSON SCREEN



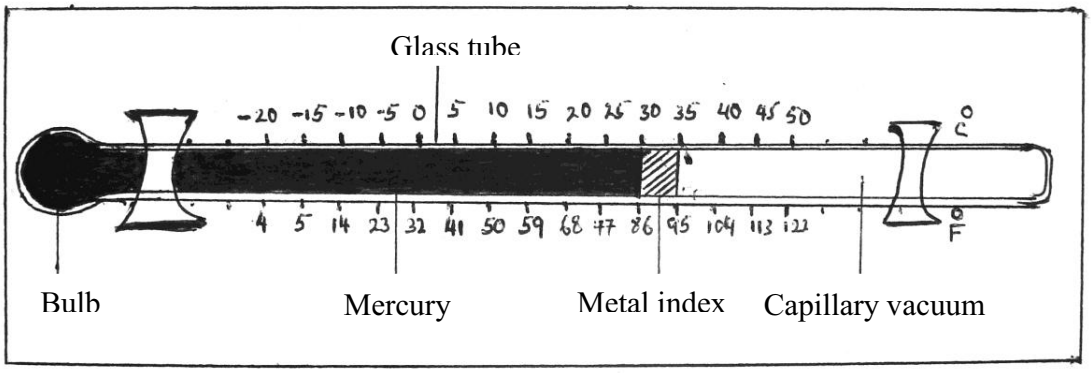
REVIEW QUESTIONS:

(a) Define weather
(b) Give the difference between weather and climate
(c) List down the four thermometers contained in a Stevenson screen.
(d) Outline the element of weather.

HOW TO MEASURE MAXIMUM AND MINIMUM TEMPERATURE

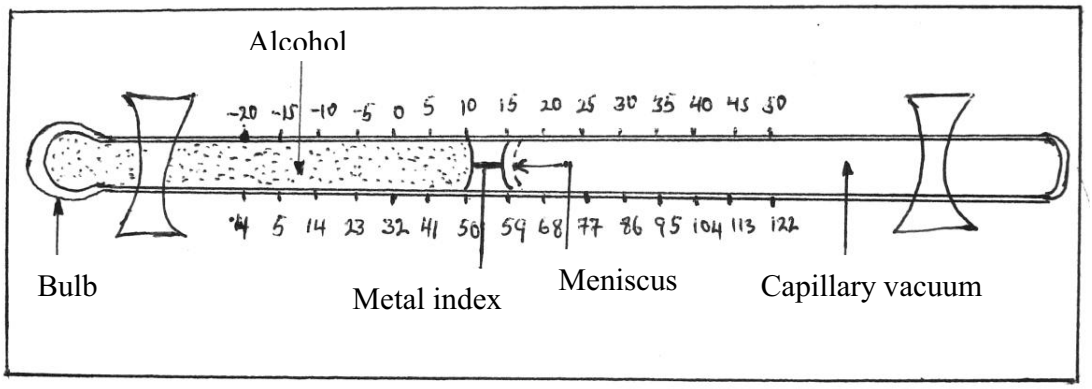
Maximum temperature can be obtained using either a maximum or a six's thermometer. Like wise the minimum temperature can also be obtained using a minimum or a six's thermometer.

THE STRUCTURE OF A MAXIMUM THERMOMETER



The structure above shows how a maximum thermometer looks like. It tries to explain that when temperature rises, mercury expands and pushes the index along the tube and that is when temperature fall mercury contracts but the index remains behind. Here the maximum temperature is obtained by reading the scale at the end of the index, which was in contact with the mercury. In the diagram above, the readings were 30^{o}C (86^{o}F). The index is then drawn back to the mercury by a magnet.

THE STRUCTURE OF A MINIMUM THERMOMETER



The explanation to the minimum thermometer is that when temperature falls, alcohol contracts and its meniscus pulls the index along the tube and when temperature rises, the alcohol expands but the index remains in the position it was pulled. Therefore, the minimum temperature is obtained by reading the scale at the end of the index, which is nearer the meniscus as shown above. The difference between the maximum and minimum thermometer is that;

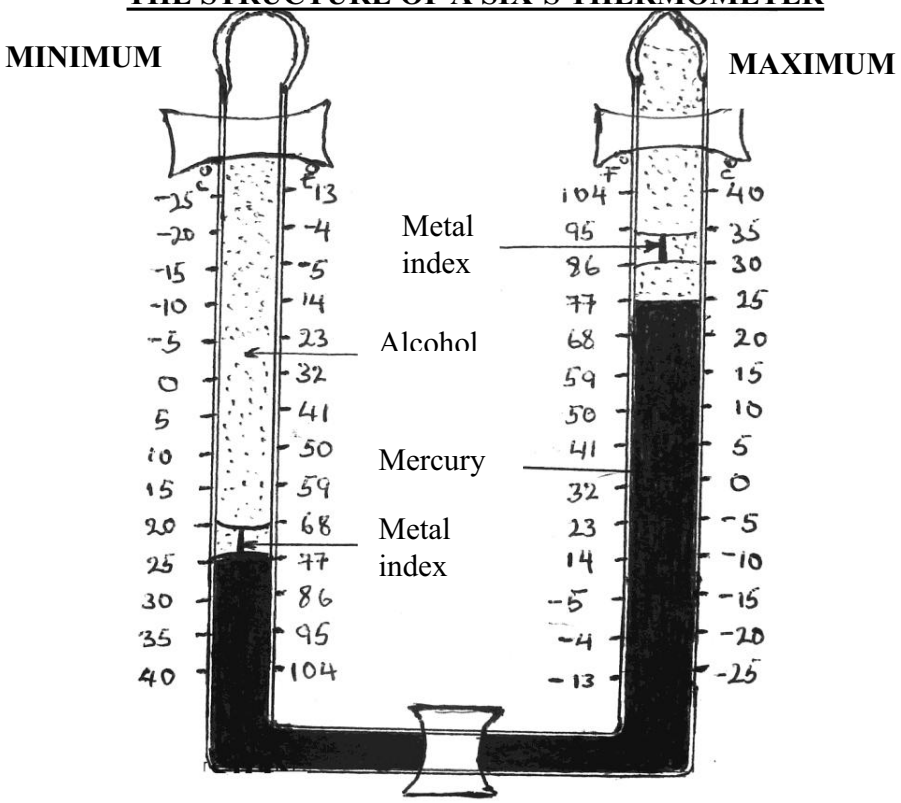
(i) A maximum thermometer measures the highest temperature where as a minimum thermometer measures the lowest temperature.
(ii) A maximum thermometer uses mercury where as a minimum thermometer uses alcohol.

The similarities of the two thermometers are;
(i) They both have glass tubes
(ii) They both use metal index etc.

A SIX'S THERMOMETER

This thermometer is the combination of the two thermometers, the maximum and the minimum thermometer. It measures both the minimum and the maximum temperatures.
When temperature rises in the left hand limb side of the six's thermometer, alcohol expands and pushes mercury in the right hand limb and contract in the left hand temperature falls. The maximum temperature will be read from the scale on the right hand limn and the minimum temperature will be obtained from the scale on the left hand limb.

THE STRUCTURE OF A SIX'S THERMOMETER



REVIEW QUESTIONS:
(a) What is a Six's thermometer?
(b) List down the differences between a six's thermometer and the minimum thermometer.
(c) Give two characteristics of a six's thermometer
(d) Of what importance is a six's thermometer?

HUMIDITY OF THE AIR

Humidity refers to the amount of water vapour in the air (atmosphere) Humidity of the air depends upon temperature. When temperature falls, air becomes saturated and it can not hold as much water vapour. Here below are two types of humidity.

(i) **Relative humidity**: This is the amount of water vapour present in the atmosphere (air). It is a ratio between the absolute humidity of a given mass of air and the maximum amount of

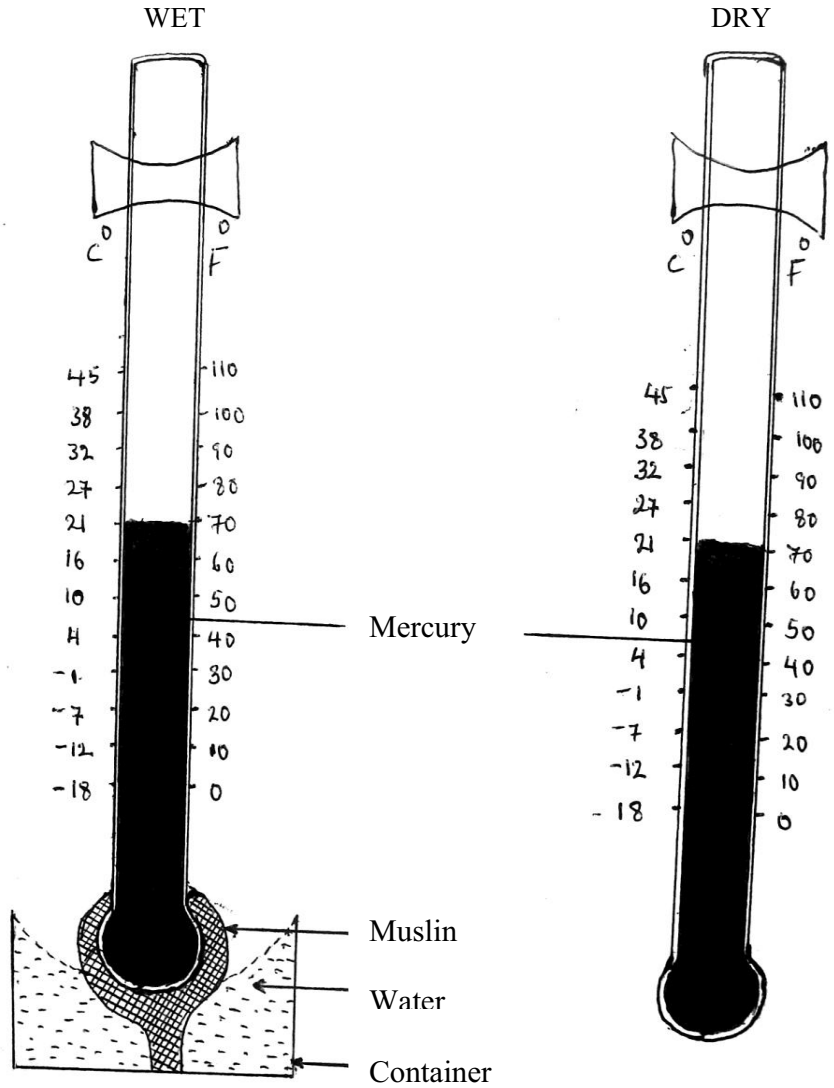
water vapour it can be held at the same temperature. When temperature falls, the relative humidity becomes 100% saturated.

(ii) **Absolute humidity**: This is the actual amount of water vapour in a given volume of air at a given temperature.

MEASUREMENT OF HUMIDITY

Humidity is measured by an instrument called HYGROMETER. This instrument consists of two thermometers and these are the wet bulb and the dry bulb thermometers.
The bulb of one thermometer is wrapped in a piece of muslin which is dipped into a container of water. This thermometer is called the wet bulb thermometer where as the other which is neither wrapped nor dipped in water is called the dry bulb thermometer. When the air is not saturated, water evaporates from the muslin and this cools the wet bulb and causes mercury to contract. Here the bulb of the dry bulb thermometer is not affected at all, so the two thermometers show different readings and that the wet bulb thermometer will always have low readings.

A SIMPLE HYGROMETER



The above two thermometers show different readings because when air is saturated we expect no evaporation and hence no cooling. It should be noted that when the two thermometers show no

difference in readings we say the air is saturated and when they show a small difference we say the humidity is high and when they show a very big difference we say humidity is low.

REVIEW QUESTIONS

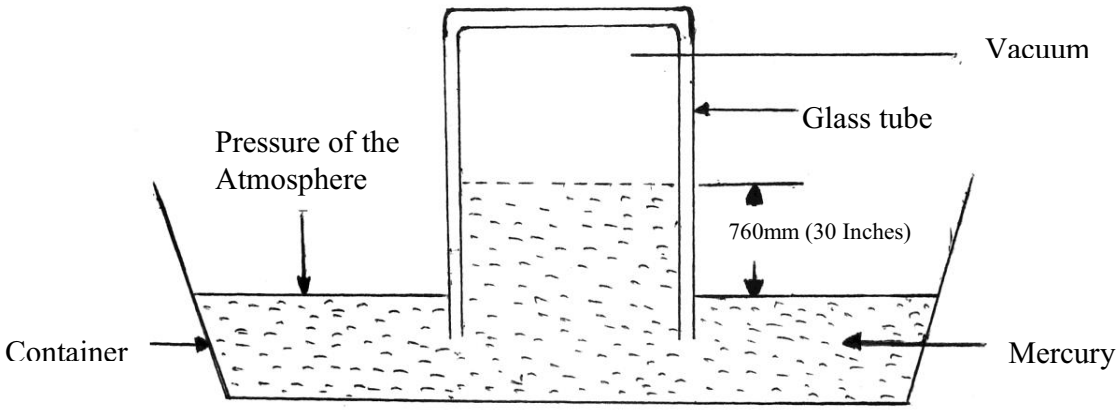
(a) What is a six's thermometer?
(b) List down the differences between a six's thermometer and a minimum thermometer.
(c) What is humidity?
(d) What do you understand by the air being saturated?
(e) What instrument is used to measure humidity?
(f) What differences are there between humidity and relative humidity?

ATMOSPHERIC PRESSURE AND ITS MEASUREMENTS

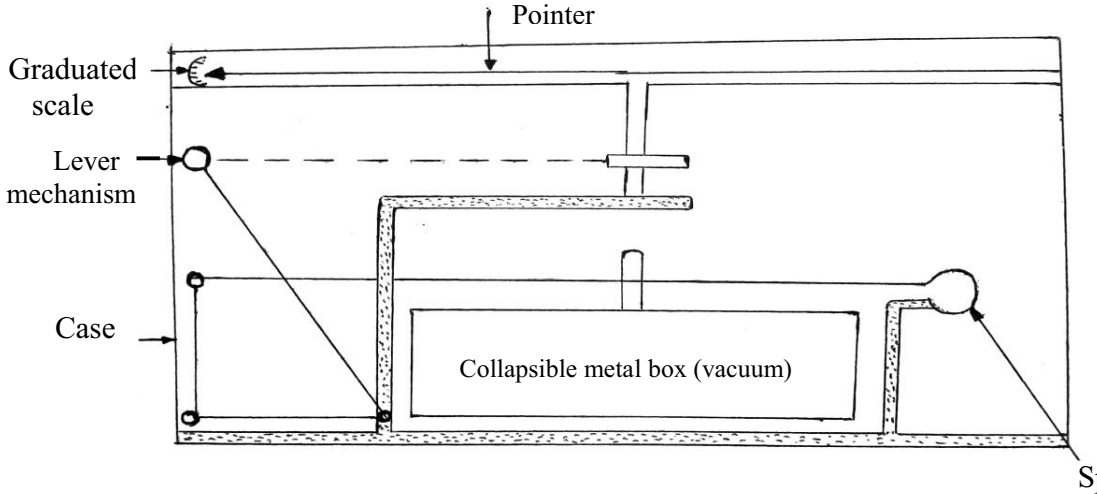
Air has weight and it exerts pressure on the earth's surface. Pressure varies with temperature and altitude. Pressure is one of the elements of weather and it is measured by an instrument called barometer. Barometers are of two principle types and these are;
(i) Mercury Barometer
(ii) Aneroid Barometer

Pressure as an element is measured and read in millibars as units and 1mm is equivalent to 1.3 millibars. Pressure on a map is recorded using lines called isobars.
Isobars are lines drawn on a map showing places with the same pressure.

A MERCURY BAROMETER



THE STRUCTURE OF THE ANEROID BAROMETER



Any fall in pressure is noticed when the lever mechanism carries the change to the pointer which moves across the graduated scale as shown above. The atmospheric pressure recorded is also drawn on a map by Isobars.

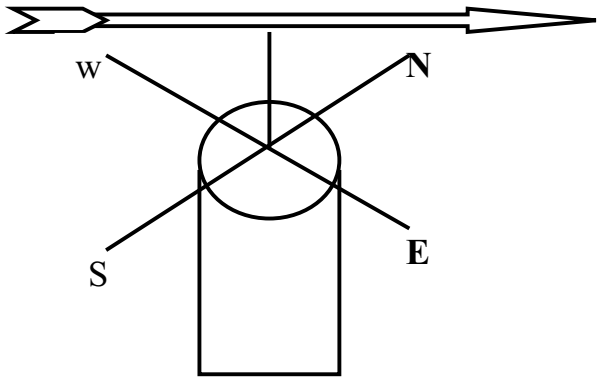
REVIEW QUESTIONS:

1. Which one of the following is not an element of weather:
   (a) Sunshine (b) cloud cover (c) altitude
   (d) rain (e) fog
2. Maximum and minimum temperatures are obtained from an instrument called;
   (a) Barometer (b) a six's thermometer
   (c) Anenometer (d) Hygrometer.
3. The following statements are correct except;
   (a) Maximum and minimum temperatures are measured by a Six's thermometer.
   (b) Atmospheric pressure by anemometer
   (c) Wind direction is by anemometer
   (d) Humidity of air is by a hygrometer.

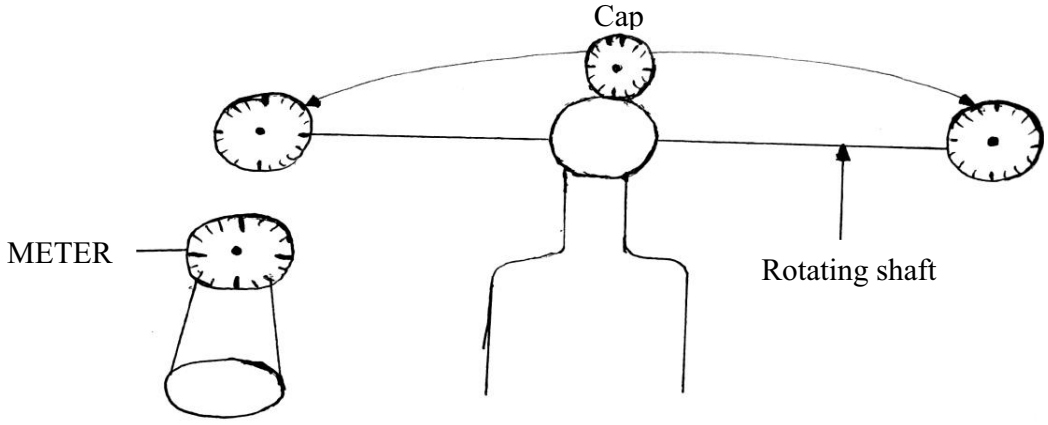
WIND SYSTEM

Wind is a vertical or horizontal air current blowing from a region of high pressure to a region of low pressure and moves in different direction given the prevailing circumstances. The direction of wind is measured by a wind vane. A wind vane consists of a rotating arm pivoted on a vertical shaft. The arrow of a wind vane always points in the direction from which the wind blows.

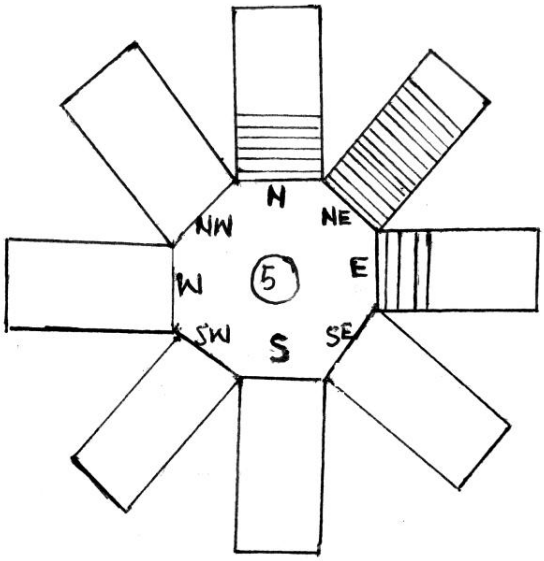
A WIND VANE



The speed of the wind is measured by an instrument known as Anenometer.
Anenometer has three or four horizontal arms pivoted on a vertical shaft. It has metal caps which are fixed to the end of the arm which rotate when there is wind.



At a weather station, the direction of wind is recorded by a wind rose. A wind rose consists of an octagon of which each side represents a cardinal point. Rectangles are drawn on each side and whenever there is wind, a line drawn across the rectangle representing the direction from which the wind was blowing and this is done for one month.

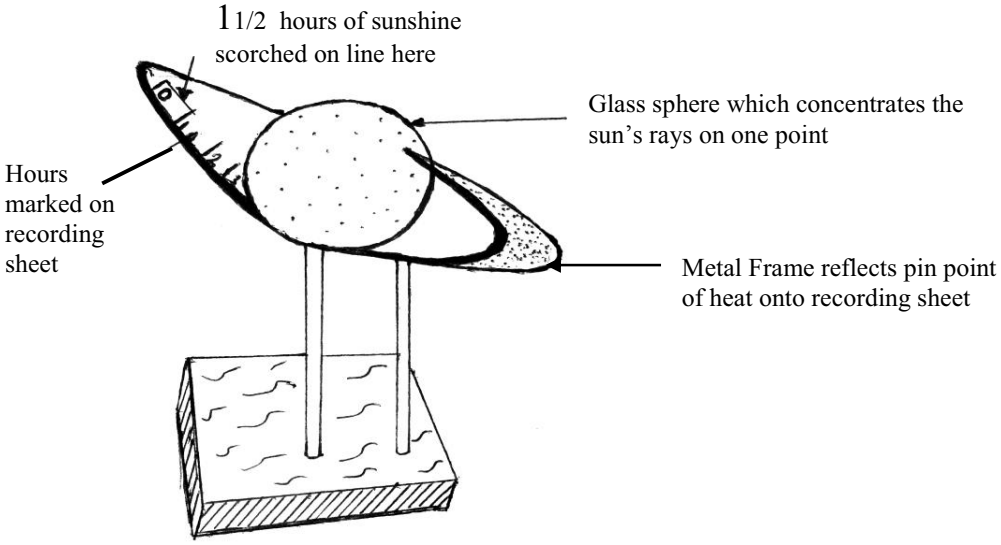


The main function of a wind rose is to record wind direction for a specific place. A simple wind rose is shown in the diagram above. The number of days when there is no wind is recorded in the circle, that is the centre of the octagon. In the diagram above it was five (5) days with no wind.

SUNSHINE

Sunshine can be referred to as the heat and light which radiate from the sun. It is one of the elements of weather. The factors which affect the amount of sun shine received in an area depend on the latitude and position of the earth in its revolution around the sun. The number of hours of sunshine a place receives is measured by using a sensitized card which is graduated in hours and on which the sun's rays are focused. On a map, areas with the same amounts of sun shine or intensity of sun heat are shown by lines called Isohels and the intensity of heat is measured by a Sun shine recorder or a Campbell – stokes.

THE STRUCTURE OF A SUN SHINE RECORDER



RAIN FALL

Rainfall is one of the elements of weather. It is measured by an instrument called a rain gauge. Water droplets fall down on the earth's surface under the influence of gravity. The water droplets are formed due to the condensation of water vapour. The dust and small particles attach themselves to form water droplets before they fall onto the earth's surface.

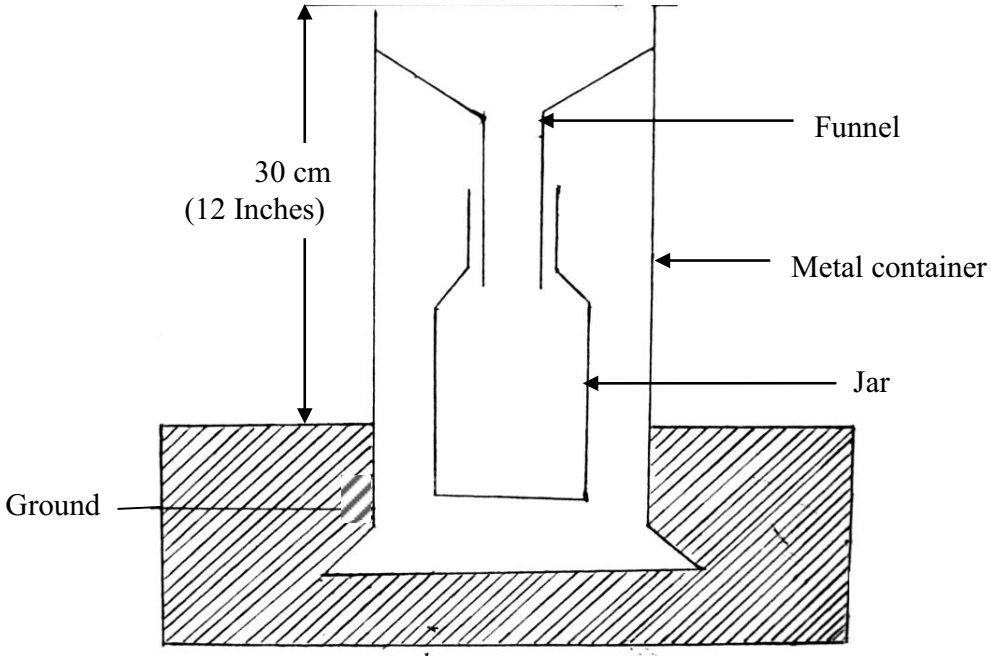
HOW RAIN FALL IS MEASURED

Rain is measured by an instrument called a rain gauge. Rain falling in the funnel trickles into the jar below and at the end of a 24hour period, the amount of water collected is poured into a measuring cylinder. The readings are always obtained from the measuring cylinder. Rainfall is measured in millimeters or inches.

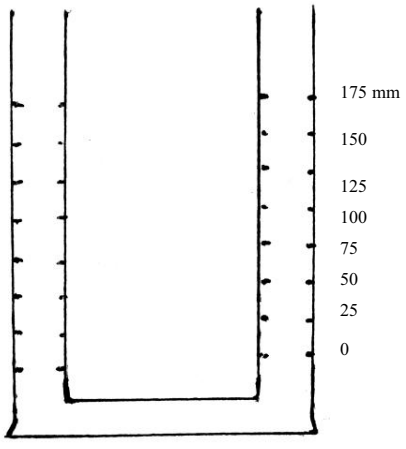
POSITION OF THE RAIN GAUGE

A rain gauge must be placed in an open place so that no run off from building or trees etc enters the funnel. It must be sunk into the ground for about 30cm above the ground level. This prevents rain from splashing into from the ground. It also prevents sun's rays from causing excessive evaporation of the water already collected in the jar.

THE STRUCTURE OF THE RAIN GAUGE



A MEASUREING CYLINDER



TYPES OF RAIN FALL

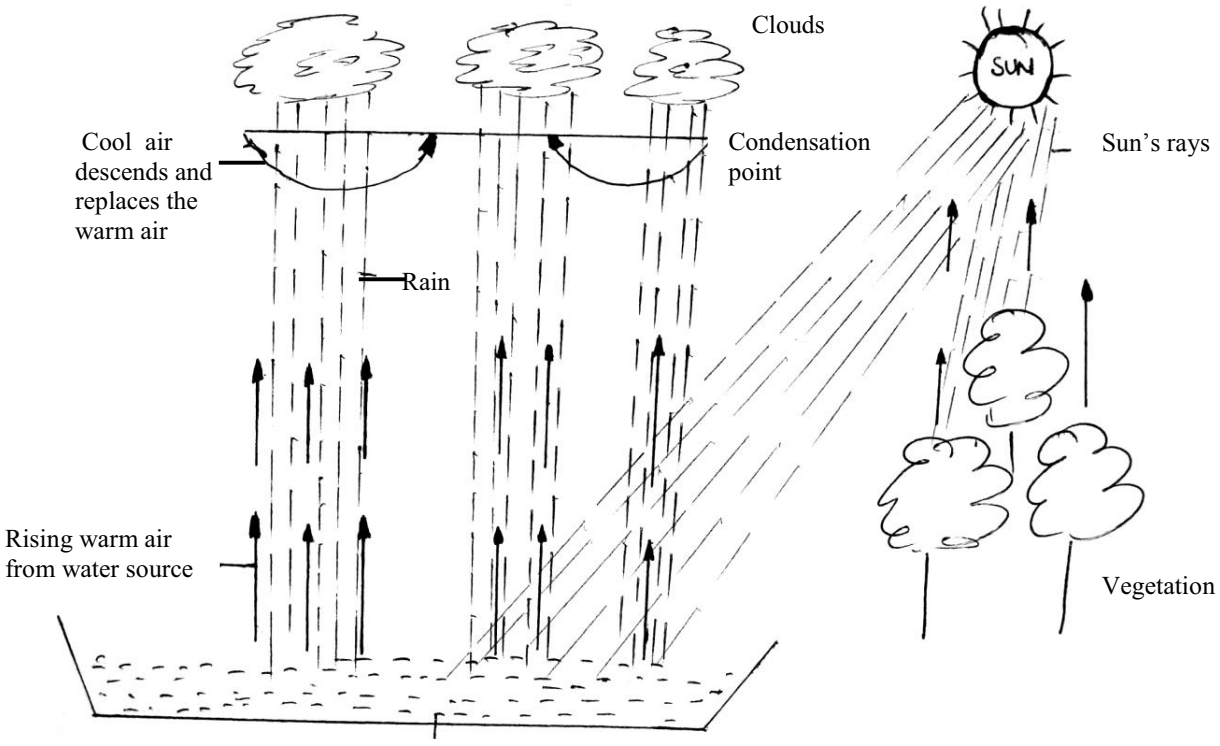
Rainfall is moist air mass which rises in the air, cools down and condenses into water droplets due to the prevailing conditions and then later falls from the air in small droplets of water. There are three major types of rainfall and these are;

(i) Convectional rainfall
(ii) Relief rainfall (orographic rain fall)
(iii)Frontal rainfall (cyclonic or depression rainfall)

(i) Convectional rainfall:

This type of rainfall is formed after the moist air masses converge at low temperature zones called inter-tropical convergence zone (I.T.C.Z). Then after convergence, air ascends in the atmosphere, the rising air mass condenses. When it reaches the dew point temperature, it forms water droplets which come back on the earth's surface as rain. This type of rainfall is very common in areas where there are vegetation cover and water bodies. When these two sources are subjected to intensive heat from the sun, water vapour from them evaporates into the atmosphere where it cools and condenses to form water droplets which come on the earth as rain.

THE FORMATION OF CONVECTION RAINFALL

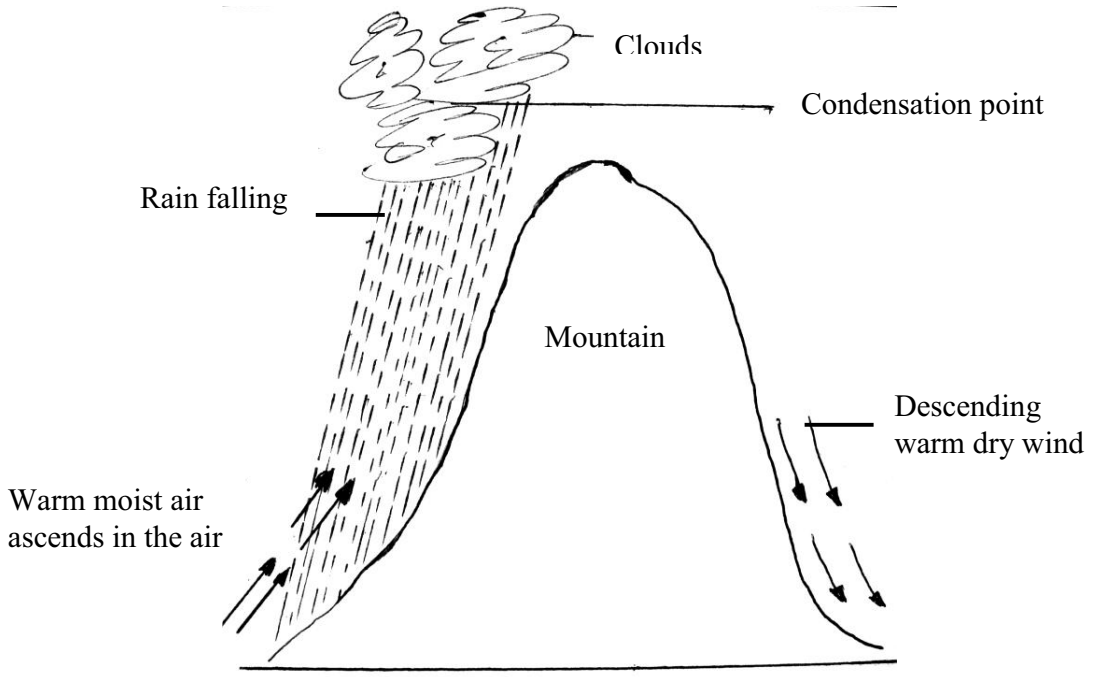


In East Africa as a whole and Uganda in particular, this type of rainfall is commonly received in areas around lakes, rivers and forest regions most especially in the equatorial forest areas and around Lake Victoria.

(ii) Relief rainfall (Orographic rainfall):

This type of rainfall is formed when the warm moist air from the Earth rises into the atmosphere. This moist air is forced to rise into the atmosphere by mountains, forests, tall building etc. In case of a mountain, heavy rainfall will be received on the wind ward side while the Leeward side or the rain shadow slope will remain dry. In Uganda this type of rain is very common in highland areas of Kabale, Kigezi etc.

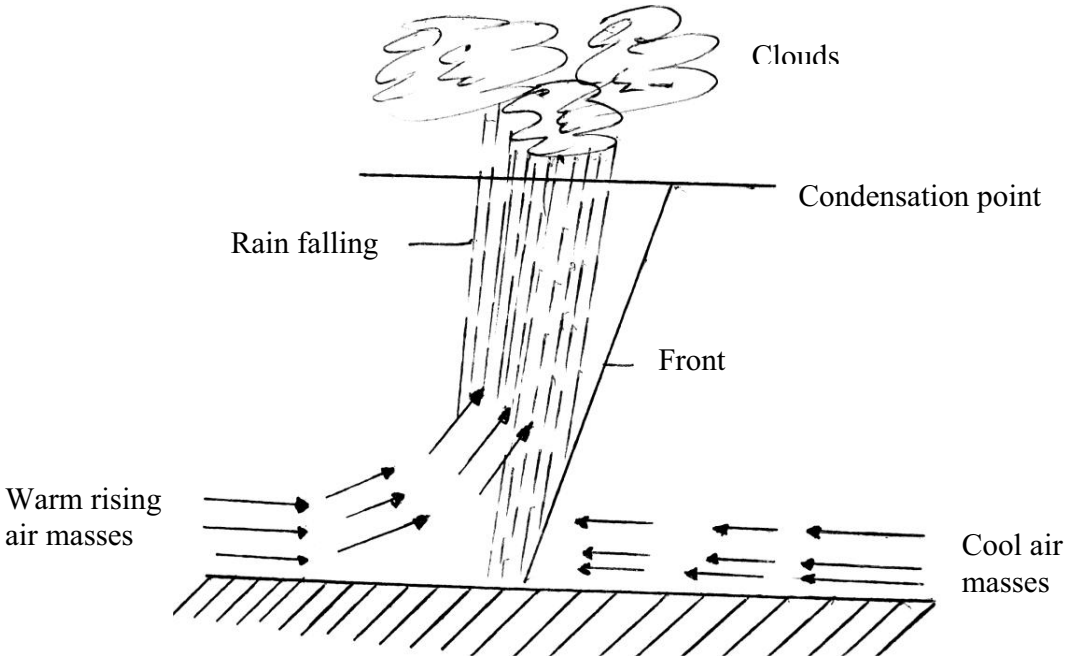
THE FORMATION OF RELIEF RAINFALL (OROGRAPHIC RAINFALL)



(iii) Frontal (Cyclonic or Depression Rainfall):

This type of rainfall is formed due to meeting and mixing of different air masses of different origins of the world e.g. some originate from tropics others from temperate regions. When the two air masses of different origin meet and mix, the cool ones and dense at the same time force the warm ones which are light to descend in the air where condensation of water vapour takes place to form water droplets which comes back on the Earth as rain.

THE FORMATION OF FRONTAL RAIN FALL



This type of rainfall described above is commonly received in, flat land areas but experience air masses of different origin, the warm and the cool ones.

On a map, areas which receive the same amounts of rainfall are indicated by line called **Isohytes.**

CLOUD

Clouds are masses of tinny water droplets which float in the air at different heights. Clouds are formed due to condensation of water vapour at the dew point temperature in the atmosphere to form water droplets which finally fall on the earth's surface as rain. Clouds are named according to their mode of formation e.g. relief clouds, convection clouds, frontal clouds, turbulence clouds etc.

TYPES OF CLOUDS

Clouds are of many types and they are classified according to their appearance on form and height (altitude). Here below are the four major classifications of clouds:

(i) High clouds
(ii) Medium clouds
(iii) Low clouds
(iv) Clouds of great vertical extent.

(i) **High Clouds:** These clouds are found between 6000 – 12000 metres high. Such clouds include cirrus, cirrocumulus and cirro-stratus clouds.
(ii) **Medium Clouds:** These clouds are found between 2100 to 6000 metres and they include altocumulus, altostratus etc.
(iii) **Low clouds:** These are found below 2100 metres. They include stratocumulus, Nimbostratus, stratus etc.
(iv) **Clouds of Great vertical extent**: These are found between 1500 to 9000 metres. These include cumulus, cumulonimbus. The cumulonimbus clouds are the ones which bring rain. The areas of the same clouds are joined or shown by lines called Isonephs.

HOW CLOUDS ARE MEASURED:

The clouds of great heights may be determined using balloons which are hydrogen filled and then released in the air. The balloons ascend and keep on expanding and then consequently burst on reaching the thick clouds. Through this process, the distance from the ground to the clouds can be determined since the balloons are filled with self recording meteorological instruments. The amount and nature of clouds are expressed in "Okta". This is the proportion of the sky covered by clouds. The study of climate is done by the meteorologists.

TEMPERATURE CALCULATIONS

(a) **The mean daily temperature** is obtained by adding up the daily maximum and the daily minimum temperatures and then divided by two. The formula for this is as follows:

$$\frac{\text{Daily maximum temperature + Daily minimum temperature}}{2} = \text{Mean daily temperature}.$$

(b) **The daily temperature range**: This is obtained by subtracting the minimum daily temperature from the maximum daily temperature.

$$\text{Daily maximum temperature – daily minimum temperature} = \text{Daily temperature range.}$$

(c) **The mean monthly temperature** : This is obtained by getting the sum of the mean daily temperature for one month and then divided by the number of days in that given month.

$$\frac{\text{Mean daily temperature for one month}}{\text{Number of days in one month}} = \text{the mean monthly temperature.}$$

(d) **The mean annual temperature:** This is obtained by getting the sum of the mean monthly temperature of one year and then divided by the number of months in the year (12)

e.g. $\frac{\text{Sum of the mean monthly temperature in one year}}{\text{Number of months in one year (12)}} =$ the mean annual temperature.

but with mean annual rainfall we get the sum and divide by one.

(e) **The annual temperature range**: This is calculated by getting the lowest mean monthly temperature and then subtract it from the highest mean monthly temperature.

E.g. Highest mean monthly temperature - lowest mean monthly temperature.

= The annual temperature range.

REVIEW QUESTIONS:

1. The daily maximum temperature of Kampala has always been calculated as 25^{o}C and its minimum daily temperature has been 15^{o}C. Calculate the mean daily temperature of Kampala.

2. The daily maximum temperature of Soroti was given as 32^{o}C and its daily minimum temperature as 22^{o}C. Calculate Soroti's daily temperature range.

3. The year 1998 had 120^{o}C as the highest mean monthly temperature and 84^{o}C as the lowest mean monthly temperature. Calculate the annual temperature range of the year 1998.

READING CLIMATIC TABLES

A Climatic table usually consists of rainfall and temperature figure for any given station representing a given climatic region. Look at the station A in the climatic table.

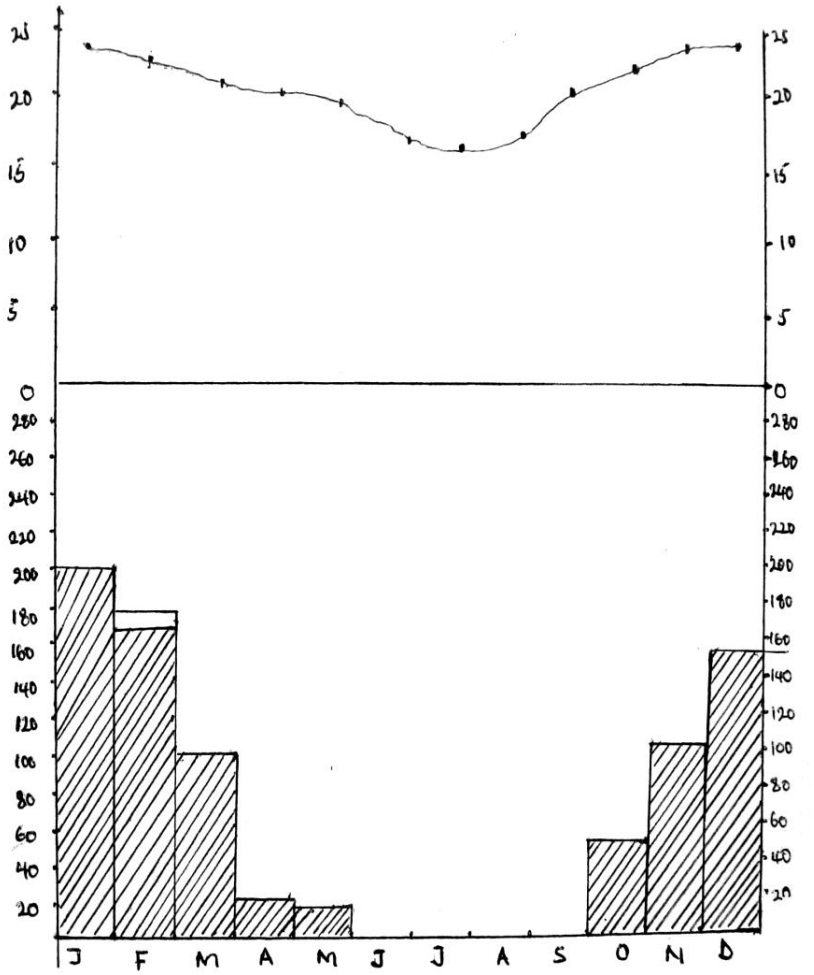
Station A:

MONTH	J	F	M	A	M	J	J	A	S	O	N	D
TEMP ^{o}C	24	23	22	21	20	18	17	18	20	23	24	24
R/F(mm)	200	175	100	25	20	-	-	-	-	50	100	175

One can use the above climate table to a bar graph or a line graph or a combined bar graph showing rainfall and temperature at the same time.

e.g. **A COMBINED BAR GRAPH SHOWING CLIMATE OF STATION A**

1cm = 5^0c
Temperature



½ cm = 20mm of rain fall

The interpretation of this graph above is that this station A receives two rain seasons and one long dry spell. These two rain seasons are commonly known as double maxima and where there is only one rain season, this is referred to as single maxima.

REVIEW QUESTIONS

Study the climatic table below and answer the questions that follow.

Month	J	F	M	A	M	J	J	A	S	O	N	D
Temp (^{o}C)	30	31	31	31	30	29	28	28	29	29	29	30
R/F(mm)	250	250	325	300	213	20	25	25	100	275	380	200

1. (a) Draw a combined bar graph to represent the information given in the table above.
(b) Tell the month with the;
(i) Highest amount of rainfall
(ii) Least amount of rainfall

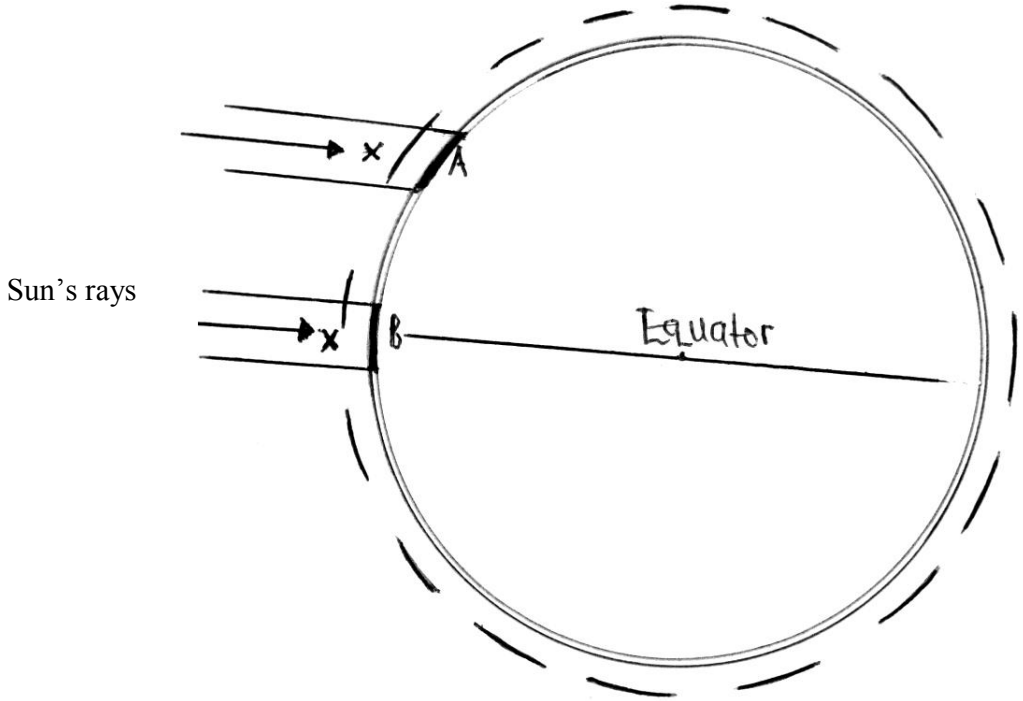
2. Use the table above to calculate the;
(i) Mean annual temperature
(ii) Annual temperature range

3. Explain the meaning of the following terms:
(i) Double maxima
(ii) Single maxima

FACTORS AFFECTING TEMPERATURE OF A GIVEN PLACE

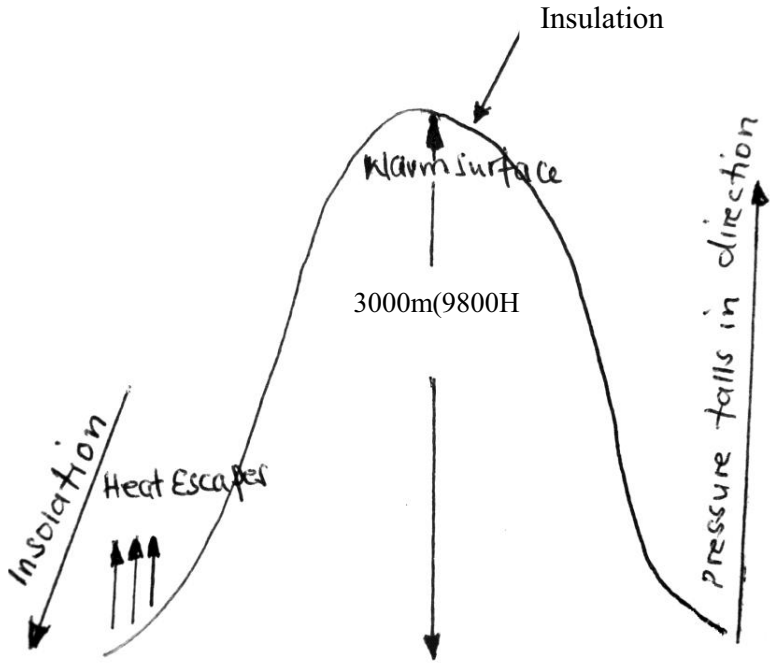
The temperature of a place depends upon some or all of the following factors;
(i) Latitude
(ii) Altitude
(iii) Ocean currents
(iv) Distance from the sea
(v) Winds
(vi) Cloud cover
(vii) Aspects
(viii) Amount of dust and other impurities in the air
(ix) The lengthy of the day etc.

(i) **Latitude:** Different parts of the world receive different amounts of Sun's insulation (heat). This is done due to geographical location. The location determines the time of the day light and the distance traveled through the atmosphere by the sun's rays and that areas around the equator receive or experience high temperatures and temperatures decrease from the equator to pole wards as shown in the diagram below:

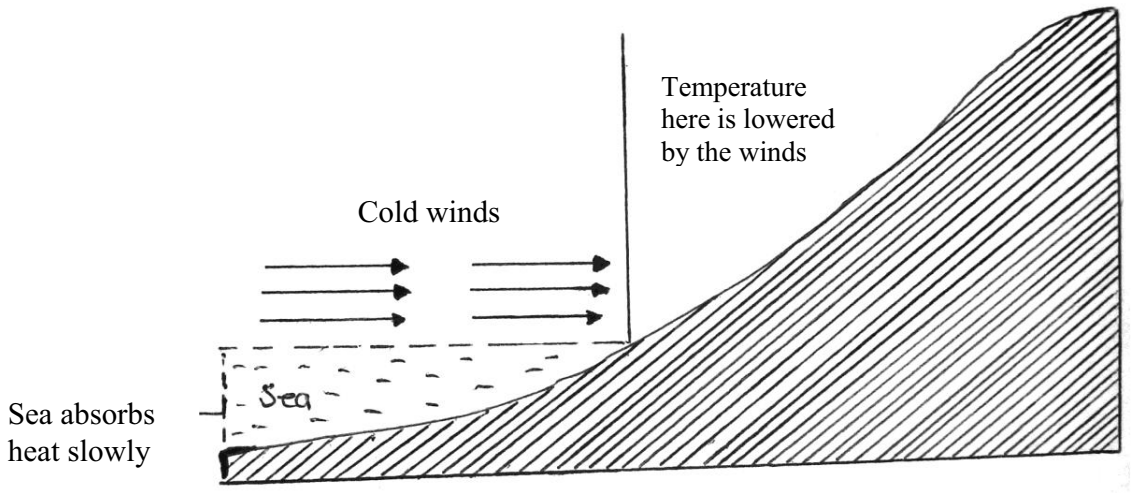


The above diagram explains that temperature at area B is very high than at area A. This is because of the latitudinal location. This means that temperature at pole wards are very low than at the equator.

(ii) **Altitude:** It is geographically believed that the sun's rays heat the earth's surface which in turn the earth's surface heats the atmosphere. The heat escaping back in the atmosphere is prevented by water vapour and dust in the air. Temperature decreases with altitude as one ascends in the air. This can be illustrated as follows:

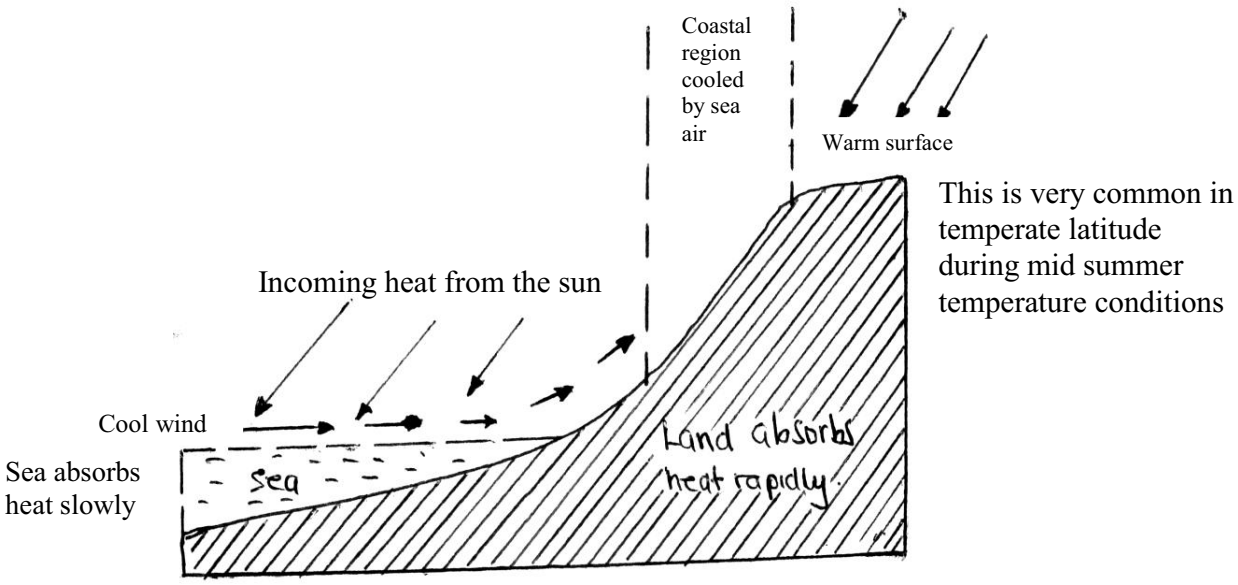


(iii) **Ocean currents**: These usually affect the temperature of the area especially those along the coastal regions where they blow to. Warm and cold ocean currents usually raise or lower the temperature of the land surface they blow to. For example, the warm ocean currents which blow pole wards carry tropical warmth into the temperate regions (higher latitudes) and these raise the temperature of the higher latitudes.
At the coastal regions, the influence of the Ocean currents is much felt at the coast as shown in the diagram.

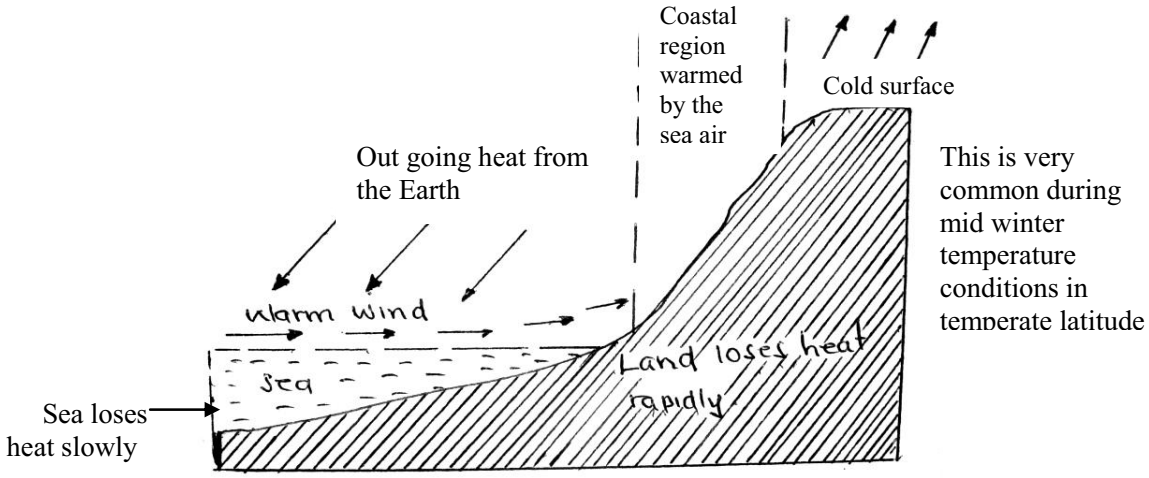


(iv) **Distance from the Sea**: The effect of the sea is noticeable especially along the coastal regions. This is because during the day when the sun's insulation is high, low pressure develops over the land caused by the warm rising air and at the same time high pressure develops over the water surface (sea). So these alterations are much more felt at the coast region as shown below:

During the day



The climate whose temperatures are influenced by the sea conditions are known as Maritime, Oceanic or Insular.

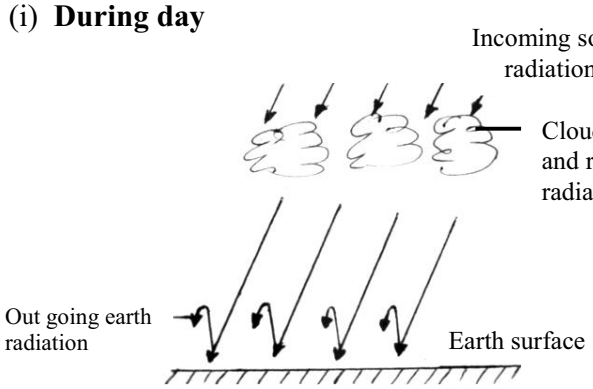


(v) **Wind**: In temperature latitudes, prevailing winds from the land lower the winter temperature but raise the summer temperature. In tropical latitudes, the on shore winds change the temperatures of the coastal belts. So the effect of the wind is to carry the temperature of the place where they are moving from to areas they are blowing.

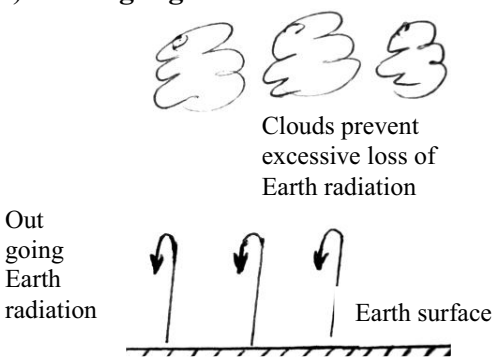
(vi) **Cloud cover and Humidity:** The work of the clouds in this case therefore, is to reduce the amount of solar radiation reaching the earth's surface and at the same time the amount of earth radiation leaving the earth's surface. Wherever these are no clouds, skies are clear both types of radiation are at their climax.

THE INFLUENCE OF CLOUD COVER IN EQUATORIAL REGIONS

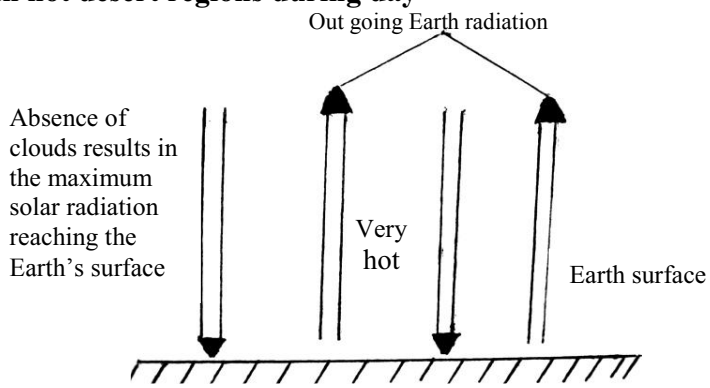
(i) **During day**



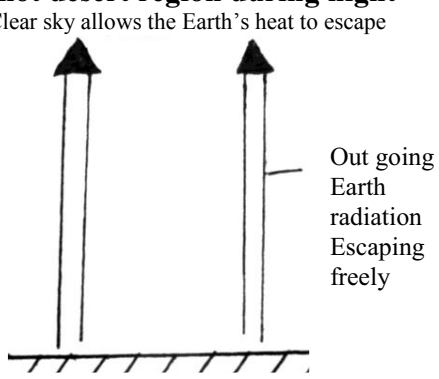
(ii) **During night**



In hot desert regions during day



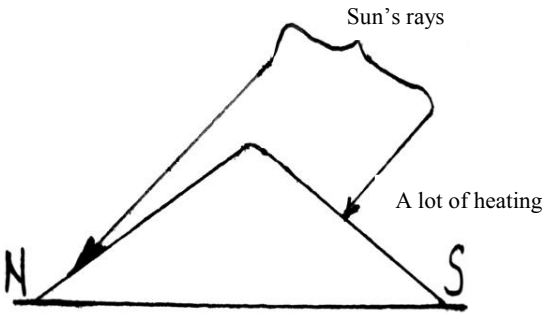
In hot desert region during night



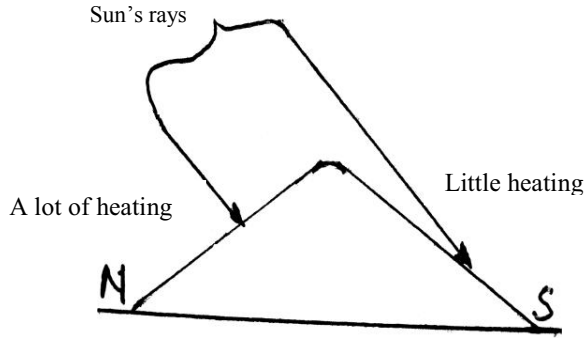
(vii) **Aspects:** The influence of aspect on temperature is noticeable in temperate latitudes and these are areas of pole wards. In tropics the mid-day sun is always high in the sky and aspect is of little importance. In the Southern hemisphere, the north facing slopes are warmer than the South facing slopes where as in the northern hemisphere the south facing slopes are warmer than the north facing slope.

THE EFFECT OF ASPECT ON TEMPERATURE

In Northern hemisphere



In Southern hemisphere



REVIEW QUESTIONS:

(a) Outline the factors affecting temperature of any given area.

(b) With the help of diagrams, explain the factors affecting temperature of any given place.

MOISTURE IN THE ATMOSPHERE:

All air contains moisture even that of dry hot desert. Air exists in the atmosphere in three (3) forms and these are;

(i) Solids in ice crystal form
(ii) Liquids in water form
(iii)Gases in water vapour form.

Moisture reaches the atmosphere by the process called evaporation. This takes place from water surfaces, vegetation, damp surfaces such as wet clothes etc.

FACTORS AFFECTING EVAPORATION

Evaporation is affected by three major factors and these are;

(i) Temperature of the surface
(ii) Relative humidity
(iii)The nature and speed of wind.

(I) **Temperature of the surface**: The warmer the surface e.g. Lakes, Rivers, Seas etc the greater the rate of evaporation and the lower the temperature the lesser the rate of evaporation. This means evaporation will be high when the temperature of the surface is also high.

(II) **Relative humidity:** When the air is damp i.e. when the percentage of humidity is high, there is less evaporation taking place but when the relative humidity is low, the rate of evaporation increases.

(III) **The nature and speed of wind**: There is greater evaporation in the moving air than in the air which is still and when the wind is dry and warm, has greater capacity to pick moisture from open water surfaces.

Whatever ascending air from the earth's surface into the atmosphere contains heat. This heat is normally given off when air reaches the dew point temperature and cools down (condense). The heat given off when this condensation process takes place is called Latent heat.

REVIEW QUESTIONS:

1. List down the three forms in which air exists in the atmosphere.
2. Explain the process by which moisture reaches the atmosphere
3. Mention any two places where evaporation can take place
4. Outline the factors which affect evaporation.

CONDENSATION

Condensation refers to the formation of water droplets when air has cooled down beyond its dew point temperature. There are two (2) ways by which condensation can take place and these are;

(i) Cooling of water vapour to form water droplets
(ii) When more water vapour is put into the atmosphere

CAUSES OF CONDENSATION

(i) Condensation will take place when radiation of air from the earth's surface on the clear nights encourages water to move into the atmosphere.

(ii) Another most important cause of condensation is the horizontal movement of air over cold surfaces. This encourages condensation to take place.

(iii) The mixing along the margins of two air currents of different origins and characteristics. This for example air currents originating from temperate regions mix with those from the tropics.
(iv) The movement of air from warmer latitudes to cooler latitudes. This encourages condensation to take place.
(v) By far the most important is ascent. Condensation cannot take place in pure air but rather in impure air which contain dust particles which form the nuclei on which water droplets are built. When water droplets condense in the air to certain critical size they may fall to the earth in the following forms of precipitation:
(i) rain (ii) snow (iii) Hail
(iv) sleet (v) Ice. Etc

REVIEW QUESTIONS:

1. The formation of water droplets when air condenses beyond its dew point temperature is called.
2. List down three causes of condensation?
3. Briefly explain one circumstance where condensation can not take place.
4. List down three forms in which precipitation can be received on the earth's surface from the atmosphere?

TEMPERATURE CHANGE IN VERTICAL AIR CURRENCY

When an air mass rises in the atmosphere, it becomes cooler when it ascends in the atmosphere and it becomes warmer when it sinks down in height.
The process by which air moves vertically and passes through layers of different pressure is known as adiabatic where as the transfer of heat by the air masses between the lowest air layer and the warmer one is called non adiabatic.

Dry adiabatic lapse rate: This refers to the fall of temperature in the rising air by $10^{o}C$ for every 1000 metres of ascent while a fall in temperature by $6^{o}C$ for every 1000 metres of ascent is called Wet adiabatic lapse rate. In this respect there is also environmental lapse rate which is a fall in temperature at a given place at a given time. This varies according to the surroundings.

REVIEW QUESTIONS:

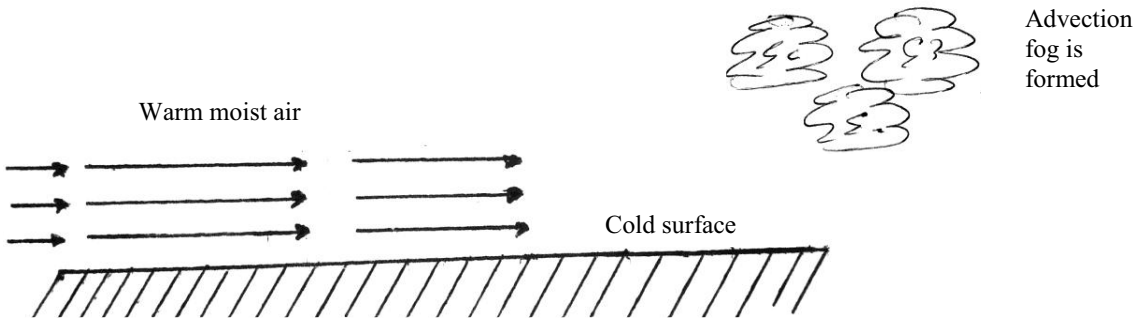
1. Explain the process by which air moves vertically and passes through layers of different pressure zone.
2. What is meant by the term non adiabatic
3. Give the difference between adiabatic and dry adiabatic lapse rate.
4. What geographical term can be used to refer to a fall in temperature as one ascend in the air by $10^{o}C$ every 1000m.

FOG FORMATION AND EXTREME STABILITY

Extreme stability leads to the formation of fog. When condensation takes place, it produces visible small water droplets which obscure the surface and this is what is commonly known as fog. There are many types of fog commonly experienced due to the prevailing climatic conditions responsible for their formation and these are;
(i) Advection fog.
(ii) Radiation fog.
(iii) Steam fog
(iv) Frontal fog
(v) Mixing fog etc

(i) <u>Advection fog</u>: This type of fog is formed when the warm moist air passes over cold surfaces of land, water etc or when the cold air passes over the warm surfaces. This type of fog occurs mainly along the coastal region. It may extend few kilometers inland.

THE FORMATION OF ADVECTION FOG



The diagram above explains that when warm moist air passes over the cold surface of say water or land, the warm air is cooled down and forms advection fog.

(ii)<u>Radiation fog</u>: This type of fog normally occurs on land especially at night and it disappears during the days when temperature rises. It is formed when still moist air is cooled down through coming into contacts with colder surfaces.

(iii) <u>Steam fog</u>: This is formed when cold air is transferred over a warm surface and as it passes over, the air becomes saturated. The condensed air appears in form of steam. This brings about what is commonly known as steam fog and at times it is referred to as arctic sea smoke.

(iv)<u>Frontal fog</u>: This type of fog is formed when rain falls into the stable cold air which is a head of the warm front. Here the falling rain raises the dew point temperature until this fog is formed. When the falling moisture is carried upwards by turbulence or convection and condenses to form stratus, cumulus or strato cumulus clouds.

<u>EFFECTS OF FOG TO THE ENVIRONMENT</u>

1. Fog obscures the ground and since people can not see properly, this affects many transport activities in very many parts of the world where it occurs.

2. The chilling conditions and too much coldness caused by fog affect agricultural activities. In Kabale where it is very common, people wake up very late because of coldness.

3. The effect of fog in some parts of the world is responsible for drought because fog is low clouds which do not bring rain at all.

4. Fog is responsible for air borne diseases such as cold pneumonia, influenza etc which are favoured by coldness.

5. In some areas fog supports agricultural activities because fog does not favour frost formation.

HOW TO DRAW A PIE-CHART

A pie chart is a circle which is 360^o. To put any figure on a pie-chart first convert it to degrees as below:

Land use types in the Democratic Republic of Congo 1991 – 1993.

LAND USE TYPE	LAND ARES (000) HECTARES
Crop land	7,893
Permanent pasture	15,000
Forest and Wood land	173,860
Others	29,952
Total	226,705

If this information was to be put on a pie-chart, one would first of all convert these figures to degrees as follows then after a pie-chart is drawn.

→ **Formula** $\frac{T}{\text{Total}} \times 360^o = \frac{T \times 360^o}{\text{Total}}$

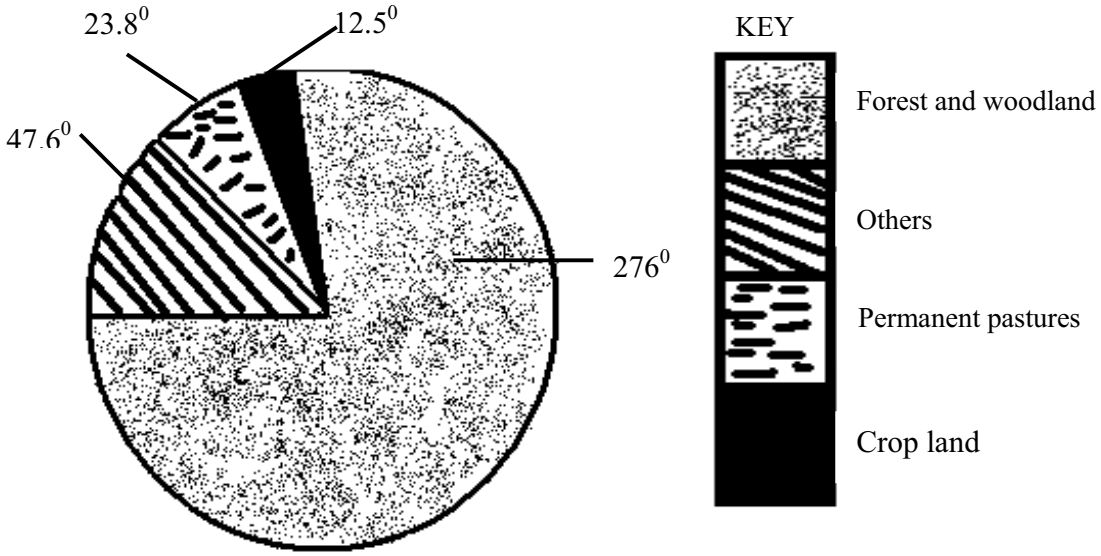
→ **Cropland** : $\frac{7873}{226,705} \times 360^o = 12.5^o$

→ **Permanent pasture** : $\frac{1500}{226,705} \times 360^o = 23.8^o$

→ **Forest & woodland** : $\frac{173,860}{226,705} \times 360^o = 276^o$

→ **Others** : $\frac{29952}{226,705} \times 360^o = 47.5^o$

∴ **A PIE-CHART SHOWING LAND USE IN D.R.C (1991 – 1993)**



HOW TO GIVE PERCENTAGES:

Percentages are given after any figure is converted to percentage as follows:

Land use type in Netherlands. Study it and answer the questions that follow

LAND USE	AREA OCCUPIED (Hectares)
Farm land	21,500
Residential	7,740
Wool land reserves and recreation	10,750
Canals, dykes and roads	301
Total Land Use	40,291

If these figures in the table above were to be converted to percentages, one would follow the formula below:

$$\textbf{Percentage} = \frac{T}{\text{Total}} \times 100\%$$

Farm land: $\frac{21,500}{40291} \times 100\% = 53.3\%$

Residential $\frac{7,740}{40291} \times 100\% = 19.2\%$

Woodland, reserves and recreation: $\frac{10750}{40291} \times 100\% = 26.6\%$

Canals, dykes and roads: $\frac{301}{40291} \times 100\% = 0.7\%$

REVIEW QUESTIONS:

1. Study the table below showing Uganda's population living in urban areas (1991) and answer the questions that follow:

REGIONS	URBAN POPULATION
Central	1,200,000
Eastern	320,000
Northern	170,000
Western	220,000
Total	1,910,000

Source: **Adapted from the Republic of Uganda 1996 statistical abstract M.F.E.P July 1996 P.15**

(a) Draw a pie-chart to show the population of the urban centres living in each region.

(b) Explain the factors which have led to the development of urban centres in East Africa.

(c) Describe the problems resulting from the development of urban centres in East Africa

(d) Identify the solution to the problem already shown in (c) above.

2. Study the table below showing livestock production for selected districts and answer the questions that follow:

DISTRICT	LAND AREA (KM^2)	GRAZING AREA (KM^2)	PERCENTAGE GRAZING AREA
MBARARA	9,906	9,064	91.5
MASINDI	8,406	7,734	___
LUWEERO	8,539	7,728	90.5
KOTIDO	13,208	12,349	93.5
MOROTO	14,113	13,196	___

(a) Calculate the percentage grazing area for districts of;
   (i) Masindi
   (ii) Moroto

(b) Draw a bar graph to show the percentage grazing areas for the selected districts.

(c) Explain the factors which have favoured livestock farming in anyone district given in the table above.

(d) (i) Describe the problems facing live stock farming in any one district chosen in (c) above.
(ii) Outline the steps being taken to solve the problems in (d)(i) above.

3. Study the table below showing oil palm production in tones for selected countries in Africa and answer the questions that follow:

COUNTRIES	**000 TONES**
Sierraleon	50
Cameroon	84
Ivory coast	135
Zaire (D.R.C)	175
Nigeria	630

Source: **Adapted from R.G White Africa New Edition**

(i) Draw a bar graph to represent the information in the table above.

(ii) State the two observations about oil palm production in Africa revealed by the graph and the table above.

(iii)Describe the natural conditions favouring oil palm production in any one of the selected conditions in the table above.

PART II
NORTH AMERICA

LOCATION AND SIZE

North America is one of the world's seventh continents. It covers an area of about 21.5 million sqkm^2 including the Arctic Island of Canada. It stretches across almost 50^o of latitude between 20^{o}N to 27^{o}N and through 115^o of longitude between 23½^{o}S – 168^{o}S.
North America is bordered by the Atlantic Ocean in the East, Pacific Ocean in the West, the Arctic Sea in the North, Mexico and the Gulf of Mexico in the South.
Politically the region follows under the United States of America and Canada.
U.S.A is a federation of 50 states including Alaska of North America. On the other hand Canada is also a federation of 9 states. The area covered by Canada alone is 8.03 million sqkm^2 while U.S.A is 13 million sqkm^2.

LOCATION OF NORTH AMERICA



THE PHYSIOGRAPHIC REGION OF NORTH AMERICA

In terms of physical region, North America is grouped into the following physical regions:

(i) The South Coastal plain
(ii) The Appalachian mountain system
(iii) The Canadian shield (The Laurentian).
(iv) The central low land
(v) The Rocky mountain region
(vi) The Intermontane plateau
(vii) The pacific coastal ranges.

(i) **The South Coastal Plains**: This region is sometimes referred to as the Atlantic and the Gulf plains. It extends from Western Texas to New York. This plain slopes gentler towards the coast. These plains are covered by young sedimentary rocks which where deposited there by streams and rivers coming from the interior.

(ii) **The Appalachian mountain system**: This mountain system extends from New found land to central Albama. This region is subdivided into three (3) sections and these are;

(a) The Southern section: This is situated in the Central Albama to river Adison which is also subdivided into four subsections namely;

(i) Pledmont
(ii) Blue ridge
(iii) The bridge
(iv) The valley.

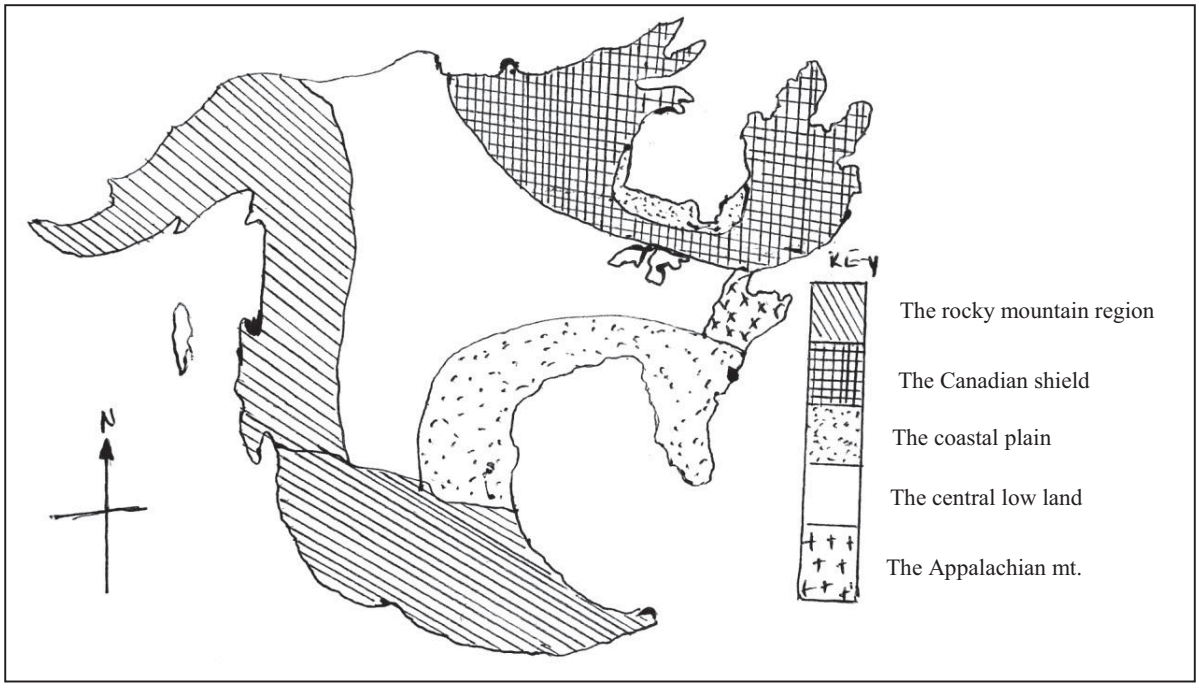
(b) The New England section: This is an Island region which was named New England by the British Immigrants. It is a plateau region which slopes towards the sea.

(iii) **The Canadian Shield or Laurentian**: This region consists of pre-Cambrian Igneous and metamorphic rocks which were deposited to the surface by erosion in some areas. Due to prolonged glacial erosion, the area has been seriously converted in a pen-plain. This region contains numerous swamps and kettle lakes formed as a result of glaciations.

(iv) **The central lowland**: This region lies between the Appalachian Mountains in the East and the Rockies in the West. This region receives very little rain fall because it astride in the rain shadow regions of the Appalachians and the Rockies. Agriculture here is carried out on the basis of irrigation.

(v) The rocky Mountain region: This region is composed of parallel ridges covering half of the Western continent. Most of the ridges represent folds, but some are raised edges of faulted blocks. In this region we also have many intermontane basins and plateau.

A MAP OF NORTH AMERICA SHOWING MAJOR PHYSICAL REGIONS



ECONOMIC DEVELOPMENT OF NORTH AMERICA

The level of economic development of North America is very high compared to that of East Africa and other third world countries. In U.S.A the rural agricultural population is only 3% of the total population while that of Canada is 6%. In East Africa, the rural agricultural population is 90% of the total population. There are a number of factors to explain this.

1. Unlike East Africa, North America has had along period of stability and condusive environment for development. More over the major world wars never affected the region because they were not fought on the American land.

2. The climatic conditions prevailing there favour the activities of agriculture. The levels of agricultural activities are high and mechanized hence 6% of the Canada's population produce enough food for the rest of the population. This is because during agricultural revolution there was land consolidation and many small-scale farmers were forced into bankruptcy and these sold off their plots of land to big entrepreneurs.

3. In terms of minerals, North America is very rich in high quality of minerals. These minerals range from Iron ore, Coal, petroleum, Aluminium, Copper etc. As a result of mineral wealth, industrial revolution took off rapidly and industries include air craft, air space, automobile, machinery, electronics and many others.

4. In terms of soils, North America has fertile soils especially in the Canadian and United State plains. This was due to glaciations which resulted into glacial moraines and these moraines are very fertile and good for agriculture.

5. North America is well endowed with a variety of forest resources especially the coniferous forest that occur in pure stand making the exploitation of forestry resources very easy.

6. North America has abundant water resources in the region because of numerous large oceans, lakes, rivers that are used for water resource – development.

7. The topography of North America is much varied offering a variety of opportunities especially the tourism industry which is a very advanced industry in the region.
8. North America like any other developed world, the level of technology, literacy is indeed very high. These two aspects have made it possible for industrial development.

THE CLIMATE OF NORTH AMERICA

Climate is the average weather conditions of a place studied for a long period of time.

North America has seven climatic regions and these are;

1. Tundra
2. Mediterranean
3. Cool temperature interior climate
4. Warm temperature Eastern Margin
5. Cool temperature Eastern Margin
6. Tropical climate
7. Desert climate

1. **Tundra:** The northern part of Canada, Alaska and Green land have sub-arctic and Antarctic climates, which is long, dark, too cold winters which alternates with short mild summers. The largest part of this region receives relatively very little precipitation and it is covered with snow and ice during the biggest part of the year.

2. **Mediterranean**: This type of climate is characterised by bright, sunny, hot and dry summers together with mild rainy winters.

3. **Cool temperature interior climate:** This type of climate is characterised by very low winter temperatures which can fall up to – 19°C while summer temperatures rise up to18°C which gives a very large annual temperature range. Rainfall is relatively low and rarely exceeds 500 mm per annum and it occurs mostly in summer seasons.

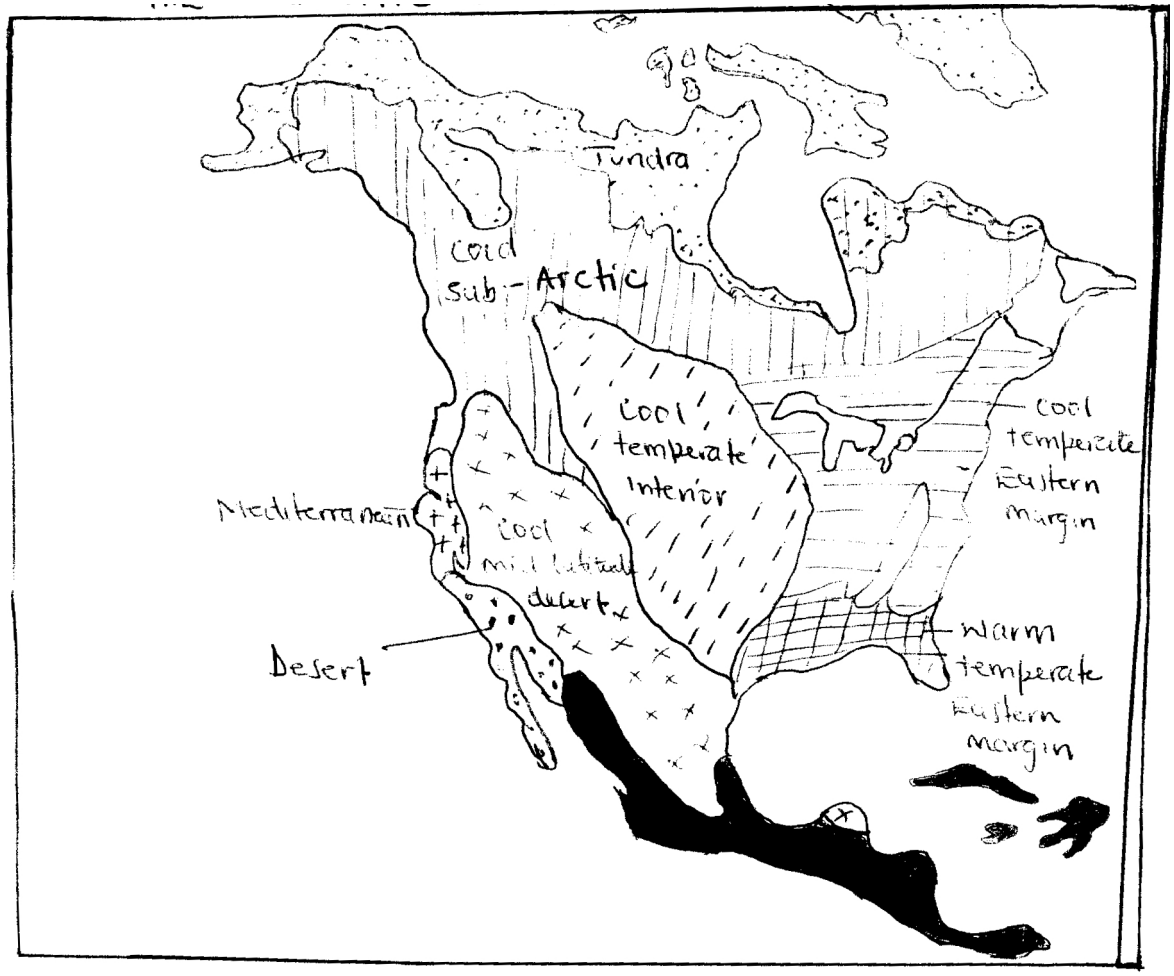
4. **Warm temperature eastern margin:** This climate has hot summers and mild winters. It receives convectional rainfall mainly in summer seasons and it normally exceeds 1000 mm per annum.

5. **Cool temperature eastern margin:** This climate has cold winter temperatures ranging between – 7°C and 9°C and warm summer temperatures. Precipitation is moderate and it occurs throughout the year and it is evenly distributed.

6. **Tropical Climate:** The largest part of Southern Mexico has tropical climate with high temperatures all the year round, with average precipitation particularly in summer seasons.

7. **Desert climate**: This type of climate is characterised by very low rare rainfall. Temperatures are very hot usually over 30°C during hot and dry seasons and cool during the rest of the seasons.

THE CLIMATIC REGIONS OF NORTH AMERICA



REVIEW QUESTIONS:

1. Draw a sketch map of North America, on it mark and name the following:

(a) (i) U.S.A and Canada

(ii) Hudson bay and the Gulf of Mexico

(b) List down five factors that give rise to economic development of North America.

FACTORS INFLUENCING THE CLIMATE OF NORTH AMERICA

Climate is of great importance in resource development of any given area. There is a relation ship between climate and land use e.g. agriculture takes place because of enough rainfall, air transport depends entirely on atmospheric conditions. Temperature and the types of crops grown some crops do not do well under frost conditions etc. The climate of North America is controlled or influenced by the following factors:

(i) Latitude
(ii) Relief
(iii) Winds and air masses
(iv) Ocean currents
(v) Winds

(i) **Latitude:** North America is located in the mid latitude between $26^{o}N - 76^{o}N$ of the Equator. There is a diversity of climate latitudinary. Tropical climate is extremely found in the South of Florida and in the Southern parts of Hawai Islands in Pacific Ocean as one moves northwards temperature changes.

(ii) **Relief:** Topographically, North America is ragged with a variety of plateaus mountains etc wind ward areas of mountains tend to receive higher amounts of precipitation compared to Lee-ward or rain shadow zones e.g. the Eastern slopes of Appalachian mountains in Eastern U.S.A receive much precipitation than the Lee-ward Western slopes.

(iii) **Winds and air masses**: North America is affected by numerous wind systems and air masses e.g. the polar continental, polar marine, tropical continental and tropical marine.

(a) The polar continental air masses: These air masses originate from the Polar Regions and move across the land. These transport cool conditions to American sub-continent. They are dry and they yield no precipitation.

(b) The Polar Marine: These originate from Polar Regions over the Ocean, from where they pick some moisture. They are cool and unstable and when they move towards the continent, they yield a lot of precipitation especially when they meet the tropical air masses which are warm light.

(c) The tropical air masses: These originate from the tropical regions and move to the continent. They are dry and they do not bring rainfall.

(d) The tropical marine: These originate from Oceans in tropical areas such as Pacific Ocean etc and they yield a lot of rainfall.

(iv) **Ocean Currents**: North America is affected by a variety of Ocean currents e.g. the Gulf Stream which are warm currents. These blow from the Atlantic Ocean and move towards the South Eastern U.S.A transporting the warm conditions. These currents bring a lot of precipitation to areas they are blowing.

(v) **Winds:** North America is influenced by a variety of winds e.g. the Westeries which blow from the Pacific Ocean and they are always off shore, especially at the coast of British Columbia where their influence is much confined.

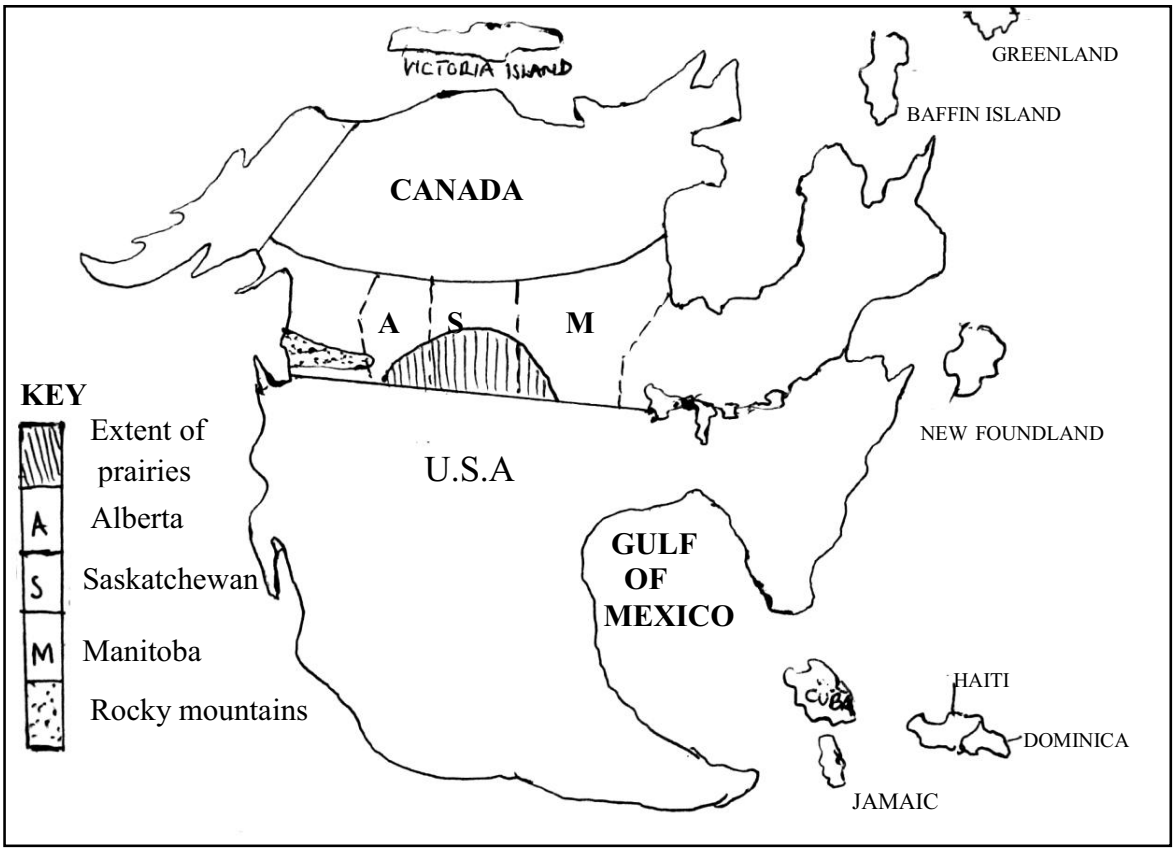
REVIEW QUESTIONS:

1. Draw a sketch map of North America, on it mark and name the following:
(a) (i) Appalachian mountains
(ii) The rocky mountain region
(iii) The Canadian shield
(b) Explain the factors that affect the climate of North America.

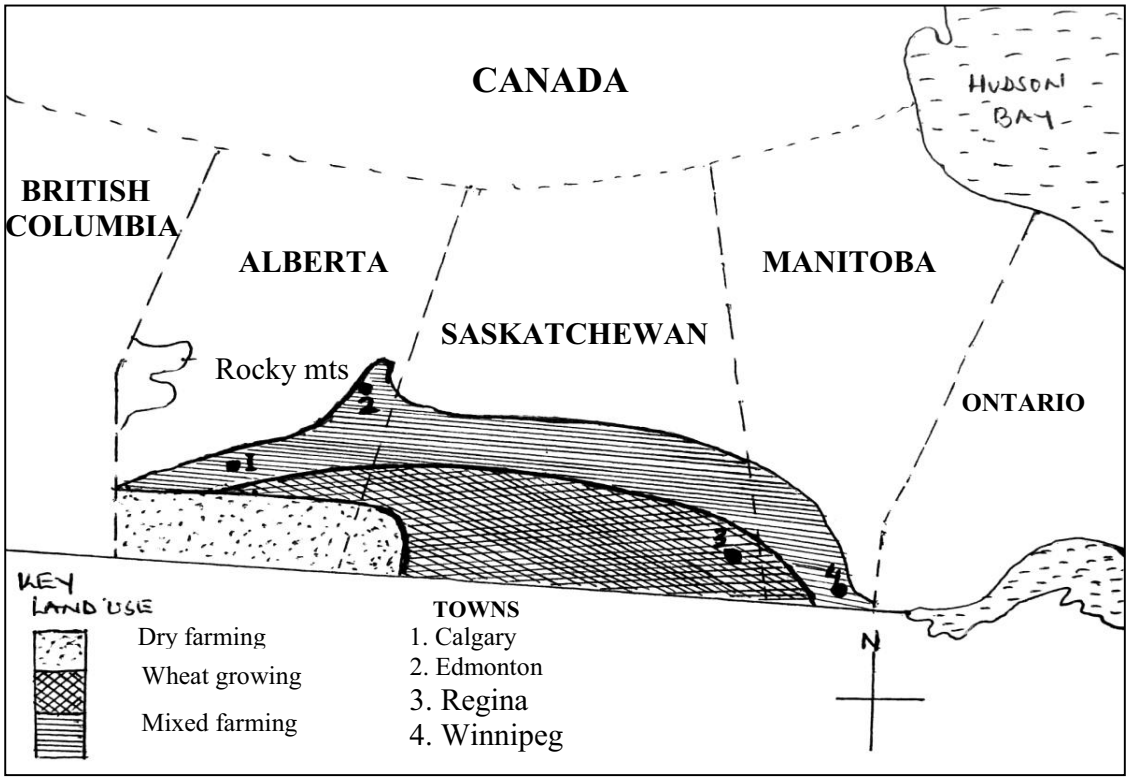
THE PRAIRIES OF CANADA

The prairies are temperate grasslands of North America. They are found in central parts of North America in the Alberta, Saskatchewan and Manitoba provinces. These three states are sometimes referred to as the "Canadian Prairie provinces." These grasslands extend as far as Dakota and Montana in the Northern U.S.A.

THE EXTENT OF THE PRAIRIES OF CANADA



A SKETCH MAP OF CANADA SHOWING THE THREE PRAIRIE PROVINCES



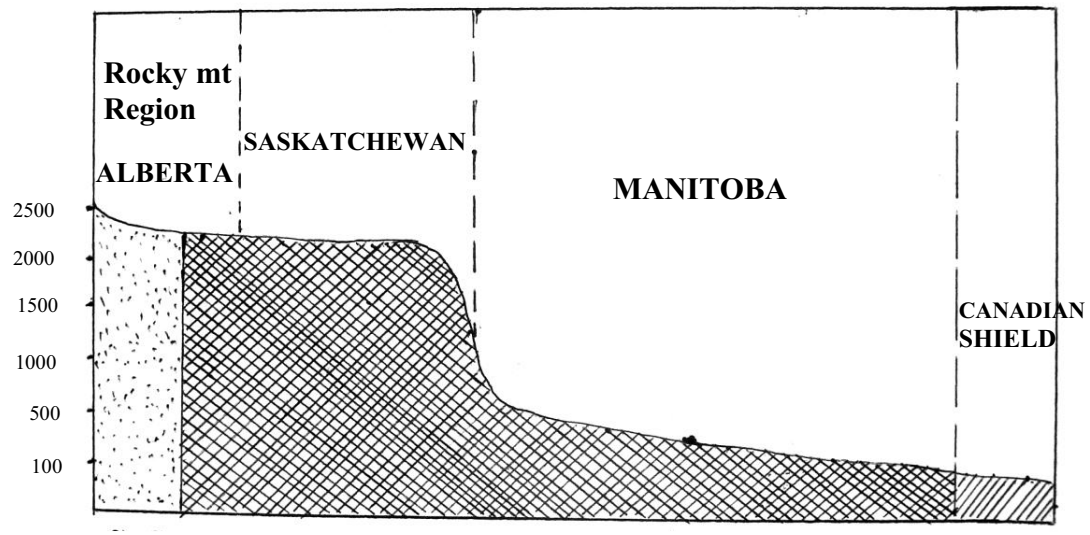
WHEAT GROWING ON THE PRAIRIES OF CANADA

The prairies of Canada used to be the leading producer and exporter of wheat in the whole world. There are a number of factors which gave rise for wheat growing on the prairies of Canada and these were;

FACTORS FOR WHEAT GROWING ON THE PRAIRIES OF CANADA

1) **Relief:** This is simply the physical appearance of the landscape. The Prairies of Canada is composed of undulating topography which is raised from the Western side with low-lying prairies province and well drained. This therefore, created a suitable ground favourable for mechanization and below is a cross section of the relief of Canadian prairies.

A CROSS SECTION OF THE PRAIRIES OF CANADA



2) **Conducive Climate**: The climate of the prairies of Canada is ideal for wheat growing. It has warm summer temperatures of about 15.5^{o}C and a mean annual rainfall which favour wheat growing. This is also favoured by spring conditions which support seed germination and quick grain ripening more to this, the winter cold dry conditions and the tropical marine air masses from the Gulf of Mexico which yield hot and humid conditions responsible for summer rainfall.

3) **Skilled farmers**: Due to high skilled man power and use of machinery on the farm, farmers have been able to produce enough wheat for sale and surplus.

4) **Existence of fertile deep and well drained soils:**
The prairies of Canada have fertile soils which are suitable for cereal growing.
These soils are not acidic in nature and have the required nutrients for the growth of wheat.

5) **Efficient transport net Work:** The construction of the Canadian pacific railway and the Canadian National railway made the exportation of wheat to outside world very cheap.

6) **Availability of a Ready/wide market potential for wheat:**
Wheat from the prairies of Canada is exported to countries like Japan, China, India and many Asian countries where the demand for wheat is very high hence creating a wide scope of market for wheat.

7) **Vast land**: The Prairies of Canada has vast trucks of land where plenty of wheat can be grown. Hence giving rise for wheat growing on the Prairies of Canada.

8) **Good storage facilities**: There is a variety of modern storage facilities where wheat can be stored for along period of time till it is exported.

9) Another important factor that favoured wheat growing on the prairies of Canada is the constant scientific research carried out for better resistant wheat breeds which are against drought and diseases.

10) **Favourable government policy:** The Canada's government policy favour agricultural farmers in that they are trained, given skills of how crops are maintained etc.

11) **Availability of adequate Capital:** The farmers of the Prairies of Canada have adequate capital to run and maintain large farms.

PROBLEMS FACED BY THE PRAIRIES WHEAT FARMERS

1. The wheat farmers of the prairies of Canada face a problem of wheat disease such as rust which is a fungus. This disease attacks and destroys the leaves of wheat. This disease can be eradicated through use of spray and introduction of resistant wheat breed seeds which can't easily be attacked by diseases.

2. Another problem is that of over production: This is where farmers produce in excess and there by at the end fail to get market for the produce. This discourages many farmers to produce the next season thus leading to shortages. This problem can be solved through looking for external markets and to limit production in a bid to stabilize prices.

3. Another problem faced by wheat farmers on the prairies of Canada is the little rainfall received in some parts of the Prairies. This affects the production and as per the research made, this problem can be solved through practicing dry farming.

4. Farmers on the prairies of Canada face a problem of soil exhaustion brought about by the mono-cultural system and if this problem is to be over come, application of fertilizers should be practiced and practicing mixed farming must be carried out.

5. More to note is the problem of price fluctuation of wheat on the world market.
   This is in most cases brought about by changes in production and competition from other wheat producers. If a lot of wheat is produced there is likely to be a price fall and vice-versa.

6. The farmers of the prairies of Canada do face a problem of substitutes on the world market. Substitutes include cereal crops like rice, maize etc. Since these cereals serve the same purpose as wheat, they tend to compete favourably with wheat, and a change in price of one will automatically affect the consumption of the other.

7. Another serious problem facing wheat farmers on the prairies of Canada is that of soil erosion brought about by extensive farming and monoculture farming system carried out on the prairies.

8. Wheat on the Prairies of Canada is sometimes destroyed by vagaries of wheather e.g frost and hail storms at the time of harvesting during summer. This has been solved by using powerful yellow head lamps on the combining harvester during the day and night.

9. There is a problem of labour shortage especially during harvesting period.

10. Since wheat is grown on a large scale, this crop faces a problem of bush fire during summer periods which destroy the crop.

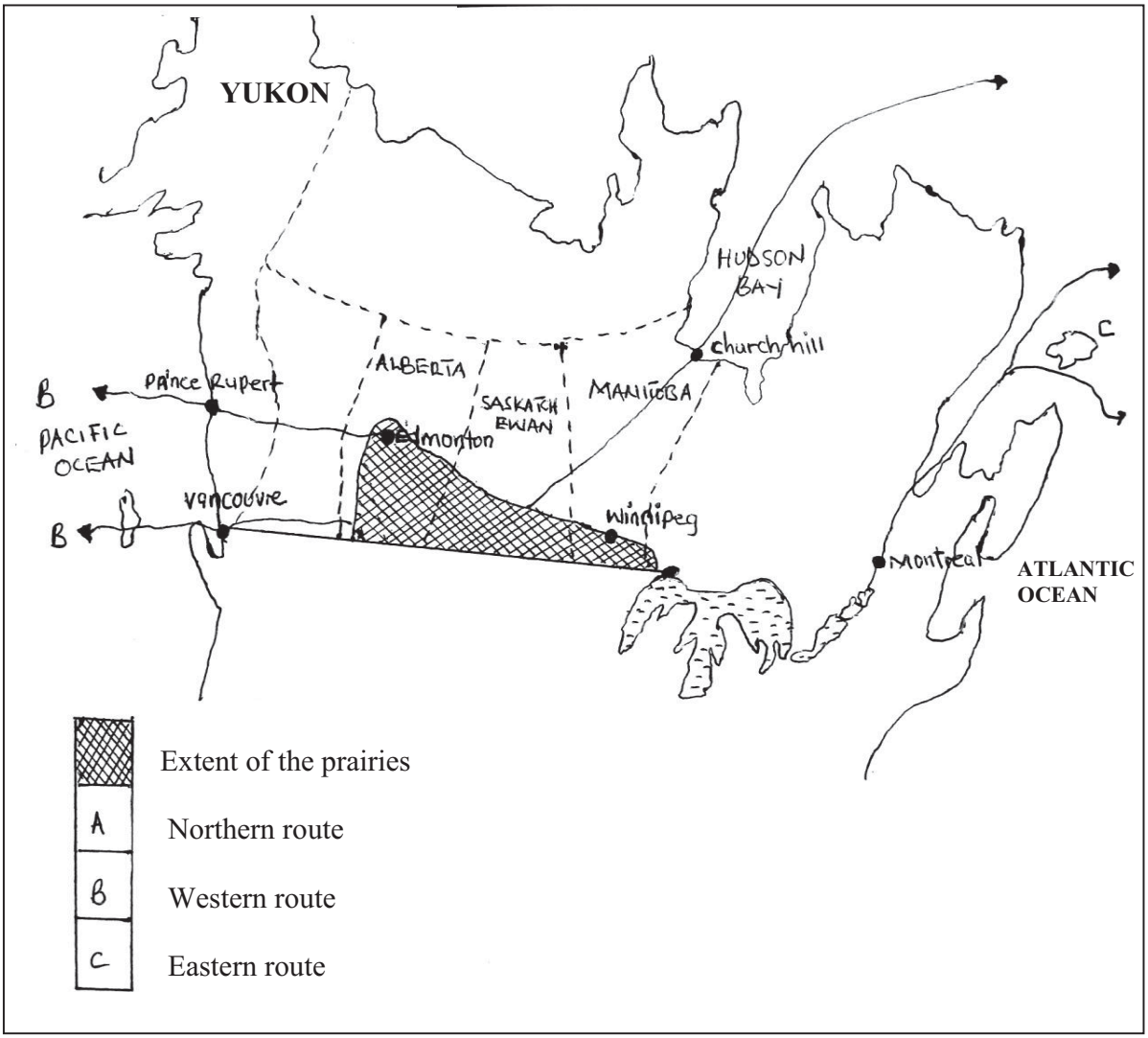
ROUTES ALONG WHICH WHEAT IS EXPORTED FROM THE PRAIRIES OF CANADA

Wheat from the Prairies of Canada is exported along the following routes:- Ports: Vancouver and Prince Rupert in the west, Church hill through Hudson bay in the North and the sea way route along the Great lakes in the East.

MAJOR IMPORTERS OF WHEAT FROM CANADA

Wheat from Canada is exported to countries like; Russia, United States of America, India, China, Japan, United Kingdom etc.

THE WHEAT EXPORTING ROUTES FROM CANADIAN PRAIRIES



ADVANTAGES OF USING THE NORTHERN ROUTE

1. It is one of the shortest routes of exporting wheat to European countries.
2. Church hill has the best handling facilities such as elevators cranes compared to other ports.
3. The northern route is free from ice conditions for four months.

DISADVANTAGES OF USING THE NORTHERN ROUTE

1. In Summer the Northern route faces a problem of shipping due to ice bergs which are a problem to shipping activities for four months.

2. The port of Church hill which is at the terminus of the northern route faces a problem of congestion during peak periods.

3. Due to congestion experienced during peak period, the port faces a problem of inadequate handling facilities.

4. It is expensive because of the long strech of Land route (road transport) from Regina to Chuchill.

THE WESTERN ROUTE

This route has two main ports i.e. Vancouver and Prince Rupert which are connected by the trans-Canadian railway.

ADVANTAGES OF EXPORTING WHEAT USING THE WESTERN ROUTE:

1. This route is free from Ice conditions
2. It is one of the shortest distances to European markets.
3. This route is not expensive in terms of transporting wheat to outside world.

DISADVANTAGES OF EXPORTING WHEAT USING THE WESTERN ROUTE:

1. It is the longest route for exporting wheat to foreign markets.
2. There is a problem of crossing the steep slopes of the Rocky Mountains.
3. Given the difficulties involved in exporting wheat using the western route, its costly and expensive.

THE EASTERN ROUTE

This route goes via ports like Duluth on Lake Superior, Thunder Bay on the same lake through Montreal on St. Lawrence River.

ADVANTAGES OF USING THE EASTERN ROUTE

1. It is the one of the shortest water transport route for exporting bulky commodities from the prairies of Canada to European world.
2. Since it is the shortest route to European market then, it's not costly in terms of transport.
3. This route is free from ice conditions.
4. There are many ports and port facilities along this route.

DISADVANTAGEWS OF USING THE EASTERN ROUTE

1. There is a lot of congestion since this route is active throughout the year.
2. This route faces a problem of shortages of handling facilities due to congestion at ports of Duluth, Thunder Bay and Montreal and this delay the exports.
3. On river St. Lawrence there are variations in volume of water which affects the movement of big bergs.

OTHER CROPS GROWN ON THE PRAIRIES OF CANADA

Other crops grown on the prairies of Canada include;

(i) Oats
(ii) Flax
(iii)Rye
(iv)Sugar beet
(v) Barley.

I. **Oats:** This is a grain crop mainly grown on the prairies of Canada to feed animals. It is an animal fodder crop used especially to feed young animals.

II. **Flax:** This crop is mainly grown in the Saskatchewan state of Canada. It does well in this state because of the prevailing climatic conditions. Soils in this state favour its growth. It is a fiber crop used in the production of seed oil.

III. **Rye:** This is a commercial crop mainly grown in sandy soils and it is specifically produced during winter seasons. It is grown as a cover crop and it is grown in areas which suffer from severe soil erosion.

IV. **Sugar beet:** This crop is mainly grown in Southern Manitoba and Alberta under irrigation. It is used in the manufacture of sugar and at the same time as an animal feed.

V. **Barley:** This is a fodder crop which is mainly grown to feed animals.

FARMING TYPES PRACTICED ON THE PRAIRIES OF CANADA

Today there are various faming types practiced on the prairies of Canada and these include;
(i) Extensive farming
(ii) Intensive farming
(iii)Dry farming
(iv)Mixed farming
(v) Ranching.

(i) **Extensive farming:** This type of faming involves the growing of wheat on a large scale. This farming system is characterized by;
1. Mechanization is carried out
2. It is carried out on a large scale
3. It is capital intensive
4. One type of crop is grown
5. There is application of fertilizers
6. It is carried out on a vast land
7. It is commercially carried out
8. It is also labour intensive.

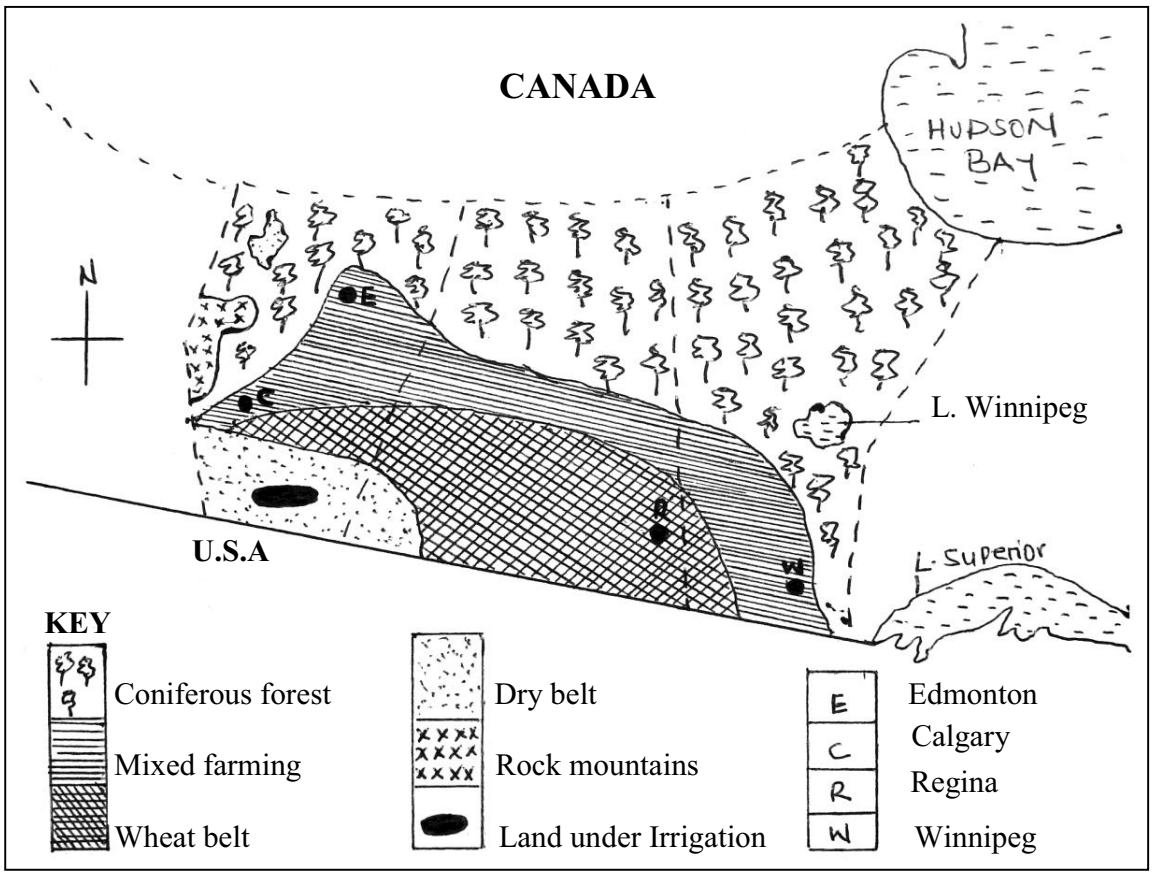
(ii) **Intensive farming**: This is a farming system where crops are grown on a small scale on a small piece of land but high yields are expected. This is due to land maintenance where there is application of fertilizers. It is practiced because of land shortage brought about by high population. This farming system is characterized by the following:-
1. It is capital intensive
2. It is carried out on a small scale
3. A lot of fertilizers are applied

(iii)**Dry farming**: This is a farming system where land is given time to regain fertility. Here the land is left to rest for some good time. This is intended among other reasons to kill the weed which compete with crops for moisture and other soil nutrients. This system is carried out in dry belts where rain fall is very little. It is characterized by;
1. It is carried out in areas which receive very little rainfall
2. It is carried out under irrigation.

(iv)**Mixed farming**: This is a farming system which involves the growing of crops and raring of animals on the same piece of land. It is intended to diversify the farmers' income and at the same time reduces over dependency.

(v) **Ranching:** This is a farming system where animals are kept for beef production. It is carried out in the dry belts of the prairies of Canada.

HOW LAND IS UTILIZED ON THE PRAIRIES OF CANADA

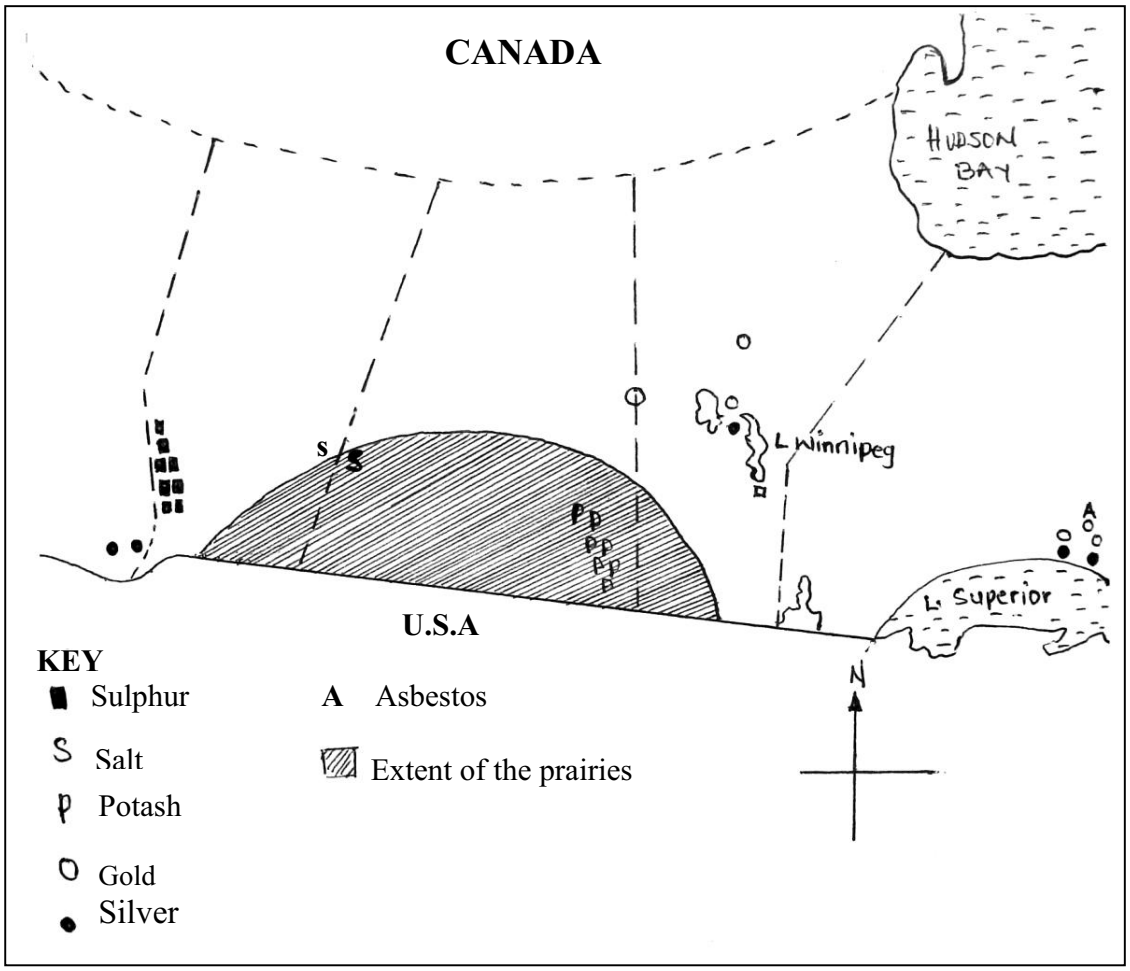


INDUSTRIAL DEVELOPMENT ON THE PRAIRIES OF CANADA

Many industries have sprung up on the prairies of Canada. This has been due to the discovery of mineral resources such as natural gas, sodium Sulphate, potash, coal and many others. This has made it possible for the development of many industrial towns such as Edmonton, Calgary in the Alberta, Regina in Saskatchewan and Winnipeg in Manitoba State.

Edmonton has become the provincial capital on the prairies of Canada because of oil exportation and its where petrol chemical industries are located and oil refined.

MINERAL DISTRIBUTION ON THE PRAIRIES OF CANADA



Examples of industries on the prairies of Canada include petrol chemical industries, oil refineries, Electronics, steal-rolling industries.

REVIEW QUESTIONS:

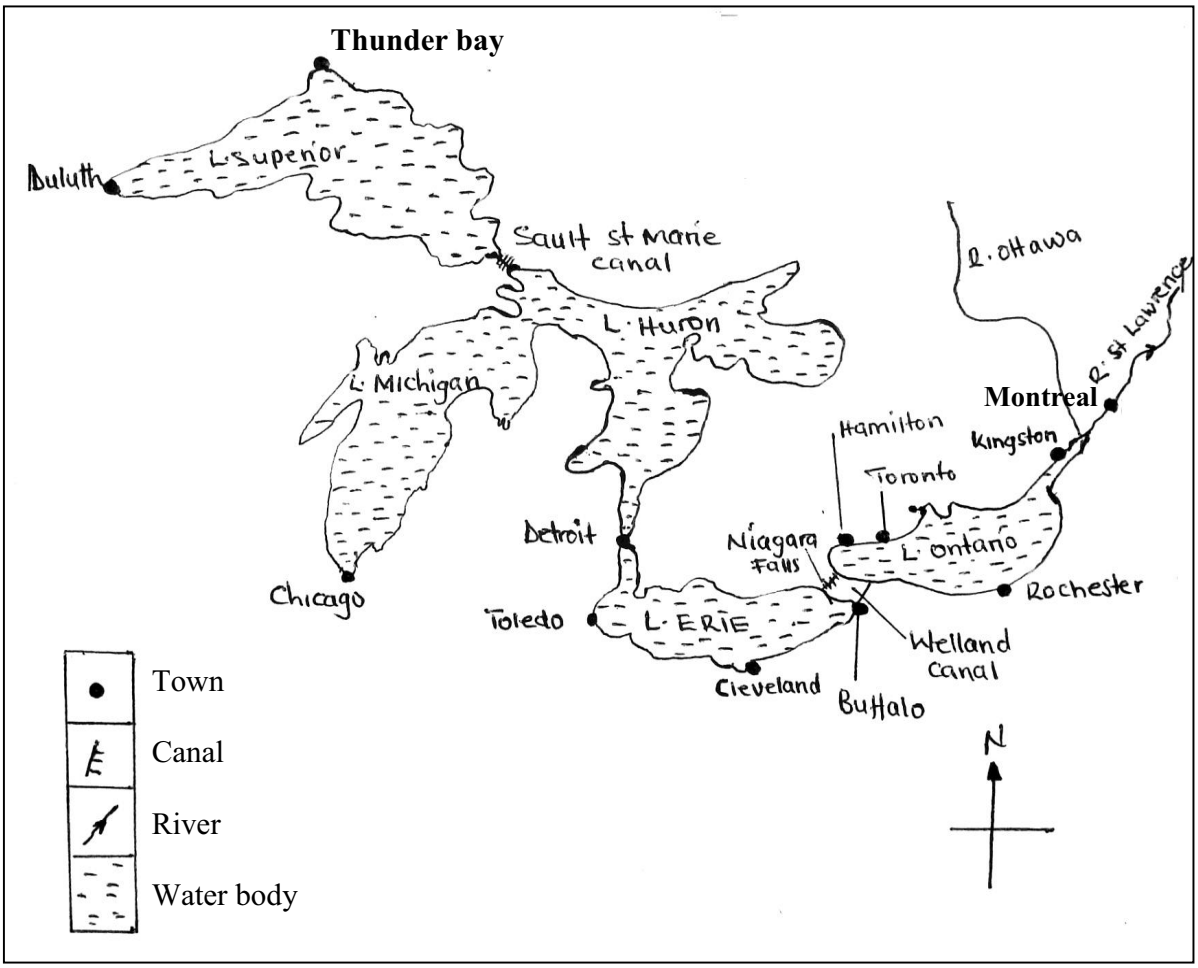
1.(a) Apart from wheat, name any other three crops grown on the prairies of Canada.
(b) List down two industrial towns located on the prairies of Canada.
(c) Identify two types of industries located on the prairies of Canada.
(d) List down two minerals mined on the prairies of Canada

2.(a) Name at least two states where wheat is extensively grown on the prairies of Canada.
(b) State the Human and physical factors which have favoured wheat growing on the prairies of Canada
(c) Identify the problems facing wheat growers on the prairies of Canada.
(d) Explain the meaning of the following terms:
(i) Wheat dumping
(ii) Surplus wheat
(iii) Wheat dependency.

ST. LAWRENCE SEA WAY

St. Lawrence Sea-way is part of river St. Lawrence which connects the great lakes region to the Atlantic Ocean on the Eastern part of North America. The Sea-way is a sea-route which was constructed to ease and accelerate quick transport in the great lakes region and the Canadian prairies. The idea of the construction of the sea way was brought by the Canadian government and later supported by U.S.A. This route runs through lakes of superior, Huron, Erie, Ontario and then river St. Lawrence. It was constructed 1954 with a number of objectives.

THE GREAT LAKES AND THE SEA-WAY



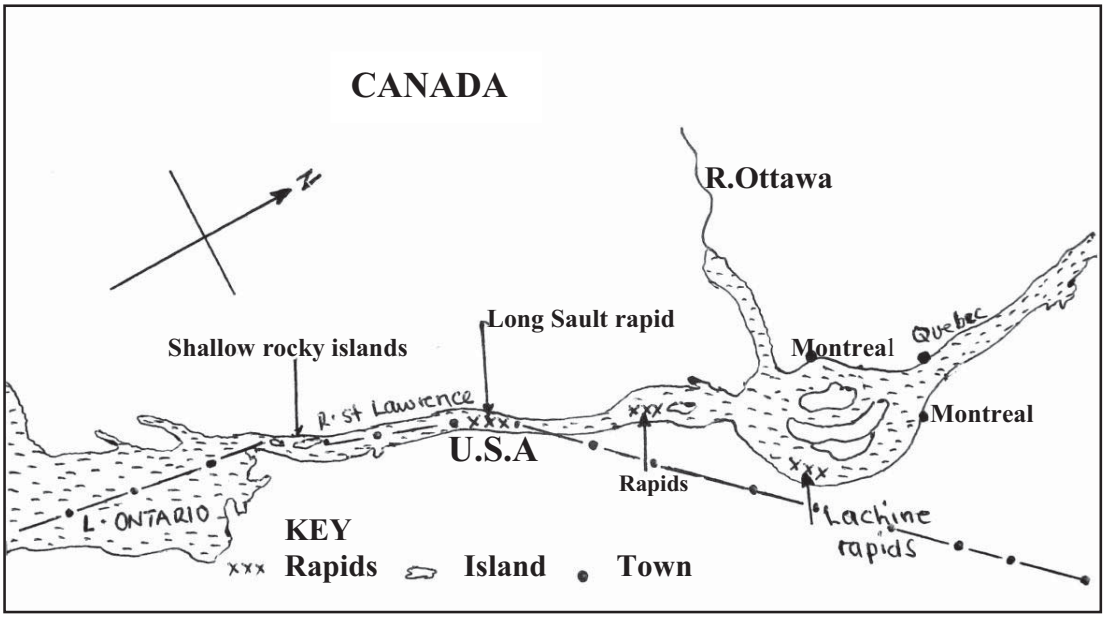
The work of the construction of the sea-way began in 1954 and was completed in 1958.

A number of reasons were put forward for the construction of the sea-way and these were;

1. The Sea-way was constructed to create deep water along river St. Lawrence so as to allow large Ocean going vessels to sail freely through the great lakes to the Atlantic Ocean via river St. Lawrence.
2. The Sea-way was constructed to generate enough Hydro-Electricity power on different water falls along river St. Lawrence as there was need for enough power for domestic and industrial use.
3. To solve the problem of constant flooding during rainy seasons. This was due to the flat nature of land and too much rainfall received in the region which led river St. Lawrence to flood its banks, hence affecting the people around and the activities out in the region.

4. Another important aspect for the construction of the Sea-way was the view of industrializing the region as this could make the importation of raw materials needed by the industries and at the same time ease the exportation of industrial products.
5. The construction of the sea-way among other reasons was intended to overcome the problem of shipping hazards e.g. water falls, rapids and shallow islands along river St. Lawrence as these could not allow ships to sail freely.
6. It was intended to help in the transportation of bulky goods such as Iron ore, fuel etc from Labrador.

THE SHIPPING HAZARDS ALONG RIVER ST. LAWRENCE BEFORE THE CONSTRUCTION OF THE SEA-WAY



The shipping hazards already shown above were solved as follow:

1. The narrowness and shallowness of river St. Lawrence were solved through widening and deepening of the river.

2. The shallow water Islands (shoals) were blasted and removed so as to make the free sailing of ships.

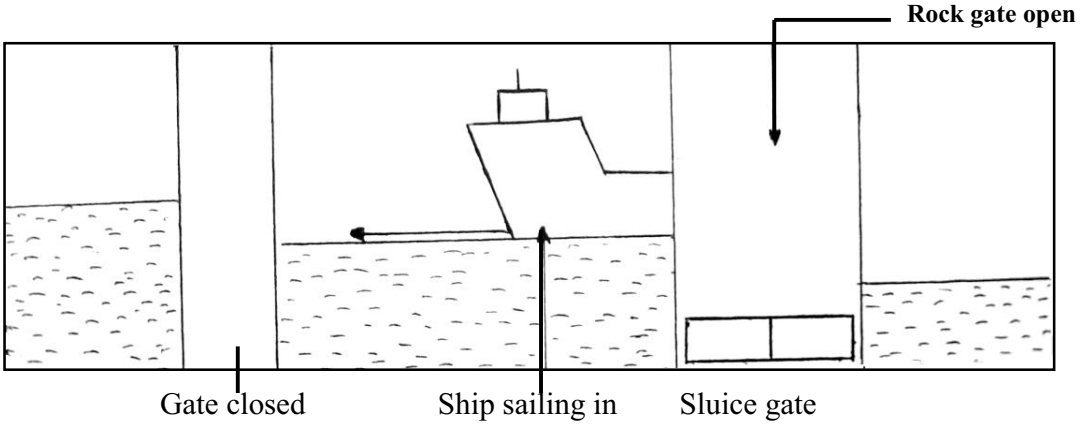
3. The rapids such as Lachine and Sault rapids were over come through the construction of dams and locks. These raised the volume of water so as to allow the ships to sail freely without any hindrances.

4. The lake and river freezing during winter season was solved through employing ice breakers which could crash ice.

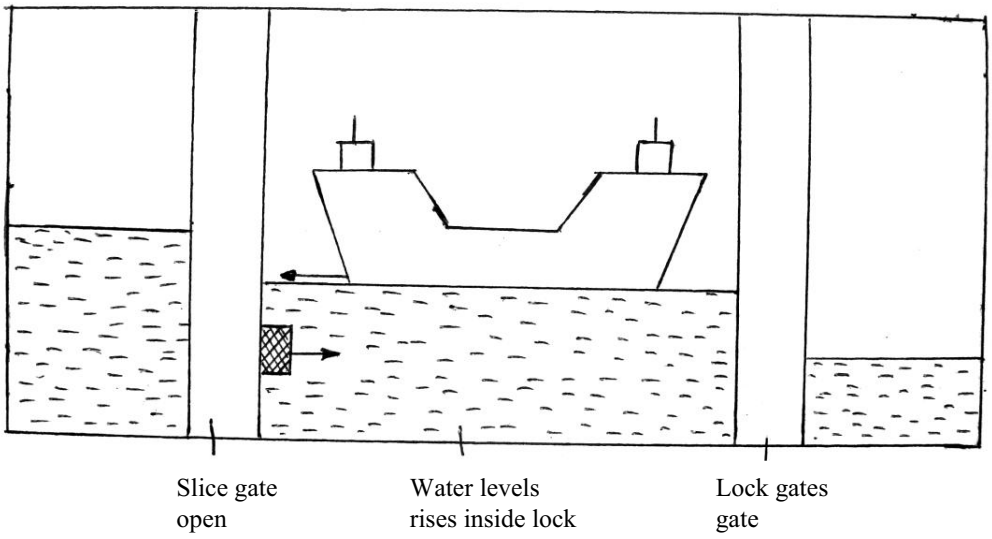
5. The construction of by-pass canals where there were water falls and rapids e.g the Welland Canal which by passes the Niagara falls a distance of 40km helped much in making transport possible.
6. Dredging of the silted sections of the river i.e f rom Kingstone to Mountreal to allow navigation of large ocean going vessels.

HOW LOCKS WERE CONSTRUCTED ALONG RIVER ST. LAWRENCE

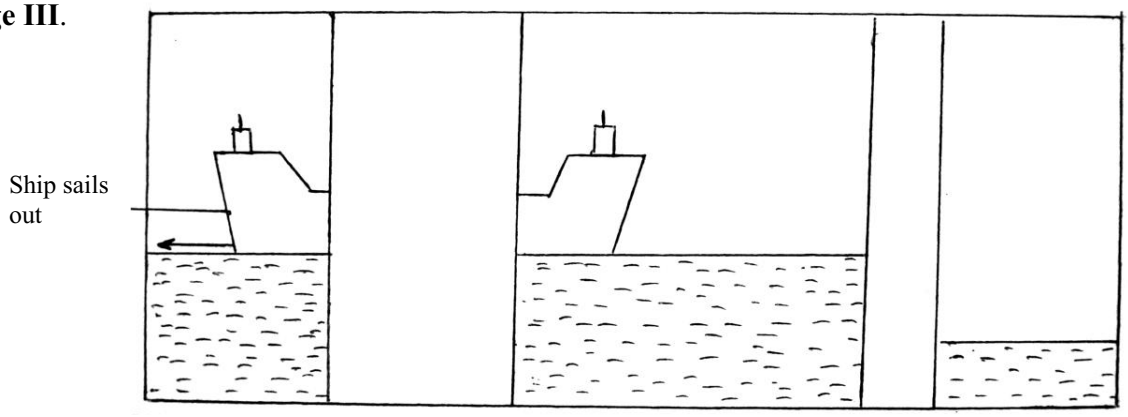
Stage I.



Stage II.



Stage III.



REASONS WHY U.S.A HAD OPPOSED THE IDEA OF THE CONSTRUCTION OF THE SEA-WAY

1. Initially U.S.A opposed the idea of the construction of the sea-way. This was because U.S.A wanted to maintain the profits it was getting through taxation on the imports and exports which were being handled by her port New York.

2. The American railway corporation that belonged to U.S.A also resisted the construction of the Sea-way. This was because for along period of time, this corporation had remained the only way through which both exports and imports of the Great lakes region were being handled. So the taxes that were being collected on the imports and exports were all being used by U.S.A alone.

3. The inland ports, like Montreal and Buffalo also opposed the idea of the construction of the sea-way, because once the sea-way was completed would make it possible for other ports to compete favorably with them and this would mean loss of profits on their side.

REASONS WHY LATER U.S.A ACCEPTED THE IDEA OF THE CONSTRUCTION OF THE SEA-WAY

U.S.A gave the following reasons as to why later accepted the idea of the construction of the Sea-way.

1. U.S.A had small ships which could sail without the sea-way.
2. U.S.A realized that once the Sea-way was completed, would render mineral deposits like Mesab Iron ore and Labrador cheap water transport.
3. U.S.A at the same time had a fear that if Canada constructed the Sea-way alone, then U.S.A would have to pay a lot of tolls.

PROBLEMS FACED BEFORE THE CONSTRUCTION OF THE SEA-WAY

1. There were many rapids and water falls on river St. Lawrence that used to hinder big ships to sail freely. This caused delays and wastage of time.

2. Too much floods which one time led to the destruction of six villages, towns as well as over fifty high ways including the Canadian National railway got drowned in the waters of the Sea-way which had flooded its banks.

3. Some parts of the Sea-way like those around Kingston and Montreal towns were narrow and shallow hence could not allow big ships to sail through.

4. Another problem was that of U.S.A and other ports like Montreal and Buffalo which had no interest in the construction of the sea-way. This delayed the work of construction.

5. Climatic conditions like winter freezing for over five months made navigation on river St. Lawrence and Lake Ontario very difficult.

6. Another serious problem was that of fog during summer seasons which used to make visibility difficult hence resulting into accidents.

7. There was also a problem of lack of appropriate funds to make it possible to combat various obstacles such as rapids and water falls along the sea-way for easy sailing of big ships.

SOLUTION TO THE PROBLEM THAT WERE FACED BEFORE THE CONSTRUCTION OF THE SEA-WAY

1. In areas where there were water falls and rapids, locks were constructed so as the water level could be raised to allow big ships to sail freely.
2. Dams in some places where the water level was low were constructed to raise the volume of the water along river St. Lawrence.

3. Canals were constructed to by pass water falls and rapids. E.g. Sault and Welland canals were constructed.
4. In some sections of River St. Lawrence where water was shallow, dynamites for blasting hard rocks were used to deepen the river.
5. During freezing, Ice breakers were employed to crash the Ice to clear the way for ships to sail through.

PROBLEMS STILL FACED ON THE SEA WAY.

1. The sea-way is still facing the problem of freezing during winter seasons from December to March every year.
2. There is still a problem of silting of river St. Lawrence which requires constant dredging.
3. There is still a problem of fog which affects visibility hence leading to delays.
4. The Sea-way is still facing a problem of too much wind which blows during summer seasons.

SOLUTIONS TO THE PROBLEMS IDENTIFIED ABOVE

1. The problem of congestion has been solved through making a time table for voyages and containerisation.
2. The problem of Ice freezing has been solved by employing Ice breakers which crash the Ice to make navigation possible.
3. The problem of silting has been solved through constant dredging of the river.
4. Automatic heaters to clear fog and melt ice have been employed.

ADVANTAGES REALISED AFTER THE CONSTRUCTION OF THE SEA-WAY

1. The construction of locks along river St. Lawrence raised the water level in shallow parts of the river hence making it possible for big vessels to sail freely.
2. Rocks that had existed in the course of the river were blasted and removed making the waters of River St. Lawrence deep for navigation.
3. In areas where rapids existed like the Lachine and the long Sault rapids, dams and canals were constructed to make navigation possible.
4. The industries that have developed along river St. Lawrence have increased employment opportunities to the people thus earning a desirable standard of living.
5. The construction of the sea-way led to the exploitation of mineral resources in the region, which later resulted into the development of industrial towns such as Buffalo, Montreal Quebec, Toronto and many others all along the sea-way.
6. Dams' construction controlled floods and at the same time increased Hydro Electric power supply in the area for domestic and industrial use.
7. The generation of Hydro electricity power (H.E.P) led to the growth of industries especially in the great lakes region.
8. The construction of the Sea-way led to improved agriculture within the Great lakes region and Canada. This was due to the development of Agro-based industries which now produce agricultural out put.
9. There was improved infrastructure in the Great Lakes region and Canada most especially in areas, which had experienced industrialization.
10. After the construction of the Sea-way, many tourists were attracted in the region as they visited major industrial areas and dams that were constructed.
11. It increased the exports for both Canada and U.S.A such as beef, timber wheat, minerals etc.

REVIEW QUESTIONS:

1. (a) Draw a sketch map of the St. Lawrence Sea-way on it mark and name the following:

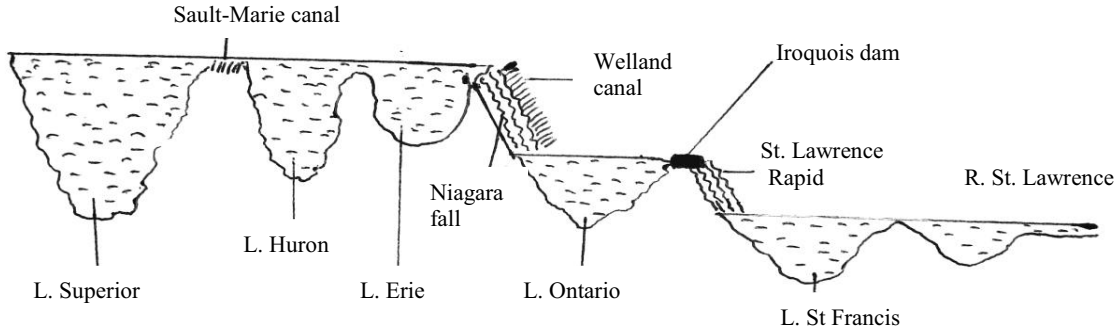
(i) L. Erie
(ii) R. St. Lawrence
(iii)Canals: Welland and long Sault.

(b) Explain why U.S.A did not have interest in the construction of the Sea-way.

2. (a) Draw a sketch map of the Great Lakes region on it mark and name;
(i) Industrial cities Chicago, Cleveland, Toronto and Detroit.
(ii) Ports: Duluth and Rochesta.
(b) (i) Explain the factors that led to the growth of industrial cities marked in 2(a)(i) above.
(ii)Identify the problems faced by these industrial cities mentioned above.
(c) Explain why the canals such as Welland and Sault Saint Marie were constructed.
(d) Explain the contributions of the Great lakes to the surrounding areas.

THE GREAT LAKES REGION

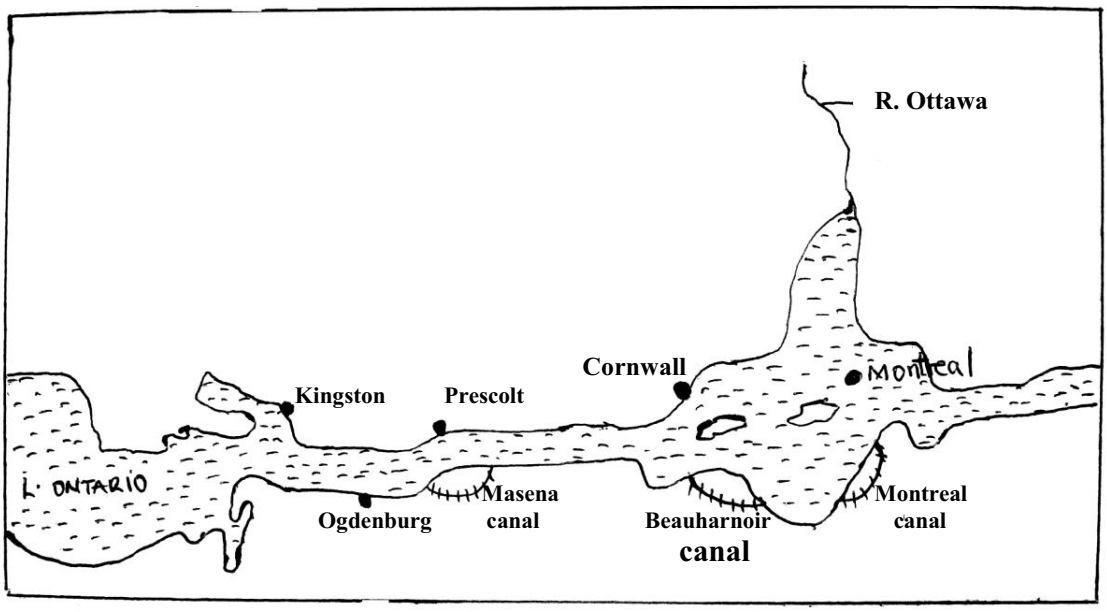
A CROSS – SECTION OF THE GREAT LAKES



MAJOR INDUSTRIES FOUND IN THE GREAT LAKES REGION

There are a number of industries found in the Great lakes region and these include;
(i) Iron and steel industry (ii) Generators (iii) Water pipes
(iv) Bicycle manufacturing (v) Television and Radio manufacturing industries
(vi) Motor manufacturing industries (vii) Ship building industries
(viii) Air craft manufacturing.

MAJOR TOWNS AND LOCATED ALONG THE SEA-WAY



FACTORS THAT LED TO THE GROWTH OF INDUSTRIES IN THE GREAT LAKES REGION

There are a number of factors that paved way for the development of industries in the great lakes.

1) The existence of abundant mineral resources e.g. Iron ore deposits along the great lakes most especially around L. Superior; this attracted the growth of industries particularly manufacturing industries like Iron and steel rolling industries.
2) Another important factor to note is the availability of cheap water transport which made the transportation of mineral resources from the mining areas to processing and manufacturing places possible.
3) The existence of a variety of coal fields in the Appalachian Mountains which are the source of power needed by industries attracted many industries in the great lakes region hence industrial growth.
4) Availability of skilled and non skilled man power used in the mining areas also led to the growth of industries in the great lakes region.
5) Ready market for industrial manufactured goods within and outside especially in the Western European countries strengthened the growth of industries in the region.
6) Government policy in relation to the establishment of industries was indeed favourable. The governments of U.S.A and Canada offered loans to industrial investors. This enabled many industries to take off.
7) Availability of adequate funds used in mining minerals as raw materials needed in the industrial inputs and pay workers etc.
8) Political stability in the region also enabled many industries to take off in the great lakes region.

EFFECTS OF THE CONSTRUCTION OF THE SEA-WAY IN THE GREAT LAKES REGION

1) Transport was improved as cheap water transport came to use where the exportation and importation of bulky industrial raw material and manufactured goods became easy.
2) The surrounding areas became heavily settled as many people came in search of social amenities such as good transport, employment opportunities etc.
3) After the construction of the sea-way, the great lakes region became a very great tourist centre in the whole of North America hence bringing in a lot of foreign exchange.
4) There was development of agriculture in the region as a result of agro-based industries which needed agricultural raw material to be processed into agricultural out put.
5) The development of industries in the region reduced on the problem of unemployment. Many people got employed in these industries.
6) Trade relationships between North America and the out side world were improved as the communication in the region through the sea-way became very easy.
7) Mineral exploitation in the region was encouraged as many of the mineral deposits were accessible due to the construction of many roads and railway lines leading to many ports.
8) The formation of Lake St. Lawrence in the region after the construction of dam along river St. Lawrence encouraged fishing.
9) It led to diversification of the U.S.A and Canada's economy.
10) The construction of the sea-way led to the development of many industrial towns such as Cleveland, Detroit, Buffalo Chicago etc.
11) It led to the development of infrastructure such as roads railway lines etc.
12) There has been generation of large quantities of hydro electricity power.
13) There has been developement of mining of various minerals e.g Iron ore.

PROBLEMS FACED BY THE INDUSTRIAL SECTOR IN THE GREAT LAKES REGION

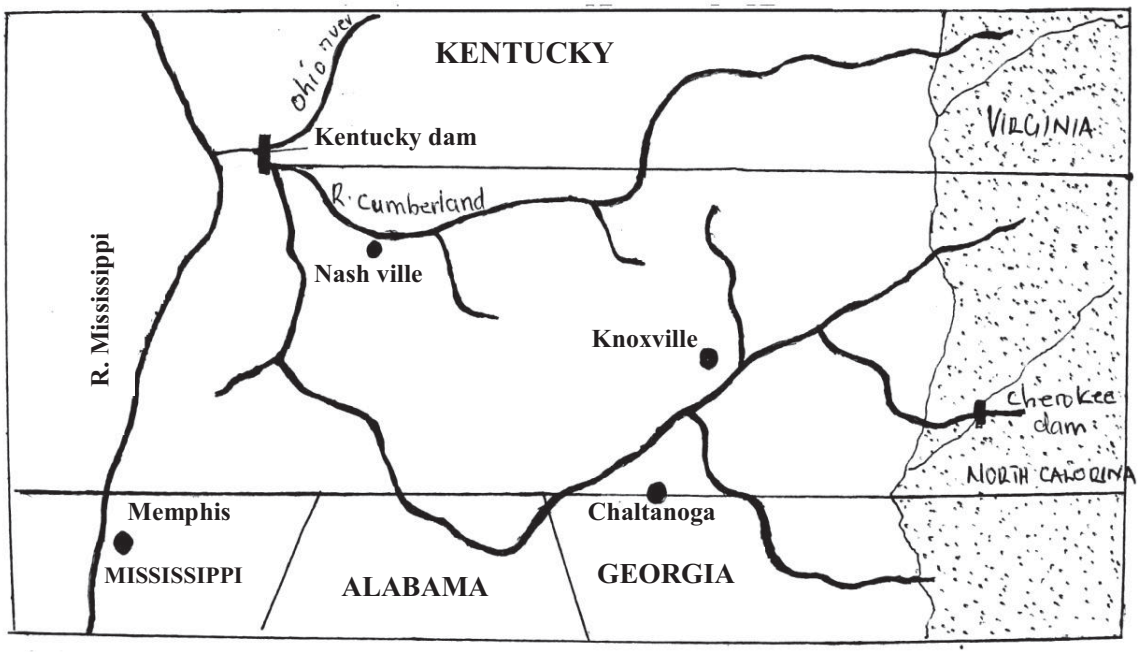
1) One of the problems faced by the industrial towns along the sea-way was the exhaustion of some mineral resources used in many industries as raw materials. Minerals like Iron Ore, Copper and Coal etc.
2) Competition from other producing countries of the world which manufacture goods at relatively cheaper prices, countries like China, Japan etc. This effect has led many industries almost moving out of the production process.
3) Another problem faced is that of the changes in Technology, tastes and fashion and as a result of these, some firms closed hence causing unemployment problem.
4) Like any other industrial region, these towns have faced a problem of both water and air pollution which has resulted into many people contracting lung cancer.
5) There has been a problem of too much congestion in these industrial towns which has led to the competition among the industrialists over the available resources.
6) Market research for the industrial goods produced within North America and outside. The market research is very costly and its one of the problems facing industrialists in the great lakes region.
7) Labour supply in these industrial areas has gradually become very expensive because labour is highly trained which results into high production costs.
8) There has been a problem of lack of space for expansion, especially in the industrial towns along the sea.
9) Price fluctuation on the world market due to duplication of industrial products.

THE TENNESSEE VALLEY AUTHORITY

The Tennessee Valley Authority (T.V.A) is a cooperation which was formed to rehabilitate the region of the seven states. These states include Tennessee, North Carolina, Georgia, Kentucky, Alabama, Mississippi and Virginia. This is a region drained by river Tennessee and its tributary river Ohio.

The Tennessee Valley Authority was a body which was established by consulting skilled people like economists, engineers, technicians from U.S.A in 1930 to solve the problems of the Tennessee Valley.

THE REGION DRAINED BY TENNESSEE RIVER





Town

River

Dam

Appalachian Mountain

PLANS FOR DEVELOPMENT OF TENNESSEE VALLEY

Putting into account the numerous problems identified, the Tennessee Valley Authority was set up 1933 with the following aims:

1) To control floods along river Tennessee. Floods during rainy seasons before the T.V.A was established used to destroy people′s lives and property.
2) It was also aimed at developing the Tennessee River for navigation as transport in the valley was very difficult and yet river Tennessee could provide a better alternative.
3) Tennessee Valley Authority aimed at producing Hydro Electricity power to the people of the Valley through construction of numerous dams along river Tennessee such dams like Guntersville, Fontana, Pickwick, Wilson, Kentucky etc were constructed.
4) Soil conservation was one of the aims for the establishment of the T.V.A with the aim of increasing agricultural out put.
5) Another aim for the establishment of the T.V.A was to carry out afforestation in an attempt to protect the reclaimed areas from further damage.
6) As a result of too much soil erosion experienced in the valley, the T.V.A aimed at educating the local people better methods of farming.
7) More to that above, the T.V.A also intended among other reasons to improve on transport facilities in the valley and many roads and railway lines as a result were constructed.
8) The T.V.A also aimed at promoting industrial development in the valley as this could be a better remedy in fighting unemployment problem in the area.
9) There was need for combating the problem of population explosion in the valley so, the T.V.A was established with the aim of teaching the local people family planning methods as a measure of reducing on rapid population growth.
10) As the valley used to experience too much Bilharzia, Malaria, etc were a problem so the T.V.A was also to control the mentioned diseases in the valley.

PROBLEMS FACED BEFORE THE ESTABLISHMENT OF THE TENNESSEE VALLEY AUTHORITY

1. Before 1993 when Tennessee Valley Authority had not been established, the Tennessee valley faced a problem of floods which led to the occurrence of various human diseases such as Bilhazia, Malaria etc
2. The Valley faced a problem of severe soil erosion due to settlement of the farmers on the steep slopes of the valley and at the same time deforestation.
3. Before the establishment of the T.V.A, the valley was facing a problem of unemployment. This was due to high population increase in the valley.
4. Another problem faced before the T.V.A was established was the shallow Tennessee river channels which could not hold water during rainy season, hence resulting in severe flow of the river over its banks.
5. Another problem faced before T.V.A was that of inadequate accommodation which resulted from very high population increase in the valley.

SOLUTIONS TO THE PROBLEMS FACED IN THE TENNESSEE VALLEY BEFORE THE ESTABLISHMENT OF THE TENNESSEE VALLEY AUTHORITY

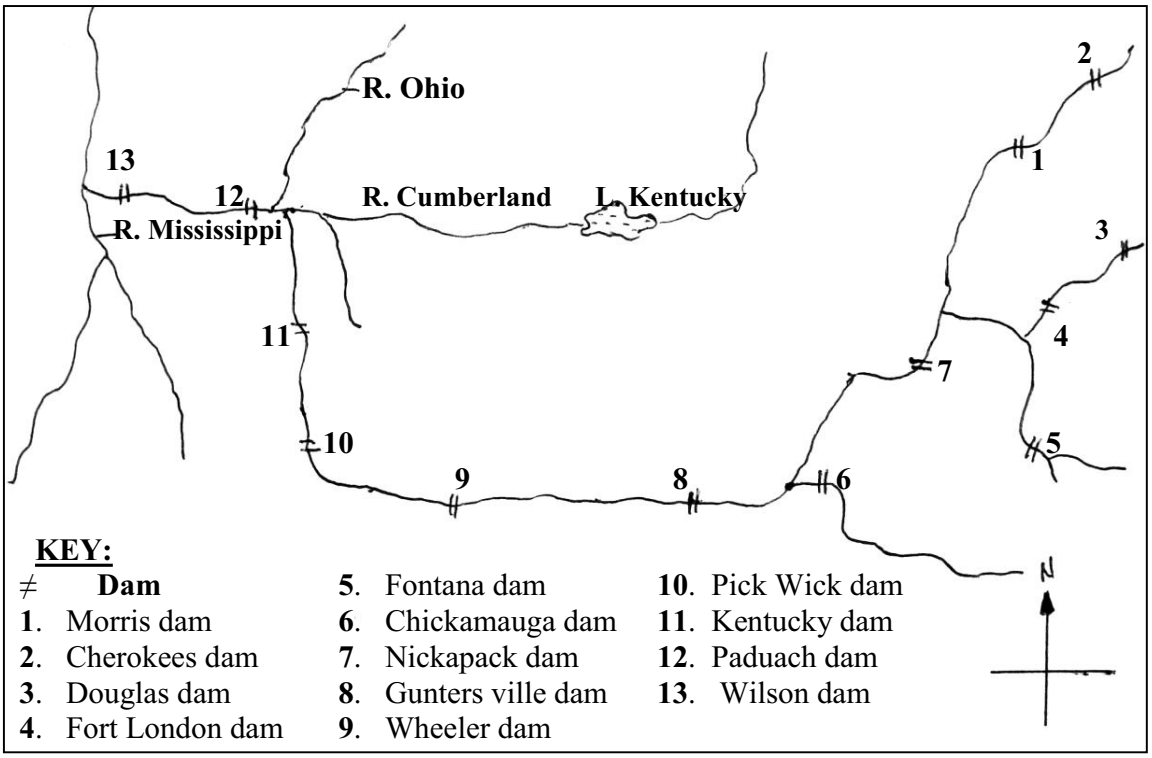
1. The problem of water floods in the valley was solved through dam construction. These dams acted as reservoirs to store water in rainy seasons in an attempt to control floods.
2. In areas where soil erosion was so severe, better methods of farming were introduced e.g. terracing of the land, strip cropping, contour ploughing, mulching and application of fertilizers to bind the soil particles together so as to reduce on the run off.
3. Afforestation was carried out along slopes to reduce the run off caused by too much rainfall supported by deforestation.
4. Demonstration farms were established to teach the local masses over the new methods of farming etc.
5. Many industries were set up in the valley to solve the problem of unemployment.

BENEFITS OF THE TENNESSEE VALLEY AUTHORITY TO THE PEOPLE OF THE VALLEY

There were a number of benefits realized after the establishment of the Tennessee Valley Authority.

1. The people of the valley realized employment opportunities after the establishment of the Tennessee Valley Authority through development of tourism industry, agro-based industries, extraction and manufacturing industries.
2. Floods were controlled through the construction of numerous dams which store water during rainy seasons.
3. Better soil conservation methods were introduced to the people of the valley such as contour ploughing, re-afforestation there by controlling the problem of soil erosion.
4. The establishment of the Tennessee Valley Authority acted as a model to the development of other places with similar problems.
5. Transport in the Valley was improved after making navigation of river Tennessee possible and today big bergs can sail on artificial lakes following river and move many miles to Knoxville.
6. The construction of dams which controlled floods also solved the problem of diseases such as Malaria brought by mosquitoes hence improving the peoples' health standards of living in the valley.
7. The establishment of the Tennessee Valley Authority encouraged mining in the valley e.g. at Chattanooga Valley, alluminium is mined and smelted at Acoa the largest alluminium rolling industry in the valley.

MAJOR DAMS IN THE TENNESSEE VALLEY REGION



KEY:

≠ Dam		
1. Morris dam	**5**. Fontana dam	**10**. Pick Wick dam
2. Cherokees dam	**6**. Chickamauga dam	**11**. Kentucky dam
3. Douglas dam	**7**. Nickapack dam	**12**. Paduach dam
4. Fort London dam	**8**. Gunters ville dam	**13**. Wilson dam
	9. Wheeler dam	

REVIEW QUESTIONS:

1.(a) Draw a sketch map of the area covered by the Tennessee Valley Authority and on it mark and name;

(i) The Appalachian Mountains.

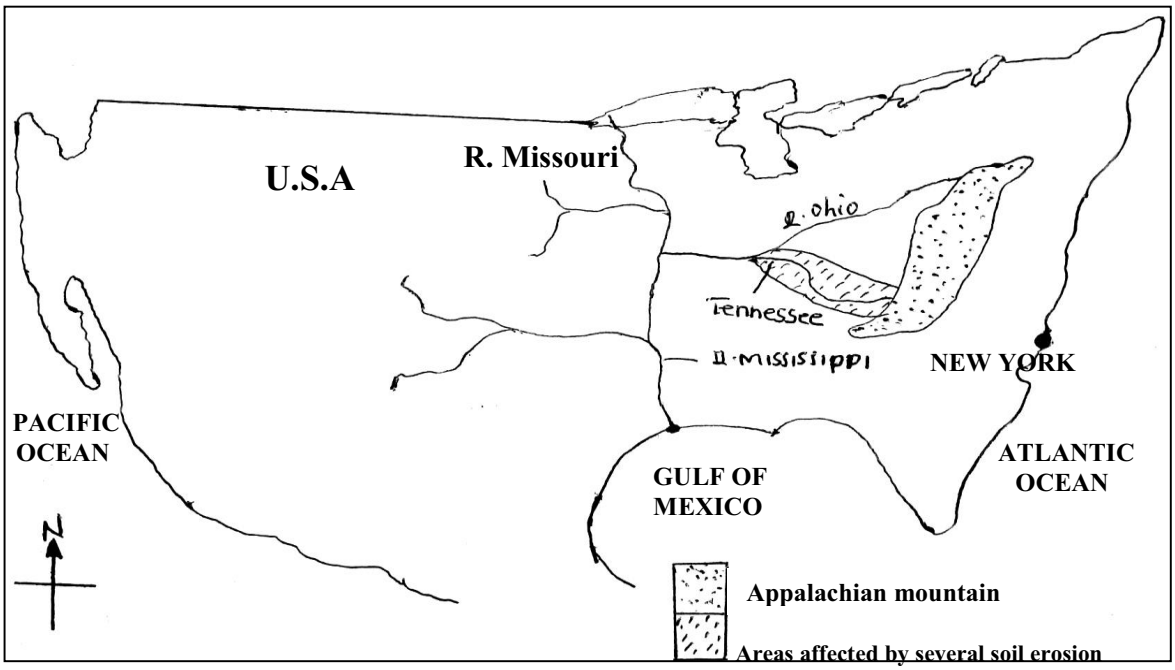
(ii) Rivers: Tennessee, Mississippi and Ohio

(b) Give reasons why the Tennessee Valley Authority was established in 1933.

(c) Identify the benefits of Tennessee Valley Authority to the people of the area.

(d) Explain how the problem of soil erosion in the Tennessee Valley region was solved.

AREAS AFFECTED BY SEVERE SOIL EROSION IN THE TENNESSEE VALLEY REGION



SOIL CONSERVATION MEASURES IN THE TENNESSEE VALLEY REGION

Many ways were advanced in order to conserve soil in the valley and below were some of the conservation measures:

(a) Mixed farming was practiced. This is the growing of crops and rearing of animals, where the animals' wastes were used as manure in the area already affected by soil erosion and become exhausted.
(b) In some areas of the valley region where soil erosion was too much, cover crops like creeping plants such as Kudzu which enrich the soil with nitrogen were planted.
(c) Gulleys that were created by soil erosion were blocked with brush wood faggots to trap the soils and stones that would be eroded away by the run off.
(d) Contour ploughing was also one of the methods that were put in place to conserve soil from further damage.
(e) Another soil conservation measure was that of re-afforestation in areas where trees had been cut to restore new ones so as to reduce on soil erosional problems.
(f) There was terracing of the valley steep slopes where the slopes were cut and reduced a certain low gradient so as to curtail the rate at which the run off moves down valley.
(g) Strip cropping was also practiced. Here different crops were planted in alternating parallel strips to ensure that no piece of land is left bare exposed to agents of soil erosion.

CAUSES OF SOIL EROSION IN THE TENNESSEE VALLEY REGION

Soil erosion in the Tennessee Valley region was caused by a number of factors and these below were some of them.

1) High population growth rate led to the clearance of forests along the valley slopes as a lot of land for agriculture and settlement was needed hence living many land surfaces exposed to agents of soil erosion.

2) The Tennessee Valley region used to receive heavy rainfall, which could erode the bare land surfaces.
3) The over cultivation of land, more over practicing mono-cultural farming systems in the Tennessee Valley accelerated soil erosional activities in the region.
4) The relief of the Tennessee Valley which composed of relatively hilly landscape where soil on this nature of land could easily be eroded away whenever the area received too much rainfall.
5) Another cause of soil erosion in the Tennessee Valley region was that of high rate of illiteracy among the local inhabitants.
6) The application of poor farming techniques left some slopes and the lower Tennessee Valley barren hence paving way for soil erosion in the region.

REVIEW QUESTIONS:

1. (a) What is soil erosion?
(b) Explain the factors that were responsible for soil erosion in the Tennessee Valley region before the establishment of the T.V.A.
(c) How were the problems of soil erosion in the Tennessee valley region stemmed up after the establishment of the T.V.A.

2.(a) Draw a sketch map of the Great Lakes region and St. Lawrence Sea on It, Mark and name;
(i) Towns: Dulluth, Thunder bay and Montreal.
(ii) Canals: Sault St. Marie and Wellland Canals
(iii) Lakes: Superior and Ontario
(iv) R. St. Lawrence.

(b) Describe the steps being taken to improve navigation on the great lakes and St. Lawrence River.
(c) Explain the benefits realized after the construction of the St. Lawrence Sea-way to the people of the great lake region.

(d) State the problems which still limit navigation on the sea-way.
(e) Explain the step being taken to the problems identified in (2) (d) above.

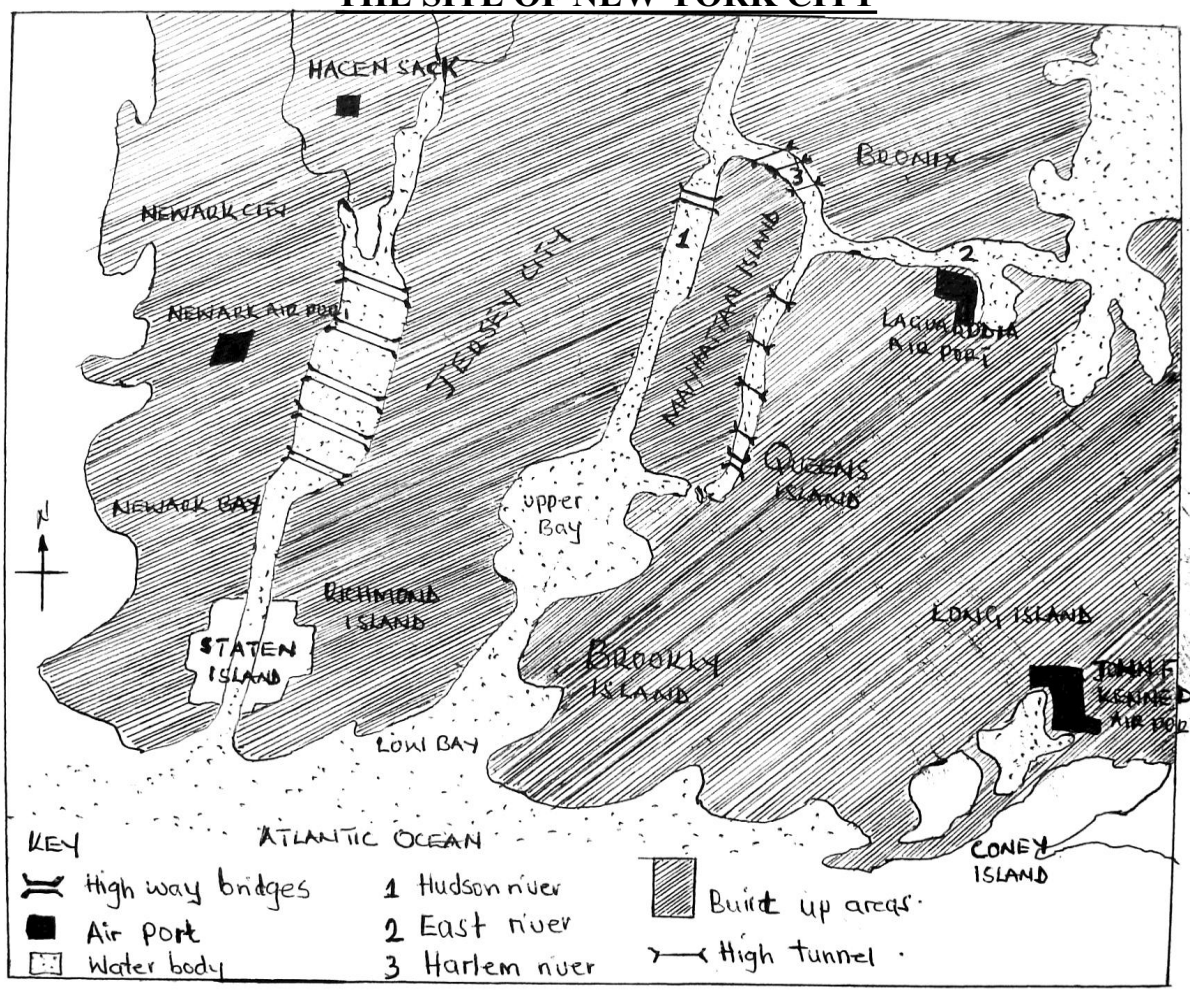
3. (a) What is St. Lawrence Sea-way.
(b) Describe the problems faced before the construction of St. Lawrence Sea way.
(c) Outline the reasons why U.S.A had opposed the idea of the construction of the sea-way.
(d) Give reasons why U.S.A later accepted the idea of the construction of the Sea-way.

NEW YORK CITY

New York is a North American city and is one of the largest urban centers of the world. This city is composed of five major islands and these are:-

1. Manhattan Island
2. Brookly Island
3. Bronix Island
4. Richmond Island
5. Queens Island.

THE SITE OF NEW YORK CITY



FACTORS THAT FAVOURED THE DEVELOPMENT OF NEW YORK CITY

1. The existence of hard crystalline rock over which the sky scrappers were built e.g. the empire state building with 102 storeys. This highly contributed to the development of New York since they are self contained.

2. New York had large market potential for the industrial goods. This was because of high population, this attracted many foreign investors in the city hence development.

3. Unlike other cities of the world, the development of New York City has been due to industrial development.

4. Another important factor which accelerated the development of New York was water supply for domestic and industrial use.

5. Transport and communication also paved way for the development of New York City.

FACTORS THAT FAVOURED THE DEVELOPMENT OF NEWYORK PORT

1. New York port developed more rapidly because of its natural harbour right away from the beginning. New York Port collects a lot of revenue on imports and exports handled by New York port.
2. New York is free from ice conditions and it is never blocked by ice conditions. This makes New York a busy port throughout the year round hence development.
3. It is connected to the interior by a cheap and short route to the great lakes region.
4. The port of New York has water which allows ships carry heavy cargo to sail freely.
5. Another important point to note that led to the growth of New York as a port was that of being sheltered from strong wind/waves of the Atlantic Ocean.
6. New York developed because of its geographical location. It is located on Hudson-Mohawk gap which is an important inlet to one of the richest hinterlands in the whole world.
7. New York has deep water in its channels which allows very big ships carrying oil to anchor.
8. New York has easy means of communication to the main land through Hudson Mohawk gap across the Appalachian Mountains.
9. The flat nature of New York facilitates the construction of the port facilities.
10. New York port has low tidal ranges which can not affect the movements of the ships at any time of the day.

PROBLEMS FACING NEW YORK CITY

1. New York City faces a problem of Traffic congestion due to very many vehicles in the city. It is too much during rash hours i.e. morning and evening hours hence making the movement of people from one place to the other very difficult.
2. Air and water pollution are common serious problems brought about by many vehicles and industries which pollute the environment. Industrial wastes discharged in water bodies also pollute water life.
3. The city also faces a problem of high crime rate as many people of different cultures and Characters move from rural areas to urban centers in search of special amenities like job opportunities and once they fail to be absorbed in the labour market, they resort to bat acts e.g. robber, prostitution which are a menace to the city.
4. Another serious problem facing New York is that of slum development. These are poorly built residential houses which develop on the out skirts of the city. These areas tend to have unhealthy living conditions.
5. The city faces a problem of racial discrimination which results into enmity amongst the city inhabitants thus misunderstandings leading to unlawfulness.
6. As a result of rural-urban migrations, the city is now facing a problem of lack of space and accommodation.
7. New York faces a problem of fog during some specific seasons and this brings some air ports to a stand still.
8. There is a problem of unemployment in the city and this is due to high population increases in the city.
9. New York faces a problem of land shortage and it cannot expand because of water which surrounds the Islands making the expansion very difficult.
10. There is a problem of people communicating from Manhattan Island to other Islands and yet bridges and tunnels are very costly.

SOLUTIONS TO THE PROBLEMS FACING NEW YORK CITY

1. The problem of lack of space has been solved though constructing storied buildings and sky scrappers.
2. Many New industries have been built to create more job opportunities to overcome the problem of unemployment.

3. The government of U.S.A has constructed cheaper and better houses to accommodate low-income earners in an attempt to solve the problem of slum development.
4. The problem of high crime rates has been solved through re-enforcing police and creation of more job opportunities to the redundant people.
5. The problem of pollution has been minimized through reducing the number of vehicles used on the city's main roads and purification of the industrial wastes before they are discharged.
6. There has been political campaign against racial discrimination.
7. Under ground tunnels have been constructed in a bid to fight traffic jam in the city.
8. More on the problem of unemployment and slum development in the city which come as a result of high population, the government of U.S.A has restricted on the number of people migrating into the city.
9. The waste products from industries are recycled into useful products.

FUNCTIONS OF NEW YORK CITY

New York being the largest city in North America plays the following functions.

1. New York plays the function of being the largest port second to Rotterdam port of Netherlands. It handles more than a half of U.S.A's exports and imports.
2. It plays the function of being the biggest stock exchange on the Wall Street where many large companies have been attracted to establish their headquarters there.
3. New York is a cultural and educational centre with a number of museums and universities.
4. It is the largest industrial city second to Tokyo of Japan in the whole world.
5. It plays the function of being the centre of leisure activities e.g. there are concert halls, night clubs, Opera houses, theatres, cinemas etc where people go during their leisure time.
6. New York plays the function of being an administrative and commercial centre where administrative and commercial activities are being carried out in the city.
7. New York unlike other worldly cities is a transport centre with many international air ports which include Daguardia air port, Hacen air port, etc. John F. Kennedy air port alone contains five main runways and 140 landing bays for air crafts, nine, aeroplanes per hour land or take off during busy early evening hours and it handles more that 7 million passengers each year.
8. New York plays the function of being a world's political centre with the headquarters of United Nations Organisation (UNO).

THE HUDSON MOHAWK GAP

This Gap is in Appalachian Mountains formed by rivers Mohawk and Hudson. It is the easiest and the cheapest route through the Appalachian Mountains.

FUNCTIONS OF THE HUDSON MOHAWK GAP

1) It's linked by many roads and railway lines thus making the exportation and importation of goods easy.
2) This route is used by Canada and other ports along St. Lawrence Sea-way during winter Seasons which take four months freezing.
3) It links New-York to rich industrial and agricultural areas of mid west U.S.A.
4) This route is never affected by ice conditions.

INDUSTRIES IN NEW YORK

Industries in New York are categorized into two:

(i) Light Industries
(ii) Heavy industries

(i) Light Industries in New York include textiles and clothing, printing and publishing industry, food processing industry. Many of these industries are found in Manhattan Island.

(ii) Heavy industries include chemical, Oil refineries, ship building and repair, railway workshop, copper smelters etc. These industries are common in Newark and Jersey cities.

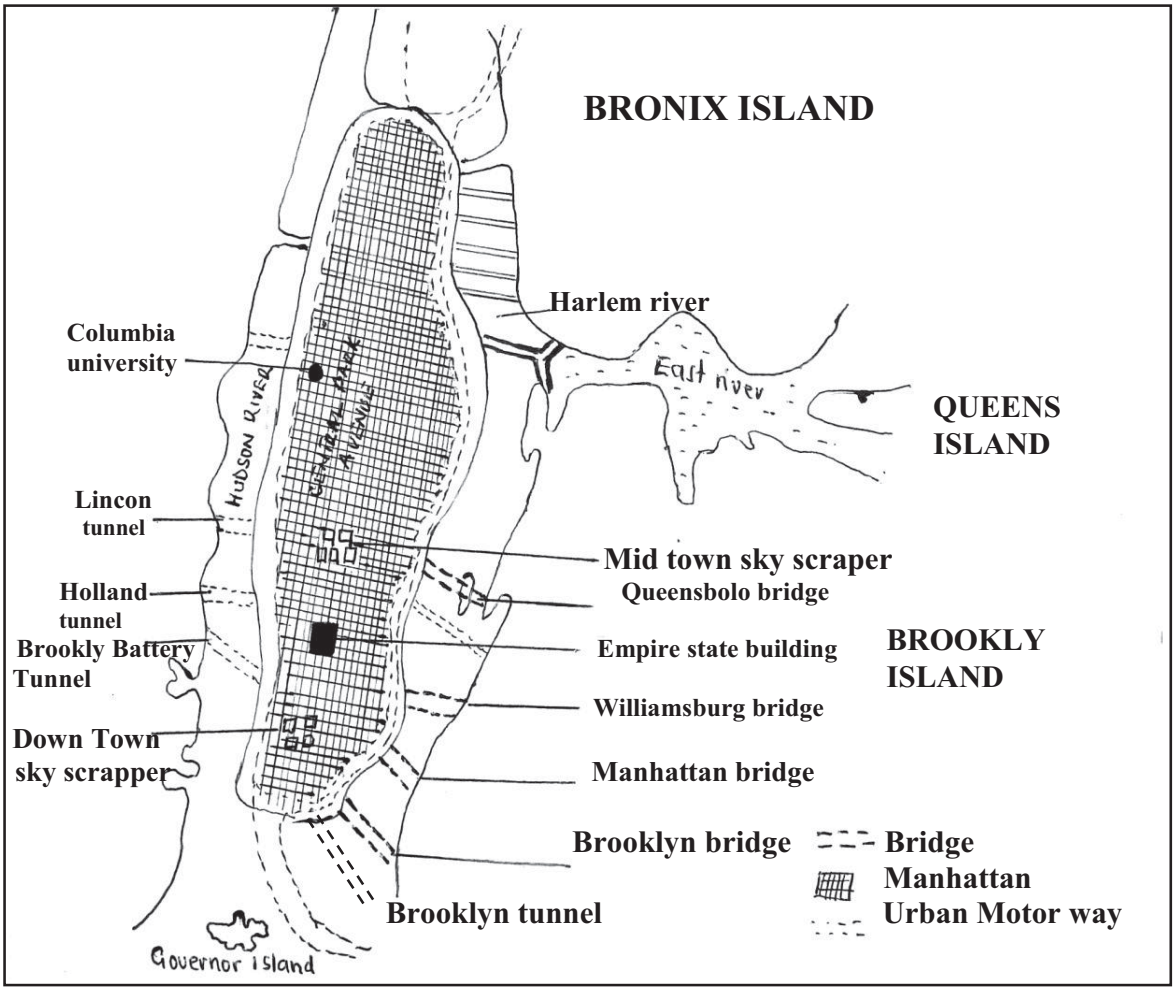
CHARACTERISTICS OF HEAVY INDUSTRIES

1. They are capital intensive
2. They use a lot of power
3. They operate on large scale
4. They employ very many people
5. They use metallic raw material e.g. Iron ore
6. They produce a lot of waste products etc.

FACTORS THAT HAVE FAVOURED THE DEVELOPMENT OF INDUSTRIES IN NEW YORK

1. Availability of skilled labour supply to work in industries.
2. Presence of sufficient raw materials required by industries to produce finished goods.
3. Availability of abundant water supply for industrial use e.g. as a mixture and coolants.
4. A ready market both at home and abroad for manufactured good.
5. Availability of adequate capital to buy raw materials and pay workers.
6. The existence of reliable power supply to run the machines.
7. Presence of advanced technology to produce goods.
8. Well developed means of transport to transport goods from manufacturing places to market centres.
9. Good political atmosphere to enable the manufacturing activities to take place.

THE SITE OF MANHATTAN ISLAND



REVIEW QUESTIONS:

1. Draw a sketch map of New York on it mark and name

(a) Islands: (i) Long island
(ii) Governor's Island
(iii) Bronx Island.

(b) Rivers: (i) Harlem
(ii) Hudson
(iii) East river

(c) Describe the conditions that have favoured the development of New York as a port.
(d) (i) Identify the problems facing New York port.
(ii) State the possible measures taken to solve the problems already identified in (d)(i) above.

2.(a) Outline the functions of New York city.
(b) List down the products from Africa being handled by New York port.
(c) Explain how land shortage problem in New York has been over come.

3.(a) Explain the factors that led to the development of New York as a port.
(b) Describe the problems facing New York City
(c) State the solutions to the problems identified in 3(b) above.

THE SOUTHERN U.S.A

This region consist of states like Georgia, Florida, Louisiana, Texas, Alabama, Arkansas, South and North Carolina, Mississippi, etc.
The major economic activity in this region is cotton growing.

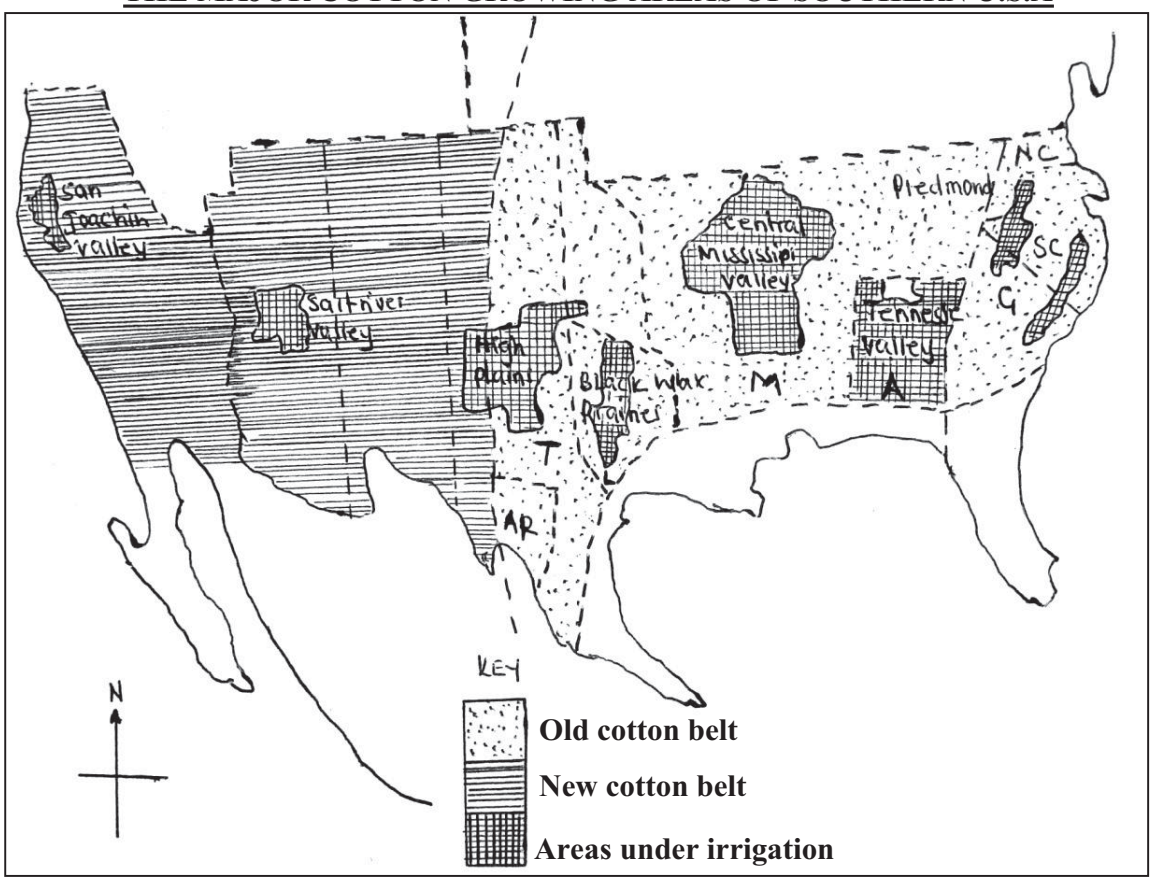
THE COTTON BELT

The cotton belt is divided into two:
(i) The old cotton belt
(ii) The New cotton belt

This belt is sometimes referred to as the inland south, the Old South, the Bible belt or the cultural south.
The cotton belt has been changing formally from East to West. It has been changing from states of Georgia, Florida, Louisiana Texas, Alabama, Arkansas, Carolina, Mississippi to states like Oklahoma, Kansas, Nebraska, Arizona, California West wards.
As early as the 18^{th} century, cotton growing was the major activity as a result of the development of the textile industry.

This area has humid subtropical climate. Rainfall in this region decreases west wards. Cotton growing has been shifting from East in the Old Cotton belt to the New Cotton belt in the West.
Other crops grown in the South include Tobacco, Sugar cane, Maize etc.

THE MAJOR COTTON GROWING AREAS OF SOUTHERN U.S.A



KEY:

NC - North Calorina	**SC** - South Calorina	**G** - Georgia	**A** – Alabama
M – Mississippi	**L** - Louisiana	**T** – Texas	

FACTORS WHICH FAVOURED COTTON GROWING IN SOUTHERN U.S.A

1. Cotton growing was favoured by good climatic conditions, the wet season in the early growing period and the sunny weather conditions during the harvesting period.
2. The fertile soils e.g. the alluvial soils of the Mississippi flood plains attracted cotton growing.
3. Availability of cheap labour supply especially during growing and harvesting period.
4. Absence of strong winds which could destroy the cotton boll before they are mature.
5. The use of high technology used in farming activities e.g. irrigation where rainfall is scarce hence ensuring cotton production throughout the year.
6. The arid conditions which were not suitable for the multiplication of pests and diseases in some states like California making the area free from diseases and pests.
7. Availability of wide market potential for the cotton produced attracted many people to grow cotton in the area.
8. The share cropping system at the time made it a success since the tenants were very poor where, land lords provided machinery, seeds and houses and tenants gave half of their produce to the land lords making cotton growing possible.
9. The introduction of modern machinery soon after the freeing of slaves further made it a success of cotton growing in the Southern U.S.A
10. Availability of vast land over which extensive farming was carried out made cotton growing possible.

THE COTTON GROWING SYSTEMS:

There three major cotton growing systems and these include;
(i) Plantation farming system
(ii) Mechanical farming system
(iii) Share crop farming system.

(i) Plantation farming system: This is a system where cotton is grown on a large scale. It is owned by one person and run by slaves.
(ii) Mechanical system: This is a system where machines have replaced slaves. This was due to the discovery of cotton pickers and share croppers.
(iii) Share cropping system: This is a system where plantations were divided up into small plots and these plots were given to slaves to cultivate them after the crops are shared between slaves and landlords.

REASONS FOR THE DECLINE OF COTTON GROWING IN THE OLD COTTON BELT

1. The fluctuation of cotton prices on the world market discouraged many farmers to continue growing.
2. Soil exhaustion due to mono-cropping system practiced in the old cotton belt led to low yields and discouraged the cotton producers.
3. Pests and diseases in some states attached the crop leading to low yield such diseases and pests included cotton boll weevils and cotton Steiner.
4. The strong winds such as the hurricanes led to the destruction of the crop hence resulting into low production.
5. The crop faced a problem of competition from synthetic fibres, this posed a serious threat to the production of cotton in the old cotton belt.
6. Poor climatic conditions due to too much rainfall in the East than the required amount of rainfall led to poor lint discouraging the farmers.
7. Another serious problem that was responsible for the decline of cotton production in the East was the labour shortage after the slaves were freed.
8. Soil erosion in East due to heavy rainfall left the soils very infertile affecting the production.
9. The government policy of diversifying the economy and construction of many industries led to the decline in cotton production as many farmers became industrialists.

STEPS TAKEN TO IMPROVE ON THE SOCIAL ECONOMIC CONDITIONS OF THE PEOPLE IN THE OLD COTTON BELT

1. Afforestation program was put in to reduce on the soil erosional problems.
2. Many industries were constructed to offer employment opportunities to the people who had become jobless after the shifting of cotton growing to the West.
3. New methods of farming such as inter-cropping that could conserve soil fertility.
4. Introduction of mechanization to reduce on labour shortage problem.
5. After the shifting of cotton growing westward, ranching schemes in East were set up.

USES OF COTTON

1. Lint from cotton is used in making of clothes.
2. Cotton residue is used in the manufacture of animal feeds.
3. Cotton seeds after crushed are used in the manufacture of soap and cooking oil
4. It earns the government with foreign exchange
5. It is used in the manufacture of cellulose. This substance is used in making plastic materials, paper etc.

FACTORS WHICH LED TO THE SHIFTING OF COTTON GROWING FROM EAST (OLD COTTON BELT) TO WEST (NEW COTTON BELT)

1. There was a lot of rain in the East which used to destroy the cotton bolls as opposed to the West where rainfall was moderate to allow cotton grow well.
2. The damp climatic conditions in the East were responsible for the multiplication of pests and diseases e.g. the cotton boll weevils, cotton Steiner and the pink boll worms which used to destroy the crop. This forced many farmers to shift West wards where the area was still free from pests and diseases.
3. The exhaustion of soil fertility in the East accelerated the shifting of Cotton growing from East to West.
4. The sunny weather conditions in the West for quick ripening of the cotton bolls paved way for the shifting of cotton growing from East to West.
5. The severe soil erosion in the East which was due to heavy rainfall and mono-cultural systems led to low yields forcing farmers to look for new areas which are not affected by soil erosion.
6. The American civil wars of 1861 – 1865 which led to the destruction of many cotton plantations in the States of Georgia and California forced many farmers to shift West wards.
7. The new Cotton belt had fairly flat landscape where mechanization could be practiced.
8. Presence of fertile virgin land in the West.

REVIEW QUESTIONS:

1.(a) Draw an outline map of U.S.A on it mark and name the following:
   (i) Appalachian Mountains
   (ii) River Mississippi
   (iii) The old and new Cotton Belts.

   (b) Describe the factors which led to successful cotton growing in the old cotton belt.
   (c) Give reasons why the new cotton belt became more important than the old cotton belt.
   (d) Compare methods of cotton growing in the new cotton belt with those of yours.

2.(a) What were the causes of the changing of land use pattern in the cotton belt?
   (b) What have been the impacts of these changes?
   (c) List down two states from each of the cotton belts.

THE RISE OF MANUFACTURING IN THE COTTON BELT

The presences of minerals such as coal, Iron ore, oil, forestry resources and agricultural resources of all types in the far East and fisheries have led to the development of different manufacturing industries and these include;

1. Agro-based industries such as textiles, food canning industries and those making drinks like beer, wine etc have been established in the area.
2. Pulp and paper industries which have a basis on the exploitation of forestry resources are now established in the Cotton belt.
3. Chemical and oil refining industries which have a basis on the existence of petroleum products hence attracting many industries processing the oil products.
4. The fishing has resulted into the fish canning industries.
5. The peninsular of Florida became a very important place for space craft and the following activities are taking place in the space industry:-
   (i) The flight control is carried out at Houston
   (ii) Rocket engine testing is done at New Orleans
   (iii) Rocket assembling is located at Los-Angels and many other places of the South

BRITISH COLUMBIA

British Columbia is one of the Canadian states. It lies approximately from 48°N and from 115°N. It borders the Pacific Ocean in the West, Alaska in the North, Yukon Territory in the North, Alberta in the East and Washington in the South.

SIZE:

British Columbia is approximately 939000km^2 in size. This state is sparsely populated compared to some African countries given its size and the number of people living there.

PHYSICAL NATURE:

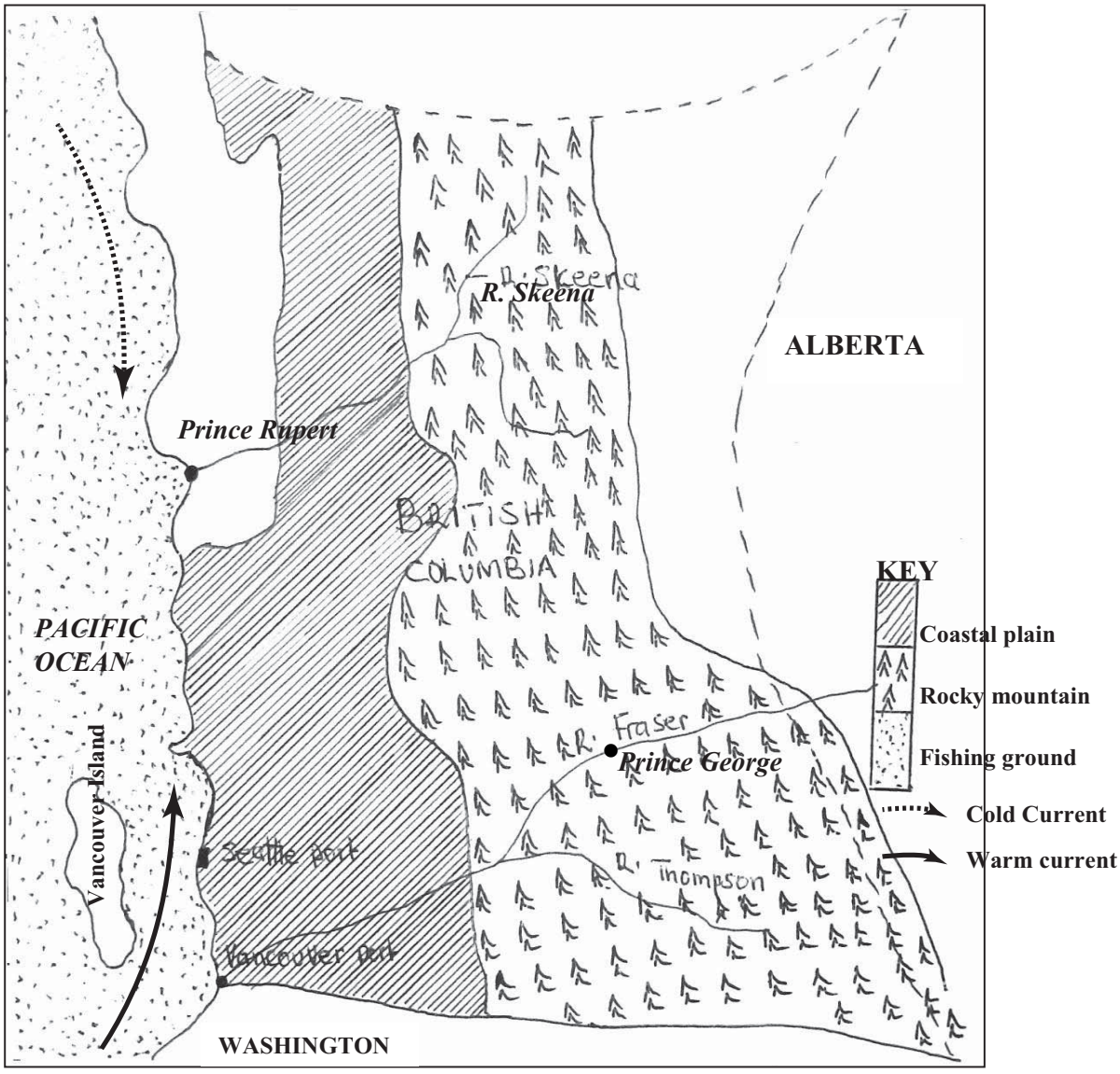
British Columbia is composed of high mountains with rugged landscape especially the Rocky Mountains in the central region and the Coastal ranges.

CLIMATE:

British Columbia receives very heavy rainfall due to the influence of Pacific Ocean. The blowing winds from the Pacific Ocean bring a lot of rain when they blow to the British Columbia's land.

The heavy rainfall received has encouraged agriculture and the development of heavy forests which bring a lot of foreign exchange in the region.

A SKETCH MAP SHOWING THE LOCATION OF BRITISH COLUMBIA



WATER RESOURCE EXPLOITATION IN BRITISH COLUMBIA

Fishing is the extraction of aquatic animals. Exploitation of water resources is the second most important economic activity in British Columbia.

FACTORS THAT HAVE FAVOURED FISHING IN BRITISH COLUMBIA

1. The meeting point for Ocean currents, the north Pacific warm Ocean Currents which meet the cool Californian currents along Vancouver Island favour the growth of Plankton on which fish feed.

2. The existence of numerous rivers such as Fraser, sticking, Columbia with fresh water provides breeding places for fish especially Salmons, Sardines, Mackerel etc.

3. Indented Coastline: There are numerous Islands as well as very rough coasts. These coasts favour the development of large shoal (number of fish). These indented coasts are not easily affected by strong winds to destroy the fish eggs.

4. Good fishing methods such as purse seining, auto-trawling, gill netting which are discriminative in catching fish thus only mature fish is caught and not depleting the water resources.

5. The application of good preservation methods such as drying, salting, tinning, sun drying etc which preserve fish for a long period of time before it is exposed to the market.

6. Proper storage facilities with the abundance of constant power supply. There are many fish processing plants as well as freezing plants for fresh fish.

7. The water of British Columbia is very clear and have enough light which enables fish to see its food.

8. Good transport net work coupled with refrigerated trucks which carry fish to market centres when still fresh.

9. Availability of a variety of fish species such as mackerel, Herrings, Tuna, Cods etc of high value attracted many industries to be established in British Columbia.

10. Presence of wide market potential for fish caught within and outside British Columbia.

11. The existence of a large continental shelf where marine fishing in British Columbia is carried out.

12. Availability of constant timber supply for the construction of fish vessels and fishing crafts.

IMPORTANCE OF FISHING INDUSTRY TO BRITISH COLUMBIA

1. Through the exportation of fish and other products, British Columbia is able to earn foreign exchange.
2. The fishing industry has provided employment opportunities to the redundant people and many people are now employed in industry.
3. Fish itself is a source of food rich in protein to both people and animals.
4. The fishing industry has led to the development of industries especially those processing fish into various fish products.

5. The fishing industry has led to the development of industries especially those processing fish into various fish products.
6. Fishing has become a major raw material, the by-products of fish are needed by the fertilizer and animal feed processing industries.
7. Fishing is a source of information to many learners.
8. Fish products are used in making of bags, shoes, glue, oil etc.

TYPES OF FISH CAUGHT IN BRITISH COLUMBIA

The British Columbia's fish is categorized into two and these are;

(i) **Pelagic fish**:- These are normally found in water near the water surface, they include tuna, mackerel, herrings, Sardines etc.

(ii) **Demersal fish:-** These are found very deep in water. They include haddock, cod, salmon, lobsters, halibut etc.

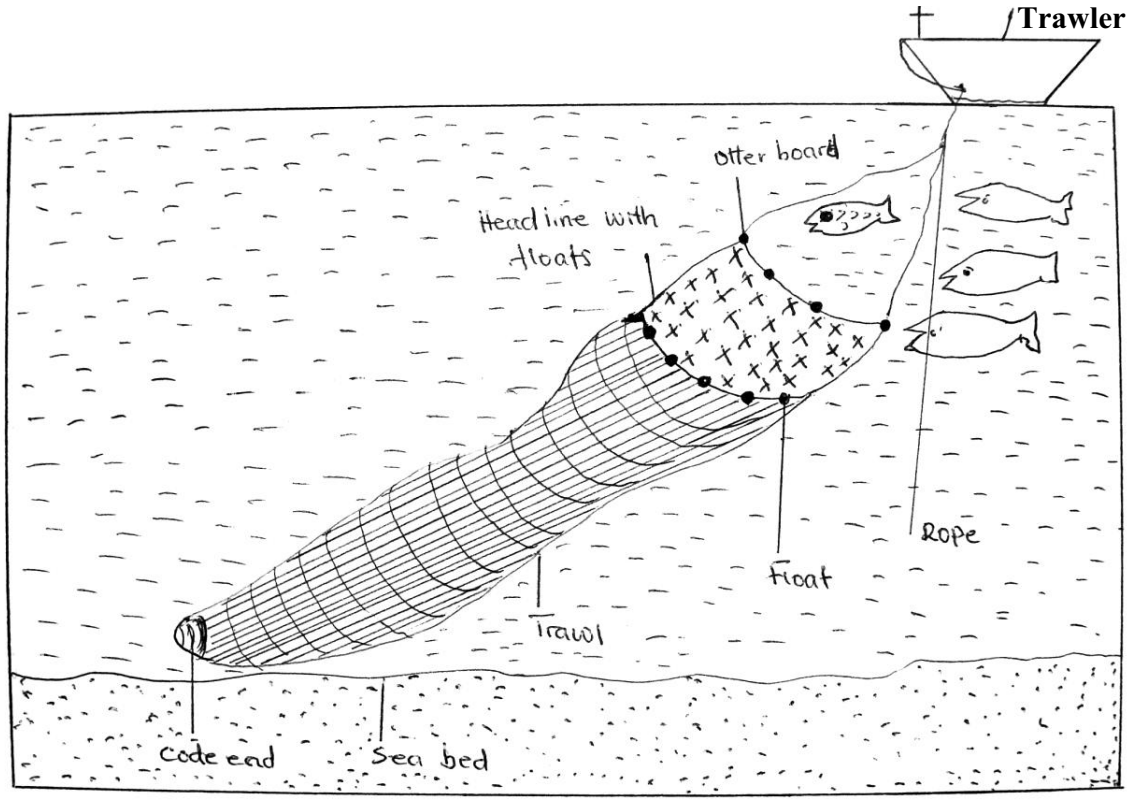
FISH PRESERVATION METHODS

The fish preservation methods used in British Columbia includes;

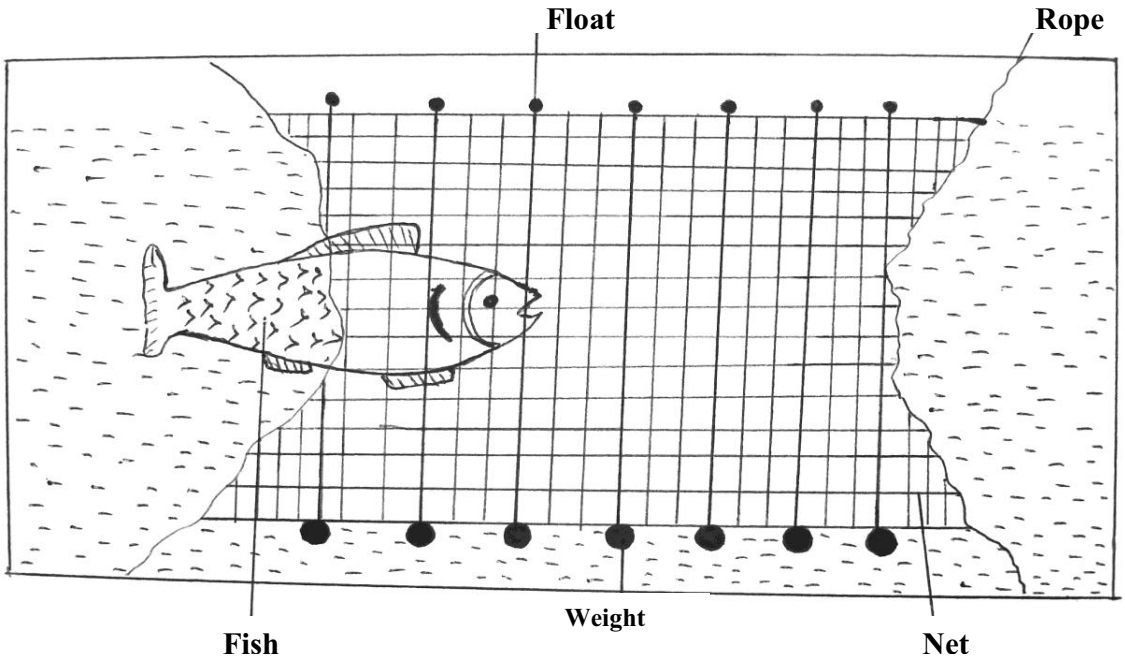
(i) Factory drying
(ii) Refrigeration
(iii) Canning and tinning
(iv) Deep freezing etc.

FISHING METHODS IN BRITISH COLUMBIA

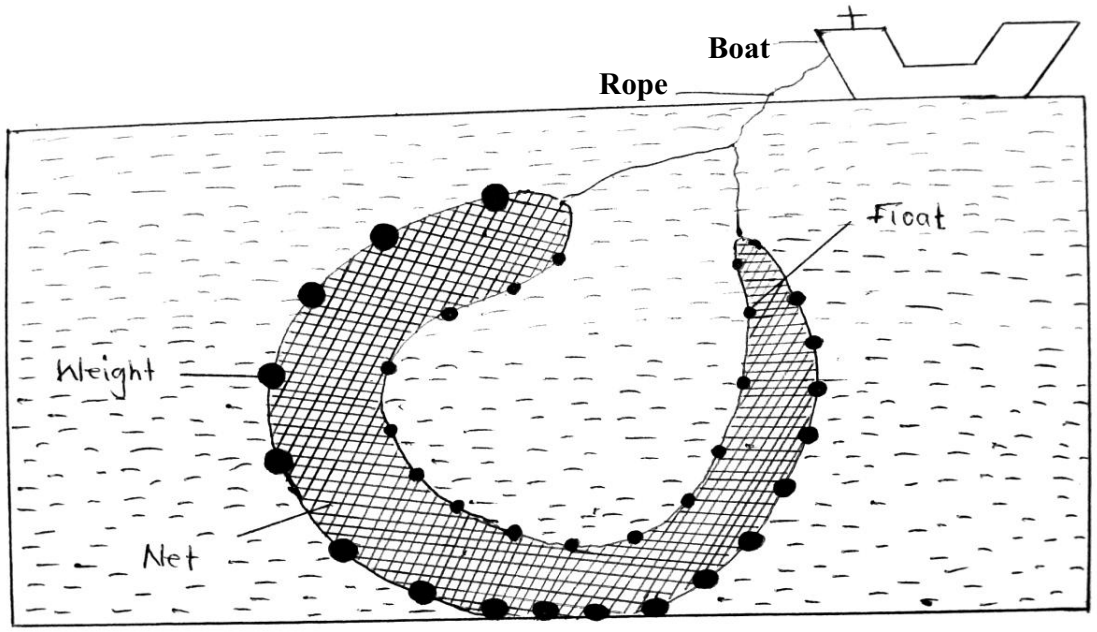
1. **Auto Trawling Method**: This is the most efficient method of catching fish species which live very deep in water. It is a bag like net whose mouth is open. The mouth bears floats and weight at the bottom. The net is cast in water and it is dragged along the sea bottom by a trawler. *See below:*



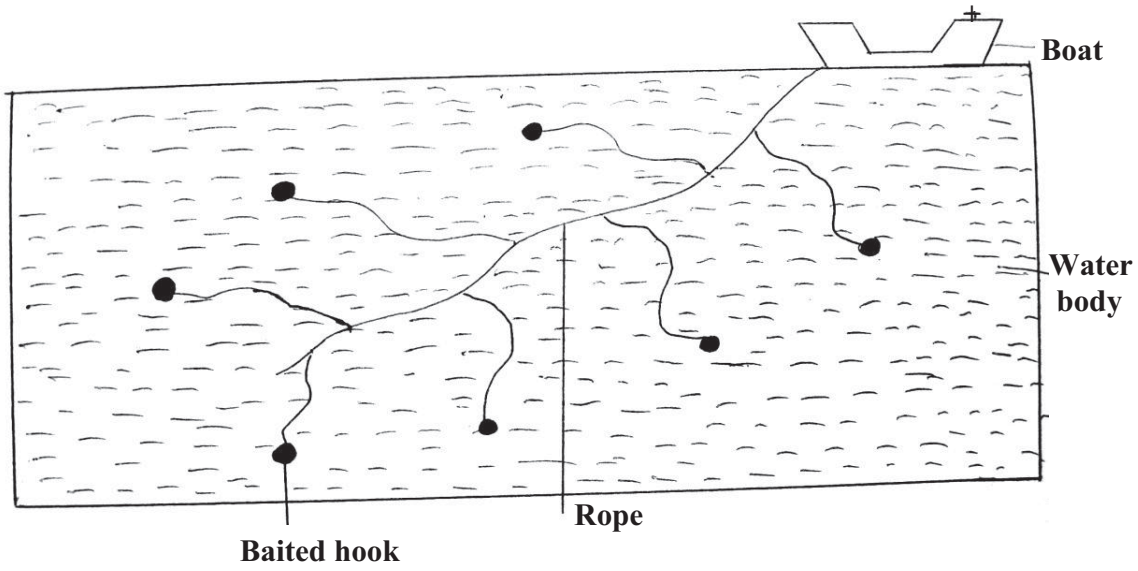
2. **<u>Gill Netting or Drifting Method</u>**: This fishing method is made of Nylon which is fixed with floats on top and weights at the bottom. The net has holes which are big enough to allow the fish to swim into the net where it is caught by its gills during an attempt to escape backwards. *See the diagram below:*



3. **<u>Purse Seining:</u>** Unlike the trawling method which is very good at catching demersal fish, purse seining method is very efficient in catching pelagic fish which lives near the water surface. See the diagram below:



4. **Long Lining Method**: This method is used in the rough sea floor which is not good for trawlers (boats). This method is used to catch big fish species like halibut which live very deep in water. *See the diagram below*:



PROBLEMS FACING THE FISHING INDUSTRY OF BRITISH COLUMBIA

1. Illegal fishing: There is illegal fishing in the waters of British Columbia by foreigners which deplete the fishing grounds.
2. Over production of fish due to mechanization effects.
3. There is a problem of competition from other leading fish exporters such as Japan, Norway.
4. Over fishing of the British Columbia's water bodies leading to depletion of some fish species thus affecting the activity.
5. There is a problem of water pollution from heavily industrialized towns whose wastes are discharged into the fishing grounds.
6. There is a problem of winter conditions especially during winter seasons. This affects the fishing activities for specific months.
7. There is a problem of frequent landslides which block the river channel thus preventing fish from reaching the breeding grounds. This affects the number of fish that would be produced in the specified period of time in the fishing grounds.
8. There is a problem of poor fishing methods such as beach seining. This method is very indiscriminative in catching fish hence depleting the waters of British Columbia
9. There is a problem of labour shortage since many people are employed in factories.

SOLUTIONS TO THE PROBLEMS IDENTIFIED ABOVE

1. Fisher men have been advised to use recommended fishing gear control fishing in order to reduce on the problem of over fishing and indiscriminate fishing.

2. Research on markets in the neighbouring states and countries has been made to cater for the problem of over production.

3. Many fishermen have resorted to mechanization rather than human labour. This has been due to labour shortage problem.

4. The recycling and treating of the toxic wastes process from many industries has been carried out to reduce water pollution.
5. Fish farming has been encouraged to reduce the depletion of the waters of British Columbia.

FORESTRY RESOURCE EXPLOITATION IN BRITISH COLUMBIA

British Columbia has vast forests that cover the southern part of the province. The exploitation of forests in British Columbia has a basis on the following factors:

1) British Columbia experiences an ideal climatic condition that support the existence of forests in British Columbia e.g. rainfall is reliable and well distributed throughout the year.

2) The British Columbia's forests have a variety of both hard and soft wood species which are of commercial importance e.g. Douglas fir, Western hemlock, red cedar, spruce etc.

3) The government policy which supports the forestry industry where by the law restricts lumbermen from felling trees without being permitted through acquiring license.

4) British Columbia's forestry industry has a lot of funds invested in for exploitation of forestry resources.

5) British Columbia's forest products have a very high market potential with in and outside British Columbia.

6) British Columbia has excellent transport facilities especially water transport, which is provided by the Pacific Ocean and numerous rivers in the interior. Some logs are floated to saw-mills mostly at the coast during December and February when snow melts to provide water to some rivers to enable them float the logs to saw-mills.

7) The low population distribution most especially in the Southern part of British Columbia. This has created room for free existence of forests.

8) Most of the forests are located along the Western part of British Columbia. This reduces on the costs of transporting the logs to saw-mills.

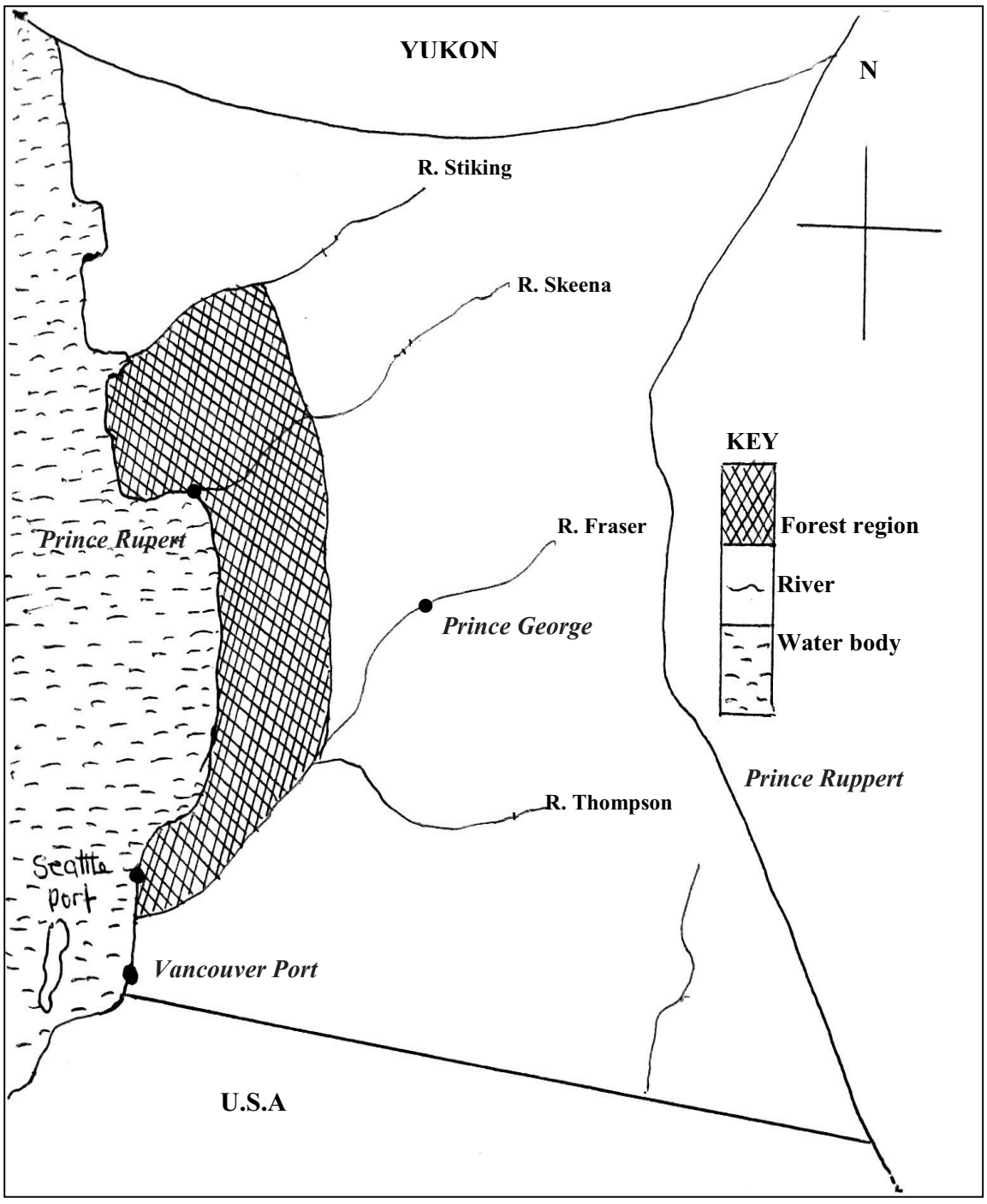
9) Good commercial tree species which grow in pure stand hence making the Exploitation of the forest very simple.

10) Presence of capital put in the exploitation of forests.

CHARACTERISTICS OF BRITISH COLUMBIA'S FORESTS

1) The trees in these forests are conical shaped.
2) The forests are very large and extensive.
3) The trees have small needle shaped leaves
4) The coniferous forests grow in pure stands.
5) There is little or no under growth. This is due to the absence of light.

BRITISH COLUMBIA'S FORESTS



LUMBERING ACTIVIRIES

There are three main activities in lumbering and these are;
(i) Felling
(ii) Bucking
(iii) Chocking

(i) **Felling** activities involves cutting down of trees by men called fellers. These people put on steel helmets to protect their heads.

(ii) **Bucking:** This involves people called buckers. These cut off tree leaves and cut logs of 12 metres length for easy transportation to saw-mills.
(iii)**Choking:** This involves loading logs onto the trucks by men called chocker men.

LOGS TRANSPORTATION
Logs from the forest regions are transported to saw mills to market centres by road transport, water transport and railway transport.

WOOD PROCESSING
Much of the wood is processed at Vancouver, Prince Rupert and Alberni port where the Saw-mills are located.

PRODUCTS FROM WOOD INDUSTRY
(i) Furniture, paper and pulp
(ii) Paper cuts and platters
(iii)Lumber
(iv)Ply wood. Etc

IMPORTANCE OF FORESTRY INDUSTRY TO THE ECONOMY OF BRITISH COLUMBIA
1. The forestry industry has offered employment opportunities to the people of British Columbia.
2. It has diversified the economy of British Columbia hence reducing on over dependency on the monopolistic economy which is a problem to most economies of the world.
3. The industry earns British Columbia with foreign exchange through exportation of forestry products such as timber ply wood, paper, pulp etc.
4. As a result of forestry exploitation, there has been improvement on the international relations between British Columbia and the rest of the world through trade links.
5. The conservation of forests in British Columbia has shaped the climate of the area and through this program the area has been able to receive reliable rainfall throughout the year and boosting agriculture.
6. The government gets revenue through taxes imposed on the forest exploiters.
7. The exploitation of forestry resources in British Columbia has led to the development of infrastructure e.g. roads, power extension in many parts of the forest region.
8. These British Columbia's forests are now used for research purposes.
9. These forests attract many tourists
10. The forests are homes of wild animals etc.

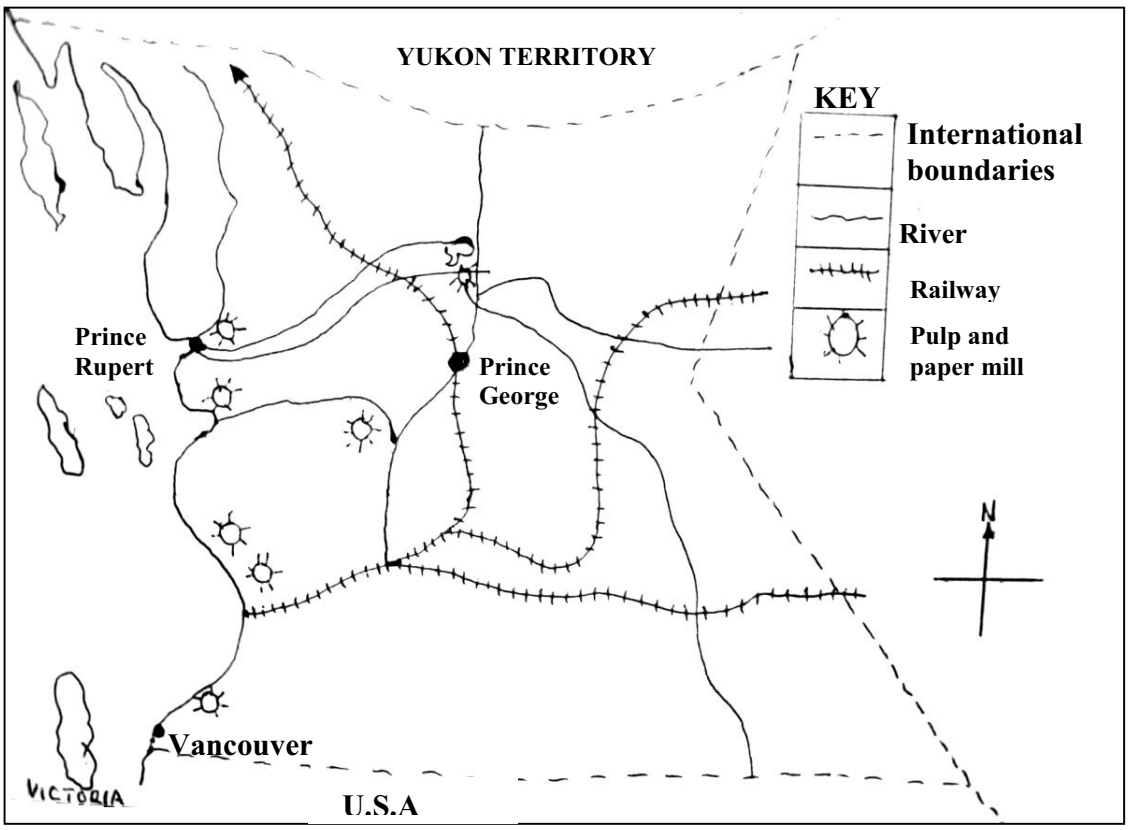
PROBLEMS FACING THE FORESTRY INDUSTRY OF BRITISH COLUMBIA
1. British Columbia's forest industry faces a problem of over exploitation of forests which results into the depletion of the forestry region.
2. The forests face a problem of summer fire out breaks caused by holiday makers who scatter burning cigarette ends in the forests.
3. There is a problem of winter freezing which makes the transportation of logs in high altitudes very difficult.
4. Poor means of transport is also a problem facing the forest industry since most of the forests are located in far remote areas. This renders difficulty to the transportation of timber to saw-mills.
5. The industry also faces a problem of lack of enough skilled personnel. This is due to poor working conditions of the workers.

6. Another problem facing the forest industry of British Columbia is that of massive forest deforestation due to high population increase in need of land for settlement and industrial use.
7. Trees in the forests are attacked and destroyed by diseases.
8. Some forest exploiters are attacked by dangerous animals and snakes.

SOLUTIONS TO THE PROBLEMS FACING THE FORESTRY INDUSTRY IN BRITISH COLUMBIA

1. Control tower fire guards have been set up to patrol and watch fire out breaks that may destroy the forests.
2. Re-afforestation program has been put in place in areas experiencing high rate of deforestation.
3. The winter logging problem in high altitudes has been reduced by encouraging exploiters to carry out these activities in low altitudes where the climate is very conducive.
4. The government has tried to improve on the working conditions in an attempt to attract and increase on the number of skilled personnel in the forest region.
5. The patch felling system as a problem facing the forestry industry has been solved through discouraging the system to allow young trees to grow.
6. Spraying the forest regions with chemicals to control pests and diseases which attack and destroy the forest has been put in place.
7. The forest exploiters have been encouraged to use railway systems instead of road transport which is normally affected by winter freezing.
8. Mechanization has been encouraged to overcome the problem of labour shortage.
9. The government has imposed heavy taxes on the forest exploiters in a bid to restrict over exploitation of the forest.

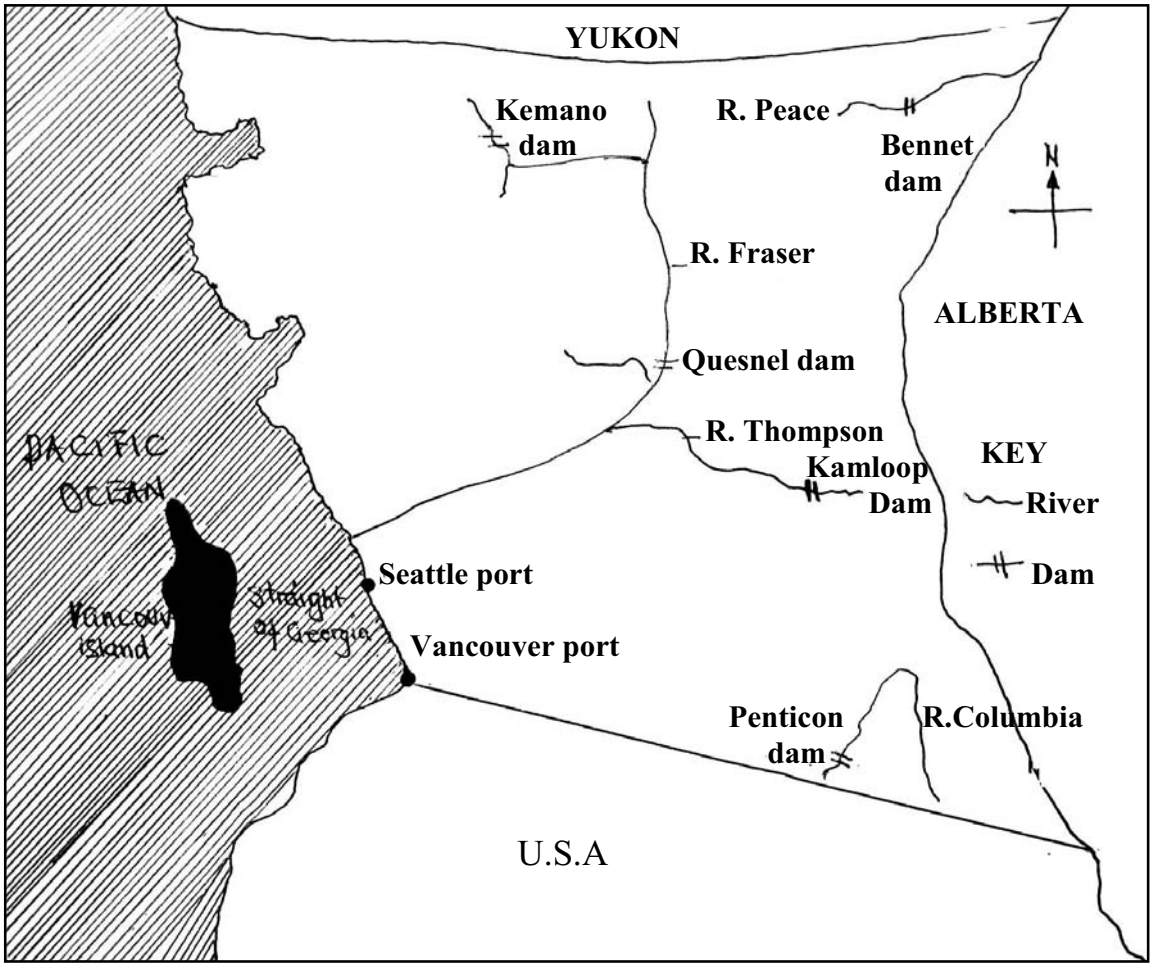
BRITISH COLUMBIA'S PAPER AND PULP MILLS



HYDRO-POWER SUPPLY IN BRITISH COLUMBIA

British Columbia has large hydro-electricity power potential. Power used in the region is got from major rivers such as Fraser where dams like Quesnel, Kemano, are located Kamloop on River Thompson, Penticon on River Columbia, Bennet Dam on River peace. Power generated is used in various industries such as paper and pulp industry, ship building, steel rolling industry, oil refineries etc.

HYDRO POWER STATIONS IN BRITISH COLUMBIA



REVIEW QUESTIONS:

1. (a)(i) Outline three natural resources of British Columbia.
(ii) Explain the factors which have favoured the development of forestry in British Columbia.
(iii) List down three species of commercial tree types got from British Columbia.

(b)(i)Explain how logs are loaded and transported to the saw-mills.
(ii) List down three products obtained from British Columbia wood mills.

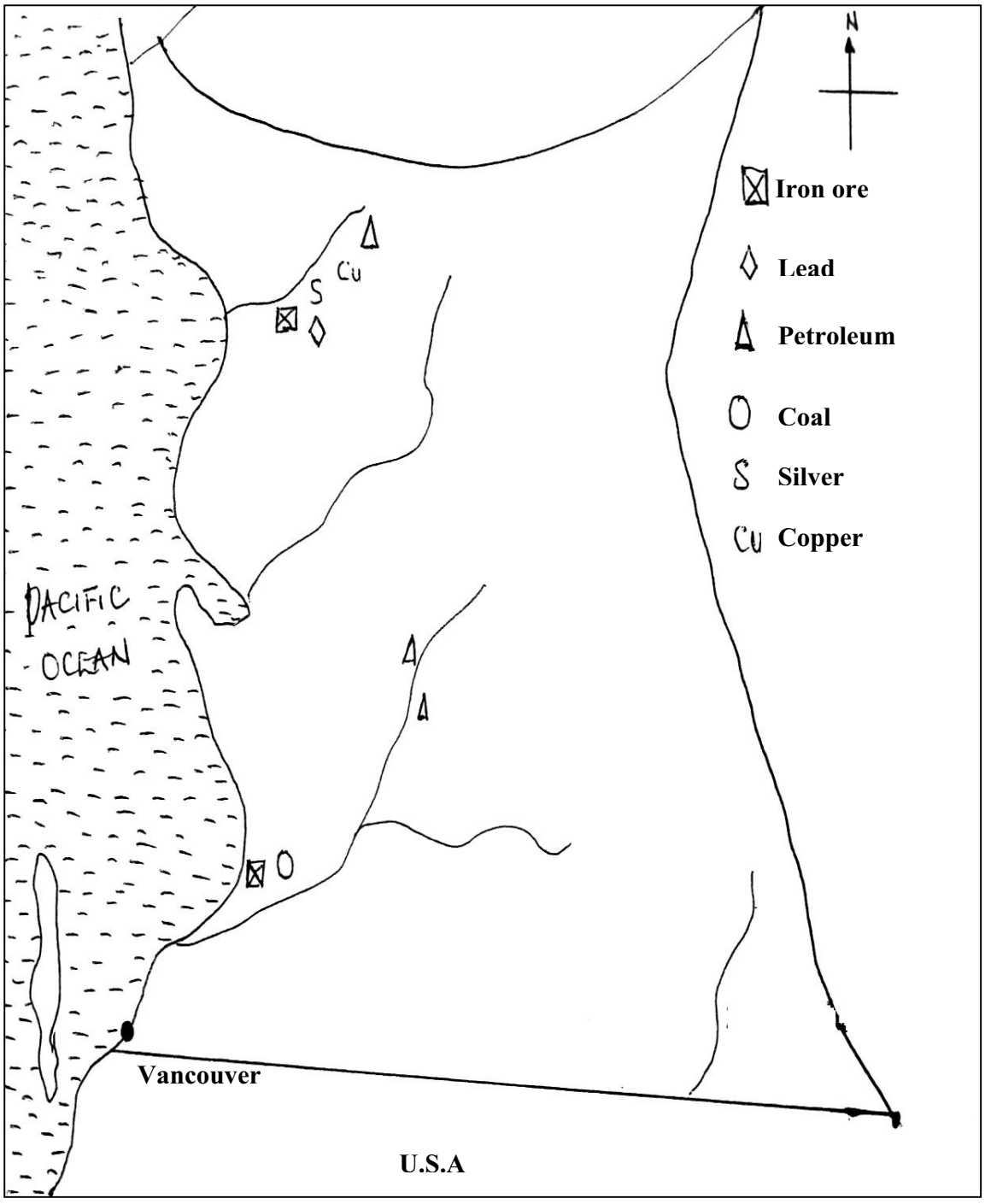
(c)(i) Identify the problems facing the forest industry of British Columbia.
(ii) How are the problems identified in c(i) above solved
2. Draw a sketch map of British Columbia on it mark and name the following:
(i) Vancouver Island
(ii) Ports: Vancouver and Seattle
(iii) Oil refinery area
(iv) One major forest zone.

(b) State the factors that have favoured the growth of forest in British Columbia.
(c) Explain why the pulp and paper industries have developed more at Vancouver port than in any other places in British Columbia.
(d) (i) Name any four exports from British Columbia that are handled by Vancouver port
(ii) Identify the problems facing Vancouver port.

THE MINING INDUSTRY OF BRITISH COLUMBIA

There are a variety of mineral resources in British Columbia which include petroleum, Iron ore, Lead, Copper, Silver, Coal etc. However, mining of petroleum is the major activity carried out in the area followed by Iron Ore and Coal.

BRITISH COLUMBIA'S MAJOR MINERAL DEPOSITS



Although the region has harsh Climatic conditions, the mining of petroleum has become increasingly very important in the economy of Canada especially at river Frazer where the largest wells are located. Another important activity is the mining of Iron Ore and Steel rolling in this region has become very important. Vancouver is the largest British Columbia's sea port. It is connected with pipelines in the prairie province of Canada. These pipelines transport crude oil from the prairie oil fields of Alberta province.

REVIEW QUESTIONS:

1. (a) List down four minerals mined from British Columbia.
(b) Explain how oil is transported from the Prairie oil fields of Alberta to Vancouver port of British Columbia.
(c) Of what importance is mining to the economic development of British Columbia.

THE DEVELOPMENT OF SEMI-ARID REGION IN SOUTHERN CALIFORNIA

In terms of climate, California is basically a semi-arid region and the local variation in climate depends mainly on altitude from north to South and sufficient rain fall is received in the Northern parts of the region, precipitation decreases southwards.
In terms of economic activities, the area has a wide range of natural resources such as minerals, forests, fisheries and fertile soils for agriculture.
California is divided into four physical divisions and these are;
(i) Southern California
(ii) The central valley
(iii) Sierra-Nevada
(iv) Central Coastal ranges.

(i) **Southern California**: This region of California has partly Mediterranean and partly semi-desert climate.

(ii) **The Central Valley:** The climate of this area is purely Desert but the region is blessed with two major rivers which flow through it and these are; Sacramento River in the North and San Joaquin river in the south. Much of the central valley is dry but with alluvial soils which are very fertile if irrigated.

(iii) **Sierra – Nevada:** This is a mountainous area, which is dissected in the West by Canyon (steep banks of the river). Much of this area receives higher amounts of rainfall due to higher elevation and it is forested especially in the windward side.

(iv) **Central Coastal Ranges**: This region is essentially high with low ranges. In some places precipitation is inadequate hence irrigation is carried out. The whole of California faces a problem of aridity because of low precipitation. Irrigation agriculture in California is restricted to the alluvial belts along the following valleys:

a) **Imperial Valley**: Crops grown here under irrigation include vegetables, sugar beet, cotton, wheat, barley etc. This is followed by dairy farming as well as beef and sheep rearing.

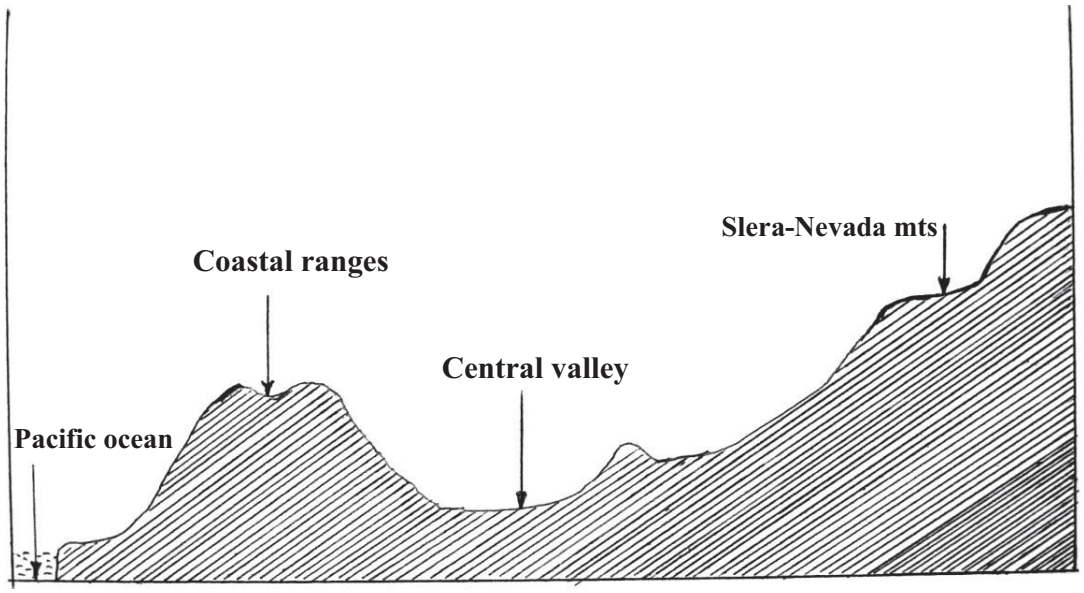
b) **Rio-Grande valley**: Crops grown here include cotton, citrus followed by sheep and cattle rearing.
c) **The Salt river Valley**: Crops grown here include cotton, citrus fruits, cereals followed by sheep and cattle rearing.
d) **Colorado Valley**: Crops grown here include potatoes, cereals, cotton etc.

e) **Salt lake Oasis Valley:** Crops grown here under irrigation in this valley include sugar beet, Alfa-alfa, citrus fruits etc.
f) **Reno Oasis Valley**: Crops grown in this valley include Alfa-alfa, wheat, sugar beet, Vegetables, citrus fruits etc.
g) **The Columbia basin project**: Crops grown under this project include Cereals, sugar beet, Onions, grapes etc.

The main features of irrigation agriculture in Western U.S.A are;
(i) It is capital intensive and requires a lot of machinery.

(ii) It is highly specialized and mechanized ranging from market gardening around the major cities to huge ranches specializing in beef or large plantations. As a result of population increase, market gardening has become increasingly very important as well as floriculture in urban areas.

A CROSS SECTION OF EAST WESTERN REGION OF CALIFORNIA



FACTORS FAVOURING MARKET GARDENING IN CALIFORNIA

1. Climate: California has favourable climate e.g. the winter provides water for fruit growing and at the same time California experiences fine sunny dry summer seasons which allows the quick ripening of the fruits e.g. peaches, olives, oranges etc during the harvesting period.

2. Fertile well drained Soils: California has deep fertile alluvial soils suitable for fruit growing. These soils originally deposited in the valley by flowing rivers from high land areas.

3. A ready market: There is a ready market for fruits grown in the valley of California within U.S.A and European countries.

4. Relief: The physical appearance of landscape in California which is gently sloping makes the construction of canals and aqueducts very simple hence making irrigation possible.

5. Easy means of transport provided by the railway system running from East to West. This made the transportation of fruits from the production areas to consuming centres cheap.

6. Availability of water supply drawn from rivers, Colorado, Joaquin and Sacramento River enabled the growing of fruits in Southern California possible.
7. The organization of farmers into co-operative societies led to the acquisition of adequate capital for the construction of aqueducts, canals and for purchasing other field in puts. These co-operative societies transport and market the fruits.

8. The gently sloping nature of land attracted the use of machinery on many fields hence making it possible for farmers to produce enough fruits.

PROBLEMS FACING FRUIT GROWERS IN CALIFORNIA

1. Fruit growing in California faces a problem of rattle and un-reliable rainfall and yet irrigation is very costly. This affects the fruit growers' profit margin.

2. Shortage of labour especially during the harvesting period since the majority of the population is employed in industries.

3. Another problem facing fruit growing in California is that of pests and diseases such as shot-hole diseases which attack and damage the fruit.

4. There is a problem of over production brought about by mechanization yet the fruits are grown on a very large scale. This leads to a fall in prices on the world market.

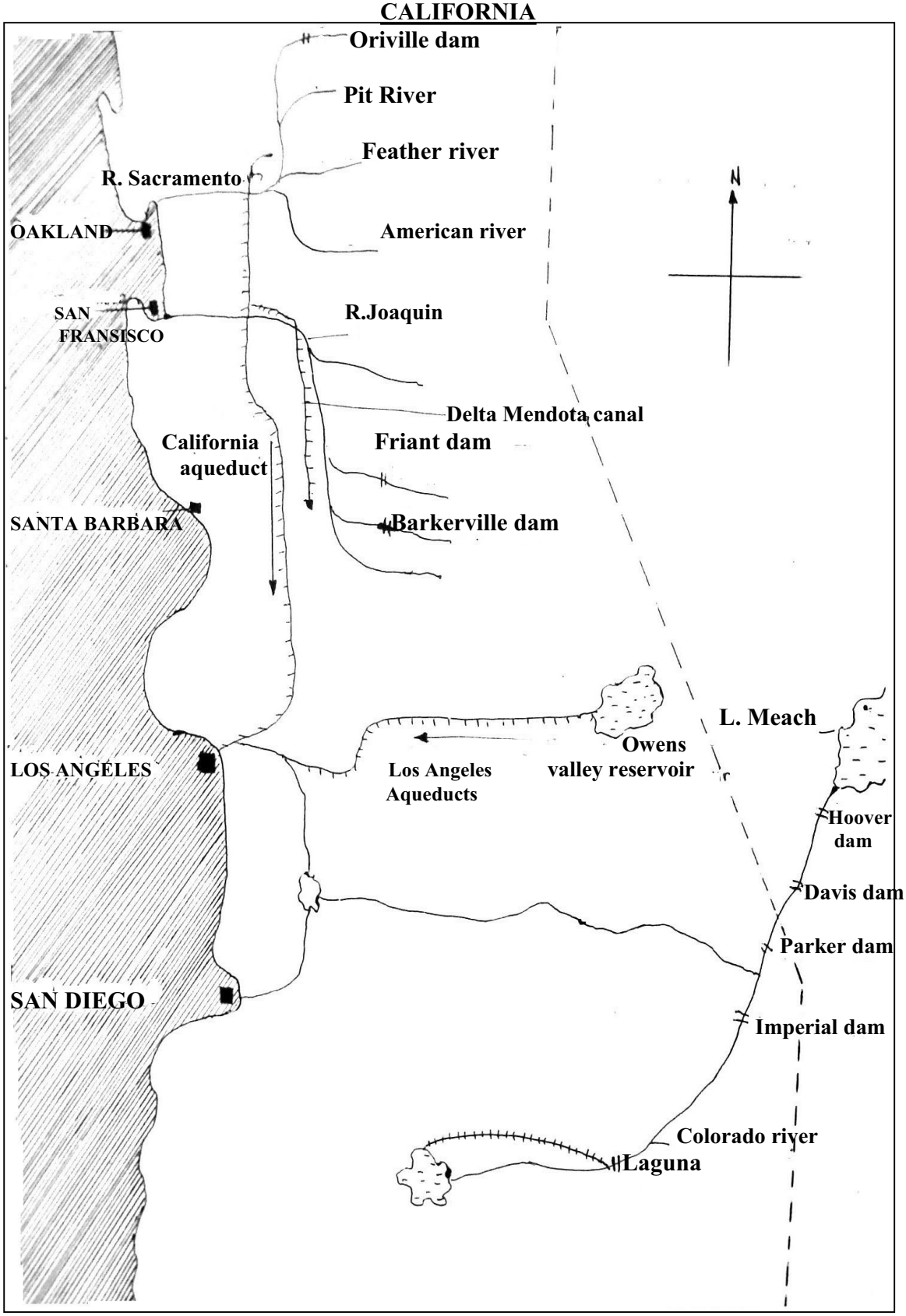
5. There is a problem of insufficient land for expansion and this is due to population increase and urban development.

6. There is a problem of floods of river San Joaquin and Sacramento during winter and spring. This affects the agricultural activities.

7. High perishability of fruits and vegetables leading to harvest losses.

8. High rate of weed growth which suffocates crops.
9. Climatic harzards e.g Strong winds which destroy crops.

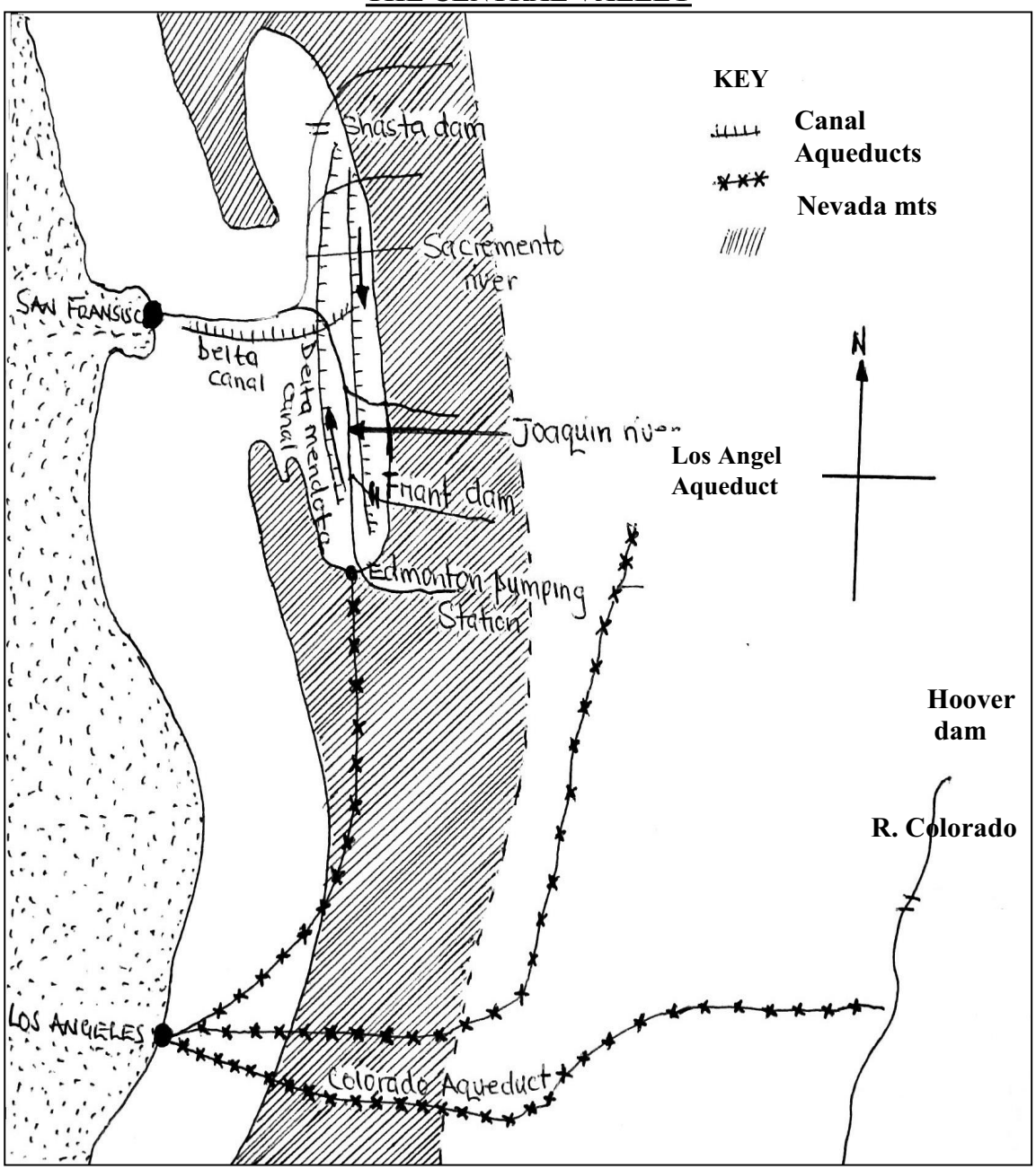
THE PRINCIPAL CANALS AND AQUEDUCTS OF WATER SUPPLY IN CENTRAL CALIFORNIA



THE CENTRAL VALLEY OF CALIFORNIA

The central valley of California is located in the rain shadow and its climate is purely desert. This area is drained by two major rivers which join and flow into the Pacific Ocean through San-Francisco town. Precipitation in this area is very low hence irrigation has to be applied.

THE CENTRAL VALLEY



FACTORS THAT HAVE FAVOURED IRRIGATION IN CENTRAL VALLEY

1. Availability of water supply from two main rivers i.e. San Joaquin and Sacramento rivers.
2. Availability of vast land suitable for mechanization.
3. Availability of capital provided by the government for irrigation, research etc.
4. Presence of skilled labour supplies which is good at operating machines, spraying, testing soils etc.
5. A ready market for the crops grown in the valley.
6. The presence of good means of transports e.g. roads, railways air, canals etc.

7. The existence of processing plants which preserve the crops till they are exposed to the market.
8. Good government policy of encouraging farmers through loan schemes.
9. Presence of fertile alluvial soils from the highland areas of Sierra Nevada suitable for crop growing.
10. The topography of the valley which slopes gently to the valley allows the gravity flow irrigation to take place.

PROBLEMS FACING AGRICULTURE IN CALIFORNIA

1. Agriculture in California faces a problem of pests and diseases which attack different crops.
2. There is a problem of un-reliable rainfall which attracts irrigation.
3. There is a problem of severe soil erosion due to the steep slopes.
4. The farmers face a problem of constant dredging of dams and canals due to deposition of silt.
5. There is a problem of competition with other worldly producers of fruits.
6. During summer seasons when there is abundance of fruits, the farmers experience the problem of price fluctuation on the world market.
7. There is a problem of labour shortage during harvesting. This is because crop harvesting is labour intensive.

SOLUTIONS TO THE PROBLEMS ABOVE

1. Irrigation agriculture has been encouraged to solve the problem of un-reliable rainfall.
2. Mechanization has been put in place to solve the problem of labour shortage especially during harvesting period.
3. There is constant dredging of dam and canal to solve the problem of dam and canal silting.
4. Spray has been encouraged to eradicate pests and diseases.
5. Soil conservation measures have been put in place in an attempt to overcome the problem of soil erosion.

INDUSTRIAL DEVELOPMENT IN THE CENTRAL VALLEY OF CALIFORNIA

Many industries have sprung up in the area and these include food processing especially those processing grains, food canning, vegetable canning, wool and textile industries.
Another major industry that has come up in the area is that of film and movie.

FACTORS THAT HAVE FAVOURED THE DEVELOPMENT OF FILM INDUSTRY

1. The area has beautiful scenery; which is composed of desert scenery and snow capped mountains ideal for filming and movie acting.

2. The densely forested areas of the western slopes of the coastal ranges and Sierra Nevada are suitable for film and movie industry.

3. The sunny weather conditions in the region are very good for film and movie playing in Los Angeles, San Barbara, San Francisco and San Bernardino are the major film centres in the region.

4. The presence of skilled man power has also favored the development of film and movie industry.

5. Availability of large market potential for films and movies has contributed to development of film and movie industry.

6. Availability of adequate capital invested in this industry has favored the development of film and movie industry in California.

Other industries that have sprung up in the region include the manufacturing industries especially heavy industries due to the presence of iron ore and coal. Products from these industries range from machinery, automobiles and aircrafts to ship building.
Chemical industries have also sprung up as a result of the presence of petroleum and other minerals like potash, limestone and products include petrol, chemical products, fertilizers, salt, medicine of all types are of importance. Therefore, the area is experiencing rapid rates of industrialization and the desert type of environment has been changed and today it is an area of woodland, farmland, touring cities and the biggest is Los Angeles.

(a) **THE ENGINEERING INDUSTRY**: Industries here are all heavy industries and manufacture goods like, electrical appliances e.g. flat iron, transistors e.g. radio, television, etc.

(b) **CHEMICAL PROCESSING INDUSTRIES**: These are basically processing industries; they process goods like pesticides, crop fertilizers, dye stuffs used in textile industries, perfumes, cosmetics, salt, acids etc.

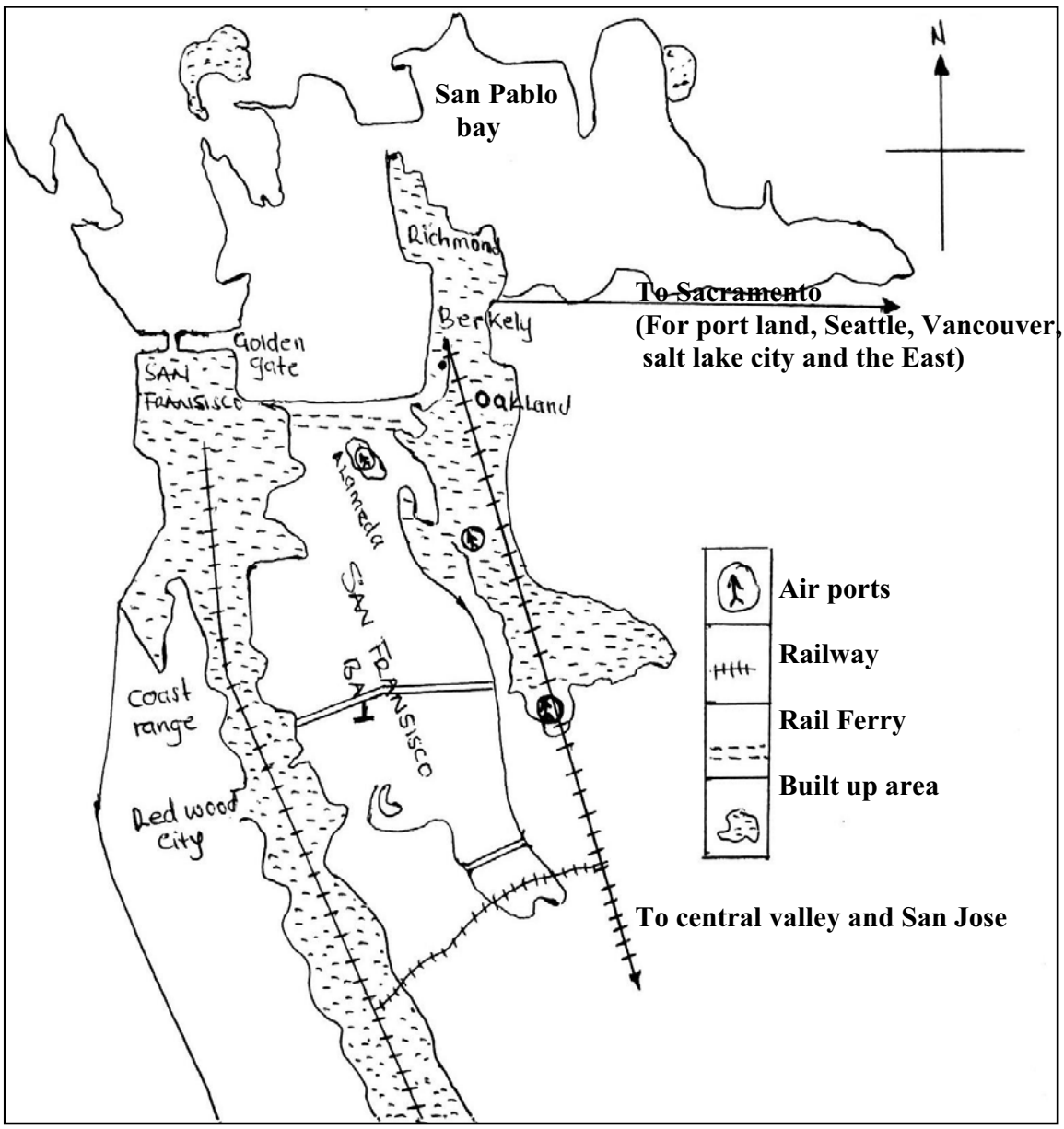
(c) **AEROSPACE ENGINEERING INDUSTRY**: These industries are found in Florida, Boston, Houston and in Southern California.

(d) **AIR CRAFT AND SPACE CRAFT INDUSTRY**: The industries which manufacture air crafts and space crafts such as helicopters; jets etc are located at Los Angeles and San Diego.

FACTORS FOR THE DEVELOPMENT OF AIR CRAFT AND SPACE CRAFT

1. Availability of high level of technology for air craft and space craft manufacturing.
2. Presence of raw materials such as copper, diamond alluminium used in the manufacturing of air space.
3. Presence of skilled man power used in these industries.
4. The strategic location of San Diego and Los Angeles suitable for test flying of the crafts.

MAJOR TOWNS AND CITIES IN SOUTHERN CALIFORNIA



REVIEW QUESTION:

1. (a) (i) What is meant by truck farming.
(ii) Name at least two crops grown under truck farming.
(iii) List down (3) three places in Southern California where irrigation agriculture is being carried out.
(b) Identify the factors favouring industrial development in Southern California.

2. (a) Draw a sketch map of California showing the central valley and on it mark and name the following:
(i) Rivers: Sacramento and San Joaquin
(ii) Ports: San Francisco and Los Angeles.
(iii) The major agricultural areas

(b)(i) What is truck farming?
(ii) Name three crops grown under truck farming in California.
(c) Describe the problems facing truck farming in California.

3. (a) (i) Name one area in the central valley of California where fruit farming is carried out.
(b) Name two types of fruits grown in the central valley of California.
(c) State the factors that have contributed to success of fruit growing in the central valley of California.
(d) What problems have faced the fruit ranches of the central valley of California?
(e) Explain why the film industry has been successful in the central valley of California.

NEW ENGLAND

New England is collective name given to the six states of north Eastern United States. They include Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut. The region bordered by New York State in the west, Canada in the north, Atlantic ocean in the east and long island in the south.

The first immigrants in this region were European settlers. These settlers found difficult conditions due to thick forests, poor strong soils, long harsh winter seasons and hostile Indians. However, these people were determined, inventive and skilled. Thus they made use of the raw materials e.g. forests, iron ore deposits, fish, fur and meat from wild animals to develop industries. The traditional industries were mainly for textiles, ship building, iron and steel, saw milling, fish processing and printing.

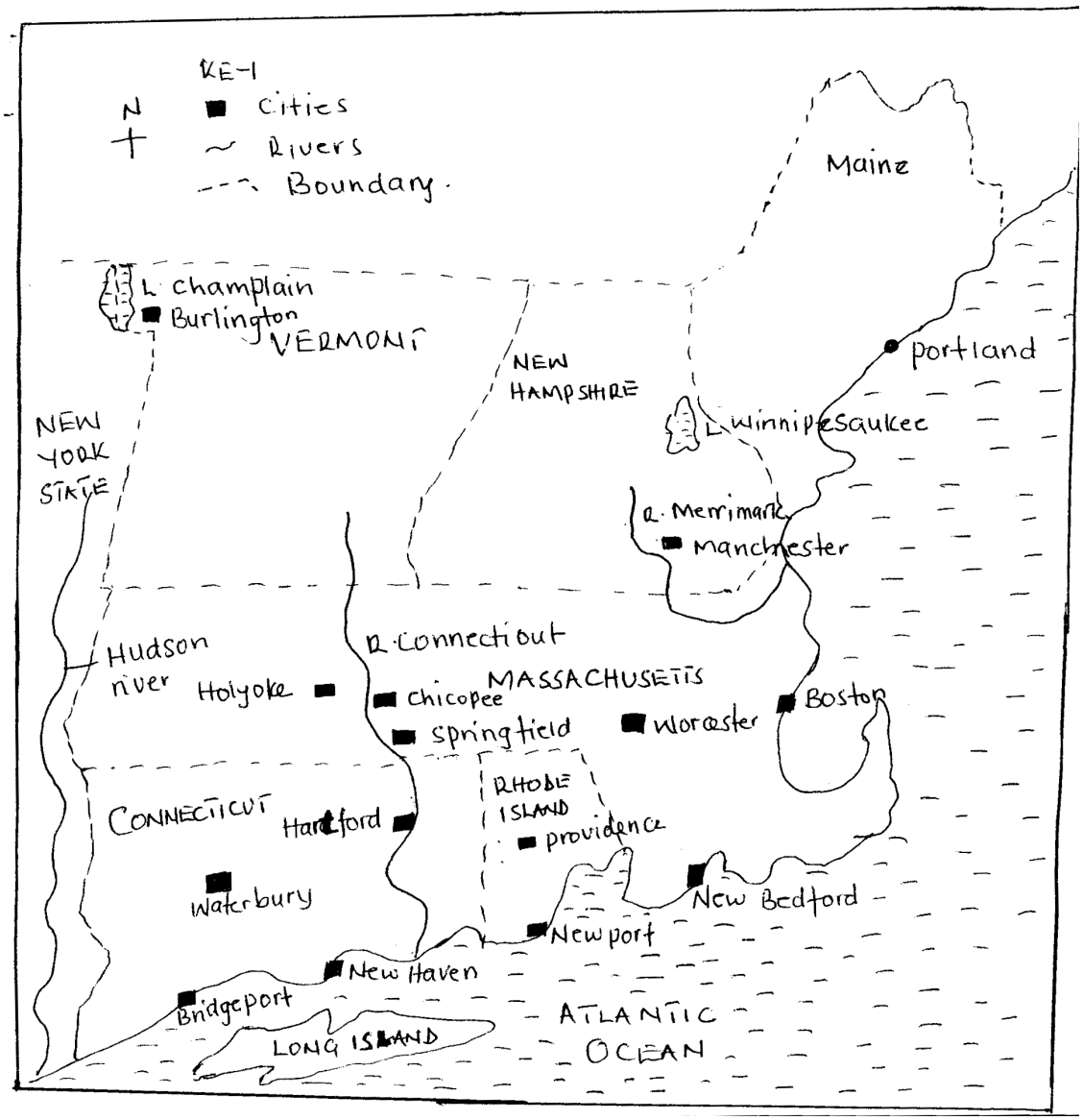
Out of this, many large industries grew up from fishing and textile industries which expanded due to large importation of cotton from the southern states and we talk now many of the traditional industries have declined and new ones have sprang up.

FACTORS FOR THE DECLINE OF TRADITIONAL INDUSTRIES

1. Exhaustion of raw materials from the forests e.g. many of the forests are now cleared.
2. Competition from other industries producing similar goods.
3. The migration of industries to other places where conditions were suitable for their survivor.
4. The industrial machinery used was out-dated and less efficient.
5. High wage rates demanded by workers discouraged many industrialists.
6. Poor working power demands of the 19^{th} century which led to New England being out competed.

Today New England is one of the most industrialized regions of USA. New industries had been setup to replace the old traditional industries. The New industries produce a wide range items of which include Electric machinery, transport Equipments (helicopters, aircraft engines, propellers, ships and submarines.), Clocks and watches, firearms, plastics, electronic equipments, office machines, ball and roller bearings, turbines and engines chemical (pharmaceuticals and soaps) and firms engaged in developing instruments for surgery and medicine and optical instruments and lenses. Another important industry is metal fabrication including the manufacture of small arms and ordnance, hardware and hand tools and cutlery.

MAP OF NEW ENGLAND SHOWING INDUSTRIAL CENTRES AND TOWNS



FACTORS FOR THE DEVELOPMENT OF NEW INDUSTRIES IN NEW ENGLAND

1. The construction of Hydro Electric Power plants which provided power for industrial and domestic use.
2. The decline in the agricultural sector attracted industries instead.
3. Presence of highly skilled labor force to work in industries.
4. Availability of large domestic and foreign market for the industrial goods.
5. Availability of capital to pay workers and buy raw materials needed by industries.
6. Well developed transport system to transport industrial goods to market centers.
7. Availability of land for industrial establishment.
8. The better working conditions that had been put in place.

PROBLEMS FACED BY INDUSTRIES IN NEW ENGLAND

1. Air pollution
2. Competition for raw material.
3. Too much congestion
4. Shortage of raw material
5. High labor costs
6. Competition for market with other worldly producers

STEPS BEING TAKEN TO SOLVE THE ABOVE PROBLEMS

1. Introduction of raw material sowing technology.
2. Relocation of industries to where labor costs are cheaper.
3. Relocation of industries to reduce congestion.
4. Use of capital intensive techniques of production.
5. Market research.

BENEFITS OF INDUSTRIAL DEVELOPMENT IN NEW ENGLAND

1. Generation of revenue to the government through taxes imposed on industries.
2. Industries offer employment to people.
3. They lead to the development of infrastructure e.g. roads, schools, hospitals etc.
4. They lead to the growth of towns e.g. Newhaven, Bridge port, Boston etc.
5. Industries generate foreign exchange from the exportation of industrial products.

THE SOUTHERN NEW ENGLAND

This region is located in the North Eastern U.S.A. It is centred at Boston. This region has many industries which developed after the European migrants settled at Boston. The major industrial towns in this region include;

(i) Boston (ii) Hart ford (iii) Bridge port
(iv) New Haven (v) Spring field.

(i) **Boston**: This town is located North East of New York city. The major industries that were set up by the European migrants in this town include, textile, engineering, foot wear, etc. This was due to the good climate and availability of raw materials in the area.

(ii) **Hart ford:** The major industries found in this town include calculators, air craft, typewriters, fire arms etc.

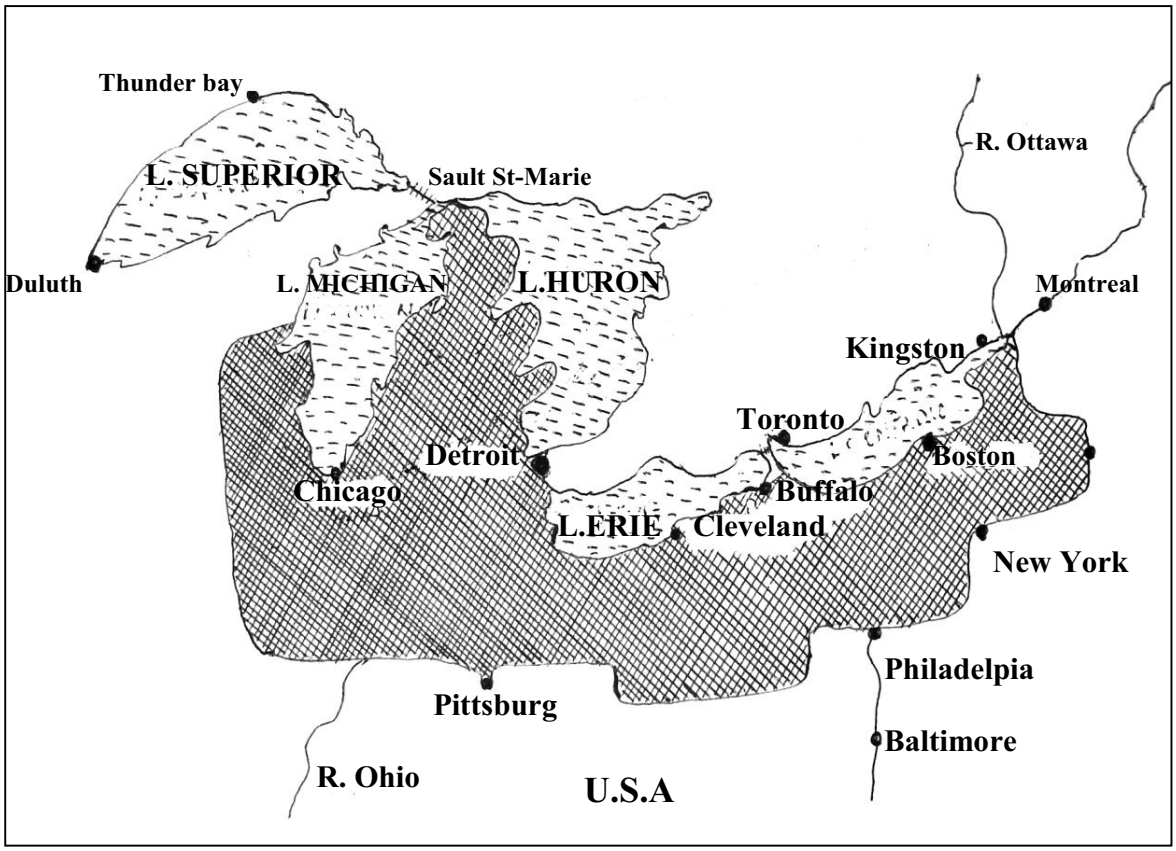
(iii)**Bridge port**: Major industries in this town include fire arms, sewing machine, air craft industries etc.

(iv)**New Haven**: Industries in this town include; paper, electronic, machinery etc.

REVIEW QUESTIONS:

1. (a) (i) What is an industrial town?
(ii) List down three industrial towns found in the Southern New England.
(b)(i) What factors that have led to the development of industrial towns mentioned in a(i) above?
(ii) Identify the problems facing these industrial towns.
(iii) What have been the solution s to these problems identified in b(ii) above?

THE NEW YORK PITTSBURG – ERIE GREAT LAKES INDUSTRIAL REGION



The major industrial towns of this region include; New York, Boston, Montreal, Toronto, Chicago, Pittsburg etc

1. **Boston:** The major industries located at Boston include textile, engineering, ship building electronics etc
2. **Toronto:** Industries located here include electronics, engineering etc.
3. **Montreal:** Industries located here include agricultural processing.
4. **New York**: Industries located here include clothing, light engineering etc.
5. **Chicago:** Industries found in this town are mainly engineering.

PART III
EAST AFRICA

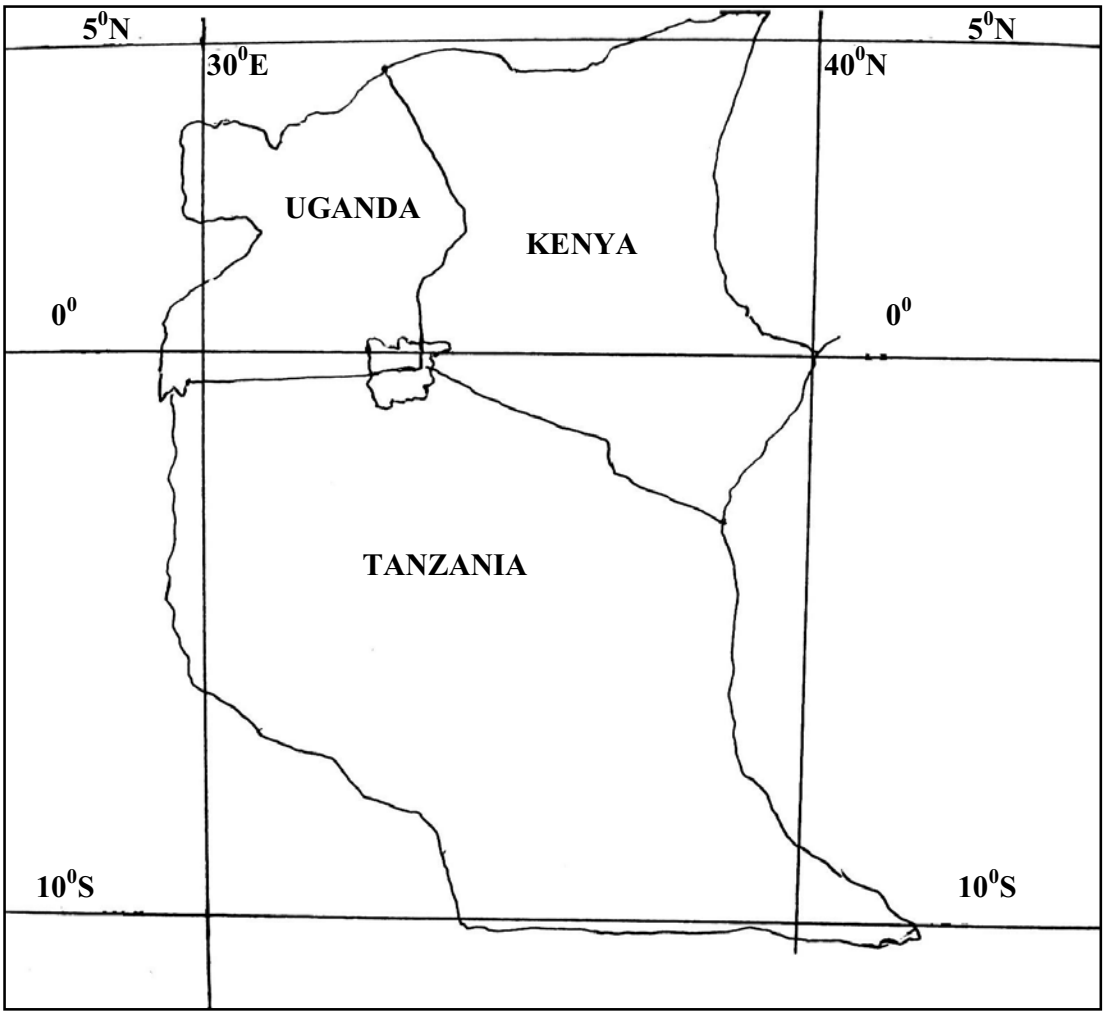
THE POSITION OF EAST AFRICA:

East Africa is a geographical region which consists of three major countries and these are; Uganda, Kenya and Tanzania. Their boundaries were determined during the colonial days. This region is located in the Eastern part of Africa. It lies approximately between 30^{o}–40^{o}East of green Witch and 5^{o}N – 12^{o}S of the Equator. Mean while the largest part of East Africa is located in the Southern hemisphere. Of all the three East African countries, Tanzania is the biggest followed by Kenya and Uganda is the only land locked country in East Africa.

THE SIZE OF EAST AFRICA:

East Africa covers an area of about 1773,200 Km^2.
Tanzania alone covers an area of about 943800Km^2, Kenya 585000Km^2, Uganda 244400Km respectively.
The three countries share Lake Victoria where the largest part of it is located in Tanzania while the smallest is in Kenya.

A SKETCH MAP OF EAST AFRICA SHOWING ITS POSITION



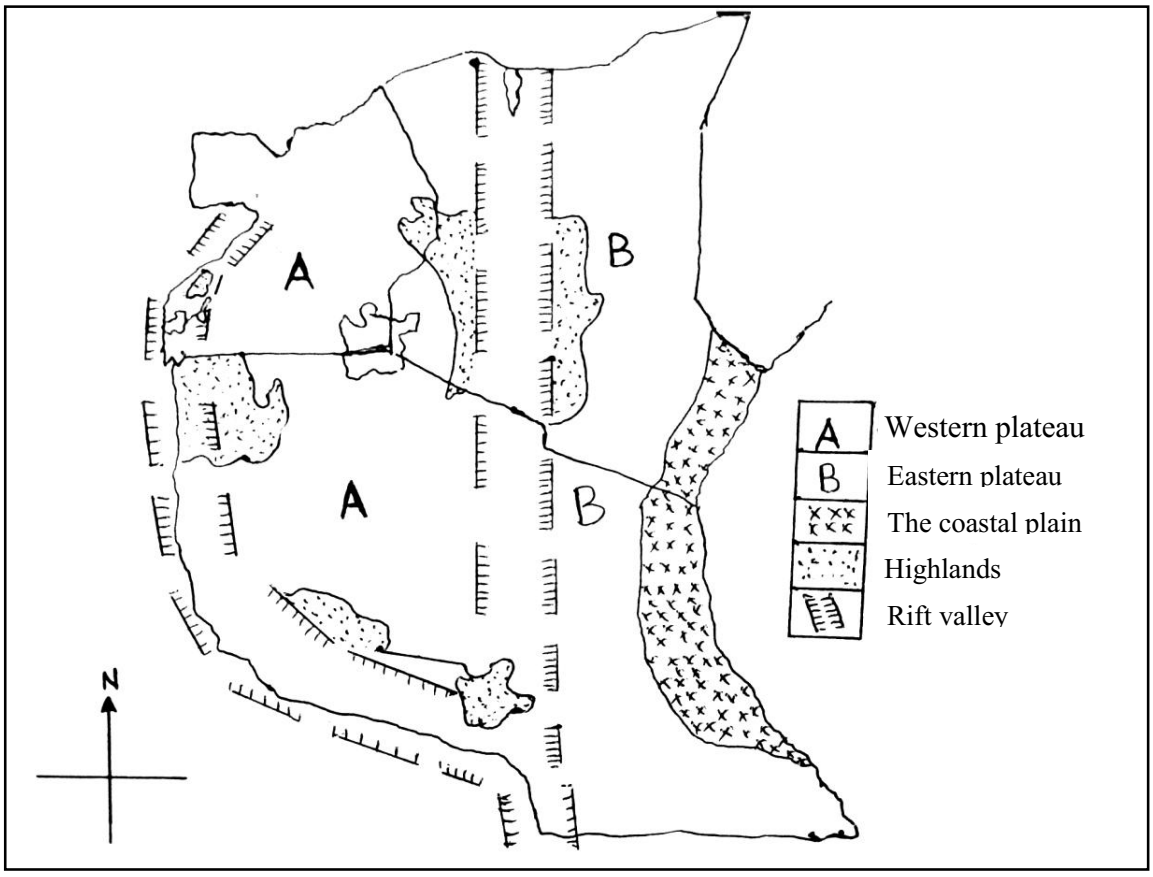
POPULATION OF EAST AFRICA

The Approximate population of East Africa as estimated in 2000 was 78,000,000.Uganda with 23,000,000, Kenya with 26,000,000, Tanzania respectively with 29,000,000 people.

THE RELIEF OF EAST AFRICA

The relief of East Africa is made up of five (5) Physical divisions and these are;
(i) The highlands
(ii) The rift valley
(iii) The Eastern plateau
(iv) The Western plateau
(v) The coastal plain.

A SKETCH MAP OF EAST AFRICA SHOWING THE MAJOR RELIEF DIVISION



East African highlands are categorized into two:
(i) Block highlands
(ii) Volcanic highlands.

Most of the East African highlands are of volcanic origin.
The largest of the volcanic mountains in East Africa include;
(i) Mountain Kilimanjaro of Tanzania
(ii) Mountain Kenya of Kenya
(iii) Mountain Elgon at the borders of Uganda and Kenya.
(iv) Mufumbiro ranges of Uganda.

Block Mountains in East Africa formed in small numbers and these are;
(i) The Usambara Mountains of Tanzania
(ii) The Abadare ranges of Kenya
(iii) The Rwenzori Mountains of Uganda
(iv) The Mau ranges of Kenya.

THE COASTAL PLAIN:

This is a low lying area bordering the Indian Ocean. Its altitude varies from O-250metres above the sea level. This area is made up of basically sedimentary rocks deposited by rivers from the interior of East Africa. Such rivers include: River Tana from Kenya, Rufigi, Ruvuma, Pangani etc from Tanzania. This area is dominated by fiord coasts, ria coasts, and deltas.
The vegetation type that occupies the coastal plain is basically Mangroove swamps.
The climate in this area is hot and wet. This climate is modified by East trade winds from the Indian Ocean. These winds bring rain which favours the growing of cloves, Cashew nuts, Sisal, Cocoa nuts.

THE HIGHLANDS:

The major East African highlands were formed as a result of Volcanicity and faulting. Their climate is modified by altitude and they normally have cool climate. Because of volcanic fertile soil and heavy rainfall received, the higher slopes are suitable for tea growing near Kitale and Limuru in Kenya.
There is also Arabic Coffee growing by the Chagga people near Mt. Kilimanjaro and near Thika and Kiambu in Kenya.

THE EAST PLATEAU:

Attitudinary, this area lies between 250m and 1100m above the sea level. This region is mainly found in Kenya and Tanzania. The climate of this area is modified altitude, vegetation and the surrounding water bodies. Rain fall is not evenly distributed. The major economic activity taking place in this area is animal rearing.

THE WESTERN OR THE CENTRAL AND LAKE PLATEAU

This region ranges from 1000m above the sea level and above. This area receives moderate rainfall which enables agricultural activities to take place. It is the most densely populated area in the whole of East Africa.

THE RIFT VALLEY REGION

The rift valley of East Africa was formed as a result of faulting process. It lies between 300m – 1800m above the sea level. The East African rift valley is part of the great rift valley of Africa which runs from Syria and Jordan valley in Asia continent. In Africa it runs from Red Sea, Via Ethiopia to East Africa then to Zambezi valley in the South. In East Africa, the rift valley is divided into two. The Eastern rift valley and the Western arm of the rift valley

(i) The Eastern arm of the rift valley in East Africa consists of lakes like Turkana, Naivasha, Elementaita, Natron, Manyara, Magadi Eyasi respectively.
(ii) The Western arm of the rift valley of East Africa consist lakes like Albert, George, Edward, Kivu, Tanganyika, Rukwa, Malawi etc.

THE GEOLOGY OF EAST AFRICA

Geology is the study of rocks and their composition.
A rock is any material that covers part of the earth's crust. The crust is the outer most layer of the earth. The earth is made up of three layers and these are;
(i) Core
(ii) Mantle
(iii) Earth's crust

In East Africa, rocks are classified into three main groups and these are;
(i) Igneous rocks
(ii) Sedimentary rocks
(iii) Metamorphic rocks

1. **IGNEOUS ROCKS:** These are fire formed rocks. Under this group we have rocks like Basalt, Obsidian, pumice etc.
(i) Basalt is fine grained rocks
(ii) Obsidian is glassy like rocks in appearance
(iii) Pumice these are spongy like rocks. These rocks above are all extrusive igneous rocks. The second type of igneous rocks are the intrusive igneous rocks and they are commonly known as plutonic rocks or hypobyssal rocks. These include granite rocks etc.

2. **SEDIMENTARY ROCKS**: These are formed when sediments of broken rock material, leaves of trees and remains of dead animals are deposited in layers called beds or strata. Examples of sedimentary rocks include sand, clay, coal, Coral, limestone, chalk etc.
Some sedimentary rocks are permeable (pervious/porous rocks). These are rocks which allow water to pass through them. Examples of these are rocks which do not allow water to pass through them. Examples of such rocks include clay, etc. Sedimentary rocks are classified according to their mode of formation e.g.

(i) Shale, Sand stone, mudstone and clay are mechanically (physically/formed rocks.
(ii) Rock salt and dolomite are chemically formed sedimentary rocks.
(iii) Lignite, peat limestone, chalk, coral, petroleum and coal are organically formed sedimentary rocks which are formed from remains of plants and dead animals.

3. **METAMORPHIC ROCKS**: These are called changed rocks. Any rock can be changed to metamorphic rock either by heat or chemical action. Metamorphic rocks are usually hard rocks e.g.

a) Shale (sedimentary rock) changes to schist.
b) Sandstone (Sedimentary rock) changes to quartzite
c) Limestone (sedimentary rock) changes to marble
d) Igneous rock changes to granulate
e) Clay (Sedimentary rock) changes to slate
f) Granite (igneous rock) changes to Gneiss.

IMPORTANCE OF ROCKS IN EAST AFRICA

1) Volcanic rocks once weathered provide volcanic fertile soils suitable for crop growing.
2) Rocks provide building materials e.g. stone concretes etc
3) Sedimentary rocks like clay at Kajjansi, Lira, Gulu, Kisumu are used in making tiles, bricks for building.
4) Coral limestone of Bamburi at Mombasa and Dar-es-salam is used in the manufacture of cement.
5) Industries set up in the manufacture of cement provide employment opportunities to people.
6) Products from these industries such as cement fetch a lot of foreign exchange to the economy of east African countries.
7) Some rocks provide beautiful scenery which attracts many tourists.

FACTORS RESPONSIBLE FOR THE FORMATION OF LAND FORMS IN EAST AFRICA

The activities which produce physical land forms in East Africa are two and these are;
(i) External (exogenic) activities.
(ii) Internal (endogen) activities.

1. **External activities:** These operate on the earth's surface leading to denudation and wave action.
   Earth quake is caused by rock adjusting to external stresses and strains. Areas where earth quake occurs are liable to volcanicity.

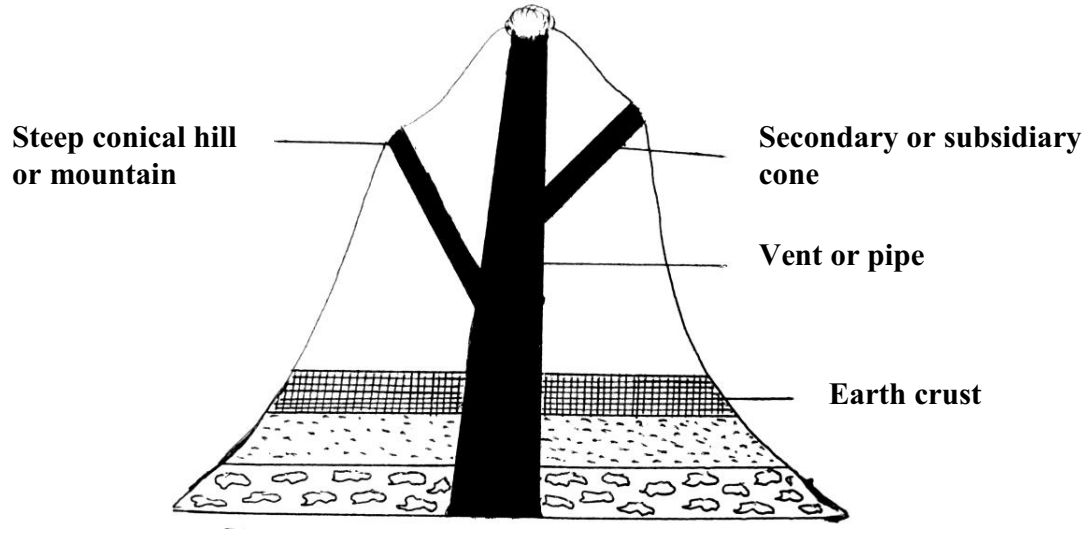
2. **Internal activities**: Internal forces or tectonic activities are lateral or vertical forces within the earth's crust.
   In East Africa, there were four (4) major processes that were responsible for land forms and these were;
   (i) Vulcanicity
   (ii) Faulting
   (iii) Folding
   (iv) Warping

(i) Vulcanicity: This is a process which involves the formation of external and internal features. Vulcanicity is the process by which solids, liquids and gaseous materials are ejected out of the earth's surface forming either intrusive or extrusive features on the earth's surface. Volcanicity is the process which involves only the formation of external features. Vulcanism is divided into two activities and these are;

(a) Extrusive/ external/ Volcanic activities
(b) Intrusive/ Internal/ Igneous activities.

There are two types of lava and these are;
(a) Viscous or acidic lava.
(b) Basic lava.

A. **Viscous or acidic lava**: These are very thick and have high silica content, there fore, when they reach the earth's surface. They solidify very quickly and do not flow for a long distance. They usually build up steep volcanoes e.g.



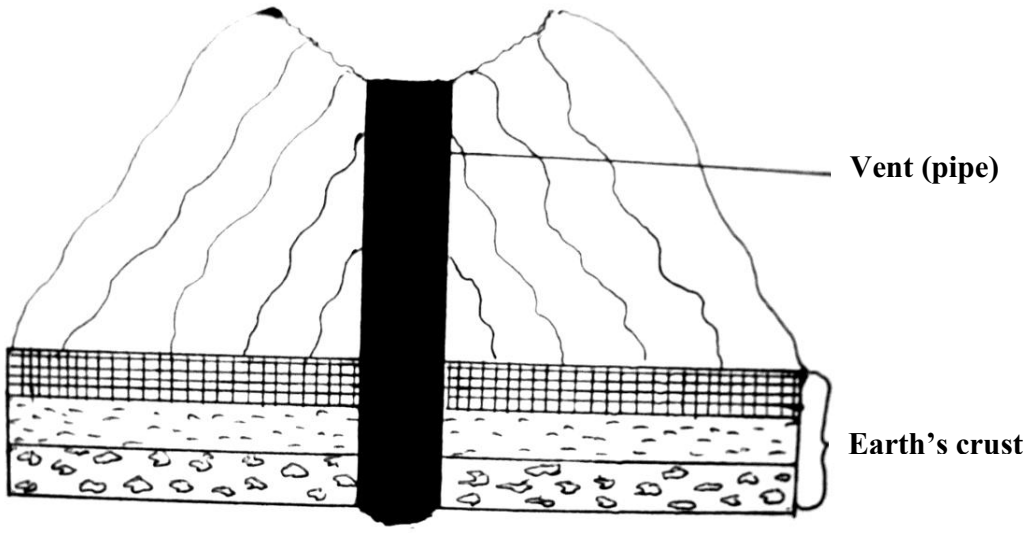
B. **Basic Lava**: These are not very acidic and they are thick when ejected on to the earth's surface. This is because they have a low melting point and they usually build up gentler sloping cones. They normally build up plateaux like Yatta, Athi, Kapiti plains and Kisoro plain of Western Uganda.

A FEATURE PRODUCED BY BASIC LAVA

(i) **Shield domes**: (Basic lava cones)

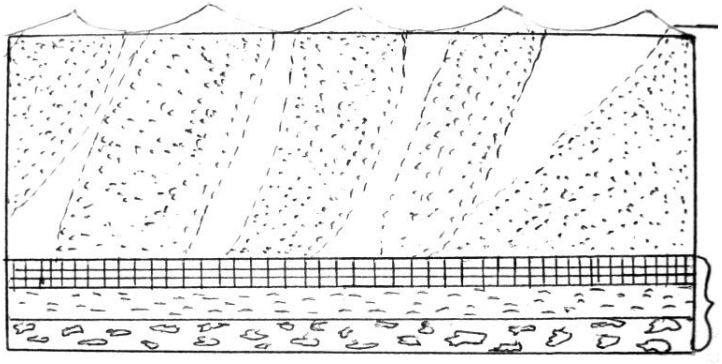
These are formed when basaltic lava rises from the central pipe (vent) and flows out over a wide area before it cools and solidifies to form a shield dome examples of these include Mt. Longonot, Nyamulangira in South Western Uganda, Mountain Kenya in Kenya.

THE STRUCTURE OF A SHIELD DOME



(ii) **Lava Plateaux**: These are formed when basaltic lava up wells along faults or vents, extensive sheets of lava are formed called lava plateaux e.g. Yatta Plateau of Kenya, Kisoro plateau, Kapiti plain, Athi plain Kericho, Bunyonyi of Uganda, Kano plains of Kenya etc.

LAVA PLATEAU/ PLAIN



FEATURES PRODUCED BY VULCANICITY:

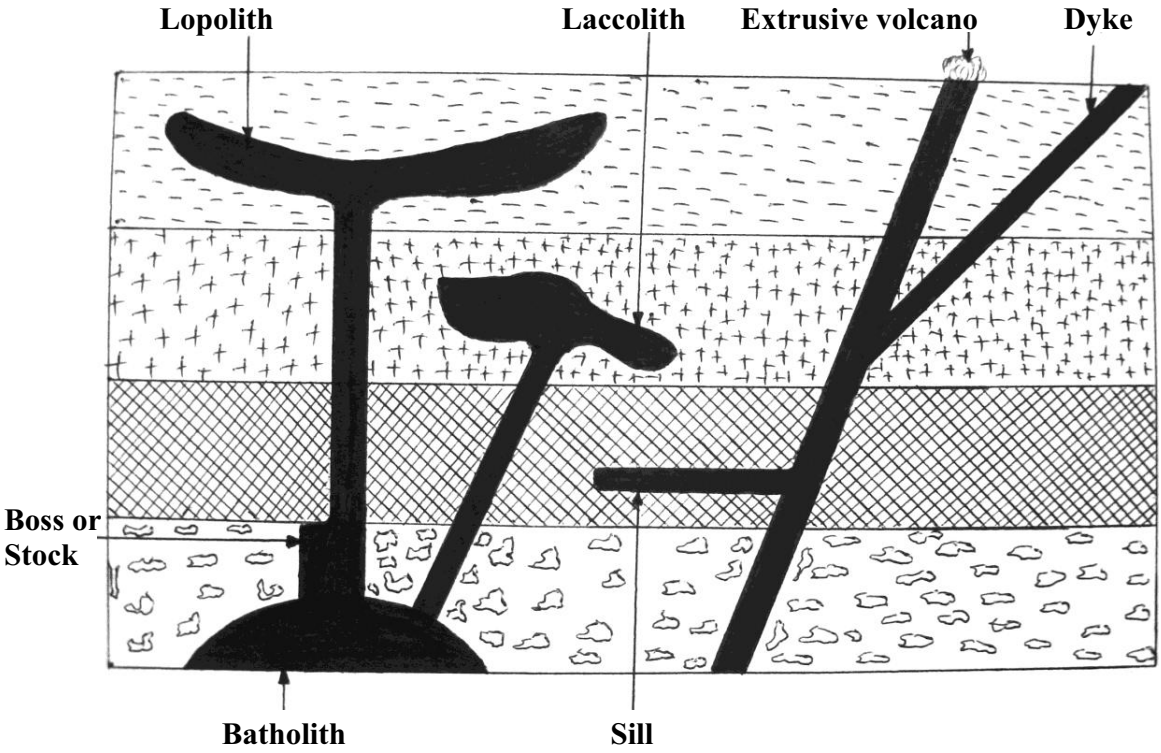
These are divided into two groups and these are;

i. Extrusive features
ii. Intrusive features

(A) **Intrusive features**: These are features formed when magma cools under ground the earth's crust before it reaches the surface.

These features above are all underground but some have been exposed on the earth's surface by the work of erosion.

A DIAGRAM OF THE EARTH'S CRUST SHOWING INTRUSIVE VOLCANIC FEATURES



(i) **BATHOLITH:** This is a dome shaped feature made of granite rocks usually found at the foot of mountains. It can be exposed out of the earth's surface by the work of erosion.

(ii) **SILL:** These are horizontal sheets of solidified rocks along the bedding planes. A good example like those of Karuma falls, Rippon falls.

(iii) **DYKES:** These are walls of solidified lava across the bedding planes. If a dyke is harder than the surrounding region, then it can resist erosion and remain standing out as a ridge or an escarpment e.g. several dykes stand out as hard bands on the side of mountain Longnot, Karuma falls, Sezibwa falls etc.

(B) **Extrusive Features**: These are formed when lava reaches the earth's surface through a vent (pipe or hole). Examples of extrusive features include the following:

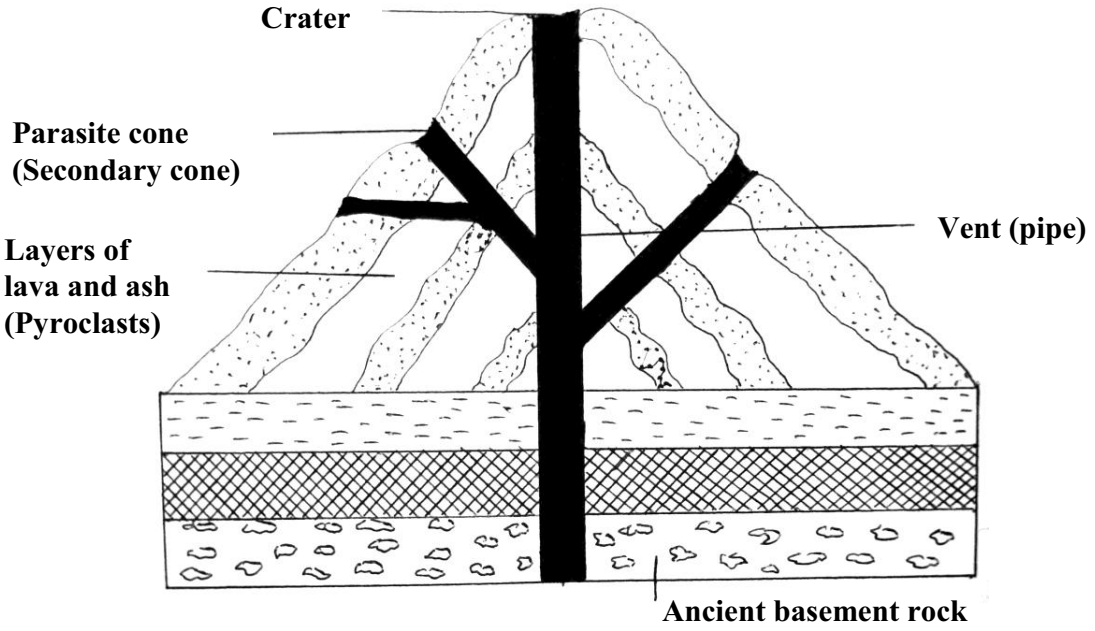
(i) Volcanoes
(ii) Plugs
(iii) Calderas
(iv) Lava
(v) Plateaux
(vi) Explosion craters
(vii) Hot springs
(viii) Cumulo domes
(ix) Geysers

(i) **A VOLCANO**: A volcano consists of a large opening on the surface of the earth. It may have a crater on top joined to a vent through which volcanic material are forced out. Normally earth tremors produce volcanic eruptions. Eruption are often very explosive and material ejected include lava, volcanic bombs, cinders, ashes, dust, hot gases, smoke, liquids and hot mud flow around the vent in successive layers building up volcanic mountains.

A COMPOSITE VOLCANO

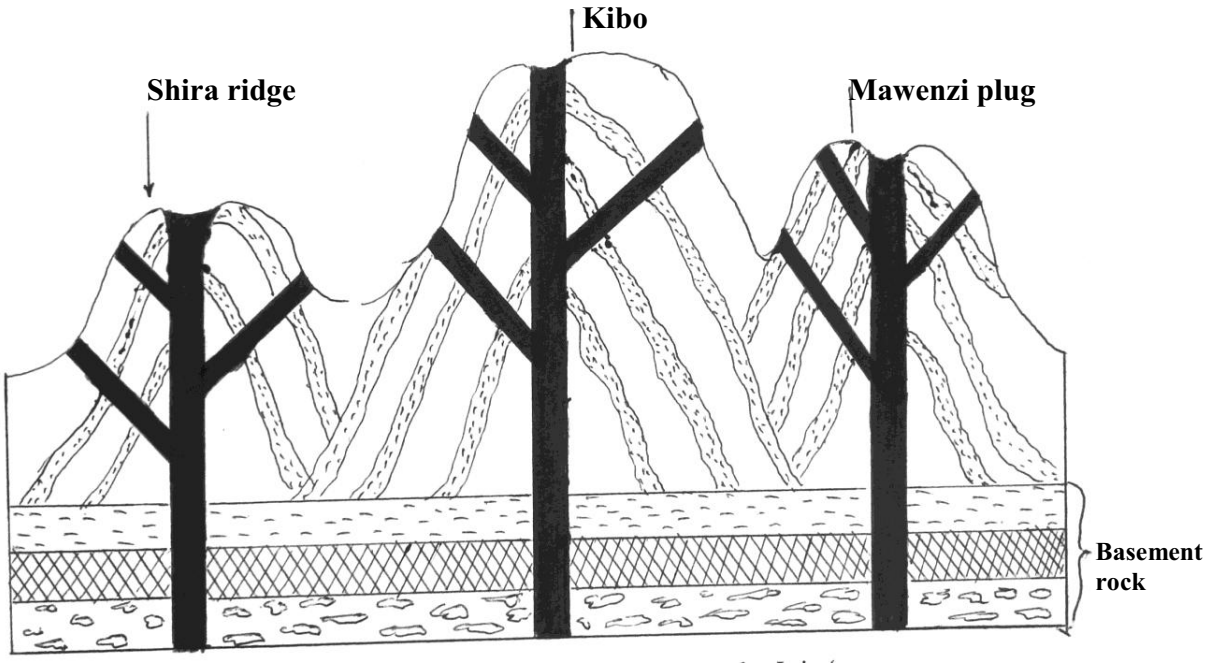
This is formed by alternative layers of ash and lava upon a base of ancient granite rocks. Lava can also escape through sides of the hill to form subsidiary cones or conelets. A volcano may have a crater on top.

A COMPOSITE VOLCANO

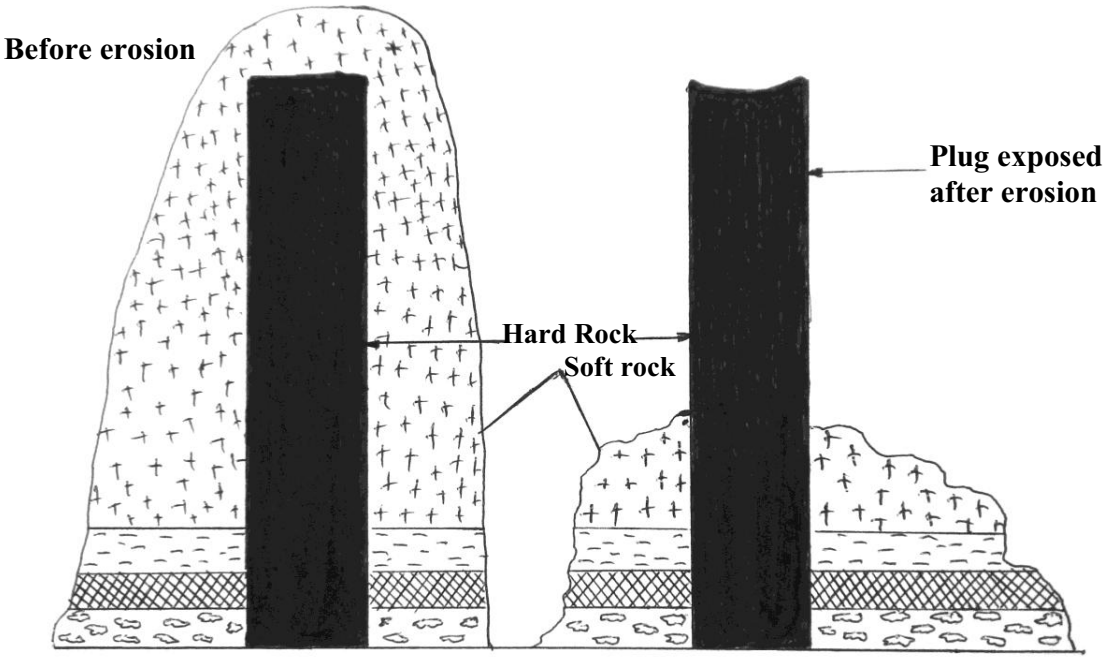


Examples of composite volcanoes in East Africa include;
(i) Mt. Elgon (4321MH)
(ii) Mt. Kenya (5200 MH)
(iii) Mt. Kilimanjaro (5890 MH)
(iv) Mt. Longonot (2777 MH)

MOUNTAIN KILIMANJARO

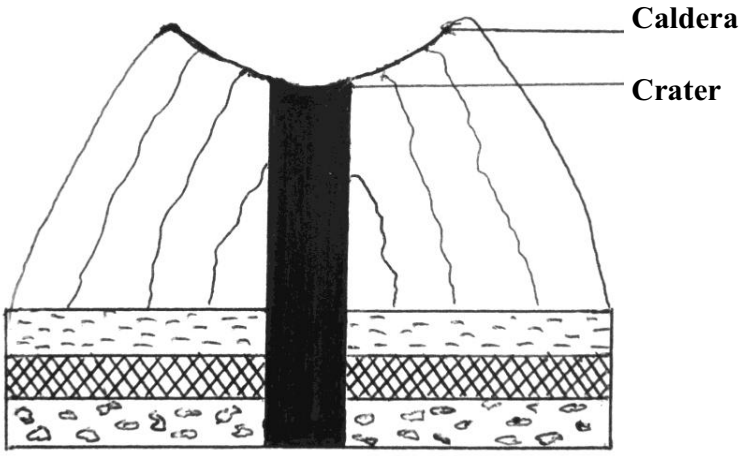


2. **A VOLCANIC PLUG**: This is also known as a volcanic neck. It is formed when magma solidifies in the vent (pipe). After wards soft lava out side the cone is washed away by erosion and the harder core remains standing above the surrounding country side or plain.
Examples of plugs are Mt. Kenya, Mawenzi, Tororo, Alekilek in Napak.



3. **CALDERA:** This is a widened crater and crater is a small depression at the top of a volcano. It is formed when a violent eruption blows off the top of a cone for example Napak in Northern Karamoja, Menengai, Nakuru and Ngorongoro craters.
   A Lake can develop on the floor of a Caldera e.g. on Mt. Masabit in Kenya.
   In dormant or extinct volcanoes vegetation can only develop on the floor for example on Mt. Longnot and at the same time new cones may develop craters.

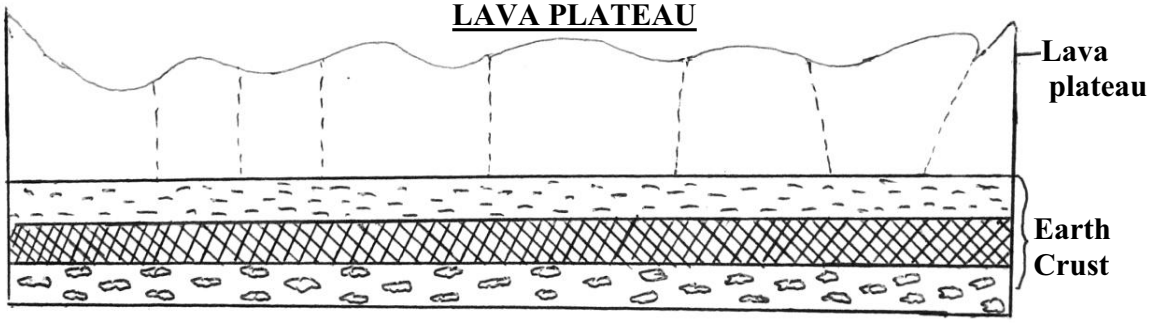
CALDERA AND CRATER



   Examples of ring craters are found in Rwenzori National Park like L. Nyamununka, L. Katwe, L. Nkugute, L. Kasenyi near Fort Portal, Ndodoto and L. Ghama in Tanzania.

4. **LAVA PLAINS OR PLATEAUX:** Lava plains or plateaux are monotonously flat areas which were formed by the out pouring of basic lava which flows through fissures. Examples of these plains are Kisoro plain in Kabale district of Uganda Uasin-gish in Kenya, Kapiti plain, Yatta plateau all in Kenya.

LAVA PLATEAU



5. **HOT SRPINGS**: This is super heated water which results from water coming into contacts with magma. This frequently reaches the earth's surface as hot springs. Examples of hot springs in East Africa are; Kitagata hot spring on the floor of Western rift valley in Ankole, around L. Magadi and Naivasha in Kenya, Maji–ya–moto in Kenya and Tanzania. More still hot springs in Uganda include Kisizi in Rukungiri, Sempaye in kabarole.

6. **GEYSERS:** These are jets of steam or boiling water thrown out regularly from cracks for example Bundibujyo in Western Uganda and around L. Naivasha in Kenya.

7. **EXPLOSION CRATERS**: These are depressions at the top of volcanic mountains. There are many explosion craters in Rwenzori National Park on the either side of Kazinga channel. This area has been referred to as the Bunyaruguru crater field. Some explosion crater contain salt e.g. L. Katwe. Other explosion craters in Uganda are Nyamulangira, Nyirangaongo, Kahokya and Butachinga craters in the Mufumbira mountains

LIFE CYCLE OR STAGES OF A VOLCANO

There are three stages of Volcanoes and these are;
(i) Active volcanoes
(ii) Dormant volcanoes
(iii) Extinct volcanoes

(i) Active Volcanoes: These are ones which erupt quite frequently. Examples of active volcanoes in East Africa include: O Doinyo Lengai in Northern Tanzania, Meru, Longonot, Likaiyu, Teleki in Kenya. These erupt after a period of 5 – 6 years.
(ii) Dormant Volcanoes: These are ones which may suddenly erupt into activity after a period of rest e.g. Kilimanjaro, Elgon, Mt.Kenya etc.
(iii) Extinct Volcanoes: These are ones which have not erupted in any historical time and are not expected to erupt. However it's difficult to tell whether a volcano is just dormant or extinct.

EFFECTS OF VOLCANISM ON HUMAN ACTIVITIES

1. Volcanic rocks are rich in valuable minerals e.g. limestone, phosphates in Sukulu hills in Kenya and Tororo rocks in Uganda. Diamond in Mwadui, Tin, Walfram, Iron ore in Kigezi highland and salt in Katwe.
2. Volcanic highlands play a big role in shaping the climate around them i.e. cool and moist compared to the surrounding lowland and these are areas which attract dense agricultural settlement.
3. Volcanic soils are generally very fertile and give high yields for crops.
4. Some volcanic mountain like Kilimanjaro, Kenya which are snow capped throughout the year provide constant source of water for the number of rivers and streams e.g. R. Tana in Kenya which is used for the production of Hydro Electric power and irrigation.
5. The snow capped mountains and other volcanic features provide beautiful landscape and scenery for tourist attraction.
6. Hot springs contain dissolved minerals which may be of medical value.
7. Forestry industry may also develop, especially on the steep slopes of these highlands. Building materials are obtained e.g. Timber is obtained and once exported foreign exchange is earned.
8. Fishing industry has been developed on lakes associated with volcanicity.
9. Volcanic eruptions and earth quake may lead to loss of lives and property. They are also a threat to communication lines e.g. the earth tremors of early 1960s caused loss of lives and property in Kasese district in Western Uganda.
10. Due to high and low altitude, it is difficult and expensive to construct roads and railway lines.

FAULTING:

A fault is a break, crack or a fracture in the earth's crust produced by vertical and lateral/ horizontal movements within the earth's crust.

FEATURES PRODUCED BY FAULTING

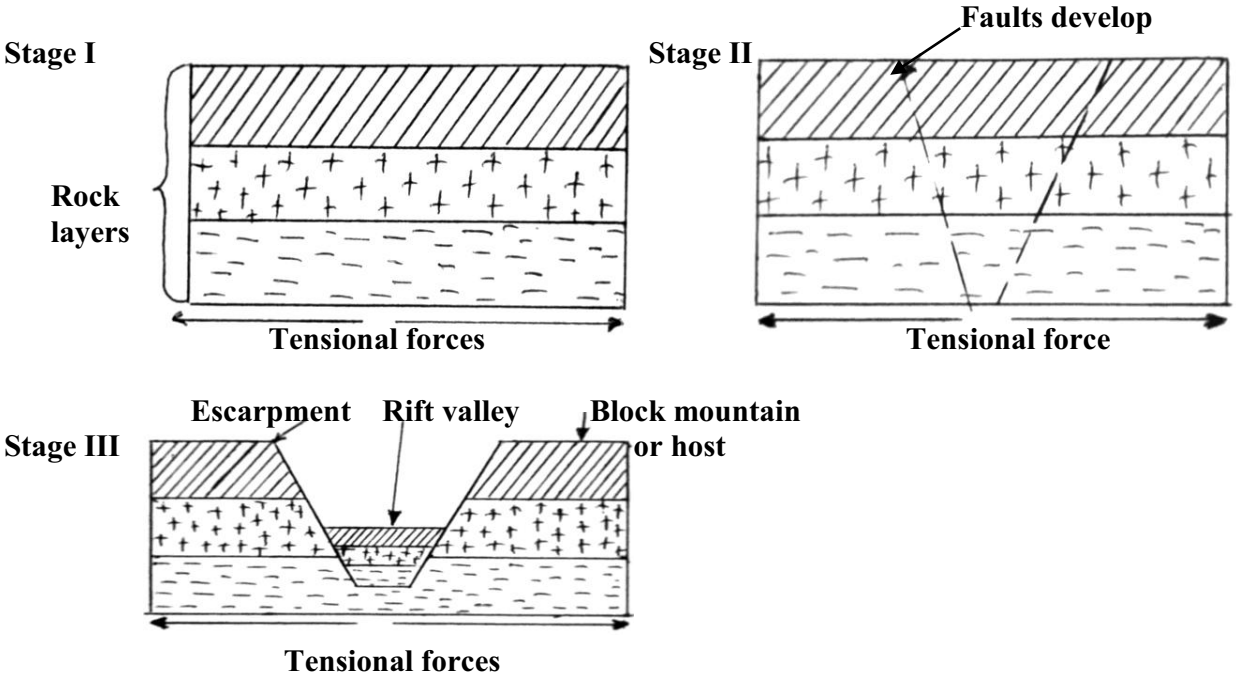
Faulting in East Africa produced the following land forms:
(i) Rift valleys
(ii) Block mountains
(iii)Escarpments
(iv)Steep faults
(v) Faulted lakes
(vi)Fault guided valleys.

THE RIFT VALLEY

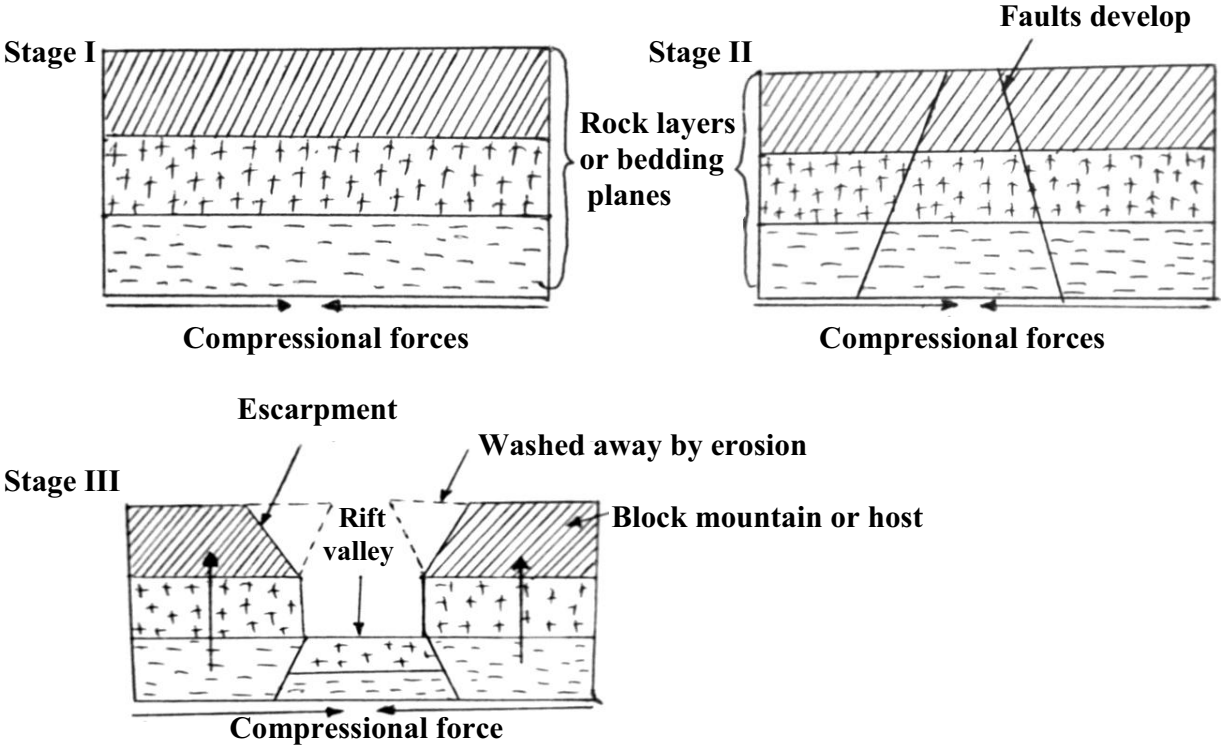
THE FORMATION OF RIFT VALLEY

It is a very generally accepted fact that rift valleys were formed by a process or tectonic movement commonly known as faulting. This process involves the fracturing or the displacement of rock strata caused by Tensional and compressional forces.

1. **Tensional Forces**: These are lateral movements which pull apart the layers of rocks. A rock under tension would fault / crack and produce normal faults.



2. **Compressional Force**: By compressional forces, forces are pushed together in the same direction and they lead to the compression of layers.

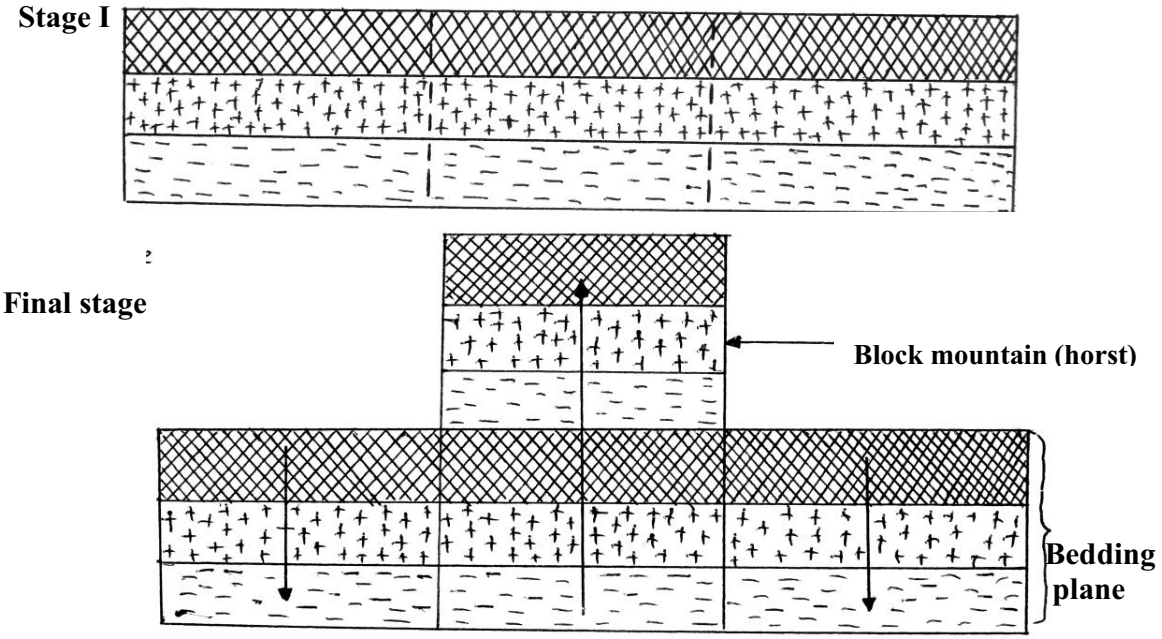


MOUNTAINS OF EAST AFRICA

BLOCK MOUNTAIN

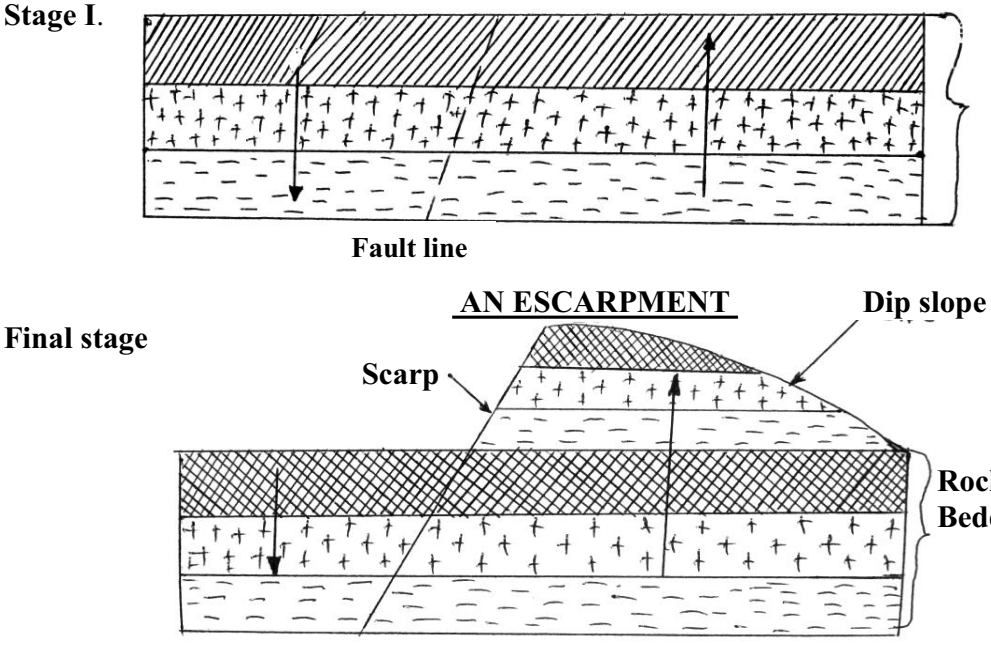
A block mountain is another feature formed by faulting. It is also known as a horst. It is a tall mountain with a level summit plane. The Rwenzori Mountain is a typical example of the above mentioned feature. Other block mountains include, Usambara, Pare, Uluguru, Mbeya Utipa.

THE FORMATION OF A BLOCK MOUNTAIN

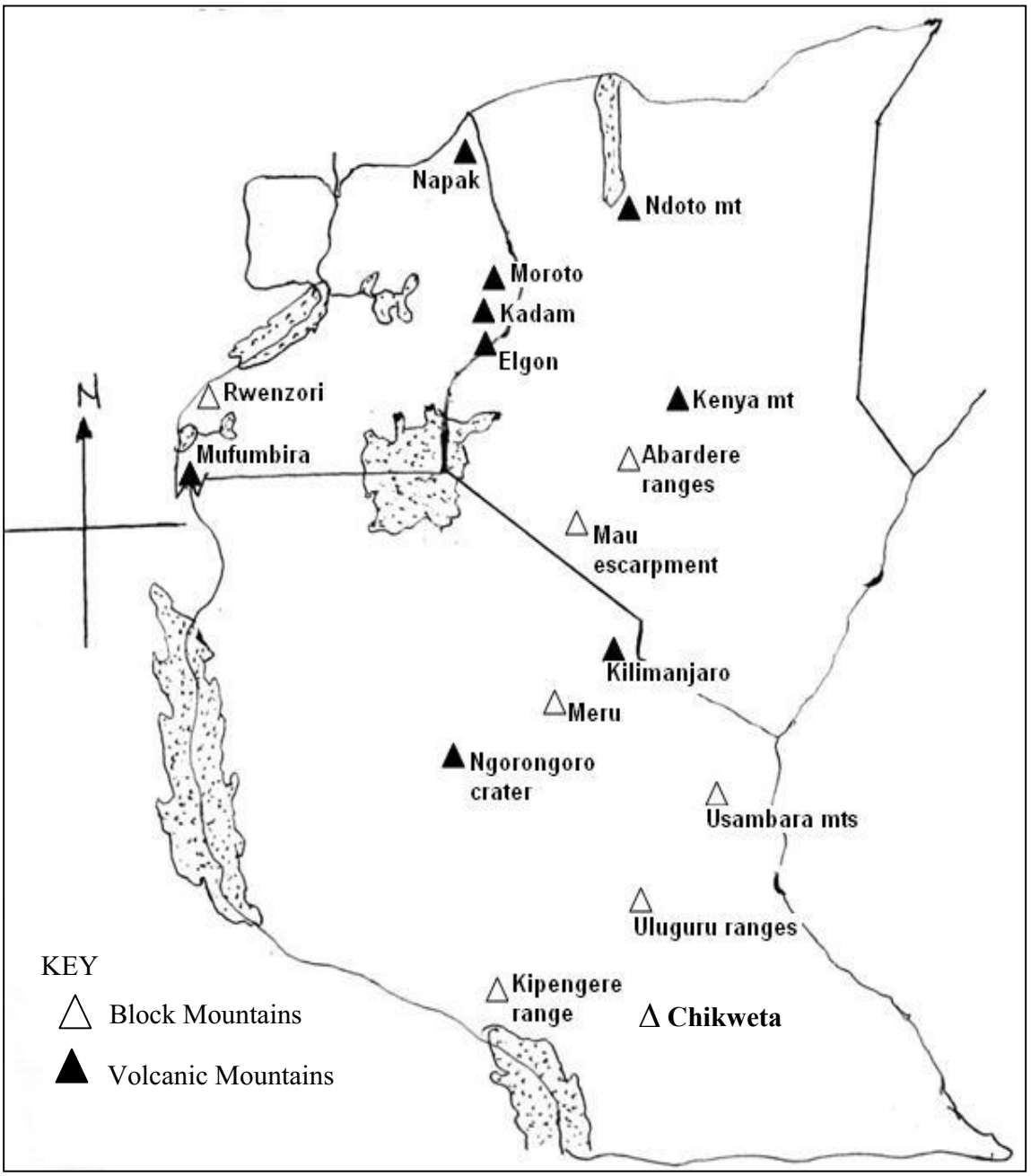


3. **Escarpments**: These are formed when one side is pushed up while the other is kept below level. It may be several hundred kilometers long e.g. Nandi, Kikuyu in Kenya, Butiaba escarpment in Uganda etc. The formation of an escarpment is associated with a single fault. During faulting, either one side of the fault was uplifted while the other was depressed. It has a dip face on one side and a scarp on the other.

THE FORMATION OF AN ESCARPMENT:



THE MAP OF EAST AFRICA SHOWING MAJOR MOUNTAINS

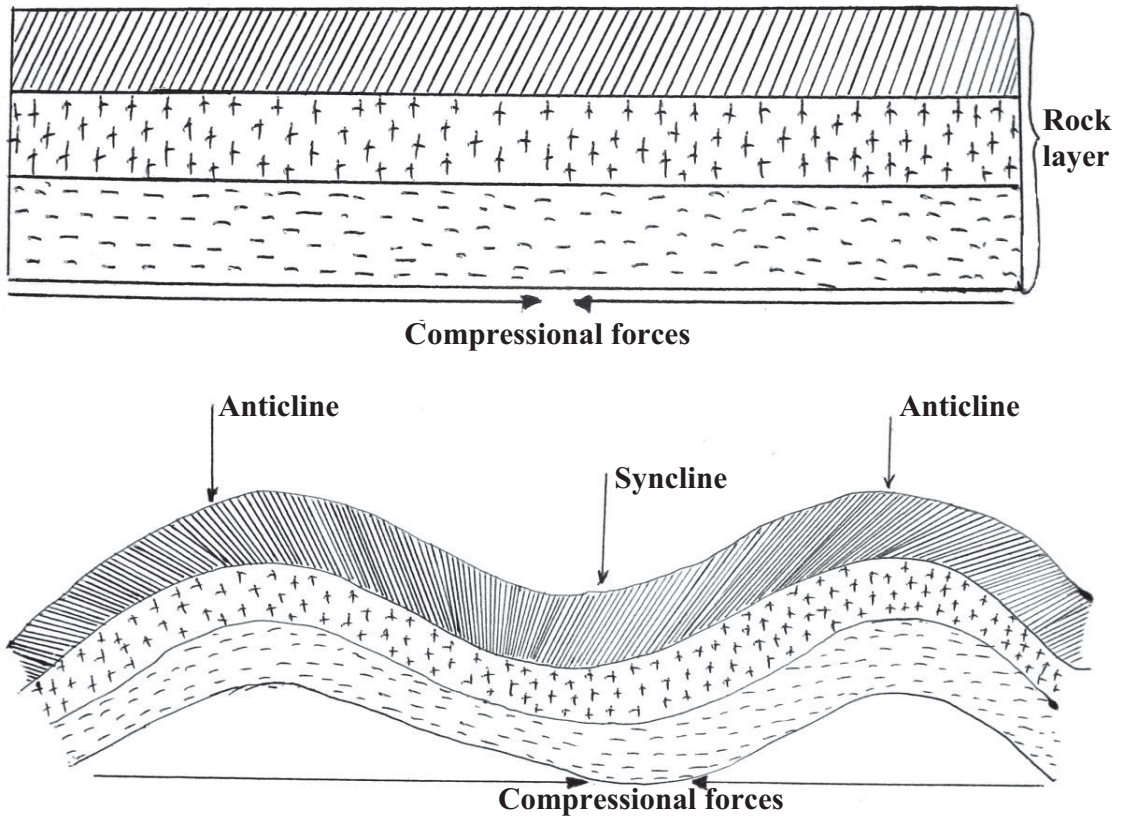


4. **RIFT VALLEY LAKES**: There are several rift valley lakes on the floor of the Western arm and Eastern arm of the East African rift valley.
   In the Eastern arm of rift valley we have lakes like L. Turkana, Baringo, Naivasha, Nakuru, Elementaita, Natron, Magadi etc.
   In the Western arm there are lakes like Alberta, Edward, George, Tanganyika, and Malawi.

(iii) **FOLDING:**

In East Africa folding did not cause high mountains as the crust consists of hard basement rocks which fracture, crack when folded. However, main folds are found in South Western Uganda forming Kigezi highlands. Folding is associated with compressional forces. From within the earth's crust, there may rise great thickness of sedimentary rocks that accumulate in the sea layers. Rocks may bend/fold upwards into hills called anticlines and down wards into valleys called Synclines

THE FORMATION OF FOLD MOUNTAINS

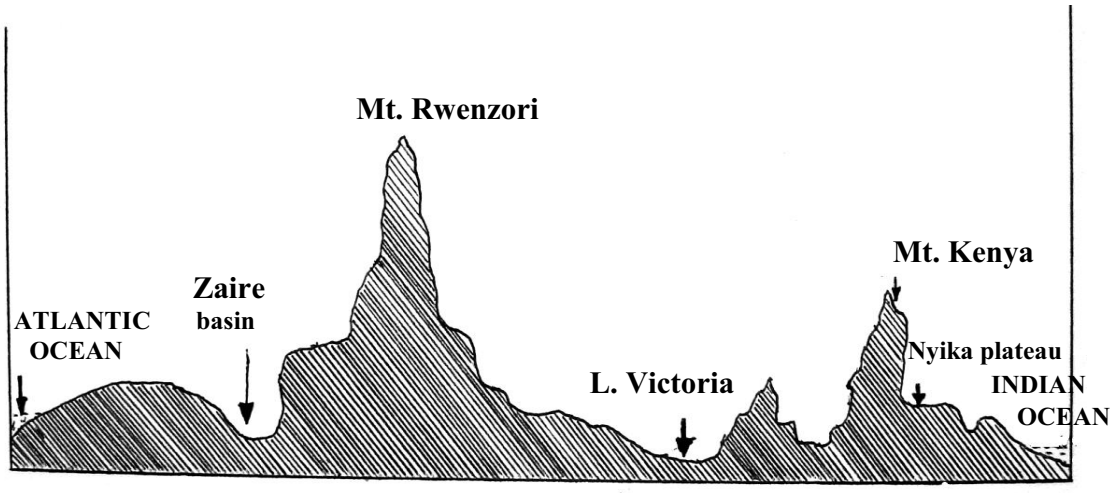


Other folded landscapes in East Africa are found in Arua, the Watian series of North East of Uganda, in Nyanza province around Kavirondo Gulf and in Bukoba in Tanzania.

(iv) **WARPING:**

This is a physical process in which there is sagging and uplifting of land leading to a shallow depression on the earth's surface. In East Africa warping led to the formation of lakes, plains etc
Lakes that were formed as a result of warping include Victoria and Kyoga in Uganda, Lake Amboseli in Tanzania in the upper Pangani river valley.
Plains which were formed as a result of warping are Tana plains of Kenya, the flat plains of Tanzania which are drained by river Wami and Kilombero, L. Kachira, Wamala, Mburo, Kijanebarora etc.

A CROSS SECTION OF LAKE VICTORIA



COASTAL GEOMORPHOLOGY

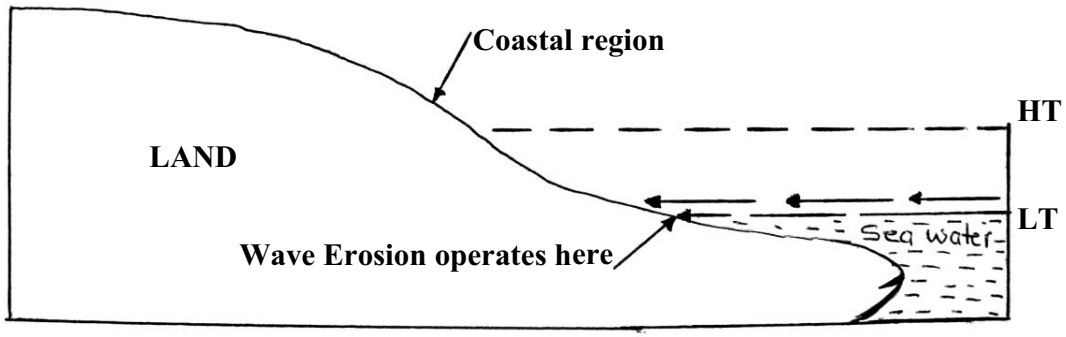
This is the study of the coastal land forms (features) along the coast.
The coastal features are mainly formed by erosion or deposition or by wave action.
There a number of features on the East African coast which were formed due to wave erosion and these include;

(i) Cliffs and wave cut plat forms
(ii) Cave
(iii) Arches
(iv) Stacks
(v) Geo
(vi) Blow hole

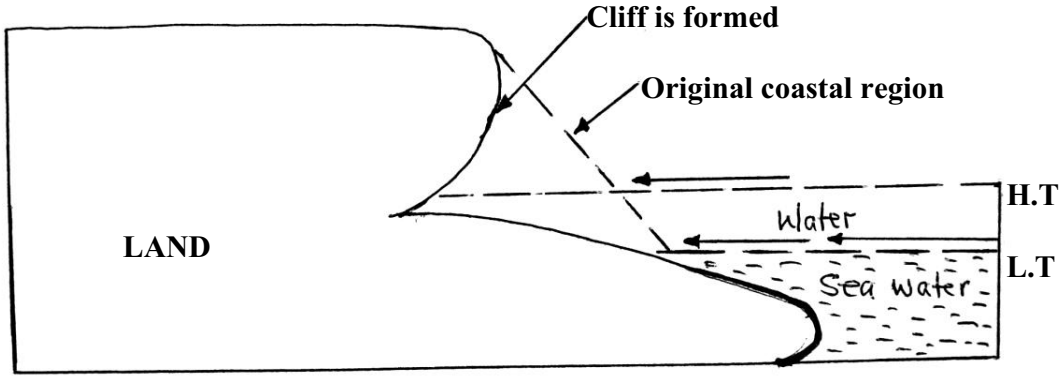
1) **CLIFFS:** These are steep slopes normally formed by wave erosion. This happens when there is a rise in the sea water a wave cut platform is produced with a dip steep slope which faces the wave cut plat form and this is called a cliff.

CLIFFS AND WAVE CUT PLAT FORM

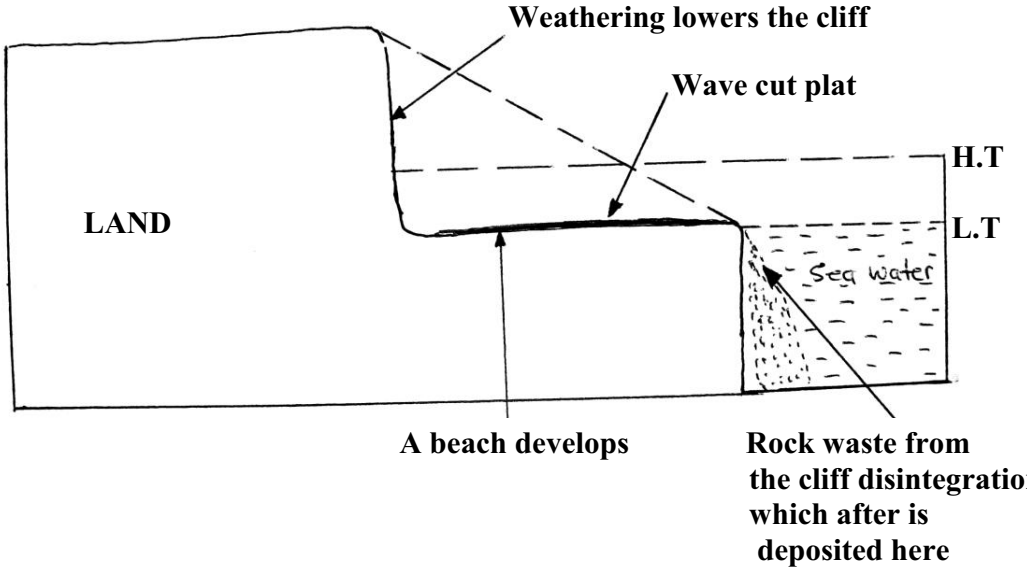
Stage I:



Stage II:

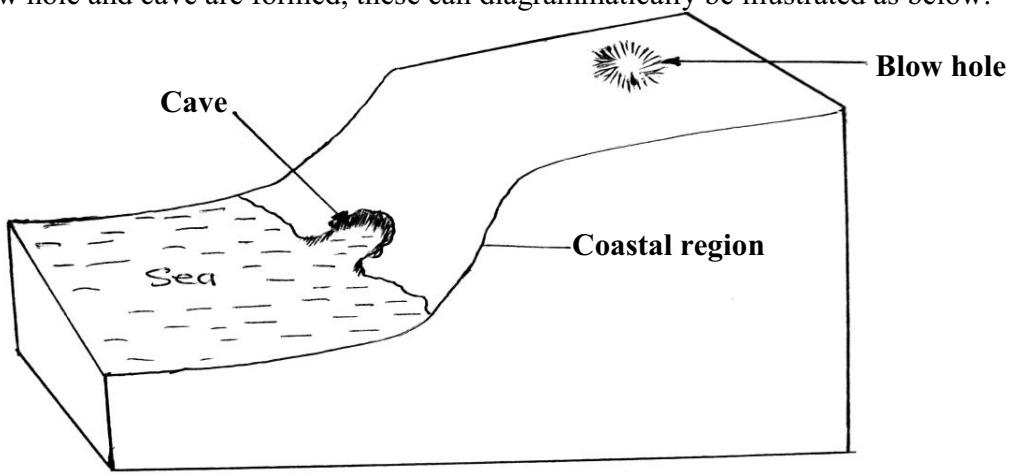


Stage III:



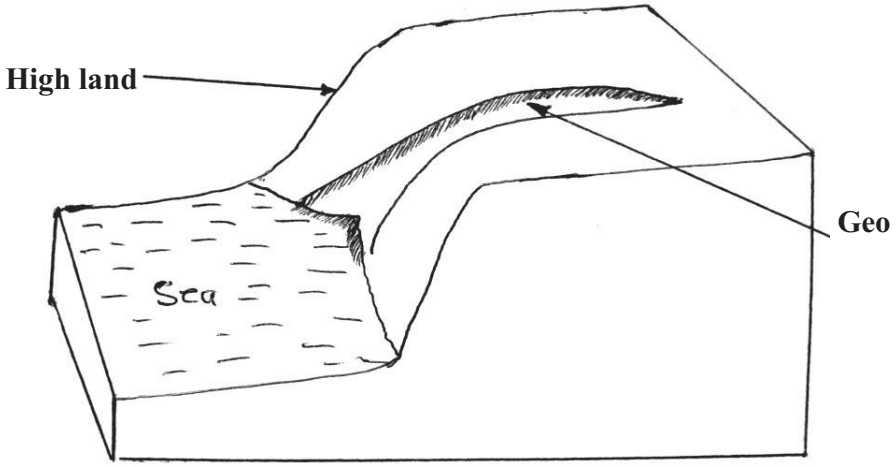
H.T **High tide**
L.T **Low tide**

2) **<u>BLOW HOLE AND A CAVE</u>**: These are coastal features which are formed when waves operate on the coastal region. As the wave erosional processes continue for a long period of time, a blow hole and cave are formed, these can diagrammatically be illustrated as below:



As the cave continues, the roof collapses to join the blow hole another feature forms and this is called a Geo.

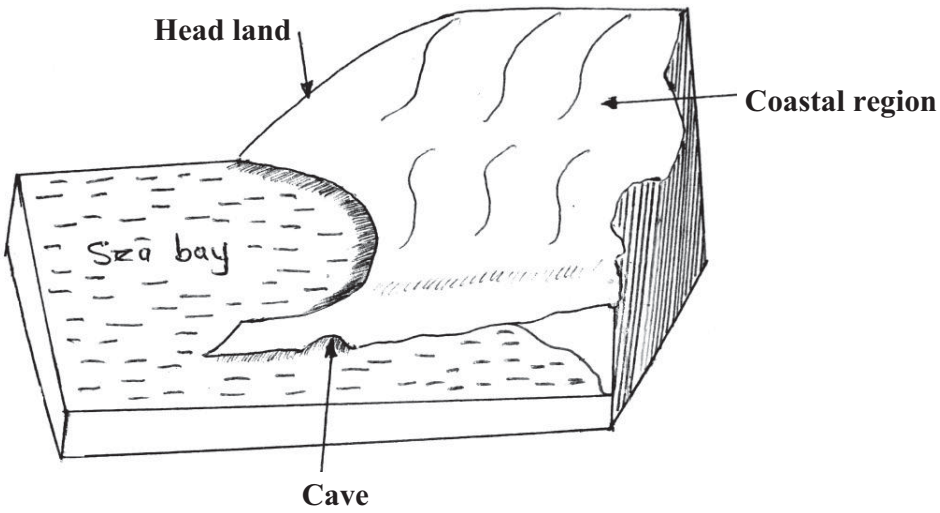
A GEO FORMATION



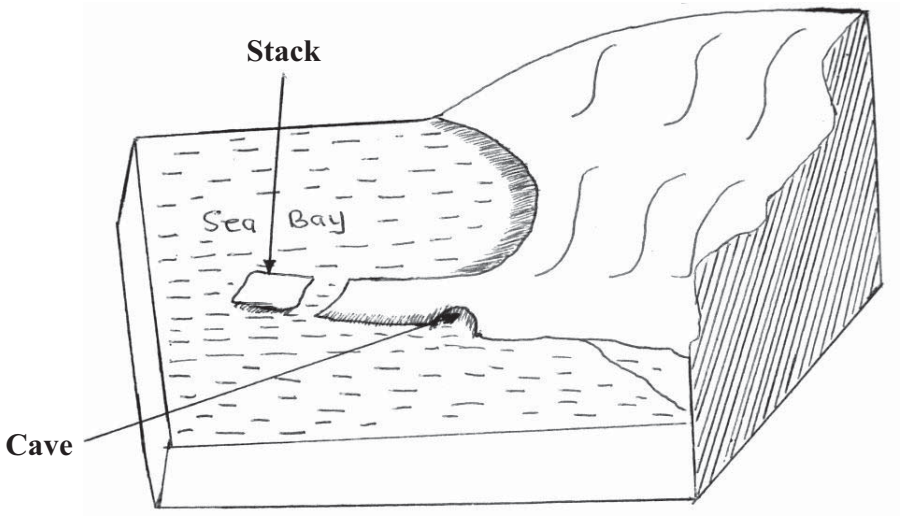
3) **ARCHES AND STACKS**: These are formed when there is a cave on either side of a head land. An arch is a small hole which is drilled through the coast line by the sea waves while a stack is a small piece of land separated from the main land (head land) when two caves caves meet, an arch is formed. When two caves join together, this gives rise to a natural arch and when an arch collapses, the end of the headland stands up as a stack.

ARCH AND STACK FORMATION

Stage I:



Stage II:



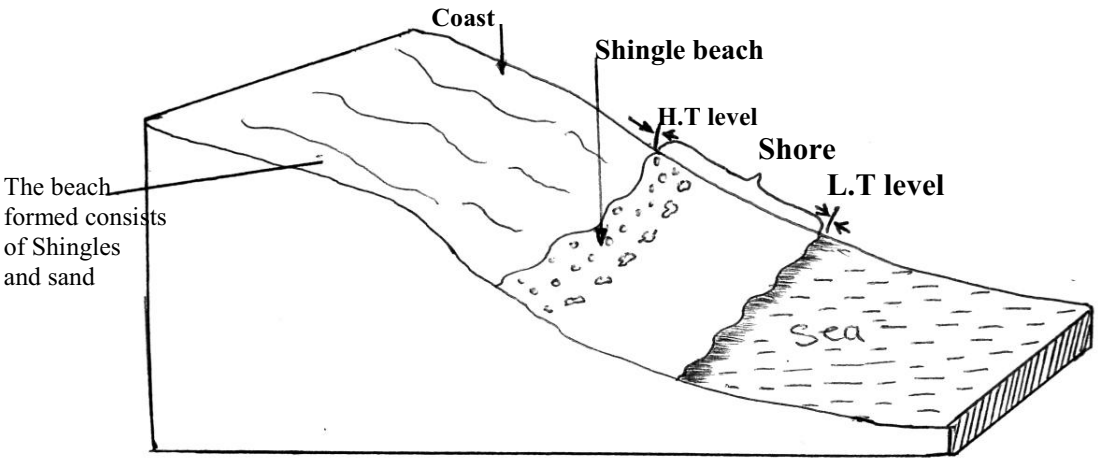
COASTAL FEATURES PRODUCED BY WAVE DEPOSITION

On the East African coast, there is a number of features produced by wave deposition, deposition means the laying down of the load either by rivers, run off and on shore drift. Features formed include;

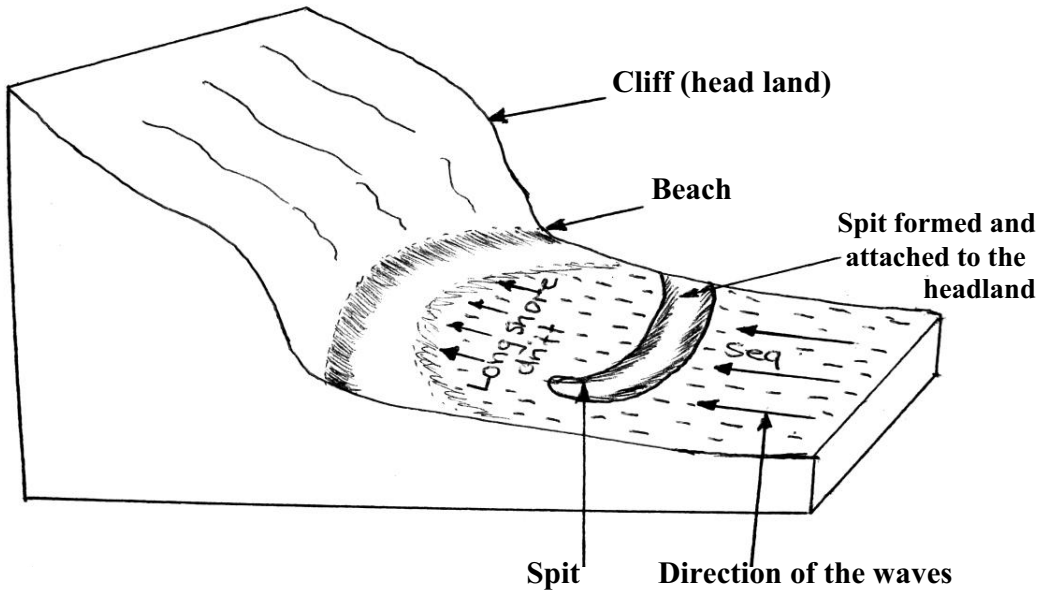
(i) Beaches
(ii) Mud flats
(iii) Coral reefs
(iv) Lagoon lakes
(v) Bars and spits
(vi) Tombolo.

I. **BEACHES:** These are formed when there is an active constructive wave which deposits pebbles, sand and mud along the coast line. These form a gently sloping plat forms known as a beach.

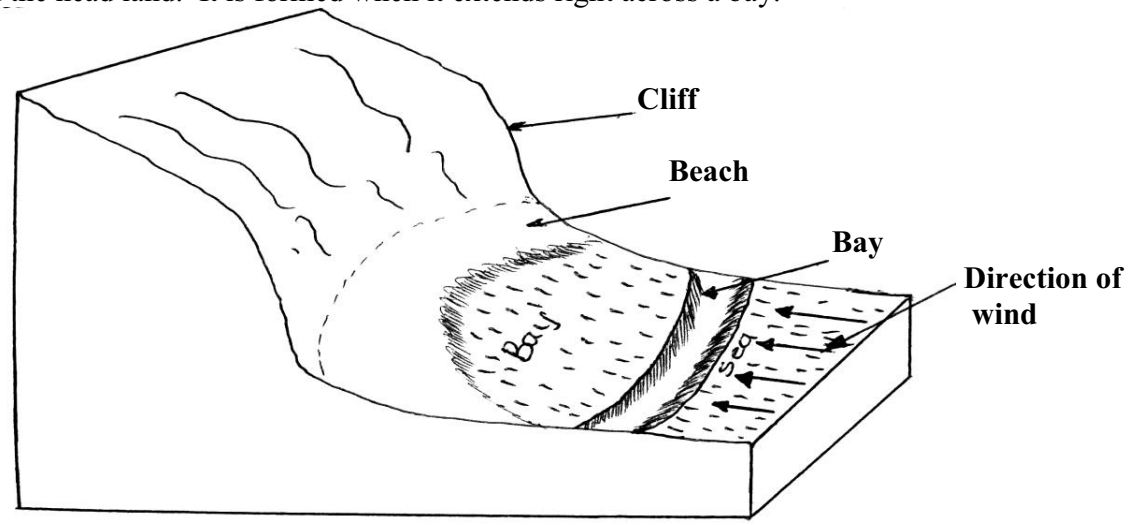
BEACH FORMATION:



II. **SPIT**

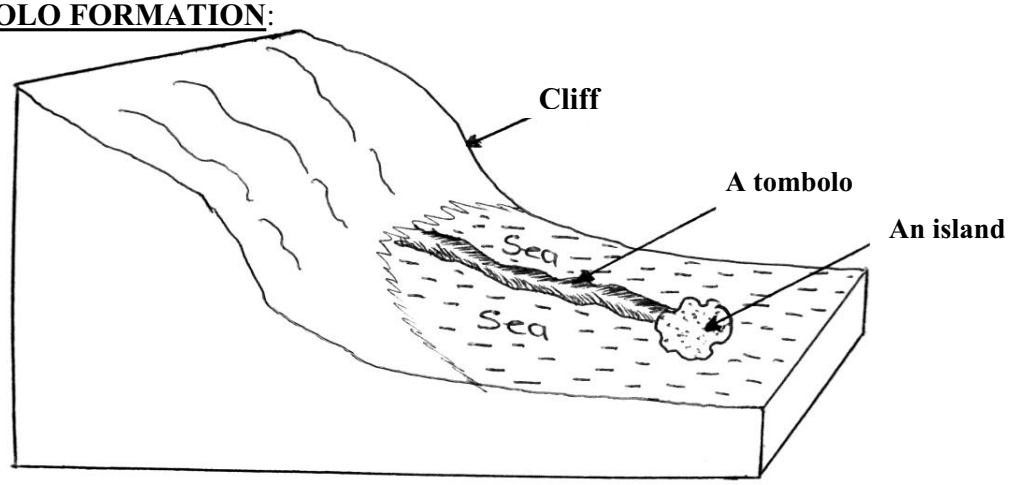


III. **A BAR:** This is a deposition of sand and pebbles. It forms when a spit attaches on either side of the head land. It is formed when it extends right across a bay.

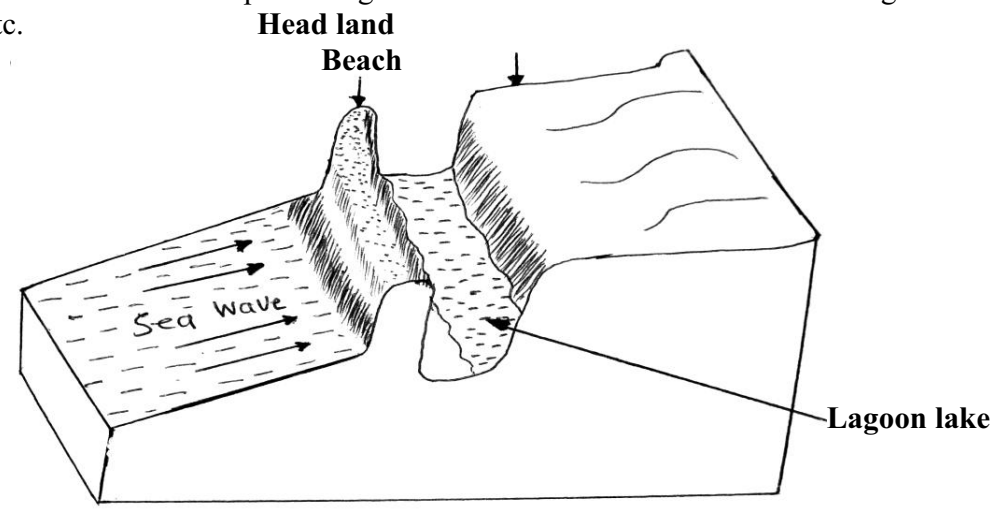


IV. **TOMBOLO**: This is a depositional coastal feature formed when a bar links itself from the mainland to an island, then a feature formed is called a Tombolo.

A TOMBOLO FORMATION:



V. **LAGOON:** This is a water body which is enclosed by a spit or spit. It is formed when a spit seals off the sea and it is separates a small water body from the sea or a lake. It is formed as a result of on shore drift. Examples of lagoon lakes in East Africa include L. Nabugabo on Lake Victoria etc.



VI. **MUD FLATS**: These are formed when tides deposit fine silt along the coast especially in bays and Estuaries. The deposition of mud is called mud flats.

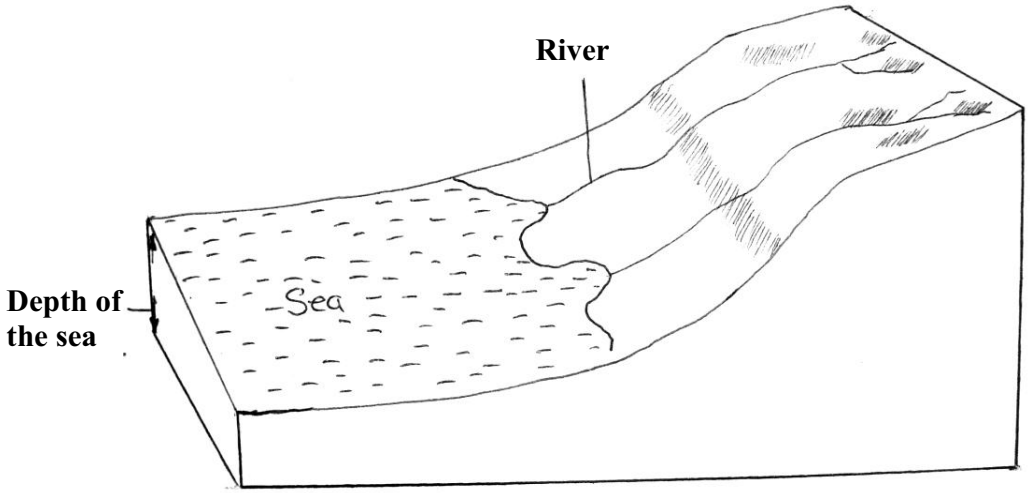
SUBMERGED HIGH LAND COASTS

These are of three main types, they include;

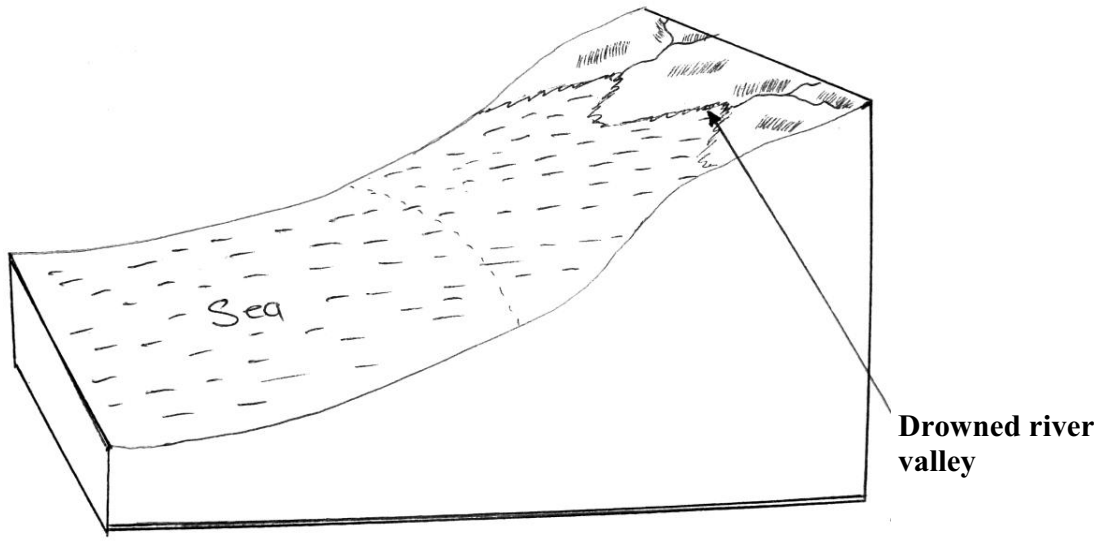
(i) Ria coast
(ii) Longitudinal coast
(iii) Fiord coast

1) **RIA COAST:** This is formed when a highland coast is drowned /submerged into its lower parts of its river valley which become flooded. The submerged parts of the valley are called rias. Rias form good sites for harbours.

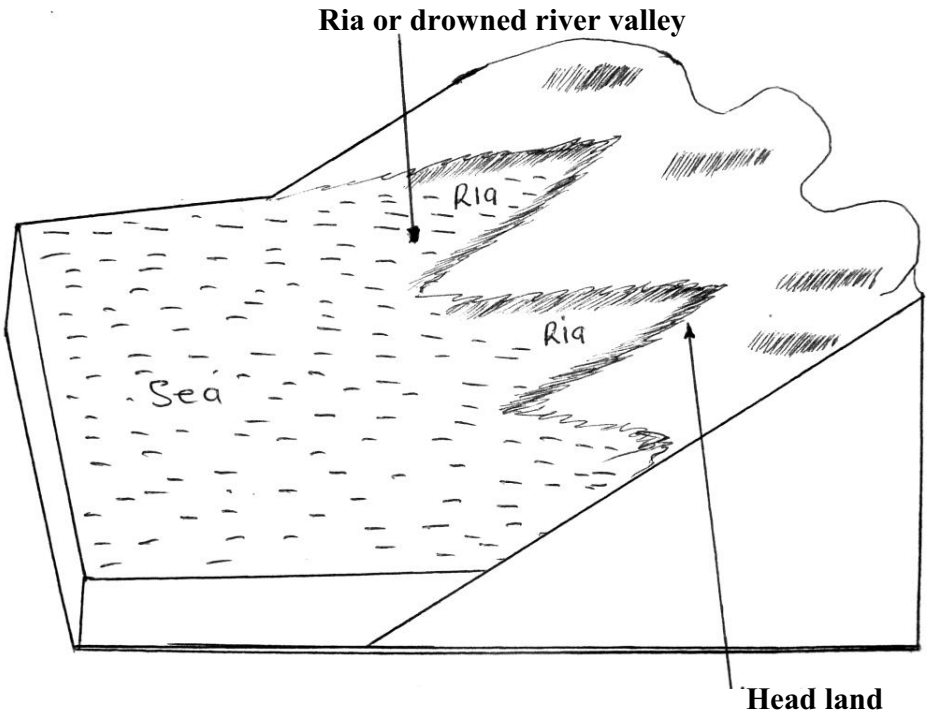
Stage I: **Before submergence**



Stage II: **After submergence**

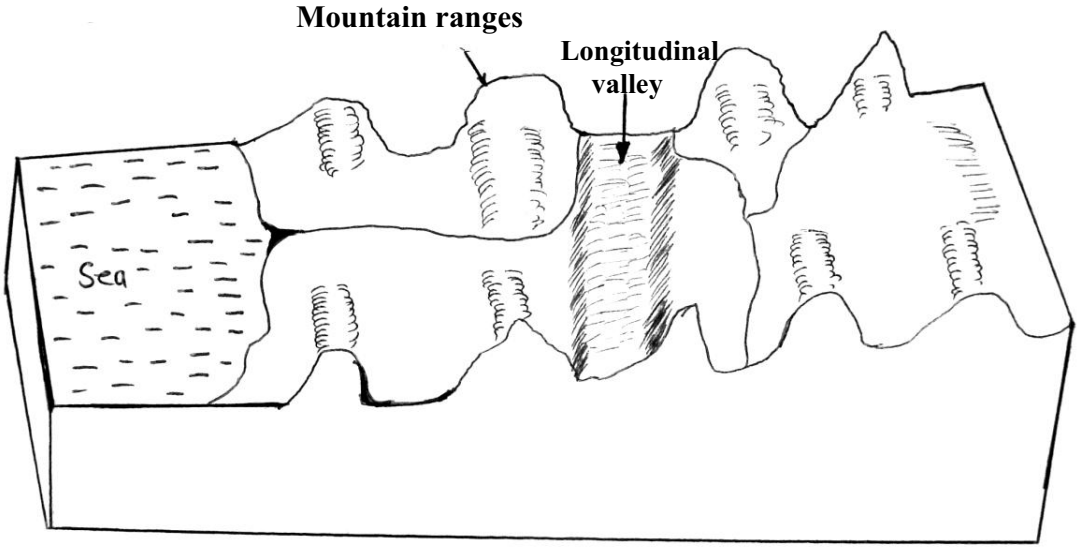


Stage III

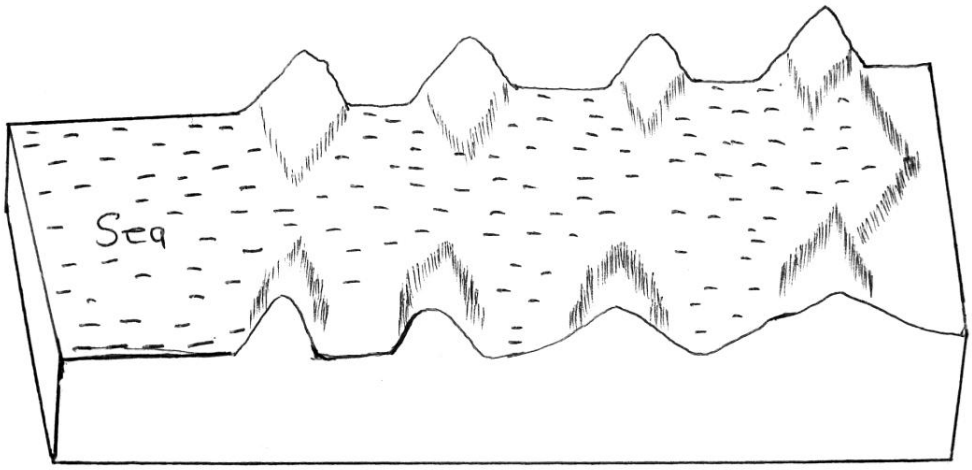


2) **<u>LONGITUDINAL COAST</u>**: These are formed when highland coasts whose valleys are parallel to the coast are submerged. Some of the valleys are flooded and the separating mountain ranges become chains of Islands. The valleys are sometimes called <u>Sounds</u>.

Stage III: Before submergence



Stage II: After Submergence:



Coastal Mt. ranges have turned into chains of Islands.

QUESTIONS FOR REVISION:

1) Which of the following features is not formed by wave erosion:
   (a) Geo (b) stack (c) beach (d) blow hole
2) Various coastal features are formed before a stack is finally formed. In which order do the following features produced take place?
   (a) Cave, head land, arch, stack
   (b) Headland, cave, arch, stack
   (c) Arch, Cave, headland, stack
   (d) Head land, arch, cave, stack
   (e) Cave, arch, headland, stack
3) All the following features are produced by wave deposition except;
   (a) Sand bar (b) beach (c) stack (d) spit.
4) A coastline which exhibits drowned river valleys is called a;
   (a) Fiord coast (b) Submerged coast (c) Ria Coast (d) Lowland coast.

CORAL REEFS AND ISLANDS

Coral is a limestone rock made up of skeletons of minute living organisms called **coral polyps**. When these minute living organisms die, their skeletons sink down in water and since these skeletons contain calcium carbonate, when they accumulate in water, they form hard rocks called coral reefs.

CONDITIONS FOR CORAL POLYPS TO THRIVE

1) They thrive well in areas where the sea temperature is about 21^{o}C (70^{o}F)

2) There should be enough sunlight.

3) They thrive in areas where there is clear salt water down to the depth of about 55m (180 feet)

4) They don't thrive well in fresh water but only in salty water of at least 2.7 – 4% salt content.

TYPES OF CORAL FORMATION

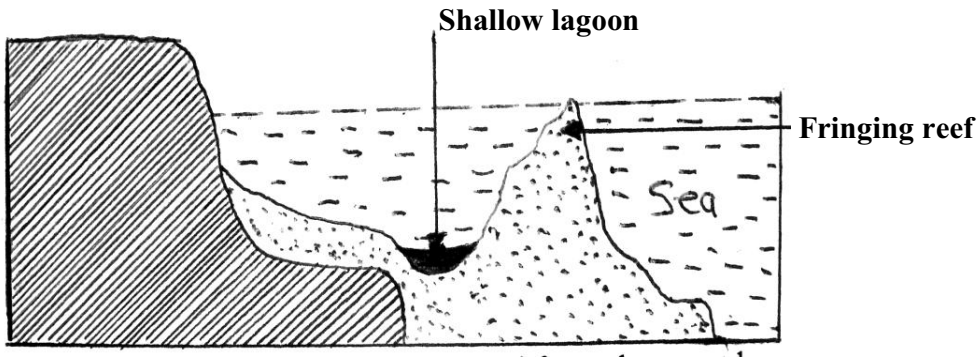
There are three major types of coral reefs and these include

(i) Fringing reef

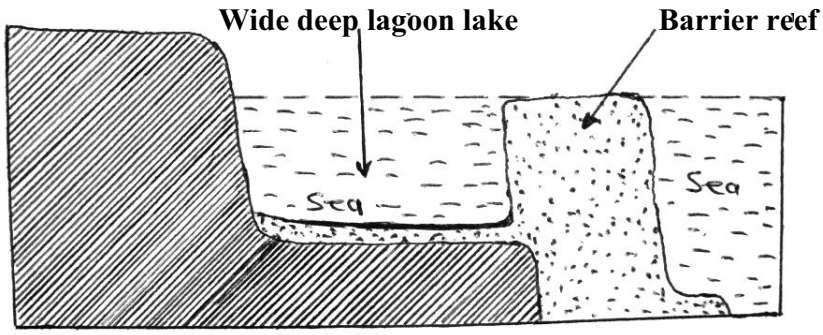
(ii) Barrier reef

(iii) Toll reef

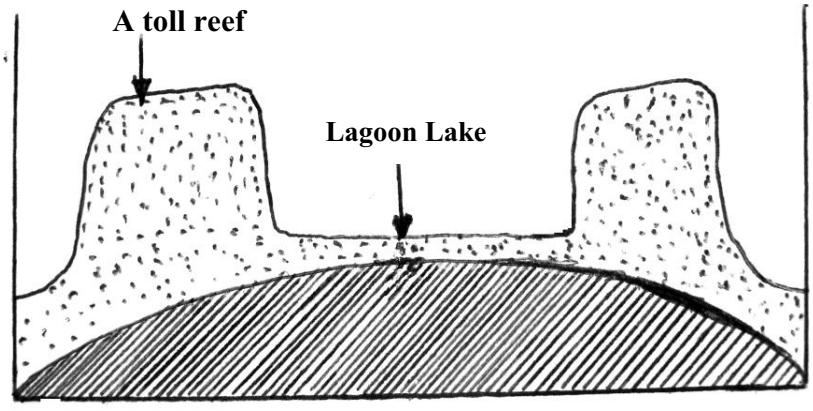
(i) Fringing reef: This is a narrow coral platform separated from the coast by a shallow lagoon lake.



(ii) Barrier reef: This is a wide coral platform separated from the coast by a wide deep lagoon. It is similar to a fringing reef only that the latter is situated several miles off the coast.



(iii) A toll reef: This is a circular coral reef that encloses a lagoon lake.



QUESTIONS FOR REVISION

1. Give the characteristics of each of the following

(i) a barrier reef

(ii) a fringing reef

2. Which of the following names is given to a circular coral reef with a lagoon lake?

(a) Fringing reef (b) barrier reef (c) toll reef (d) coral island

3. Which one of the following conditions is not important for the growth of coral?

(a) cool climatic conditions

(b) clean salt water

(c) Warm sea temperature of about $21^{o}C$

(d) plenty of sunlight

GLACIATION IN EAST AFRICA

Glaciation is the process by which glaciers move down valley. Glaciers are moving ice which flow out of snow capped areas (highlands) or snow field under the influence of gravity. Snow capped mountains in East Africa include mountains Kilimanjaro, Kenya, Rwenzori, e.t.c

Glaciation involves two major activities which are

(i) erosion

(ii) deposition

FEATURES PRODUCED BY GLACIAL EROSION

The most important of these are: U shaped valleys, hanging valleys, cirques (corrie), arêtes, pyramidal peaks. These glaciers erode through two processes and these are

(i) Plucking

(ii) Abrasion

(i) **Plucking:** This is the process by which parts of the underlying rocks are frozen into the base of the ice and pulled off. This process is aided by melt water which freezes into the rock cracks.

(ii) **Abrasion:** This is a process in which stones and other materials carried by glaciers are frozen into the base of a glacier and is dragged over the rock floor where the floor is scrapped and polished. The floor is deepened through a process called siltation.

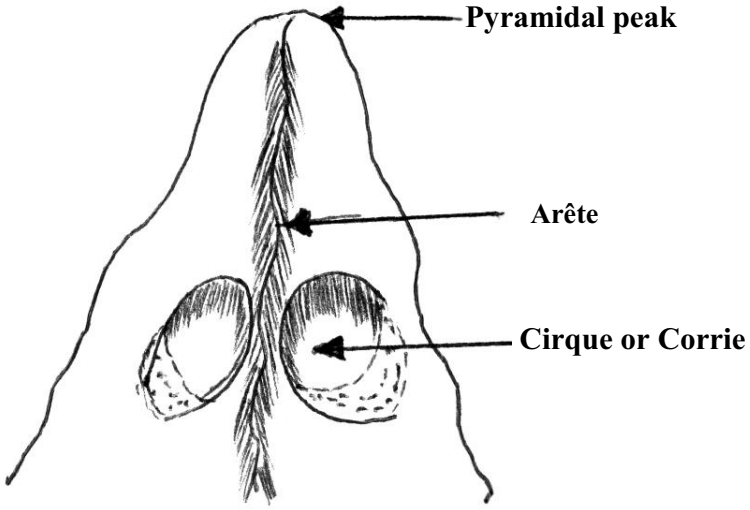
(a) **A cirque/corrie:** This is a depression produced by glacial erosion on a mountain side. It is a circle-like structure. Examples of such features in East Africa include Teleki tarn, Hut tarn on mountain Kenya, Bujuko, Speke e.t.c. on mountain Rwenzori, Karanga and mountain Kilimanjaro

(b) **Pyramidal peak or horn:** this is the jagged rough peak with arêtes radiating from the sides. It is formed due to backward erosion of the glaciers. It is formed when three or more cirques develop on the sides of the peak. Examples of peaks in East Africa include Speke, Baker, Stanely, Margherita on mountain Rwenzori, Midget Delamere, Pont John, Pont Piggot on mountain Kenya, Kibo, Mahwenzi on mountain Kilimanjaro

(c) **Glacial trough:** This is a wide flat bottomed steep sided value with a U- shaped structure. Examples of troughs in East Africa are Mubuku, Bujuku, Mugusu, Kamusoso, Butahu on mountain Rwenzori. Mackinder, Karange, Hobley and gorges on mountain Teleki, Kenya and Karanga on mountain Kilimanjaro.

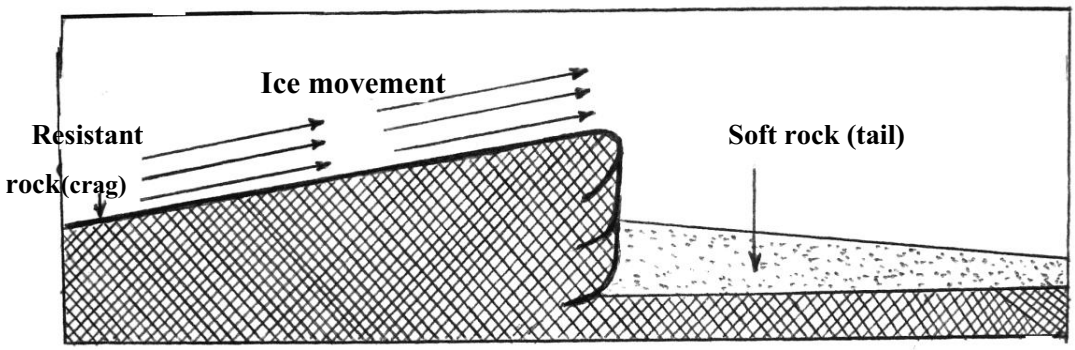
(d) **Arêtes or ridges:** These are narrow steep sided rocky ridges that separate two cirques/corries. They are formed by backward erosion of corries.

THE STRUCTURE OF A CIRQUE, ARÊTE AND PYRAMIDAL PEAK



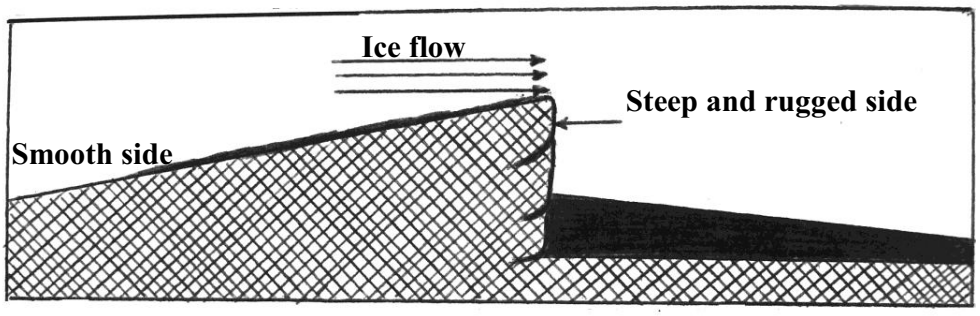
(e) **Crag and Tail:** This is an elongated rock mass which is formed when a flowing glacier meets a resistant rock protecting a rock on its Lee side. The soft rock on the Lee side is called **tail** while the resistant rock on the other hand is called a **crag.**

A CRAG AND TAIL

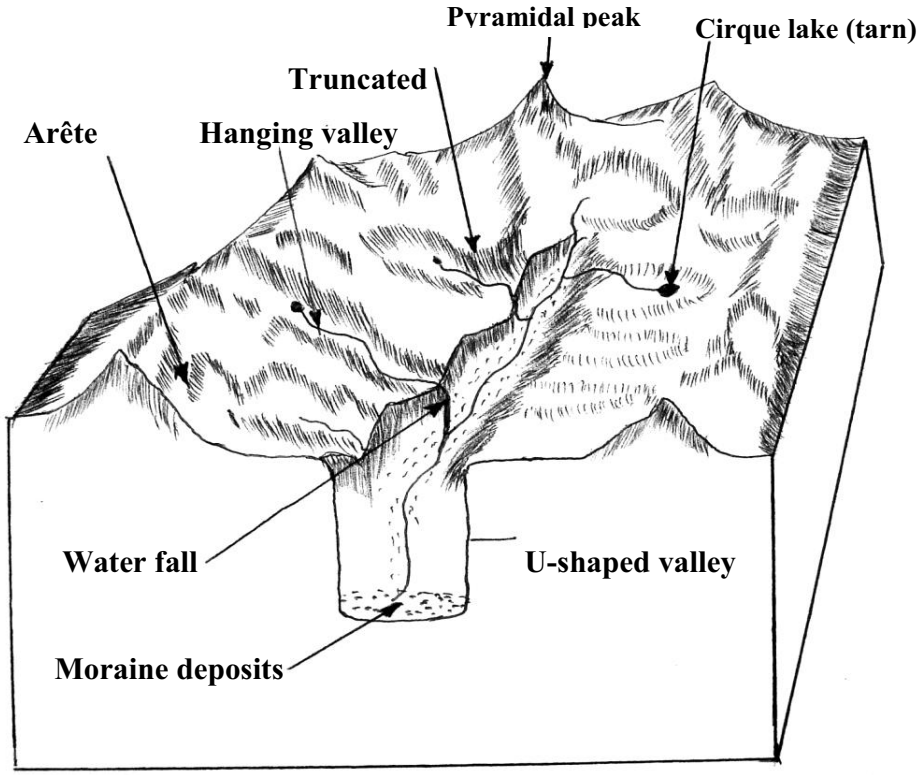


(f) **Roche Mountonnee:** this is a resistant rock mass which rises above the plain. The sides and upstreams of a roche mountanee is steep and irregular because of plucking by the glacier.

A ROCHE MOUNTONNEE



GLACIAL EROSIONAL FEATURES IN HIGHLAND AREA



Glacial depositional features (Land forms)

A valley glacier carries large quantities of rock waste called moraine. Glacial features are divided into two

(i) Till features

(ii) Fluvio Glacial features

(a) Till glacial features: These are glacial depositional features that and features formed under this type of glacial deposition include

(i) Erratics

(ii) Till plain

(iii) Moraines

(i) **Erratics:** These are boulders which were originally transported by the advancing glaciers and later deposited in different areas. They are found in Morrainic ridges within glacial troughs.

(ii) **Till plain:** This is sometimes referred to as the boulder clay plain. It is monotonously flat land which is formed as a result of constant deposition by ice sheet as it is advancing.

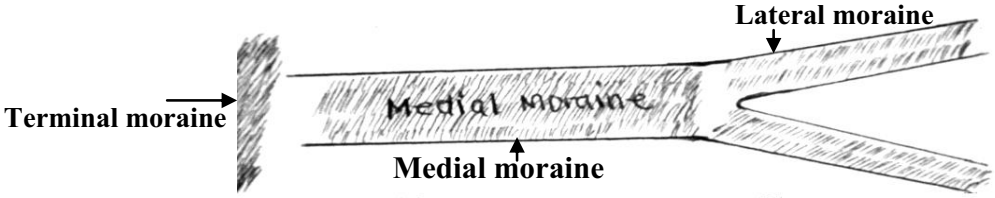
(iii) **Moraines:** These are materials carried by the glacier and later deposited when ice sheet stagnates. There are three types of moraines and these are:

a. Lateral moraine

b. Terminal moraine

c. Medial moraine

a. Lateral moraine: This is an elongated ridge formed on the side of a valley during ice melting.



b. Terminal moraine: This is a glacial morainic deposit which forms across the valley the advancing ice.

c. Medial moraine: This is formed at the centre of the glacier when the ice retreats and it deposits its moraine.

(b) Fluvial glacial features: These are land forms/ features formed by melting water. The glacial streams carry great quantity of fine materials. These materials are later deposited in the channel under the ice. The major Fluvio glacial features include :

(i) Drumlins

(ii) Eskers

(iii)Coastal plain

(iv)Kettle hole

(v) Kame terraces

(vi)Kame

(i) **Drumlins:** These are glacial morainic deposits which from several hundred kilometres thick and their surfaces are marked by long rounded hills.

(ii) **Eskers:** These are elongated, narrow ridge like deposits made up of rock debris mainly sand and gravel deposited by glaciers.

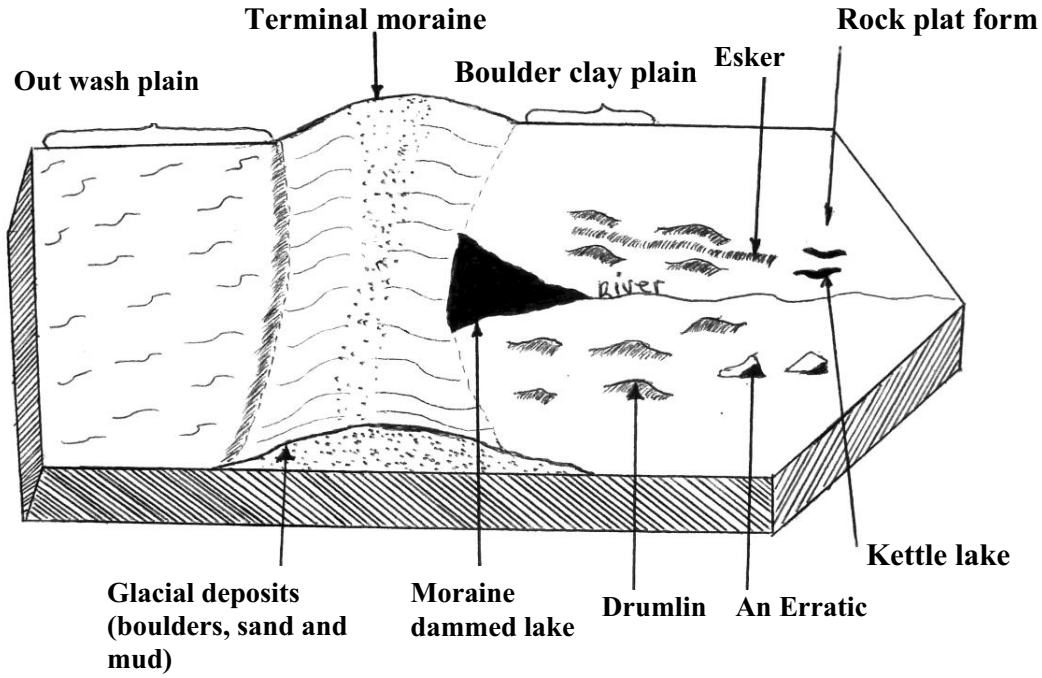
(iii)**Out wash plain:** This is a wide gently sloping plain composed of mainly sand, gravel and deposits by glaciers.

(iv)**Kettle hole:** This is a depression or a hollow which is formed in Fluvio glacial deposit. It is formed when a block of ice is detached from the main glacier. When the kettle hole is occupied by a water body, then it is called a kettle lake. A good example of a kettle hole in Uganda is Mahoma Kettle Lake on Mountain Rwenzori, and Lake Ellis on Mountain Kenya.

(v) **Kame terraces:** These are formed by the deposition of sand and gravel in narrow lakes held between the ice and Front and an adjacent upland.

(vi)**Kames:** these are Fluvio glacial features which are irregular and undulating hills of sand and gravel deposited by glaciers.

FLUVIO GLACIAL DEPOSITIONAL FEATURES



IMPORTANCE OF GLACIATION TO PEOPLE

1. Boulder clay plains are very fertile and suitable for agriculture

2. Lakes such as moraine dammed and kettle lakes boost the fishing industry

3. Glacial landforms attract tourists.

4. Glacial streams provide water for irrigation, domestic and industrial use.

5. Water falls in glaciated uplands are suitable for the development of hydro-electric power plants.

6. Lakes formed as a result of Glaciation provide water transport.

REVIEW QUESTIONS:

1. Which of the following features is not produced by glacial erosion?

(a) Hanging valley (b) An arête

(c) Cirque (d) An esker

2. Of what importance are glaciers to economic development of any East African country?

3. All of the following features are produced by glacial deposition except

(a) Drumlin (b) Moraine

(c) An arête (d) An esker

WEATHERING IN EAST AFRICA

Weathering refers to the disintegration of rocks into small particles. It may also be defined as the breaking down of rocks. This process takes place in many ways.

(i) Mechanical weathering

(ii) Chemical weathering

(iii) Biological weathering

(i) Mechanical (Physical weathering): Under this type of weathering, rocks are subjected to direct physical stresses and strains which lead to breaking up of rocks.

Types of mechanical weathering

There are two main types of mechanical weathering and these are

(a) Exfoliation

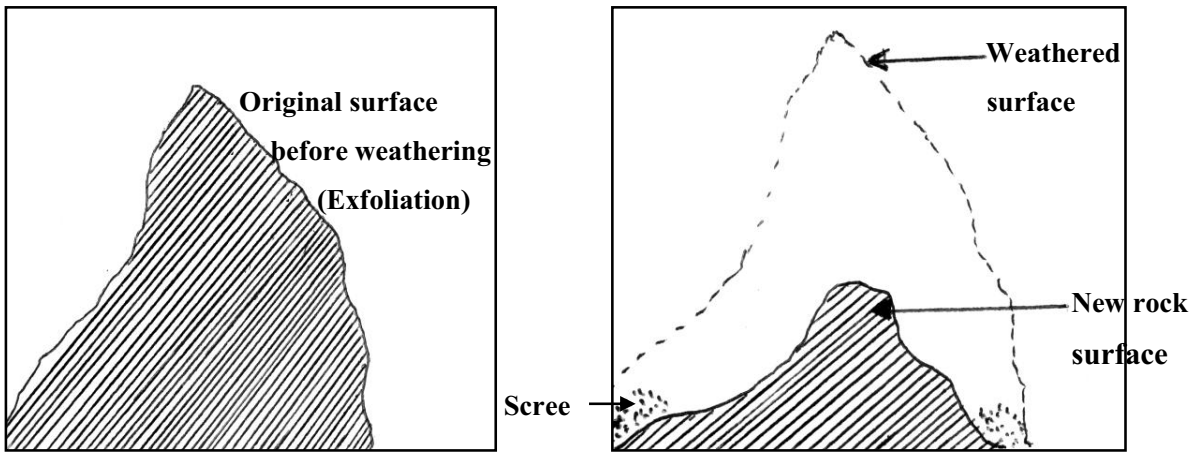
(b) Frost shattering

(a) Exfoliation: This process involves the fracturing of rocks caused by alternate heating and cooling. During the day when the rocks are subjected to intensive heat, they expand and at night

because of the absence heat, rocks cool down and contract. The expansion and contraction of rock during the day and at night weaken rocks and consequently lead to plucking off the outer layer.

FORMATION OF AN EXFOLIATION DOME

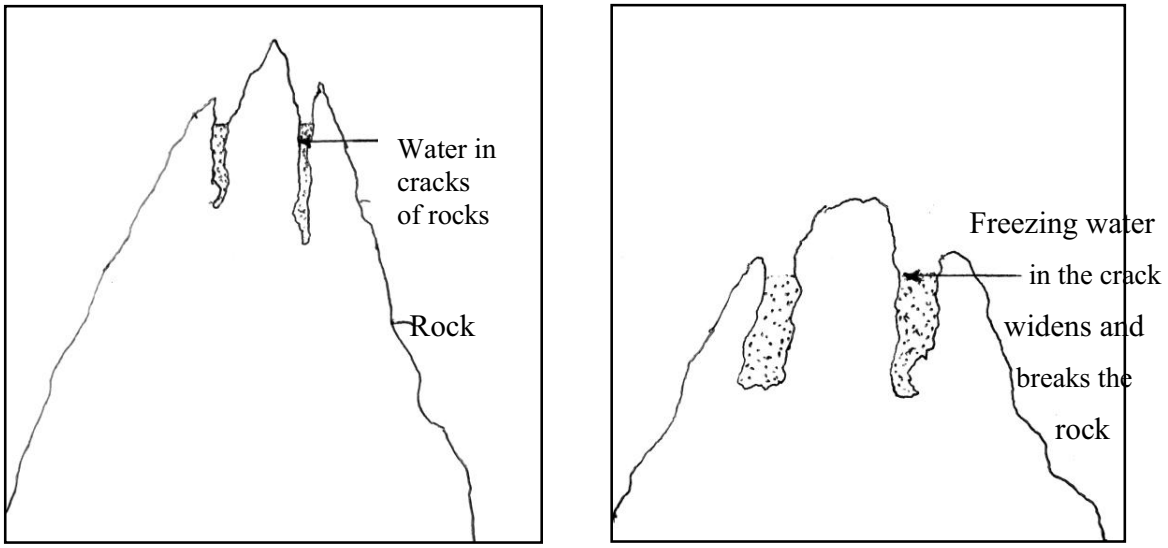
(I) Before weathering **(II) After weathering(Exfoliation)**



Exfoliation in East Africa is very common in Mubende, Nakasongola, Kitgum, Karamoja, and Soroti in Uganda, North West and North East Kenya, East of Songea, Kongwa, Serengeti, Dodoma in Tanzania.

(b) Frost shattering: Frost shattering or frost action occurs in areas which experience temperature variations especially where temperature keeps on fluctuating above $0^{o}C$. This takes place when joints of rocks are filled with water and when water freezes, it enlarges the joints and eventually rocks break down. This type of weathering is very common in very high mountains e.g. Kilimanjaro, Rwenzori and Kenya.

FROST ACTION IN HIGHLAND AREAS OF EAST AFRICA



(ii) <u>Chemical weathering</u>: In this type of weathering, gases of the atmosphere i.e. water vapour, oxygen and carbondioxide penetrate the rock and react in the presence of water with the rock minerals.

There are four types of chemical weathering and these are

(a) Hydration

(b) Hydrolysis

(c) Carbonation

(d) Oxidation

(a) Hydration: This takes place when certain rocks absorb water and in the process the rocks expand e.g. $2Fe_2O_3 + 3H_2O \rightarrow 2Fe_2O_3.\ 3H_2O$

(Haematite) (water) (Limonite)

Haematite + water → Limenite

(b) Hydrolysis: This refers to the process by which water reacts with mineral elements. The reaction takes place when the hydrogen ions of water and mineral ions. Hydrolysis is the major process in the decomposition of field spars which are important in minerals. e.g.

$2KAlSi_3O_8$ + $2H_2O$ + CO_3 → $Al_2Si_2O_5(OH_4)$ + K_2C_3O + $4Si_2O$

(field spar) (water) (carbon mineral) (clay mineral) Potassium carbonate (silica)

$2CaCO_3$ + M_3^{2+} → $CaMg(CO_3)_2$ + Ca^{2+}

Coral (magnesium) (dolomite) calcium ion

(limestone) ion from) released into water

water

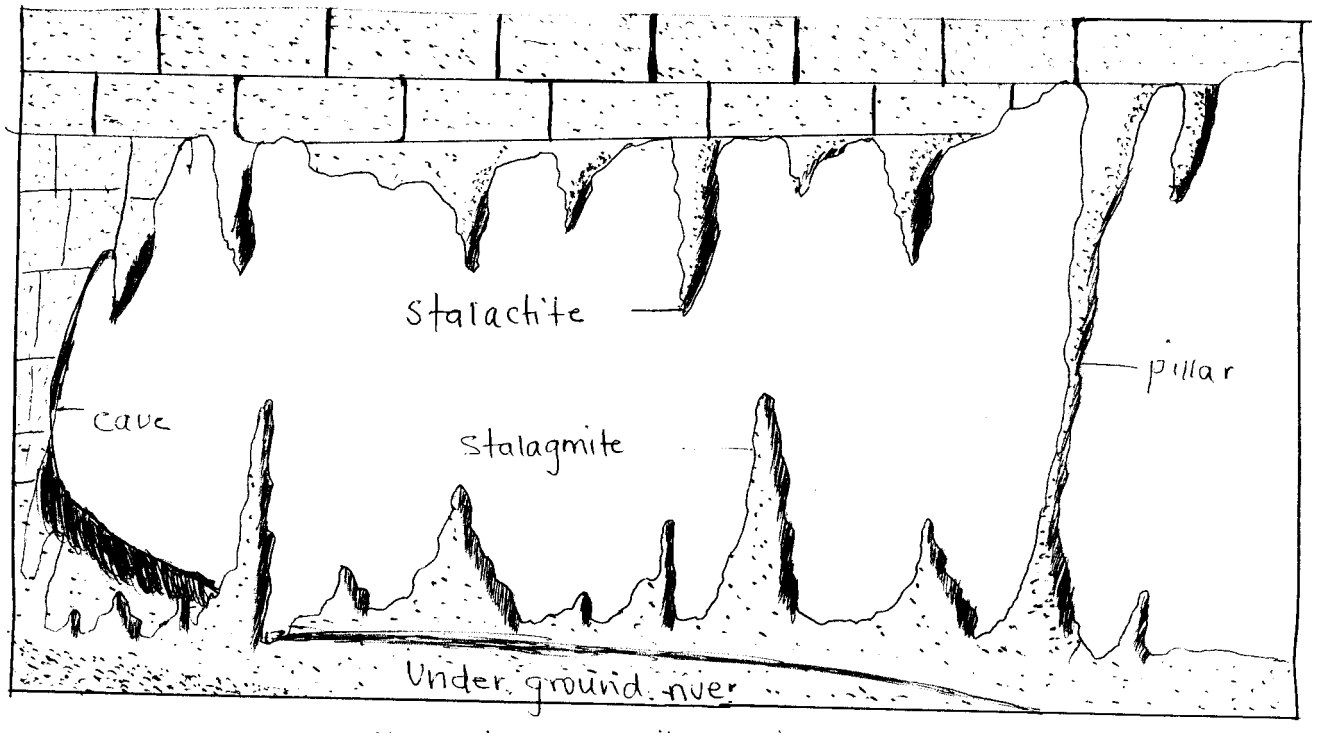
(c) Carbonation: This is a process by which carbondioxide in the air combines with rain water to form a weak carbonic acid. It takes place mainly in limestone and dolomite rocks. e.g.

$CaCO_3 + H_2CO_3 \rightarrow Ca(HCO_3)_2$

Limestone + carbonic acid → calcium bicarbonate

Carbonation results into the formation of Karst scenery features in limestone regions such as stalactites, stalagmites, caverns, or underground caves, sink holes, grikes and clints, uvalas dolines, pillars and joljes.

AN ILLUSTRATION OF KARST SCENERY FEATURES



Karst is a term used to describe a peculiar landscape typical of time stone regions where the process of carbonation is prominent.

In East Africa Karst scenery can be seen along the East African coast in areas of Tanga in Tanzania and Mombasa in Kenya and in Nyakasura, Toronto and Bundibujjo in Uganda.

(d) Oxidation: This is a process which involves the addition of oxygen to minerals with Iron, Magnesium and Aluminium. It takes place where oxygen in the water reacts with rocks

$4FeO + O_2 \rightarrow 2Fe_2O_3$

(iii) <u>Biological weathering</u>: this takes place when living organisms force rocks to decompose or disintegrate or break. Such living things include animals like worms, rodents, ants, plants, bacteria, snails which live in the soil, man's activities.

Biological weathering aids chemical weathering to take place because oxygen, carbondioxide and water easily enter the rock.

FACTORS INFLUENCING WEATHERING

Weathering in East Africa is influenced by the following factors

(i) climate of the area (ii) relief (iii) the nature of the parent rock

(iv) living organisms (v) time

(i) **Climate of the area:** The climate experienced by an area plays a vital role in influencing the role of mechanical, chemical and organic weathering e.g. the amount of rainfall received in an area is likely to affect both chemical and biological weathering. Desert climate has much influence on the mechanical weathering.

(ii) **Relief:** The nature of the landscape determines the type of weathering that is likely to take place in that given area. Highland areas which receive heavy rainfall aids chemical weathering.

(iii)**The nature of the parent rock:** Some rocks because of their mineral composition are easily weathered while others are very resistant to agents of soil erosion.

(iv)**Living organism:** The effect of living organism involves both plants and animals. Plant roots exert pressure on the existing rock structure which leads to rock disintegration. Man's activities such as quarrying play a big role in rock disintegration.

(v) **Time:** The longer the time weathering process takes place, the deeper the weathering and the shorter the time, the less the rate of weathering.

MASS WASTING

The term mass wasting refers to the creeping, flowing, sliding or falling of rock and other weathered material down slope under the influence of gravity.

The major factor which aids mass wasting is water because water reduces the cohesion of the material in the mass. Water acts as a lubricant in mass wasting process.

FACTORS AFFECTING THE NATURE AND SPEED OF MASS WASTING

1) Man's activities like mining, quarrying, road construction, building e.t.c.
2) Earth movements such as folding, faulting, warping e.t.c.
3) Vegetation e.g. plants. Areas without vegetation cover aid the process of mass wasting
4) Climate of a place i.e. wet or dry. Wet climate accelerates chemical weathering while dry climate is basically responsible for mechanical weathering.
5) The nature of the slope i.e. steep or gentle. The steeper the slope. The greater the mass wasting.

TYPES OF MASS WASTING

There are three major types of mass wasting and these include

(i) slowage process of mass wasting

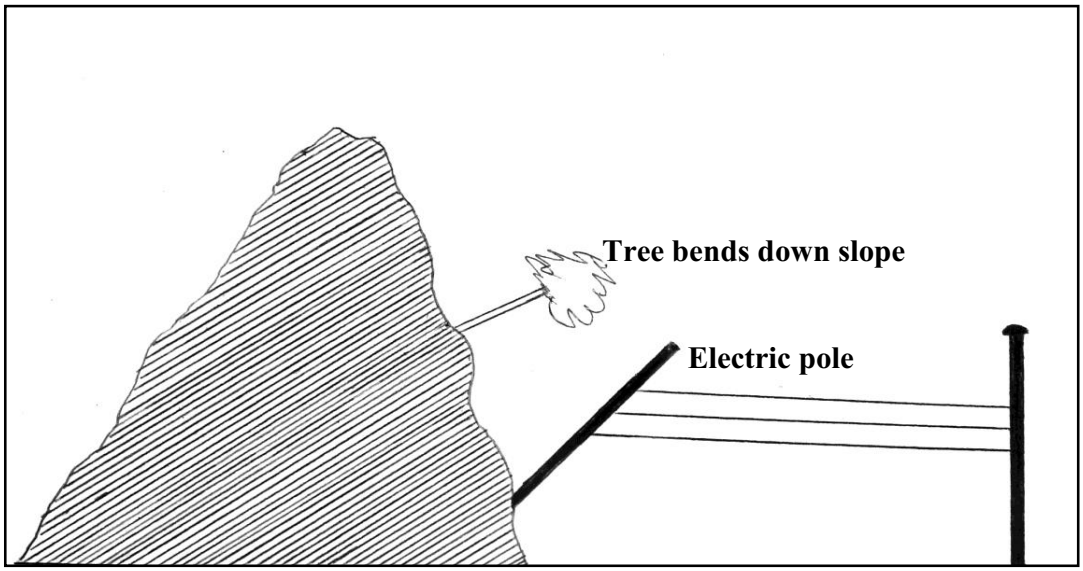
(ii) rapid flowage process of mass wasting

(iii) slide or landslide process of mass wasting

(i) **Slowage process:** Under this process, we have soil creeps which involves a number of processes, which are very slow.

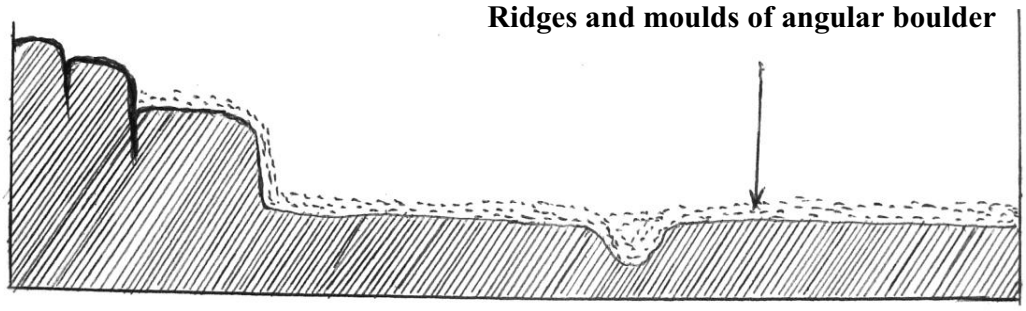
(a) **Soil creep** is the most common mass wasting process in tropical and temperate climates.

SOIL CREEP ALONG A SLOPE



(b) **Tulus creep:** This is a movement of rock material mainly scree down slope which is dry. It is very common in Tulus creep.

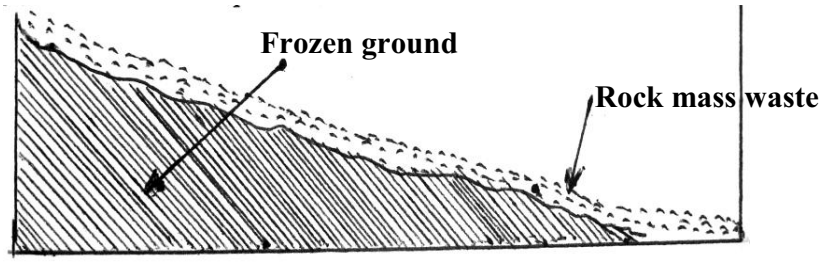
TULUS CREEP



(c) **Rock glacier creep:** This is the movement of boulders in a channel. This takes place in cold climate.

(d) **Rock creep:** This involves pieces of rock which are slowly moving down slope.

(e) **Soliflution:** This takes place in cold climate especially in highland areas e.g. Mt. Kilimanjaro, Kenya e.t.c.



(ii) **Rapid flowage process:**

Under this process, we have earth flow, mud flow, debris e.t.c.

(iii) **Slide process:** These are very rapid processes in which dry masses of material slide along a slope. These include rock fall, rock slide, debris slide, rock slump.

CAUSES OF MASS WASTING

1) Man's activities e.g. road construction
2) Nature of the soil
3) Rock structure
4) Earth movements

SOILS

Soil is a thin layer of organic and inorganic material covering the earth's surface which is capable of sustaining plant growth.

Soil is composed of the following materials

(i) weathered material

(ii) alluvial deposits

(iii) volcanic material

(iv) glacial deposits

(v) river deposits

FACTORS INFLUENCING SOIL FORMATION

There are two major factors that influence the formation of soil and these include;

(i) Climate

(ii) The parent rock

(iii) Relief or topography

(iv) Living organisms

(v) Time or age

(i) **Climate:** This is the most effective factor affecting soil formation. It consists of two weathering processes i.e. physical and chemical weathering e.g. in humid areas. Chemical weathering is the most dominant while in desert regions, physical weathering is the most effective. In dry seasons, physical weathering is responsible for leaching leading to the formation of laterite soils.

(ii) **The parent rock:** This also plays a vital role in soil formation, the nature of the parent rock e.g. the harder the rock, the less the soil formation and vice-versa.

(iii) **Topography:** The role of soil formation is indeed direct. Relief controls the rate at which the rocks are weathered, transported and deposited. The steeper the slope the higher the soils are washed away from highland areas to lower areas.

(iv) **Living organisms:** This involves both plants and animals in soil formation. Man contributes to soil formation through activities like road construction, overgrazing, quarrying e.t.c. Animals like rats, rodents, which dig underground, disintegrate leading to soil formation.

(v) **Time:** Time is associated with the age of the rock. A properly formed soil requires much longer time which are known as horizons. These horizons mature with time and consequently lead to a fully developed soil profile.

PROCESSES OF SOIL FORMATION

Soil formation processes are activities which take place to produce soil out of the dead mineral matter or soil plant material. These processes include:

(i) **Leaching**

(ii) **Mineralization**

(iii)**Elevation**

(iv)**Humification**

(v) **Illuvation**

(i) **Leaching:** This is the movement of minerals such as salts and carbonates from the top layer to lower layers by the work of deposition.

(ii) **Mineralization:** This is a process by which organic materials are decompose, broken and changed into minerals or inorganic substances.

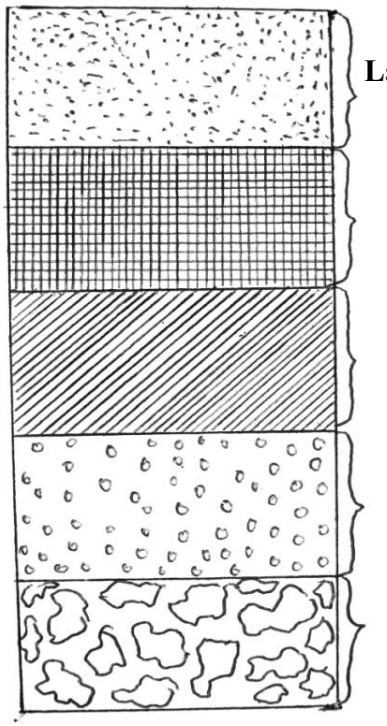
(iii)**Elevation:** This refers to the movement of soil material in solution or suspension from one place to another within the soil. The movements are vertical or lateral depending on the direction of the soil water.

(iv)**Humification:** This refers to the process by which organic matter is decomposed to form humus. This process is very active ion wet and warm areas than in dry or cold places.

(v) **Illuviation:** This is a process where soluble materials are washed in to form mineral particles which are hard and weathered.

SOIL PROFILE

This is the vertical arrangement of soil layers from the top to bottom according to rock material, texture, structure, and colour.



Layer of humus

Horizon A leaves surface debris
-Decomposition of organic material
-Light coloured

Horizon B leaching and loss of clay particles
accumulation of organic material

Horizon C weathered parent rock material

Horizon D parent rock

FACTORS AFFECTING THE DEVELOPMENT OF SOIL PROFILE

1) Time or age
2) Man's activities such as road construction e.t.c.
3) Topography
4) Climate
5) Vegetation

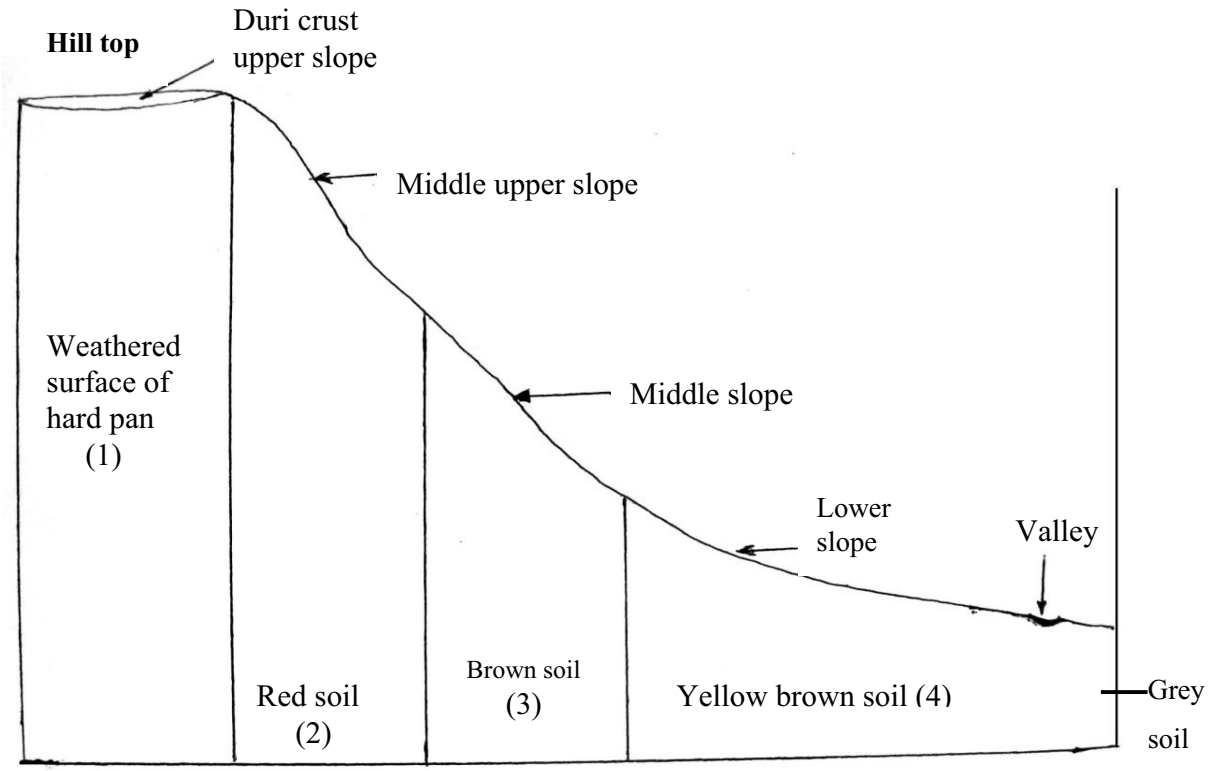
Soil colour: This is the description and classification of soil depending on the colour. e.g. light, bright, dark e.t.c.

Soil texture: This refers to the degree of coarseness of the soil material in terms of its particle size and mechanical composition.

Soil porosity: This refers to the total volume of the pores or space between the particles of the soil material.

Soil catena: This is the successive arrangement of soils along a slope under similar influence of climate, depth, texture and water content of soil.

THE STRUCTURE OF SOIL CATENA



Soil constitute: This refers to what the soil is composed of e.g. mineral matter, organic matter, air, water, e.t.c.

SOIL TYPES

There are four (4) major soil types and these are:

(i) Loam soil (ii) Clay soil

(iii) Sandy soil (iv) Laterite soil

(i) **Loam soil:** This type of soil is often very fertile and supports crop growth. It is basically made up of sand, silt humus and little clay. It is rich in humus, retains water, easy to cultivate and it is suitable for growing of food and cash crops.

(ii) **Clay soil:** It has fine grained soil particles. It contains less or no humus. It is acidic and contains a lot of water. It lacks oxygen which is needed by bacteria to decompose organic matter but rich in mineral nutrients. Clay soil is not good for cultivation because during the wet season it becomes water logged. It dries up very fast and cracks in the dry season.

(iii)**Sandy soil:** This type of soil is coarse grained and contains large particles. It is easy to work and permeable.

(iv)**Laterite soil:** This soil is sometimes referred to as leached soil. It is formed as a result of mineral nutrients moving from the upper layers to deeper soil layers. It is not suitable for crop growing but provides soil for brick making and marrum for road construction.

SOIL EROSION IN EAST AFRICA

Soil erosion refers to the removal or washing away of the top soil layer by agents of soil erosion e.g. running water, wind, moving ice.

The most affected areas by soil erosion are the dry areas of East Africa e.g. Northern Kenya, Kondoa province, Poroto highlands of Tanzania, Machakos district, Turkana land and Nyanza province of Kenya.

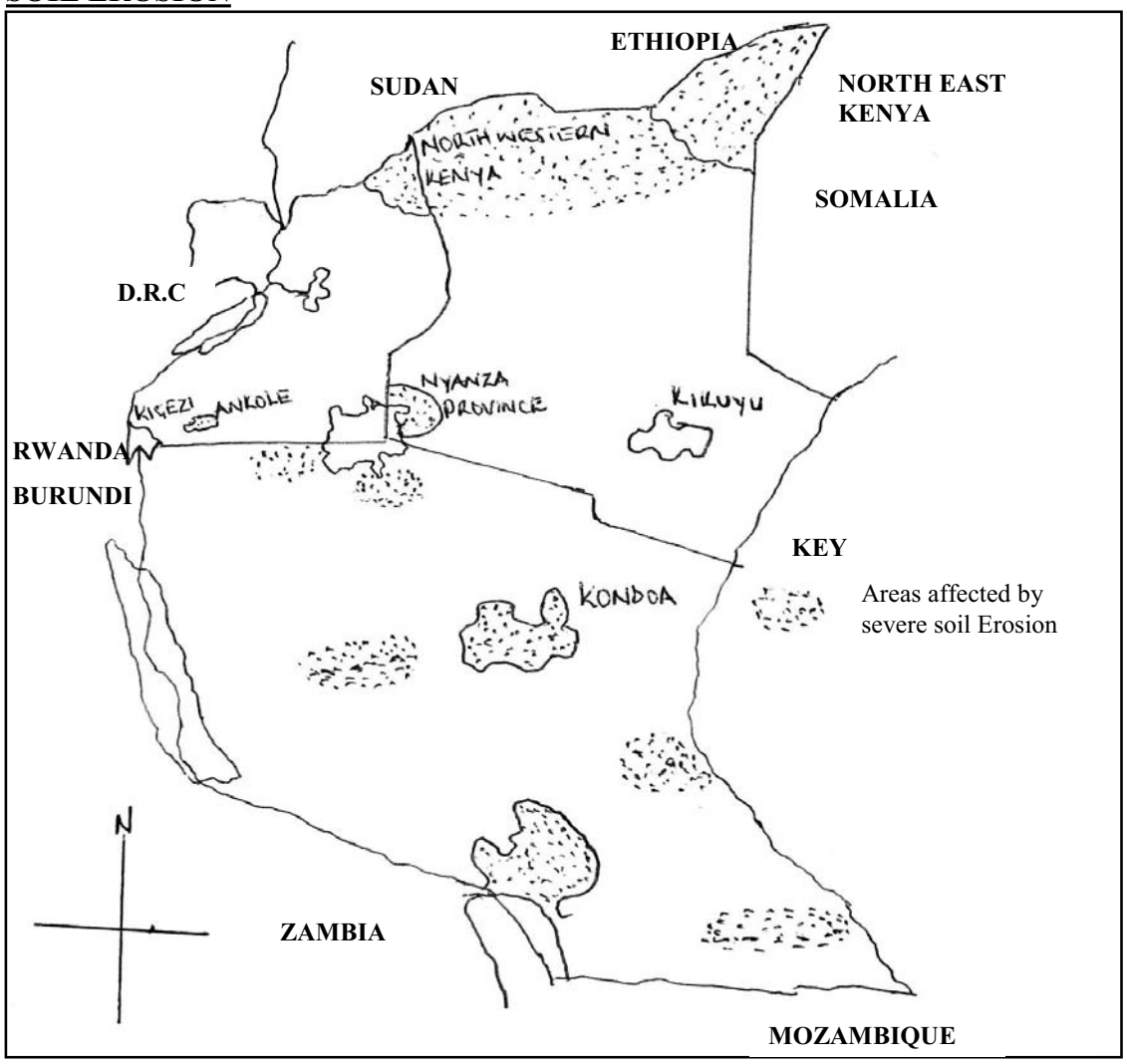
CAUSES OF SOIL EROSION IN EAST AFRICA

1) Monoculture practiced by primitive societies.
2) Land fragmentation e.g. in Kigezi and Kabale areas of Uganda
3) Man's activities e.g. road construction, deforestation.
4) Steep slopes like those of highlands which receive heavy rainfall experience severe soil erosion .
5) Population pressure on land where land is over cultivated, deforestation accompanied by ;and fragmentation.
6) Bush burning by innocent and illiterate people who do not know the dangers of bush burning.
7) Overgrazing of animals where animals graze a particular area to the grass roots.
8) Deforestation due to need for land for settlement, industrial development, agriculture. Here forests are cleared and land is left bare exposed to agents of soil erosion.

CAUSES OF SOIL EROSION IN KONDOA DISTRICT OF TANZANIA

1) The district receives heavy rainfall
2) Overstocking of animals which overgraze the hilly areas.
3) The soils are less resistant to soil erosion e.t.c.
4) The existence of high population in the district support soil erosion.

A SKETCH MAP OF EAST AFRICA SHOWING AREAS AFFECTED BY SEVERE SOIL EROSION



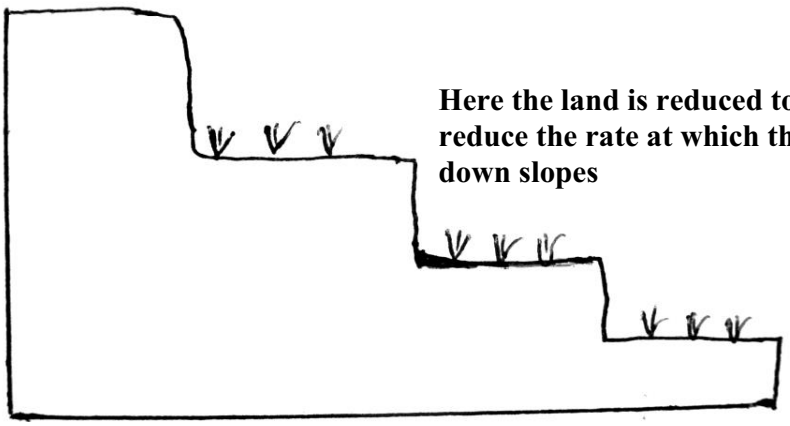
EFFECTS OF SOIL EROSION IN EAST AFRICA

1) Environmental degradation due to vegetation cover destruction.
2) Lack of enough food for the people due to soil erosion which leads to soil infertility.
3) Soil erosion leads to loss of mineral nutrients in the top soil hence leading to low agricultural production.
4) Soil erosion may destroy communication lines like roads, railway lines e.t.c.

SOIL CONSERVATION MEASURES IN EAST AFRICA

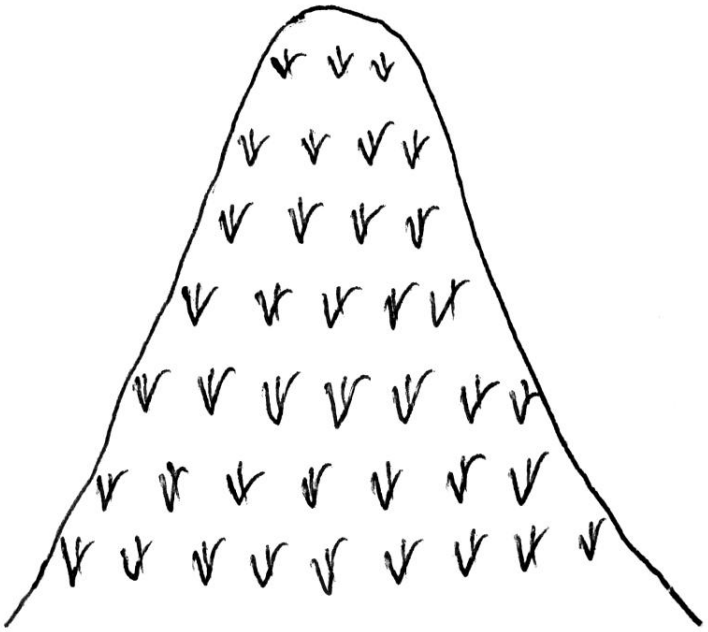
1. **Afforestation:** This is the planting of tress in an area to protect the soil from agents of soil erosion e.g. wind, running water e.t.c.
2. **Mulching:** This refers to the covering of the soil by grass or stones to reduce the rate of water loss from the agent of soil erosion e.g. running water.

3. **Re-Afforestation:** This is the re-planting of trees where they have ever existed. This is intended to protect the affected areas.
4. **Contour Ploughing:** This is where cultivation takes place along the contours. It is carried out in highland areas of Kigezi and Kenya highlands.
5. **Terracing of land:** This refers to the building of wall-like structures across the slope at fixed intervals.



Here the land is reduced to low gradient to reduce the rate at which the run off moves down slopes

6. **Strip cropping:** This is where crops are placed in strips along the along a hill side.



7. Educating the people on the methods of farming which do not accelerate soil erosion. e.g. planting of deep-rooted or grass, intercropping e.t.c.
8. Reducing on the number of animals kept in a given area to reduce on the problem of overstocking e.g. overgrazing of land which supports soil erosion.

RIVER SYSTEMS OF EAST AFRICA

A river is a body of water flowing down slope along a well defined channel.

A drainage pattern: This is a layout or plan made by a river and its tributaries.

The drainage pattern is associated with the following aspects.

(i) the rock structure

(ii) the nature of rock, resistant or less resistant.

(iii) The slope of the kind.

River profile: This is the arrangement of a river along the bed of the river from the source to the mouth.

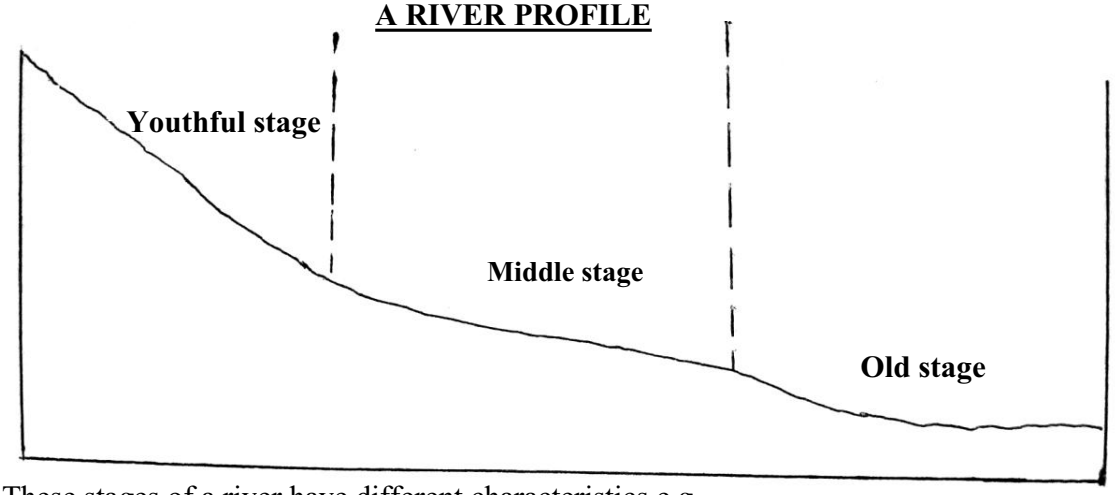
A river profile is divided into three main sections

(i) Youthful (Upper stage)

(ii) Middle (Mature stage)

(iii) Old (Lower stage)

A RIVER PROFILE



These stages of a river have different characteristics e.g.

(i) **Youthful (Upper course):**

This is the stage when a river is in its young stage of development and it has the following characteristics

a. It has a narrow V –shaped valley or contours.

b. Contours are very close along the river course representing steep valley sides.

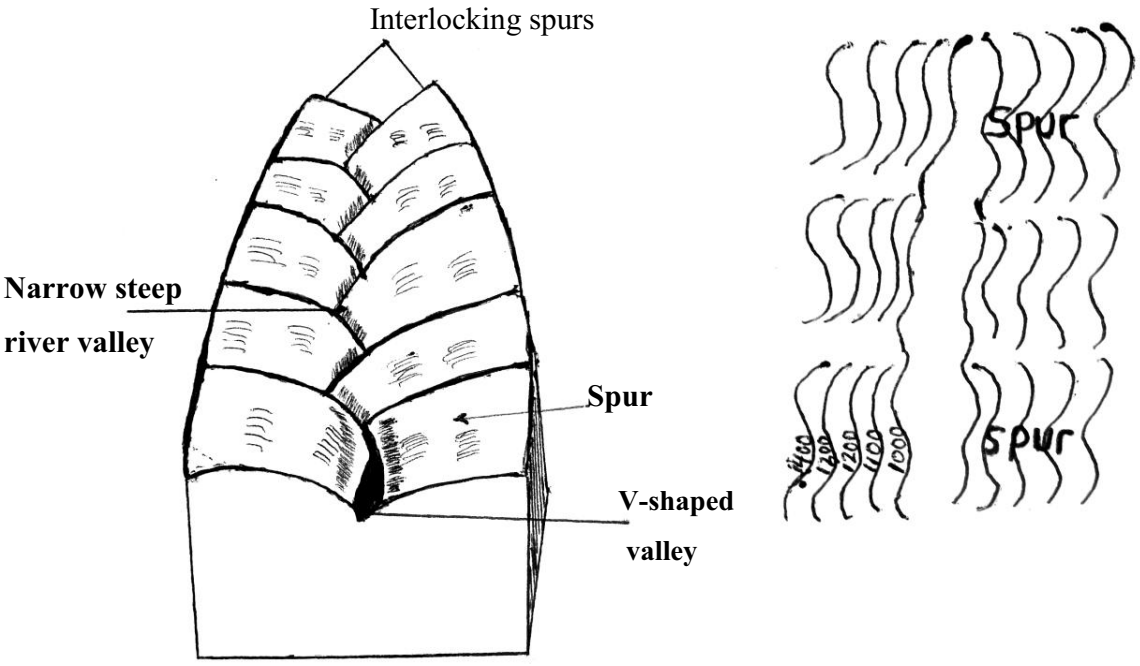
c. There is absence of meanders i.e. this stage of a river has a fairly straight course

d. There is no deposition of load in this course of a river

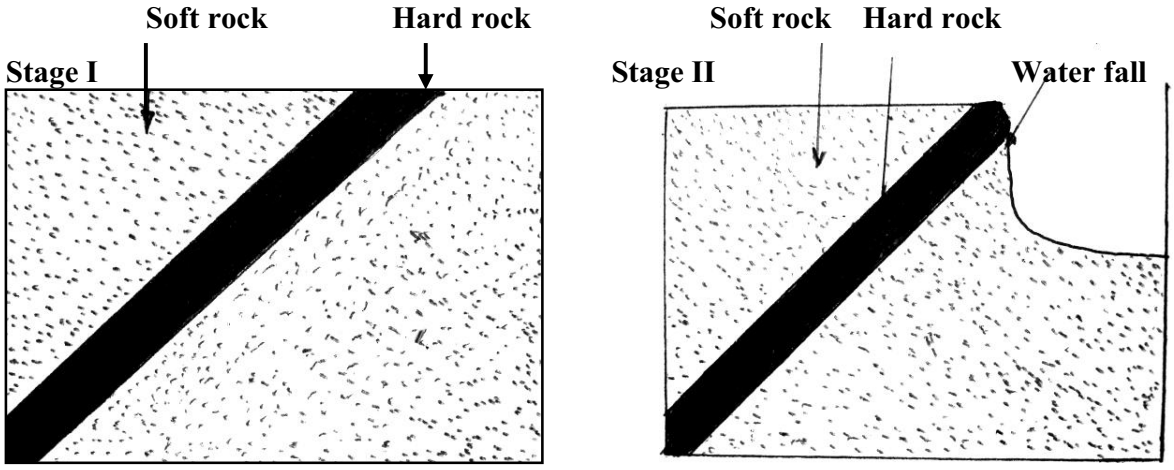
e. The most common land forms in this course of a river are hanging valleys, water falls, rapids, gorges e.t.c.

f. There is vertical erosion taking place in this stage of a river.

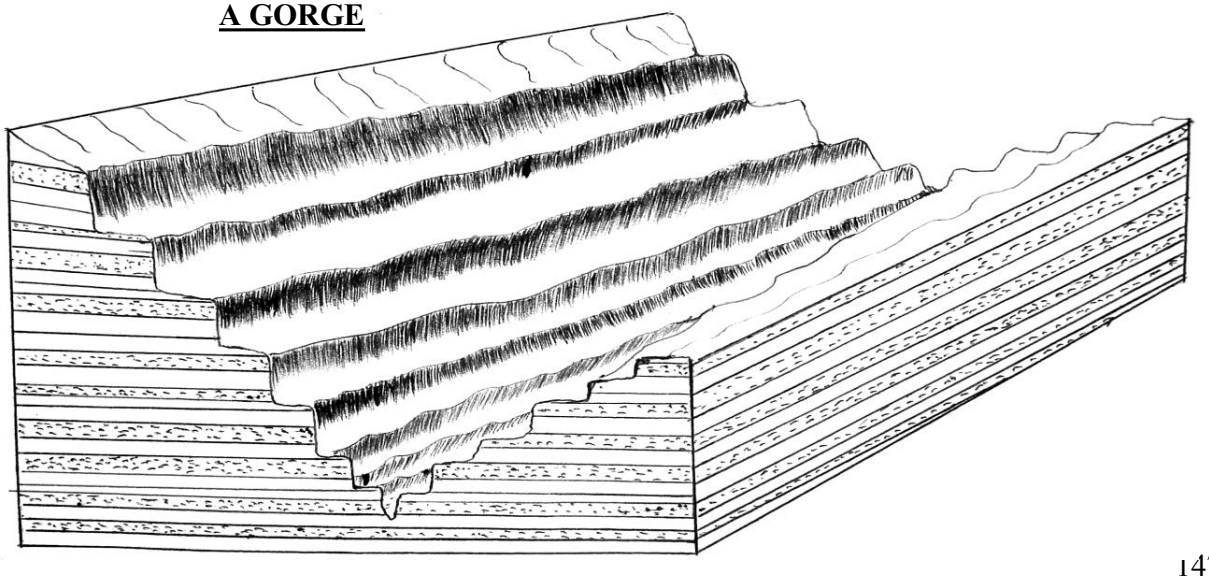
AN ILLUSTRATION OF A YOUTHFUL STAGE OF A RIVER



WATER FALLS



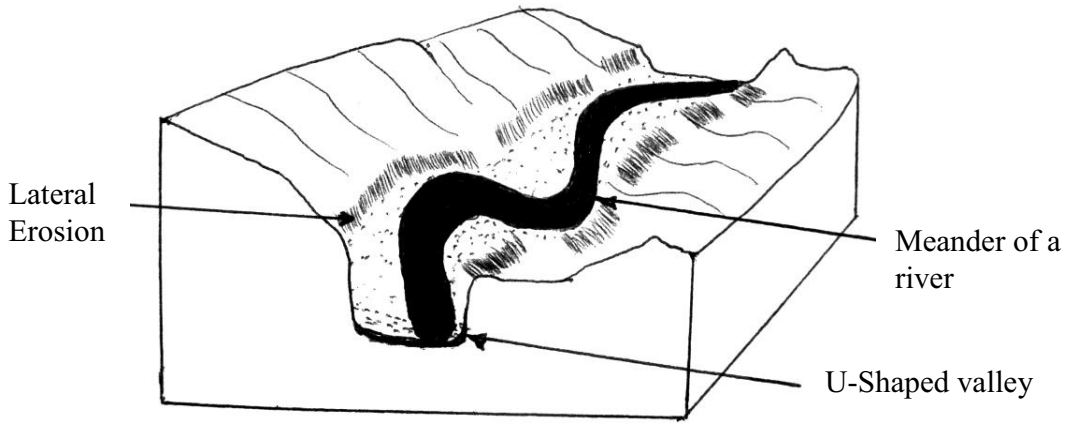
A GORGE



(ii) Mature stage (Middle stage):

This stage is characterized by the following attributes

1. It has a U shaped valley which cuts the river at wider intervals unlike the youthful stage.
2. There is lateral erosion (widening of channel)
3. The load of the river has rounded boulders and small stones.
4. It has an area of fairly flatland called flood plain on either side of the river.
5. It has a gentle slope.
6. It has a number of meanders in its course of development.



(iii) Old stage (Lower stage):

This stage of a river has the following characteristics.

1. Contours are far apart from one another

2. It has more pronounced meanders

3. It is characterized by the presence of ox-bow lakes.

4. The deposition of load is at climax.

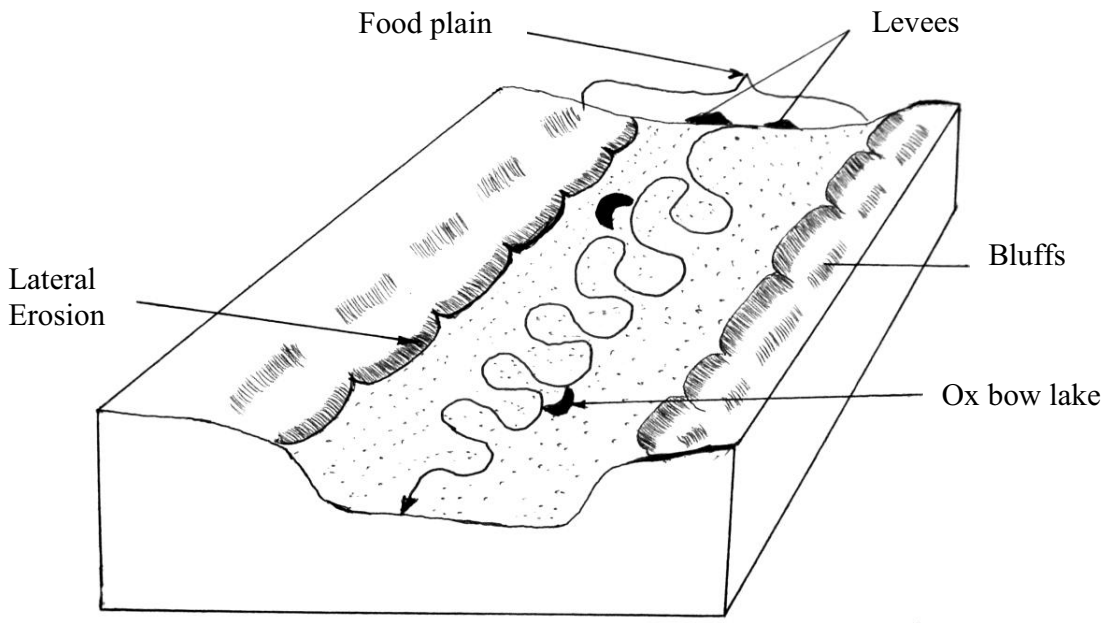
5. The speed of the river is lower

6. There is less erosion than deposition

7. It has a very gentle slope.

8. the most common land forms in this stage include deltas, ox-bow lakes, levees, estuaries, meanders

9. It has a wide valley.



Flood plain: is a wide flat area of alluvium on the foot of a river valley across which a river which flows in the meandering channel. Flood plains are deposited materials of rivers in the old stage.

A river meander is a curved bend of a river channel.

Rivers with Ox-bow lakes in East Africa

1. R. Rufigi in Tanzania
2. R.Rwizi in Western Uganda
3. R. Kilombero in southern Tanzania
4. R.Nzoia in the Kano plains of Kenya
5. R. Tana in Central Kenya
6. R. Nyando in Kano plain.

Deltas: These are large flat low lying plains of rivers deposits laid down by rivers.

Estuaries: These are river mouths

Rivers with deltas in East Africa include:

1. R, Nyando, Western Kenya

2. R. Kilombero in southern Tanzania

3. R. Omo which drains in L. Turkana in Kenya

4. R. Kilombero in Southern Tanzania

A drainage is studied in many aspects and these include:

(i) **Drainage basin or catchment area:** This is the total area occupied and drained by a rivers system.

(ii) **Drainage system:** This is the total arrangement of the main river with its tributaries and sub tributaries.

(iii) **Drainage pattern:** It is a layout or plan made by a river and its tributaries.

(iv) **Water shade divide:** This is an highland area which separates two drainage basins or catchment area.

TYPES OF DRAINAGE PATTERNS IN EAST AFRICA

There are five major types of drainage patterns in East Africa and these are:

(i) Trellis drainage pattern (rectangular)

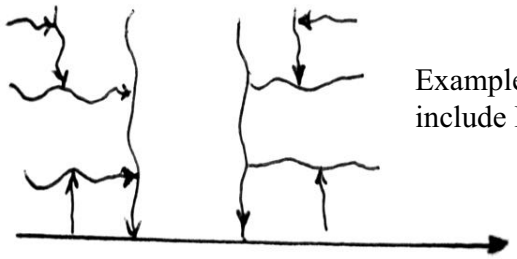
(ii) Dendritic drainage pattern

(iii)Radial drainage pattern

(iv)Centripetal drainage pattern

(v) Parallel drainage pattern

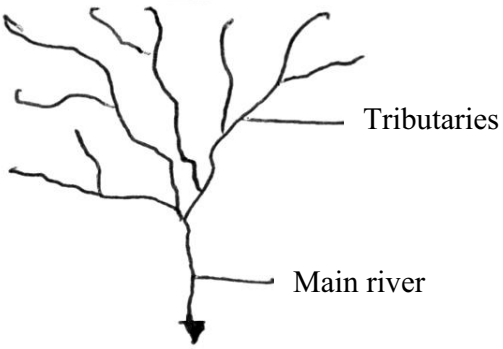
(i) **Trellis drainage pattern:** This type of drainage pattern is formed in faulted areas where tributaries and distributaries join at right angles.



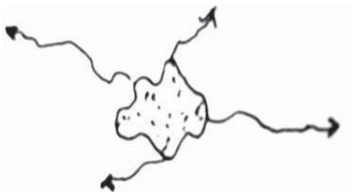
Examples of such rivers in East Africa include R. Tana, R. Mara etc

(ii) **Dendritic drainage pattern:** It forms in highland areas with the same rocks. Examples of such rivers include Athi, Nzoia e.t.c.

DENDRITIC DRAINAGE PATTERN

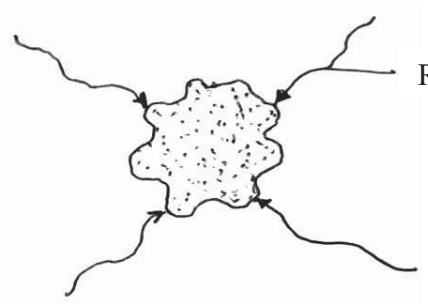


(iii) **Radial drainage pattern:** This type of drainage pattern is formed in highland areas. e.g. Mt. Kenya, Mt. Kilimanjaro, Muhavura, e.t.c. Here rivers originate from the centre and then radiate outwards.



(iv) **Centripetal drainage pattern:**

Here rivers flow into the central basin from different directions e.g. L. Victoria where rivers such as Katonga, Kagera, e.t.c. drain into L. Victoria. Other lakes include L. Baringo, L. Natron, L. Naivasha, L. Turkana e.t.c.



(v) **Parallel drainage pattern:**



Examples of Parallel drainage patterns include Athi, Nkusi e.t.c.

IMPORTANCE OF RIVERS IN EAST AFRICA

1) Rivers provide water for domestic and industrial use.
2) Rivers attract tourists.
3) Rivers provide water transport.
4) Fishing industry may develop along the river valley. Fish is a source of proteins.
5) Rivers are used in the production of hydro electricity.

River rejuvenation: This is a renewed erosive activity in a river valley. It is due to either a fall in the level or a regional uplift of the land. A river may also be rejuvenated by an increase in its discharge causing increased energy. This may result from increased rainfall or river capture.

River capture or river piracy: This is the diversion of part of a river course into the system of an adjacent powerful river.

LAKES OF EAST AFRICA

A lake is a body of water contained in a basin or hollow.

TYPES OF LAKES IN EAST AFRICA

In East Africa there are a number of types of lakes and these include

(i) Depression lakes

(ii) Man- made lakes

(iii)Depositional lakes

(iv)Tectonic lakes

(v) Volcanic lakes

(vi)Glacial lakes

(i) **Depression lakes:** These are formed due to down warping e.g. L. Kyoga, L. Victoria, L. Mburo, L. Nakivale e.t.c.

(ii) **Man- made lakes:** These are formed due to man's activities like ponds behind e.t.c. Examples of such lakes include Kabaka's lake, Kibimba, Kajjansi e.t.c.

(iii)**Depositional lakes:** These are rivers which are formed due to glacial deposits, river deposits, wave deposition e.t.c e.g. ox-bow lakes, lagoon lakes from onshore drift. Examples of lagoon lakes in East Africa include L. Nabugabo, on L. Victoria in Uganda.

(iv)**Tectonic lakes:** These are formed due to faulting e.g. Nakuru, Naivasha, Turkana, Tanganyika e.t.c.

(v) **Volcanic lakes:** These are formed as a result of volcanicity e.g. crater lakes like Mutanda, Muhehe, L. Bunyonyi in south western Uganda. Explosion craters lakes like L. Nymununka, L. Munyanyange, Katwe e.t.c.

IMPORTANCE OF LAKES IN EAST AFRICA

1. Climate around lakes favours agriculture especially high rainfall totals and reliable has contributed to farming practices.
2. Lakes are sources of fishing grounds. Fish is a source of foreign exchange to the economies of East African countries.
3. Some lakes in East Africa are among the sources of minerals e.g. mining of soda ash from L. Magadi, salt from L. Katwe e.t.c.
4. Lakes provide water transport e.g. L. Victoria.
5. Lakes attract tourists.
6. lakes provide water for domestic and industrial use.

POPULATION IN EAST AFRICA

Population refers to the number of people living in an area. There a number of terms used in studying population. These include;

(i) Population density

(ii) Population growth

(iii)Population census

(iv)Population birth rate

(v) Population death rate

(i) **Population density:** This is the number of people living in an area per square kilometer.

$$\text{Population density} = \frac{\text{Number of people in the area}}{\text{Area of the land}}$$

(ii) **Population growth:** This is the change in the number of people living in the country or area. It is associated with the increase or decrease in the population of an area. It is mainly influenced by birth rate migration, age, death rate e.t.c.

(iii) **Birth rate:** This refers to the number of new born babies per one thousand people per year.

$$\text{Birth rate} = \frac{\text{Number of births x 1000}}{\text{Total population}}$$

(iv) **Death rate:** This refers to the number of deaths per one thousand people per year

$$\text{Death rate} = \frac{\text{Number of deaths x 1000}}{\text{Total population}}$$

(v) **Population growth rate** $= \frac{\text{Birth rate – Death rate x 1000}}{1000}$

Age population structure: This refers to the percentage of the old and young people out of the total population in the country.

Other terms used in studying population include

(i) Over population

(ii) Under population

(iii) Infant morality rate

(iv) Life expectancy

(v) Optimum population

(i) **Over population:** This refers to the situation whereby the existing population is over the available resources in the area.

(ii) **Under population** is a situation where the available resources are greater than the existing population.

(iii)**Infant mortality rate:** This is the rate at which children die.

(iv)**Life expectancy:** This refers to the average age at which people in the country or an area are expected to stay alive. In East Africa life expectancy is estimated at about 50 years while that of North America and Europe is at 70 years.

(v) **Optimum population:** This is a situation where the number of people living in an area is considered to be the most desirable for the utilisation of the country's natural resources.

FACTORS AFFECTING POPULATION IN EAST AFRICA

1. **Fertile soils:** Areas with fertile soils tend to have many people because these are areas which are agriculturally productive. e.g. areas with volcanic fertile soil like Kigezi highlands, Kenya highlands, and the highlands of southern Tanzania. Lake shores like those of L. Victoria due to good soils and reliable rainfall attract dense settlement .
2. **Water supply:** Areas which are well endowed with water resources normally have many people. This is due to the need for water. Water is life and areas which experience water shortages are sparsely populated.
3. **Heavy and reliable rainfall:** Areas which receive heavy and reliable rainfall which is well distributed throughout the year tend to have many people since agriculture can be carried out there e.g. areas around L. Victoria are densely populated due to heavy and reliable rainfall which is well distributed throughout the year.
4. **Mineral deposits:** Areas with mineral deposits attract dense population e.g. there are many people in Kasese due to Kilembe mines, Mwadui diamond mines in Shinyanga district of Tanzania and in many other mining areas of East Africa.
5. **Diseases:** Areas which are free from disease favour dense settlement while those which have good grounds for pests and diseases tend to have low population.
6. **Government policy:** Some areas in East Africa are sparsely populated because some areas are gazatted for wild life or future development.
7. **Drainage:** Areas which are poorly drained like those of the coastal regions of Kenya and Tanzania which are occupied by Mangroove swamps and are agriculturally very unproductive.
8. **Industrial development:** Areas which have developed industrially have many people due to migrations in search of employment opportunities. e.g. Nairobi, Jinja e.t.c

9. **Urban development:** Areas which have developed into urban centres e.g. Kampala, Nairobi, Dar-es-Salaam have attracted dense settlement. People migrate to these areas in search of employment opportunities, security, good water supply, easy means of transport e.t.c.
10. **Thick vegetation:** This plays a big role in the distribution of people in the country.

PROBLEMS CREATED BY HIGH POPULATION DENSITIES IN EAST AFRICA

1. In East Africa areas with high population experience the problem of land shortage e.g. Kigezi district in western Uganda.
2. Areas with high population e.g. Kabale experience land fragmentation. This is the division of land into small pieces.
3. Unemployment. This is a situation where people fail to secure a job.
4. Environmental degradation. As the population increases in many areas of East Africa, there is need for settlement and agriculture.
5. In urban centres, there is a problem of slum development. These are poorly built up houses and they are characterized by high crime.
6. Land conflicts are very common in places which are densely populated e.g. Buganda, Kigezi e.t.c.
7. Areas which are experience the problem of famine and malnutrition.

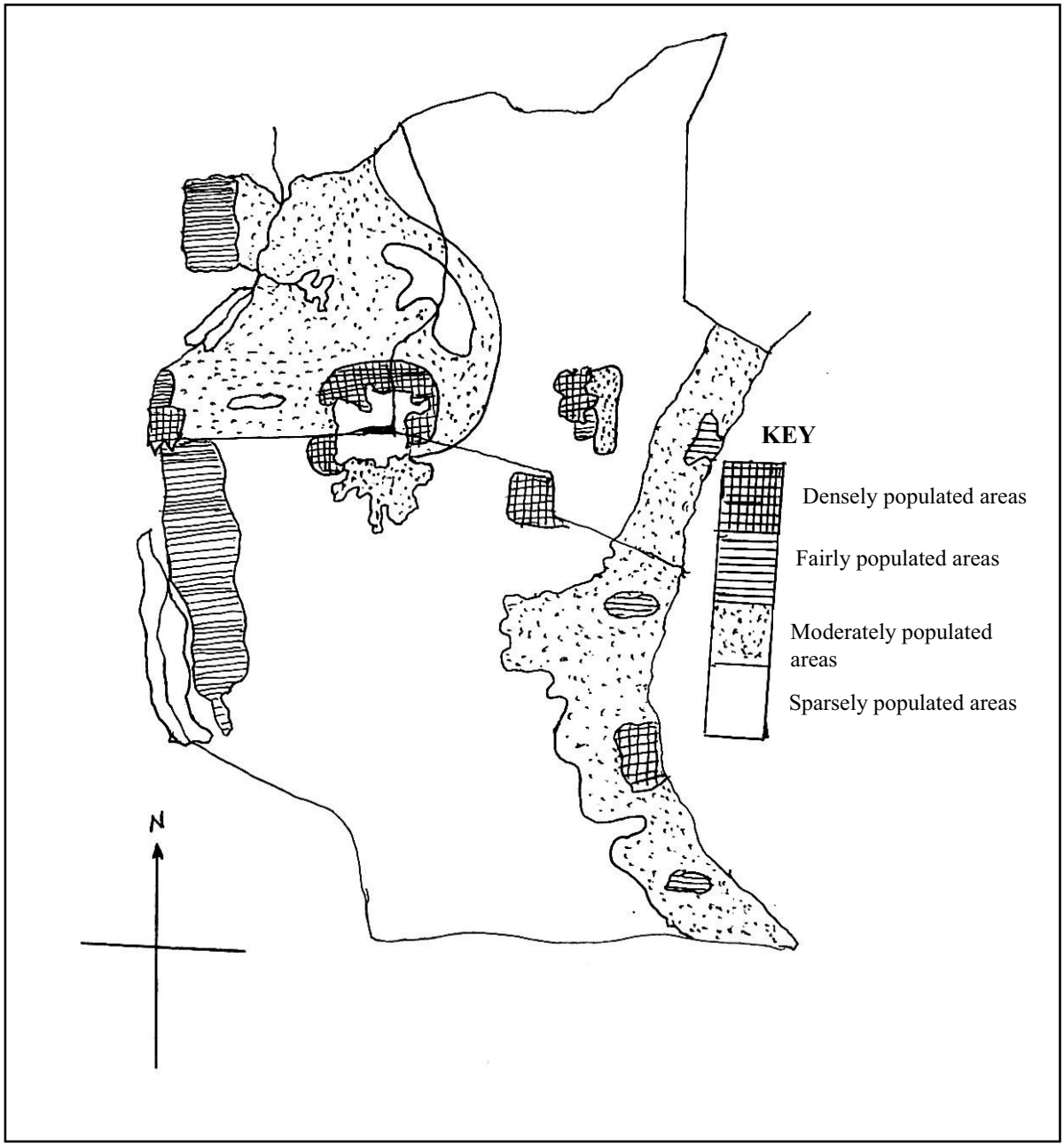
SOLUTIONS TO PROBLEMS OF HIGH POPULATION IN EAST AFRICA

1) There has been a campaign to train people to be job creators other than being job seakers. This has reduced un employment and rural-urban migration e.g some have started fish farming.
2) The minstry of agriculture has tried to train people on application of good farming methods to reduce on soil erosion which comes as a result of high polulation.
3) Storeyed building are now constructed in the cities' outskirts in an attempt to provide enough accomodation to the ever increasing number of people in the cities of East Africa..
4) The East Africa governments have embarked on intensive training of the police to strengthen securityin the cities.
5) Traffic police and traffic lights have been set up to control traffic jam in the East African cities.
6) There has been relocation of some industries to rural areas to reduce on rural urban migration.

ADVANTAGES OF HIGH POPULATION

1) High population provide market for manufactured goods hence boosting industrial development
2) Areas with high many people are not easily attacked by enemies hence providing security to themselves.
3) It leads to utilization of resources e.g. land, forest, swamps e.t.c.
4) High population provides labour to the community hence solving the problem of labour shortage.

A SKETCH MAP OF EAST AFRICA SHOWING AREAS WITH HIGH POPULATION



FACTORS RESPONSIBLE FOR LOW POPULATION IN EAST AFRICA

1) Political instabilities. Areas which experience political insurgencies tend to have few people living there.
2) Unreliable rainfall. These are areas which do not attract dense settlement hence low population.
3) Areas with poor transport facilities tend to have very few people.
4) Poor soils. Areas which are unproductive agriculturally have low population.
5) The relief of the land. Highland areas which are very cool attract very few people.

AGRICULTURE IN EAST AFRICA

Agriculture is the growing of crops and rearing of animals. In East Africa this can be either carried out on large scale or small scale.

AGRICULTURAL SYSTEMS OF EAST AFRICA

Agricultural practices of East Africa include;

(i) Subsistence farming
(ii) Shifting cultivation
(iii) Bush fallowing
(iv) Plantational farming

(a) Subsistence farming: This is a type of farming where farmers grow crops or rear animals for home consumption. This type of farming system includes the following;

(i) Shifting cultivation: This is a primitive farming system where by farmers clear forest for agriculture. After when soil has lost fertility, they shift to another piece of which it is still fertile. In East Africa, this farming system is carried out in areas of low population like Makonde areas south east of Tanzania, southern Buganda areas e.t.c. the major crops grown under this farming type are seasonal crops like maize, beans, sorghum e.t.c.

CHARACTERISTICS OF SHIFTING CULTIVATION

1. I is carried out in sparsely populated areas.
2. There is no ownership of land.
3. There is use of traditional tools like hoes, axes, pangas e.t.c.
4. There is no permanent settlement.
5. vegetation cover is cleared through deforestation

ADVANTAGES OF SHIFTING CULTIVATION

1. No land wrangles since there is no ownership of land.
2. Since this system involves shifting, land is given time to regain fertility.
3. Famine problems are minimized since there is food crop production.

DISADVANTAGES OF SHIFTING CULTIVATION

1. It leads to environmental degradation since it involves the clearance of bushes and forests.
2. It accelerates soil erosion due to constant deforestation
3. This system cannot be carried out in densely populated areas so it stands chances of dying out due to population increases in many parts of East Africa.

(ii) Bush fallowing: This is a farming system where the farmers use a piece of land and later give it time to rest and regain fertility. It is practiced in areas where there is vast land.

CHARACTERISTICS OF BUSH FALLOWING

1. Unlike shifting cultivation, there is permanent ownership of land.
2. There is rotational growing on pieces of land.
3. Rudimentary tools like hoes, pangas, axes are used.
4. Crops grown are mainly food crops e.g. cassava, millet, sorghum, rice e.t.c
5. There is permanent settlement on land.

ADVANTAGES OF BUSH FALLOWING

1. It gives land time to rest and regain fertility.
2. It reduces chances of soil erosion since land is given time to grow into bushes.
3. This system is neither capital nor labour intensive.
4. It reduces food shortage problems since there is food production.

DISADVANTAGES OF BUSH FALLOWING

1. It is affected by population increase since it is carried out on vast land.
2. This system is not economically productive since food crops grown are for home consumption.
3. It is affected by climate because irrigation is not carried out.

NOMADIC PASTROLISM IN EAST AFRICA

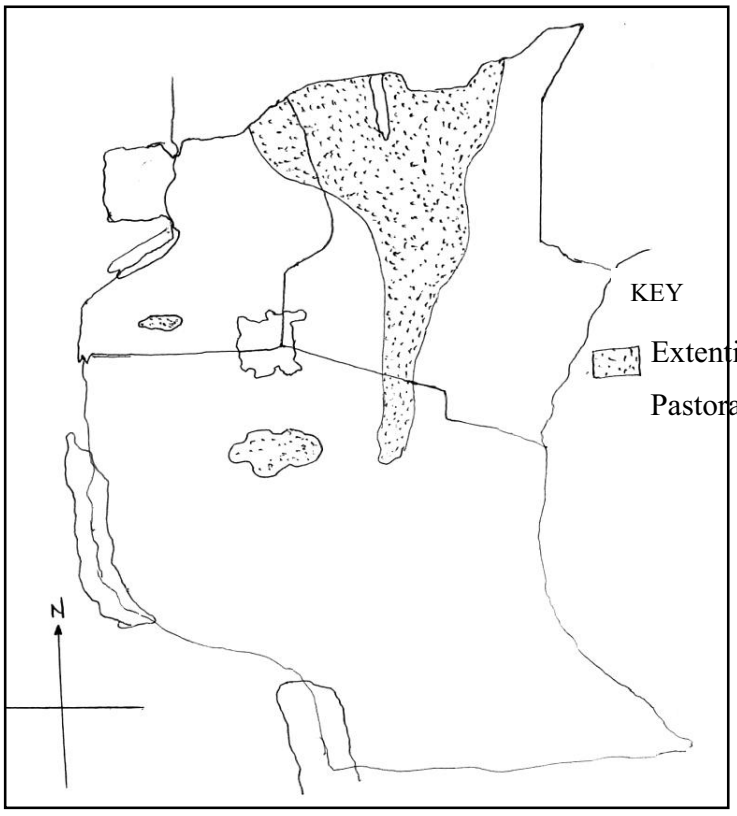
Nomadic pastoralism: This is a primitive farming system where by pastoralists move from one place to another together with their animals in search of water and pasture. It is mainly carried out by the Turkana, Karamojong, Kikuyu, Kalenjin, Galla, Boran e.t.c.

These people also carry out what is commonly known as transhumance. Transhumance is the seasonal movement of nomads with their animals from low lying areas to higher altitudes following the rain regimes.

CHARACTERISTICS OF NOMADIC PASTORALISM IN EAST AFRICA

1. They keep uncontrolled number of animals
2. They graze their animals communally
3. They have no permanent homes
4. They keep poor breeds of animals
5. They keep different types of animals
6. They keep animals for home consumption
7. They keep animals in areas which are sparsely populated.
8. Nomadism is carried out in dry areas of East Africa.
9. Nomadists together with their animals move long distances.

AREAS OCCUPIED BY NOMADISTS IN EAST AFRICA



PROBLEMS FACING NOMADIC PASTORALISTS IN EAST AFRICA

1. They face a problem of diseases accelerated by communal grazing, diseases like nagana caused by tsetse flies e.t.c.
2. They suffer from long distances which they cover in search of water and pasture.
3. They face a problem of overstocking.
4. There is a problem of lack of storage facilities like refrigerators for storing milk.
5. They face a problem of poor breeds which give poor yield
6. There is a problem of tsetse flies which would cause trypanasomiasis or nagana in animals and sleeping sickness in people.
7. It is carried out in areas which receive low rainfall so face a problem of drought.
8. They face a problem of cattle rustling amongst pastoral tribes. This leads to insecurity and loss of lives.

SOLUTIONS TO THE ALREADY IDENTIFIED PROBLEMS.

1. The problem of drought has been minimized through digging valley dams and introduction of drought resistant grass seeds to farmers.
2. The problem of diseases has been reduced through spraying and use of cattle dips.
3. Farmers are educated on how to improve on the quality of their animals through cross breeding of their animals hence solving the problem poor breeds of animals.
4. Farmers have been educated and taught new methods of keeping animals e.g. fencing and paddocking to minimize the problem of covering long distances in search of water and pasture.
5. Farmers have also been educated on how to reduce on the quantity of their animals to a manageable number to solve the problem of overstocking.
6. Introduction of food crops to supplement o the animal products as food crops have encouraged the pastoralists in one place and this has helped and eased the provision of veterinary services
7. The government has extended infrastructure e.g. roads, schools, hospitals to develop the pastoral areas to make them settle in their areas.

EFFECTS OF NOMADIC PASTORALISM ON THE ENVIRONMENT

1. Loss of vegetation as a result of bush burning and overgrazing, affects the climate of the are in question.
2. Cattle rustling and raiding amongest the nomads lead to insecurity and displacement of people in the area.
3. Overgrazing of animals on a piece of land leads to soil erosion.
4. It leads to desertification due to loss of vegetation.
5. Communal grazing of animals leads to the spread of pests and diseases.
6. Animal dung leads to soil fertility hence high crop yields.

CASE STUDY

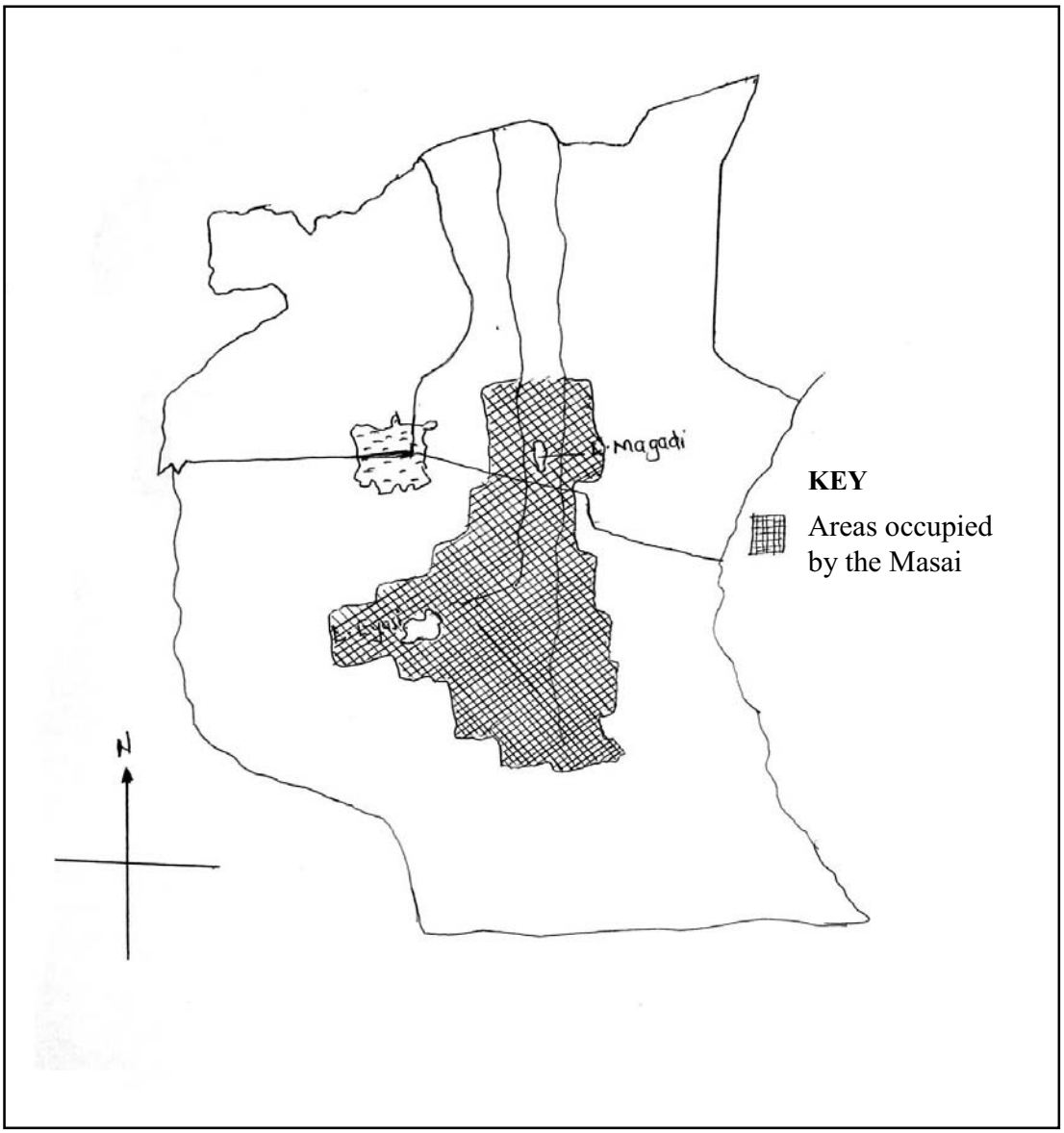
KENYA

Animal rearing in Kenya is mainly carried out in the central highlands where it was first introduced by the British. Kenya ranks the first in East Africa in livestock production where products like mutton, bacon, pork, beef from ranches and ghee, butter, cheese, milk e.t.c. from the dairy farming are obtained.

TANZANIA

Animal rearing is mostly carried out in highland areas north eastern Tanzania and Kongwa district of Tanzania e.t.c.

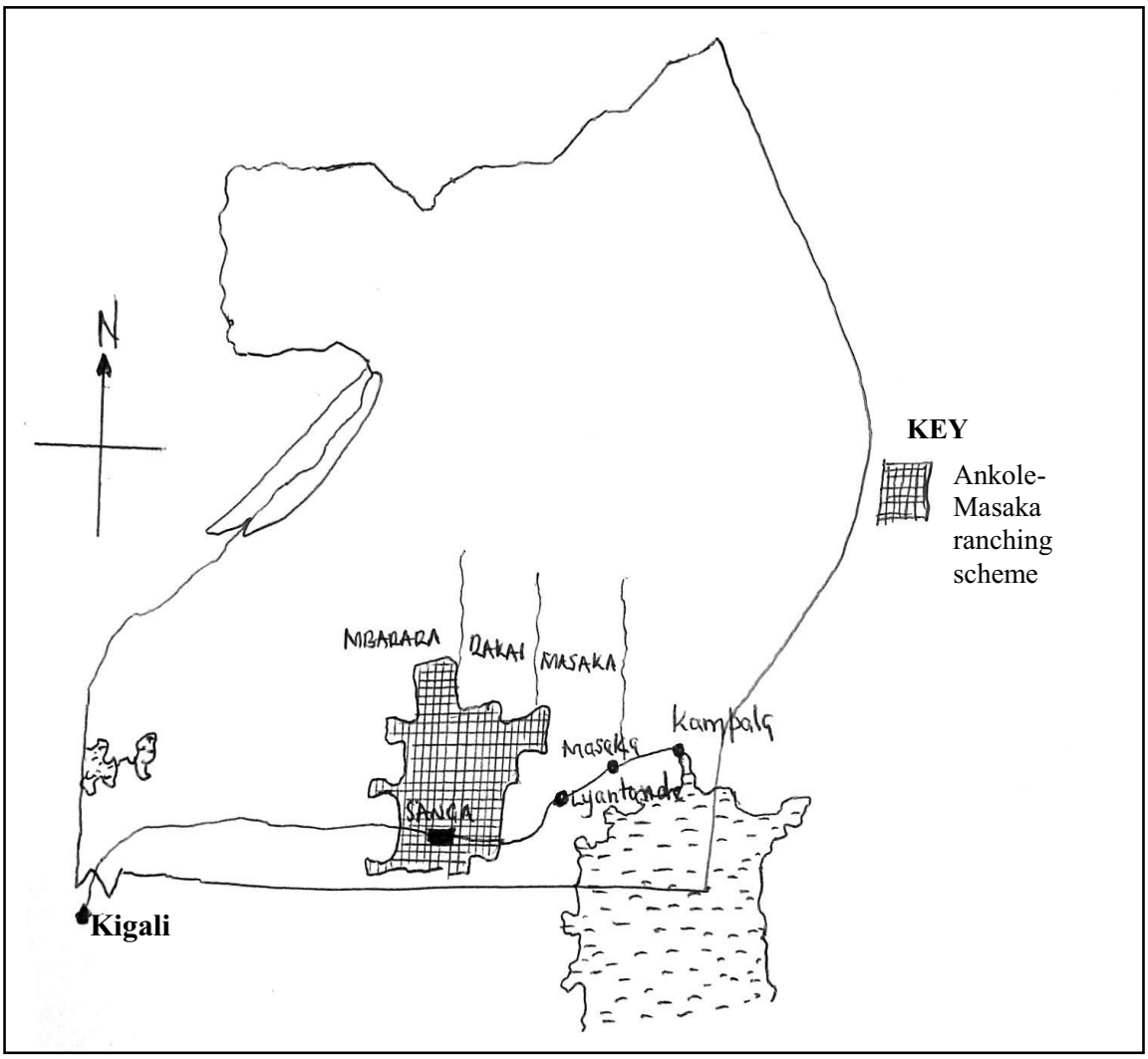
A SKETCH MAP OF TANZANIA SHOWING AREAS OCCUPIED BY THE MAASAI



The Ankole – Masaka ranching scheme

This scheme is found in Lyantonde, Mbarara and Rakai districts of southern Uganda. This area receives little and unreliable rainfall.

A SKETCH MAP OF UGANDA SHOWING THE MASAKA RANCHING SCHEME



PLANTATION AGRICULTURE

Plantation farming: This is a commercial type of farming where a single crop is grown on a large scale using machinery and scientific methods. Crop grown are perennial ones e.g. tea, sugarcane e.t.c. crops are grown on large scale.

ADVANTAGES OF PLANTATION AGRICULTURE

1. Plantation farms offer employment opportunities to people.
2. They provide workers with housing facilities.
3. They lead to the development of infrastructure e.g. roads, schools, hospitals.

4. They can afford mechanization which leads to smooth quick harvesting and processing of the crop.
5. They can afford to make research for their produce.
6. Workers get trained on the farm e.g. how to use fertilizers, harvesting, operating machines like tractors, trucks, e.t.c.

DISADVANTAGES OF PLANTATION AGRICULTURE

1. Plantation farms lead to soil exhaustion since one crop is grown on a large scale.
2. They over produce which affects the price of the crop in question
3. Since it is a monocultural type of farming it suffers from substitutes.
4. Since crops are grown on large scale, they suffer from fire outbreak.
5. The system faces a problem of fluctuation of prices on the world market.

CHARACTERISTICS OF PLANTATION FARMING

1. It is carried out on a large scale.
2. One type of crop is grown on a piece of land
3. They normally face a problem of diseases due to monocultural cropping.
4. There is a problem of land shortage for expansion.
5. Plantation farms face a problem of fire outbreak.
6. They are very expensive since large scale farming requires skilled managers who are scarce in developing countries.

COMMERCIAL CROP GROWING IN EAST AFRICA

Here crops are grown for sale. The major characteristic of commercial crop growing is that crops are grown on large scale.

In East Africa, commercial crops include tea, coffee, sugarcane, pyrethrum, wattle, tobacco, sisal e.t.c.

1. TEA GROWING IN EAST AFRICA

Tea in East Africa is grown in Mubende, Mukono, Fort Portal in Uganda, Limulu district and Kericho areas in Nyanza province of Kenya.

In Tanzania tea is grown in Mbeya, Iringa and the slopes of Usambara and Kilimanjaro slopes of Usambara and Kilimanjaro mountains.

CONDITIONS FOR TEA GROWING IN EAST AFRICA

1. It needs fairly heavy rainfall which is well distributed.
2. It needs deep acidic well drained soils
3. It requires careful regular pruning and plucking of branches and leaves.
4. It requires a fairly hot temperature.
5. Gently sloping hills which enable proper drainage.
6. It requires cheap labour from the sorrounding areas to work on tea plantations.

TEA PROCESSING IN EAST AFRICA

1. Tea leaves are plucked, taken to a factory to be dried. This process of removing moisture from tea leaves is called **withering**.
2. After withering, the leaves are put into a machine where they are chopped and crushed.
3. This is followed by fermentation of leaves. This is intended to create taste and colour.
4. After drying them, they are cooled and graded ready for consumption and exportation.

PROBLEMS FACING TEA GROWERS IN EAST AFRICA

1. They face a problem of substitutes on world market e.g. cocoa, coffee e.t.c.

2. There is a problem of hailstorm. This is a serious problem most especially to tea growers of Kericho in Kenya.

3. They face a problem of fluctuation of prices at world market.

4. Poor means of transport is another problem to the tea growers in East Africa since most tea estates are located in remote areas where and the feeder roads during the rainy season become flooded and impassable.

5. Competition. Tea growing in East Africa faces a problem of competition with other producers of the world.

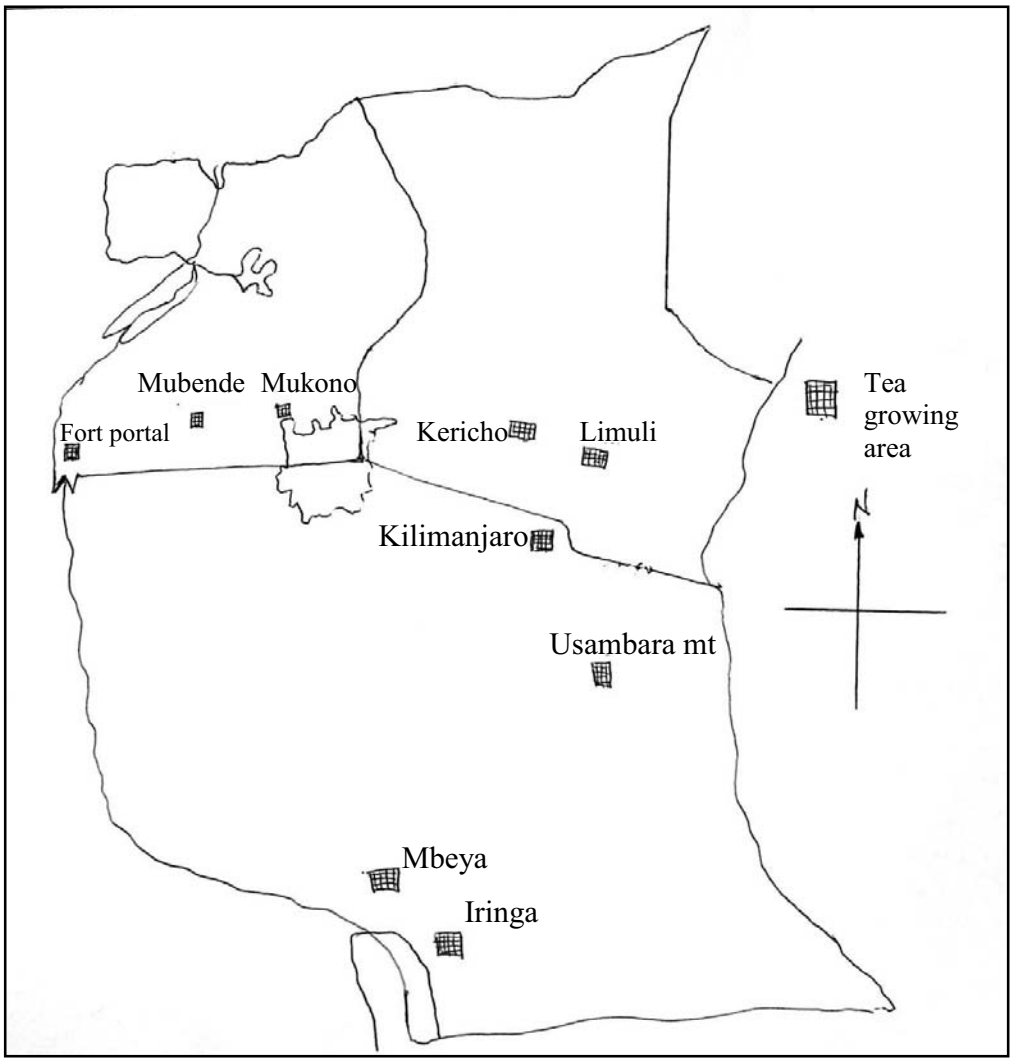
6. Tea faces a problem of diseases. Diseases and pests attack the tea leaves. This affects the output.

7. There is a problem of soil exhaustion. This is due to over cultivation of land.

8. There is a problem of over production. This in turn affects the price of tea.

9. There is a problem of the poor working conditions of the works. This greatly affects the out put.

A SKETCH MAP OF EAST AFRICA SHOWING THE TEA GROWING AREAS



2. Cotton

In East Africa cotton is mainly grown in the following areas: South Eastern Mwanza, in the delta region of river Rufigi and Pangani in Tanzania. In Uganda, cotton is grown in Kasese, Teso, Lira, Soroti, Busoga e.t.c. In Kenya cotton is grown in Kisumu and lower Tana river.

CONDITIONS FAVOURING COTTON GROWING IN EAST AFRICA

1. It requires rainfall which ranges from 500-1250 mm especially during the early growing period.
2. It requires frost free conditions supported by high temperatures throughout the growing period.
3. Fertile drained soils.
4. Labour supply especially during the harvesting period.
5. It requires dry period with sunshine for quick ripening of cotton bolls.

HOW COTTON IS PROCESSED

1. Picking is done followed by separating.
2. Ginning follows. This is the separation of cotton seeds from lint.
3. After ginning, spinning follows. This is the turning of cotton into threads.
4. Lastly after spinning, threads are channeled into a loom where they are weaved into cloths and then washed to remove starch and to give colour.
5. Cotton seeds are used in the manufacture of animal seeds.
6. It is used in the manufacture of cooking oil.

3. Pyrethrum

This crop is mainly grown in Kenya and Tanzania. In Kenya, it is grown in Kenya highlands e.g. Nakuru and also in highland areas of Moshi and Arusha of Tanzania. This crop is used in the manufacture of insecticide and mosquito coil e.t.c.

4. Sisal

This crop is mainly grown in Tanzania and Kenya most especially along the coast. It is mostly grown in drier parts of Kenya and Tanzania. In Tanzania sisal is grown in Tanga region, Lindi and around Dar-es-Salaam.

In Kenya sisal is grown at Lamu and Malindi. This crop is used in the manufacture of sacks, ropes, mats and pain killing drops from sisal juice.

HOW SISAL IS PROCESSED

Sisal is processed through four stages (processes) before it is ready for consumption or to a final product and these are; striping, washing, brushing and grading.

5. Wattle crop

This crop is mainly grown in Kenya and mostly at Eldoret and in areas of Kitale. It is used in the manufacture of leather substance which is used in most leather tanning industries of East Africa.

6. Tobacco

Tobacco growing requires the following conditions

(i) It requires heavy rainfall and well distributed throughout the growing period.
(ii) It requires high temperatures of about $20^{o}C$
(iii)It thrives well in areas with well drained soils

This crop is mainly grown by all the three East African countries in the following areas.

In Uganda, tobacco is mainly grown in the north western region i.e. Arua and west Nile areas

In Tanzania, tobacco is grown in central region areas of Iringa and Songea.

In Kenya it is grown in south and southwestern region in areas of Kisii and Kitui in the south.

7. Sugar canes

In East Africa sugarcane is grown under the following conditions

(i) It thrives well in areas with at least 1500 mm of rainfall which is well distributed throughout the year or in areas where irrigation is practiced. The irrigation method carried out in the sugarcane growing areas is that of the overhead sprinkler irrigation.

(ii) Sunshine is of vital importance in enabling the areas to have a high sunshine content.

(iii) It requires easy means of transports from sugar estates to processing places.

(iv) It requires sufficient labour supply.

In East Africa sugar cane is grown in the following areas;

In Uganda, sugar cane is grown in the northern shores of Lake Victoria and such estates for sugarcane growing include Kakira, Lugazi, Sango bay in Mubende.

In Kenya, sugarcane is grown in the central coastal plain in areas of Malindi, Nyanza province in Kano plains e.t.c.

In Tanzania sugarcane is mainly grown in Kilombero valley where it is grown under irrigation, Arusha, Moshi and in areas of Bukoba and Mwanza around L.Victoria.

USES OF SUGARCANES

1. Sugar got from sugarcane is use as a beverage
2. It is used in making of biscuits, bread, sweets e.t.c.
3. Sugar cane trash are used in the manufacture of paper, glue, soft board e.t.c
4. The by-products of molasses are used as fertilizers.
5. Sugar cane molasses are used in the making of alcohol.

8. Coffee growing in East Africa

There are two major types of coffee grown in East Africa and these are

(i) Arabic coffee (ii) Robusta coffee

Arabic coffee: This type of coffee grows at the height between 1500 – 2300 mm above sea level while Robusta coffee grows well at the height 1000 – 1500 mm above sea level.

CONDITIONS FAVOURING COFFEE GROWING

(i) It requires deep well drained fertile soils such as brown volcanic soils of mountain Kilimanjaro.

(ii) Arabic coffee is basically grown at the height of 1500 -2300 mm above sea level while Robusta coffee grows well at the height of 1000 -1500mm above sea level.

(iii) Robusta coffee requires high temperatures of about $20^oC – 26^oC$ where as Arabic coffee needs temperatures between 19^oC and 23^oC.

(iv) Coffee needs enough labour supply to plant, weed and pick e.t.c.

PROBLEMS FACING COFFEE GROWING IN EAST AFRICA

1. Coffee faces a problem of pests and diseases. Pests like antestia, leaf miners, coffee berry borer, mealy bugs. Diseases like leaf rust, coffee berry disease, die back e.t.c
2. There is a problem of soil exhaustion since one crop is grown.
3. It faces a problem of price fluctuation at the world market.
4. Coffee growing in East Africa faces a problem of competition from other coffee growers elsewhere.
5. Coffee faces a problem of substitutes on the world market.

AGRICULTURAL SCHEMES IN EAST AFRICA

MAJOR AGRICULTURAL SCHEMES OF EAST AFRICA

Agricultural schemes in East Africa are categorized into two and these are

(i)Multipurpose schemes

(ii)Pilot schemes

(i) **Multipurpose scheme:** This is an agricultural project that performs many functions e.g. crop growing, animal rearing, settlement of people e.t.c.

(ii) **Pilot scheme:** This is also an agricultural scheme intended for experimental purposes, experiment crop growing or animal rearing, whether they can succeed in a given are or not.

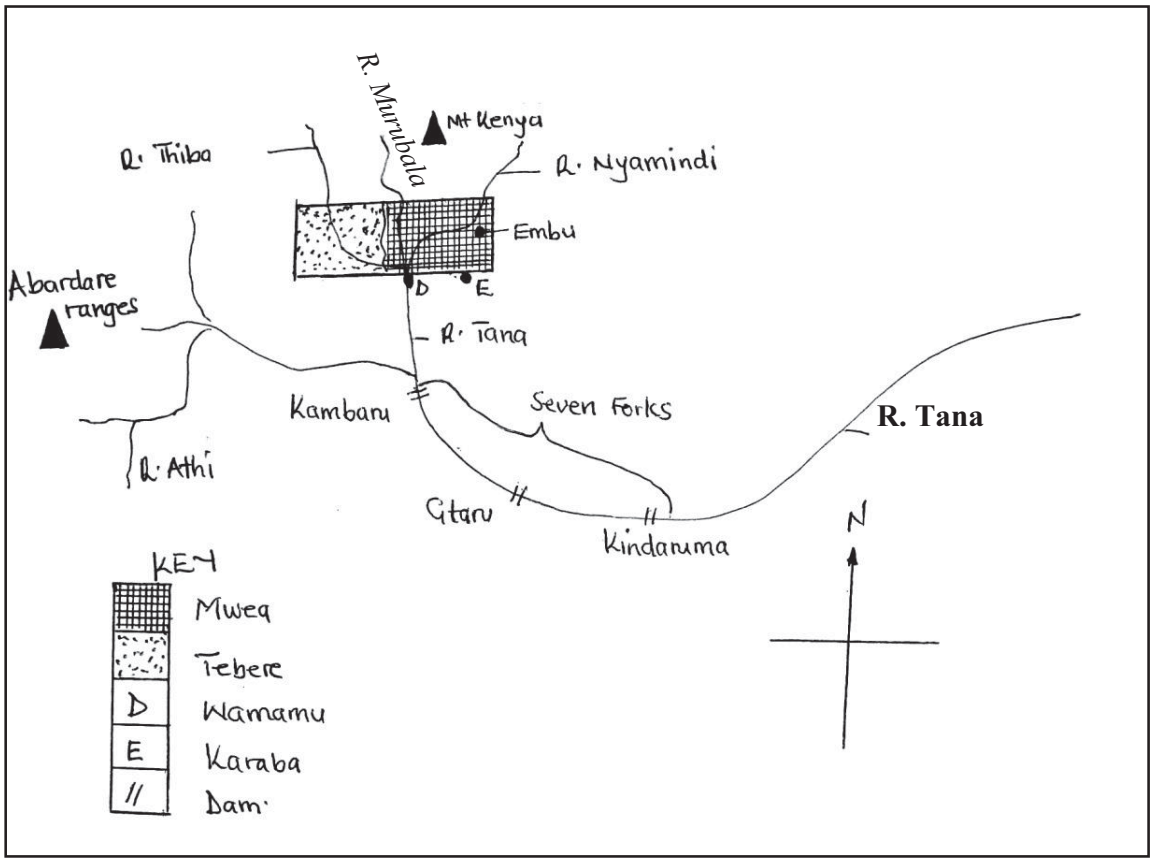
There are a number of schemes in East Africa and these include

Ahero pilot scheme: This scheme is in Kenya located in Kano plains. It was intended to experiment rice growing with the help of irrigation. Water used for irrigation on this scheme is drawn from R.Nyando. Another crop besides rice growing is sugar cane.

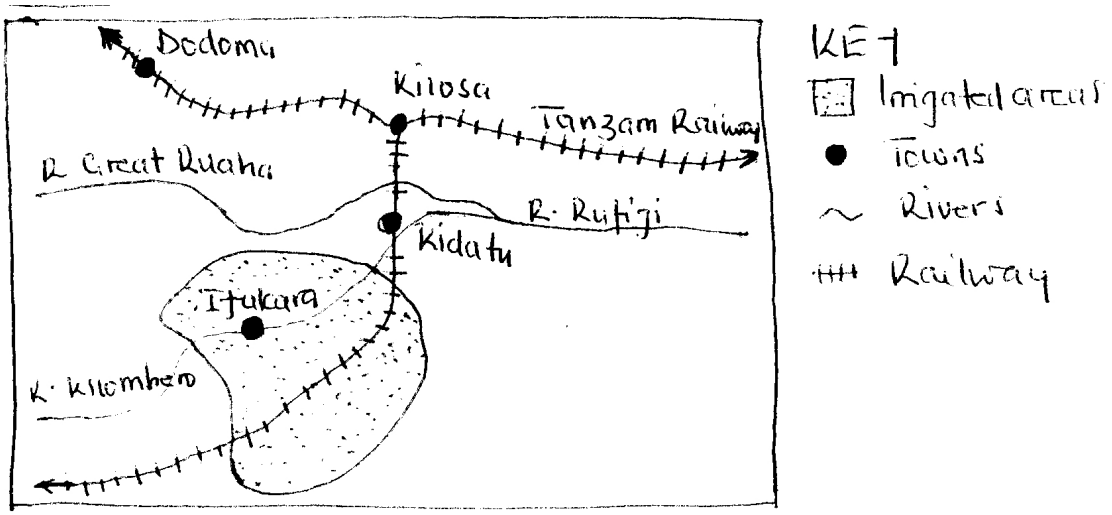
Kilombero valley scheme: This scheme is in Tanzania located on river Kilombero, a tributary of river Ruaha. The chief crop grown under this scheme is sugarcane.

Mwea-Tebere irrigation scheme: This is a multi purpose scheme found in Kenya. The chief crop grown under this scheme is rice. It was intended for rice growing and for the resettlement of the Kenyan political detainees. Water used for irrigation on this scheme is got from two main rivers and these are R.Thiba and R.Nyamindi.

THE SITE OF THE MWEA-TEBERE IRRIGATION SCHEME



A SKETCH MAP OF KILOMBERO IRRIGATION SCHEME SHOWING MAJOR RIVERS, RAILWAY LINE, THE SITE OF THE SCHEME AND MAJOR TOWNS.



Kibimba rice scheme: This scheme is located on the shores of L. Victoria in Bugiri district of Uganda. The major crop grown here is rice.

Mubuku irrigation scheme: This scheme is found in western Uganda on the slopes of Mt. Rwenzori. The chief crop grown is cotton. Water used for irrigation is drawn from river Sebwe. Other crops grown on this scheme include vegetables, rice e.t.c. This scheme was intended to re-settle the Bakiga in an attempt to reduce population pressure on the land.

Doho irrigation scheme: This scheme is found in Uganda located in Tororo district. The chief crop grown on this scheme is rice. Water used on this scheme is got from river Manafa.

Kiige irrigation scheme: This scheme is located in Kamuli district of Uganda specialized in the growing of citrus fruits. Water for irrigation is obtained from Nabigaga.

Lari settlement scheme: It is one of the multipurpose schemes of East Africa found in Kenya. It was established to settle Kikuyu farmers such that they could carry out dairy farming and pyrethrum growing.

Kongwa ranching scheme: This is one of the biggest schemes in Tanzania. It was established after the failure of the groundnut scheme. After the failure of the groundnut scheme it turned into a ranching scheme.

Garole pilot scheme: This scheme is found in Kenya located on river Tana east of Nairobi. The chief crop grown under this scheme is cotton. other crops grown include sugarcane e.t.c.

Ujama scheme: This scheme is found in Tanzania. It was established by the government of Tanzania in order to put people together such that they could be helped with education, transport, water supply, medicine together with farm inputs.

The Maasai wheat scheme: This is a Kenyan scheme. It was established to grow enough wheat. This was done after the shortage of wheat which had been caused by prolonged drought. It was also intended to stop the Maasai people from over depending on animal rearing.

Kaputei ranch scheme: This scheme is found in Kenya. It was established to curb the problem of the Maasai cattle keeper, problems like water shortage, pasture, diseases e.t.c.

West Kano Scheme: This scheme is located on the shores of Lake Victoria in Nyanza province. It gets water for irrigation from L. Victoria. The major crops grown here are rice and sugar canes. It's a pilot scheme found in Kenya.

Yala and Bunyala Scheme: It is a multi-purpose scheme found in Kenya.

The major crops grown here are rice and sugar canes. It is located on the shores of Lake Victoria along River Yala.

It had been intended to reduce population pressure in the Kano Plain and settle for crop production and at the same time eliminate malaria and bilhazia in Yala swamp.

MINING IN EAST AFRICA

Mining refers to the extraction of valuable minerals from underground. In East Africa there are a number of minerals mined e.g. coal, petroleum, gold, diamond, bauxite e.t.c.

FACTORS AFFECTING MINING IN EAST AFRICA

1. Availability of mineral resources
2. Advanced methods of mining.
3. The quantity of the mineral ore
4. The cost of labour supply
5. The cost of means of transport
6. Availability of capital for paying workers e.t.c.

METHODS OF MINING IN EAST AFRICA

There are three major methods of mining commonly used in East Africa and these include

1. Open cast method
2. Under ground method
3. Alluvial mining method

1. **Open cast method:** This method of mining is commonly used to mine minerals which exist near the earth's surface. Here, upper layers of rocks are removed till the mineral ore is reached. This is the cheapest method of mining.
2. **Underground method:** This method of mining involves sinking vertical shafts deeper underground the earth's crust to reach the mineral ore underground. It is one of the most expensive methods of mining.

   Adit mining: This is one of the underground methods of mining where the ore bearing rocks are reached from the inside of the hill. Here, horizontal tunnels are used to reach the mineral ore.

   Drilling mining: This is also an underground method of mining used to drill oil and natural gas.
3. **Alluvial mining:** Here minerals which occur in alluvial deposits can be removed by gravel, pumping, dredging, hydraulicking e.t.c.

USES OF MINERALS IN EAST AFRICA

Coal is used for heating in iron and steel industries

Diamond: This is used for jewelry industry of East Africa. It is also used in cutting of glass and drilling hard rocks. Diamond dust is used for polishing machines.

Petroleum: This is used to run machines e.g. aircraft, vehicles. It is also used in the plastic industries of East Africa.

Bauxite: This is used in the manufacture of Aluminium which is used to make aircraft, kitchen ware, motor vehicles e.t.c.

IMPORTANCE OF MINING TO THE ECONOMIES OF EAST AFRICA

1. Source of foreign exchange which is required in many developing countries to develop infrastructure e.g. roads, hospitals e.t.c.
2. Mining leads to industrial growth and development e.g. Jinja, Tororo, Mwadui, Shinyanga e.t.c.
3. It leads to provision of employment opportunities to the people.
4. It leads to development of towns e.g. Kasese in western Uganda
5. Mines are used for educational purposes by students from higher institutions of learning as they make research on mineral rock composition.
6. Mining centres attract tourists, both local and international tourists. These earn the economies of East Africa foreign exchange.
7. Mining plays a vital role in diversifying the economies of East Africa through the utilization of resources that would otherwise be lying idle.

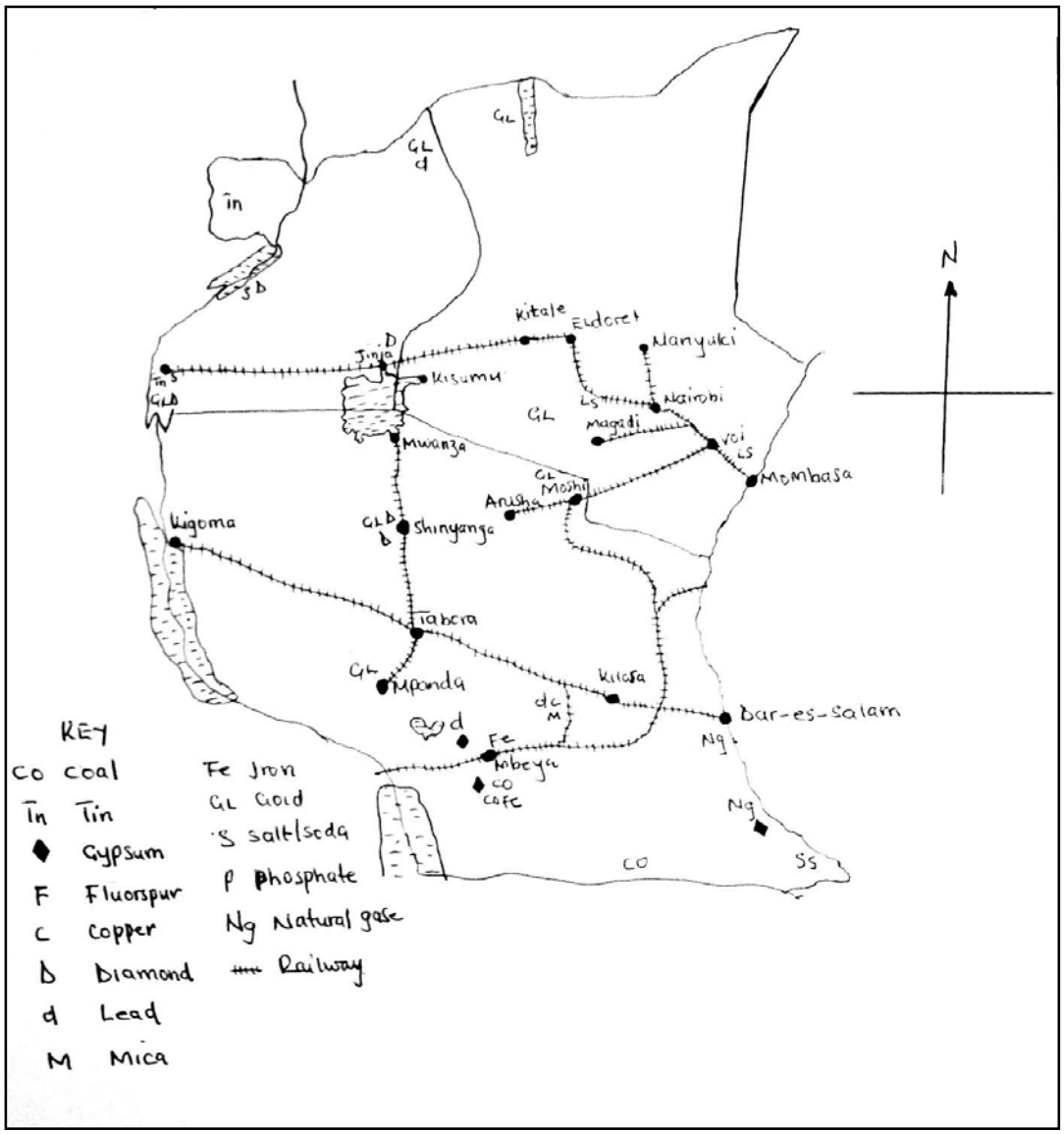
PROBLEMS FACING MINING IN EAST AFRICA

1. Limited technology of mining East Africa's mineral resources
2. Lack of enough labour supply especially skilled labour like geologists, geochemists e.t.c
3. The mining sector faces a problem of limited market for mineral mined at home.
4. There is a problem of political instabilities in some parts of East Africa which scare off the investors
5. The mining industry of East Africa faces a problem of competition from other mineral mining countries of the world e.g. South Africa, Zambia. Democratic Republic of Congo.
6. There is a problem of mineral exhaustion. This results into the closure of some mines e.g. Kikagati tin mines in western Uganda.
7. Price fluctuation for minerals on the world market affect the income of the East African economies
8. Lack of enough capital to carry out survey, pay workers, buying machinery e.t.c. affects the mining activities

PROBLEMS RESULTING FROM MINING

1. Exhaustion of minerals which is accompanied by closure of mines leading to unemployment due to the fact that many workers have to be laid off.
2. Mining leads to both water and air pollution in places where mining is taking place hence affecting human and animal health.
3. It leads to environmental degradation since vegetation cover is cleared in many places in search of mineral resources.
4. The clearance and digging underground in search of minerals accelerates soil erosion in many parts and some areas are exposed to agents of soil erosion.
5. Mining leads to shortage of land for agriculture because in most cases good soils for agriculture are removed and washed away by agents of soil erosion.

A SKETCH MAP OF EAST AFRICA SHOWING MINERAL DISTRIBUTION



MINING IN KENYA

Minerals mined in Kenya include fluorspar, soda ash, gold, limestone, asbestos, mica, gypsum e.t.c

Fluorspar: This mineral is mainly mined in Kerio valley. It is used in the making of metal alloys, steel and Aluminium strengthening. It is also used as aerosol cans, frying pans, sulphuric acid and toothpaste.

Soda ash: It is mined from lake Magadi in the rift valley. It is the basis for the chemical industry in Kenya. This mineral is formed by leaching of volcanic ash and excessive evaporation from lake Magadi. Soda ash is a sodium carbonate. Soda ash is used in making of glasses, detergents, soap, insecticides, caustic soda, drugs, dyes, paper, chemicals and in the refinery of petroleum. It is exported to countries like Latin America, Japan, Australia, South Africa, India e.t.c.

Gold is mined in the coastal province o Kenya and Nyanza province of western Kenya. It is used in jewellery industries.

Limestone: Limestone mining is located along the coast of Kenya in the coral rocks. It is used in the production of cement at Bamburi Portland near Mombasa.

Asbestos: This mineral is mined at Kaptumet. It is used as a tyre proof and other asbestos products include roofings, pipes e.t.c

Gypsum: This mineral is mined around Malindi and Garisa. It is used in the manufacture of cement and chalk.

MINING IN TANZANIA

The most important mineral mined in Tanzania is diamond. This mineral is mined in Mwadui Shinyanga area in northern Tanzania.

FACTORS THAT LED TO THE DEVELOPMENT OF MWADUI DIAMOND MINING

1. High quality diamond need for a number of uses.
2. Diamond is located near the earth's surface hence making it easy to mine.
3. The relief of the area is generally flat. This favours mechanization.
4. Availability of improved means of transport e.g. the central Tanzania railway and roads.
5. Availability of capital to pay workers, purchasing machinery
6. Presence of skilled man power e.g. engineers, technology e.t.c.
7. Political stability in the country. This has attracted many foreign investors.

MINING IN UGANDA

The major minerals mined in Uganda include copper, cobalt, asbestos, phosphates, soda ash, limestone e.t.c. petroleum deposits have been discovered in lake Albert basin.

Copper mining started at the foot of mountain Rwenzori at Kilembe in 1956. it was processed on the site into copper concentrates which was then transported to Jinja for smelting.

STAGES OF MINING AND PROCESSING COPPER AT KILEMBE

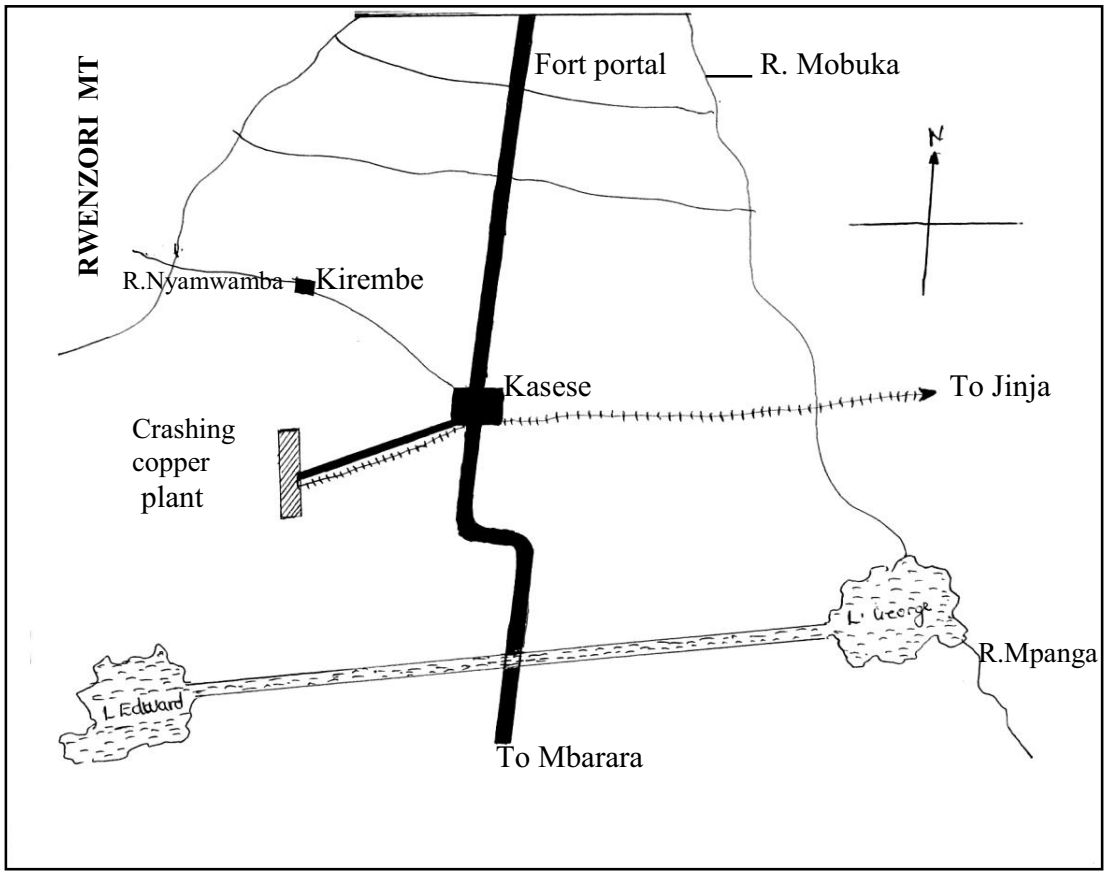
Drilling and blasting is done to extract the ore. After when this is done, transportation of copper ore by railway tracks from the mine to the crushing plants is done.

After crushing, copper is rotated in water to separate the heavier ore from the waste and for a slummy of about 27- 30% actual copper.

The concentrate of copper is pumped through an 11 kilometer pipeline to the railway station at Kasese a distance of 430 metres below.

The suspension is filtered and dried to reduce its weight and then loaded into 36 ton capacity railway trucks and sent to Jinja, a distance of about 420 km.

A SKETCH MAP SHOWING KILEMEBE COPPER MINES



FACTORS THAT HAVE FAVOURED MINING OF COPPER AT KILEMBE

1. Large deposits of copper which ensured continued copper supply.
2. Availability of cheap railway transport from Kasese to Jinja where smelting was carried out.
3. Presence of food from neighbouring areas for the labour.
4. Power supply from Owen falls dam at Jinja and Mubuku power stations.
5. Availability of capital provided by the government of Uganda. The Uganda Development Cooperation and a Canadian firm Frobisher company limited.

ADVANTAGES OF COPPER MINING TO THE ECONOMY OF UGANDA

1. Growth of towns like Kilembe and Kasese.
2. Provision of employment opportunities to the people of Uganda
3. Increased agriculture in form of food and milk. Bwamba and Bukonjo became big matooke producers.
4. It improved infrastructure e.g. schools, roads, hospitals e.t.c.
5. It is a source of foreign exchange to the economy of Uganda.

PROBLEMS FACING COPPER MINING AT KILEMBE.

1. A fall in prices of copper in 1970's and the political instability in the country affected much the mining of copper in Uganda.
2. Competition with other copper producing countries like Zambia, Mauritania in 1970.
3. Lack of enough man power since most of the experienced labour force changed jobs and others retired.

PROBLEMS HINDERING THE DEVELOPMENT OF MINING IN EAST AFRICA

1. Poor means of transport in some parts of East. Africa makes the mineral deposits inaccessible.
2. Lack of enough capital to carry out mining activities.
3. Industrial development is still very low to provide a ready market for the minerals.
4. Limited research to discover mineral deposits. This is brought about by lack of capital.
5. Lack of enough skilled man power to carry out mining activities and processing minerals
6. Most minerals are in small quantities and at the same time they are of a poor grade.
7. Political instabilities in some parts of East Africa e.g. northern Uganda where rebels have over stayed the area. This has hindered mining activities to take place there.
8. Exhaustion of mineral ore has led to some mining centres to close down.

SOURCES OF POWER IN EAST AFRICA

Energy is defined as power which can be used to drive machines.

SOURCES OF POWER

Power is obtained from natural gas, sun (solar), water, wind, coal, earth's crust (geothermal), biomass, tides, uranium e.t.c.

CLASSIFICATION OF ENERGY

Energy is categorized into two

Renewable sources of energy: These are sources of energy which can be used without getting exhausted in future. These include solar energy from the sun, wind energy from the wind, geothermal which is generated from the earth's crust especially from volcanicity, hydro electric power from running water, biomass from burning wood, agricultural waste.

Non-renewable sources of energy: These are resources which get used up or exhausted. These include natural gas, uranium, petroleum, coal (lignite or brown coal, bituminous and anthracite)

HYDRO ELECTRICITY POWER

This type is generated by running water which drives turbines to generate power;

FACTORS FAVORING HYDRO ELECTRIC POWER PRODUCTION IN UGANDA.

1. Constant water supply from lake Victoria which runs the turbines to produce electricity.
2. Strong foundation for dam construction.
3. Availability of space for water reservoiur.
4. Presence of big power market in the industrial towns of Kampala and Jinja. This reduces costs of transmission of electricity.
5. Availability of market in the neighbouring countries like Kenya, Tanzania, e.t.c. In 1980, Uganda was producing 135 MW and could only use 80 MW and 30 MW were exported to Kenya.

6. Uganda has potential sources of power production at the following falls which are good sites for dam construction

   Bujagali falls on Victoria Nile

   Kabalega falls

   Ssezibwa falls on river Ssezibwa in Mukono district

   Nyagaki falls on Albert Nile in Nebbi district.

   Kaku falls on river Kaku in Kisoro district

   Sippi falls on river Sippi on Mt. Elgon.

HYDRO ELECTRIC POWER PRODUCTION IN KENYA

There are many dams in Kenya which have been constructed on river Tana. This river rises from Mt. Kenya and Nyandarua Mts. It major tributaries include Nyamindi and Thiba. The following are the major dams that have been constructed

Masinga dam (40 MW)
Kambalu dam (94 MW – 1975)
Gitaru dam (145 MW)
Kindaruma dam (44 MW – 1968)

→ **SEVEN FOLKS DAM**

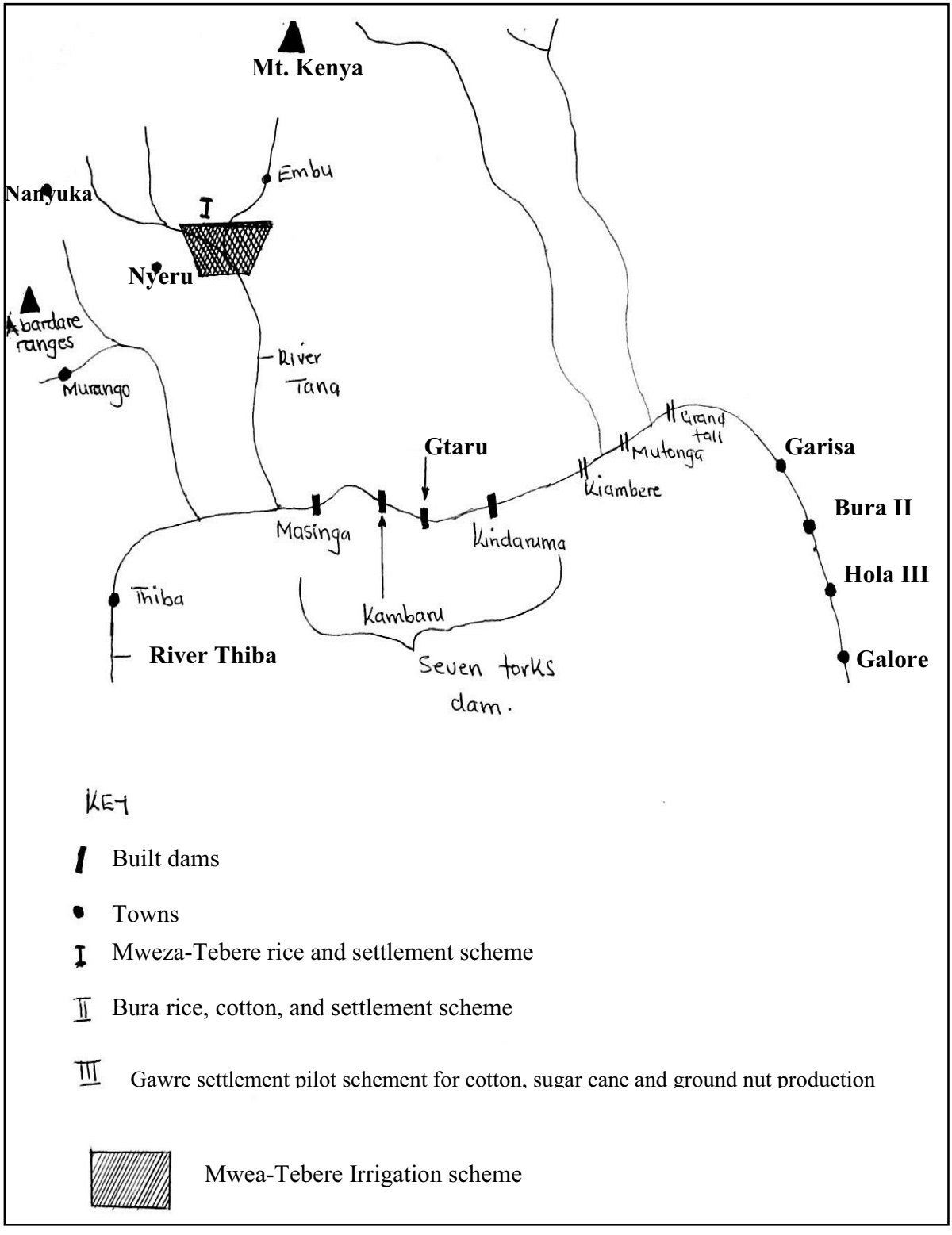
Other proposed sites in Tana basin include

Kiambere

Mutunga

Grand

HYDRO ELECTRIC POWER PRODUCTION ON RIVER TANA



HYDRO ELECTRIC POWER PRODUCTION IN TANZANIA

Hydro electric power production in Tanzania takes place on river Pangani, river Ruvu and river Wami. The following are the major dams which produce electricity in Tanzania

Mtonga dam on river Ruvu

Wami 1 and Wami 2 on river Wami

Grand Pangani on river Pangani

The three dams of south of Pare on river Pangani

GEOTHERMAL POWER PRODUCTION IN EAST AFRICA

Geothermal power is generated from the earth heat where rain water enters the earth's crust and is changed to steam by heat from magma. In the valley areas of East Africa magma comes near the earth's surface through faulting, volcanicity and rafting. There are several geothermal power sites in Kenya in the rift valley and these include

lake Bogoria geothermal field near lake Bogoria north of Menengai crater

Eburru geothermal field south of lake Elmenteita

Alkaria geothermal field near Mt. Longinot and south of lake Naivasha.

THE VEGETATION OF EAST AFRICA

Vegetation refers to a living plant that covers the earth's surface.

VEGETATION TYPES OF EAST AFRICA

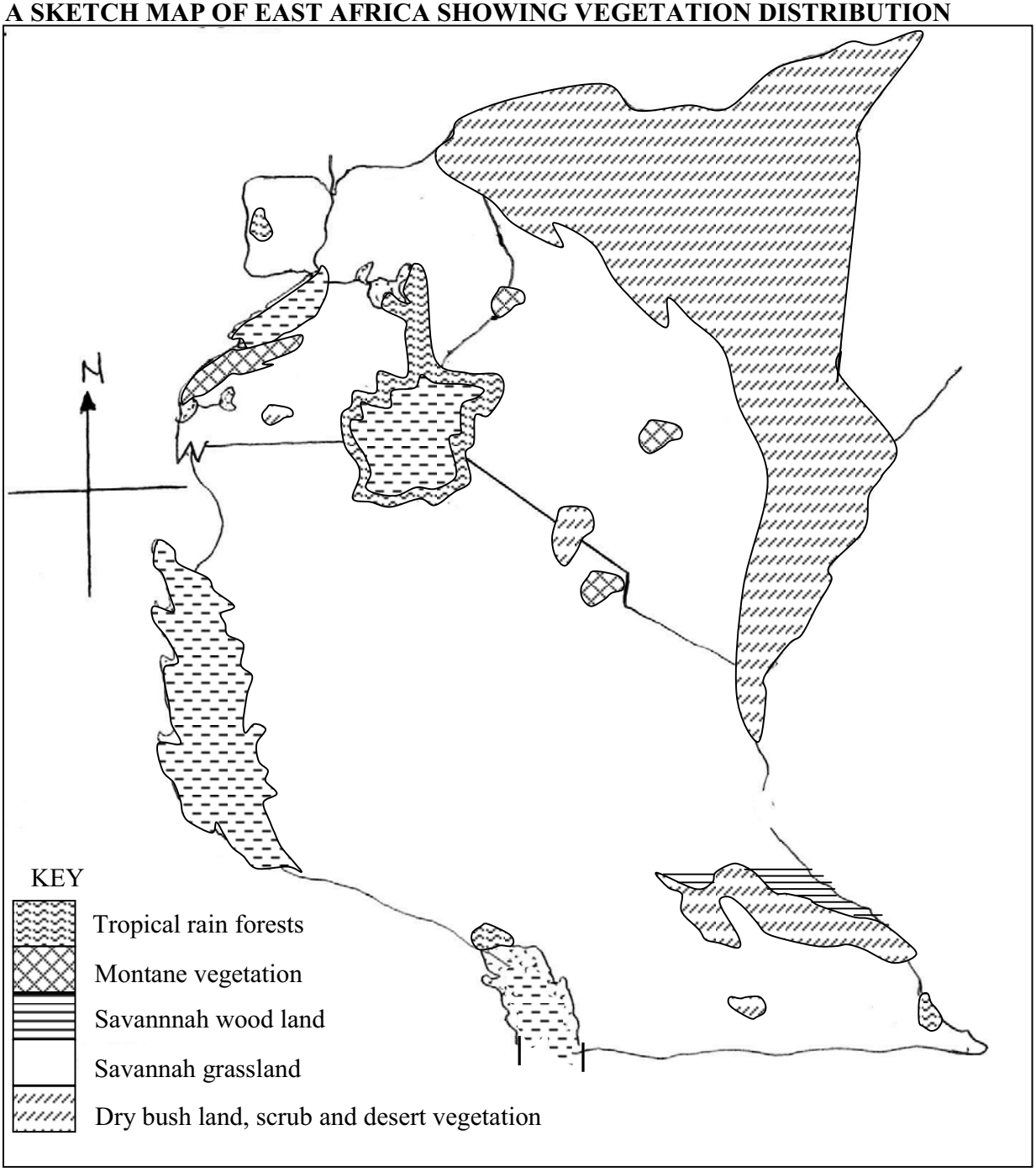
There are a number of vegetation types in East Africa which include.

(i) Equatorial (Tropical forest)
(ii) Savannah grassland.
(iii) Savannah woodland.
(iv) Montane vegetation
(v) Scrub and bare vegetation

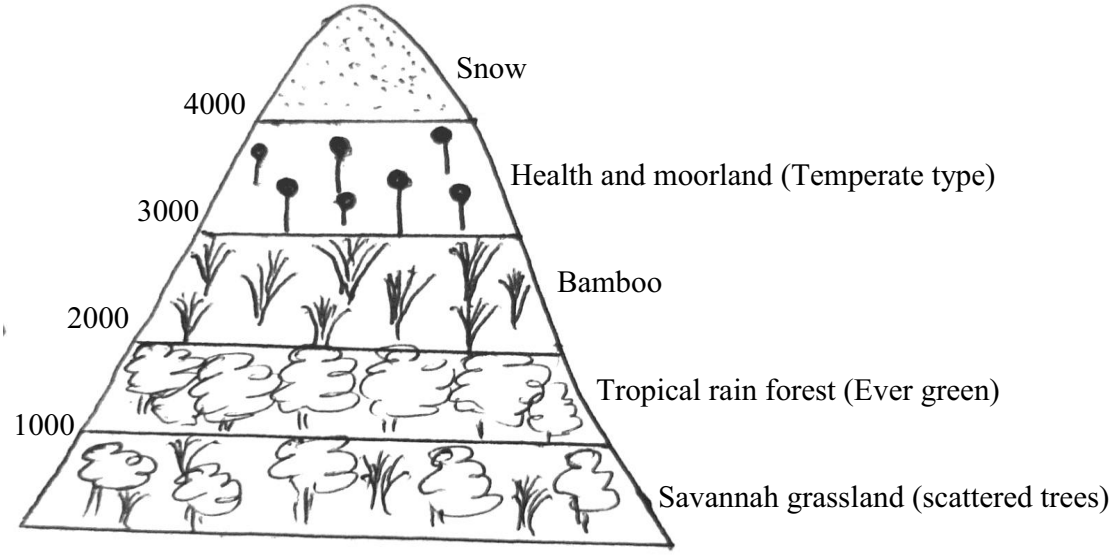
FACTORS RESPONSIBLE FOR VEGETATION DISTRIBUTION IN EAST AFRICA

1. Rainfall: Areas which receive heavy and reliable rainfall e.g. highlands and around Lake Victoria tend to have dense forests.
2. Man's Influence: Man plays a very big role in vegetation distribution. Man clears vegetation because he wants to carry out agriculture, settlement, mining, industrial development etc.
3. Soils: areas with fertile soils like those of volcanic origin and around Lake Victoria support dense forests.
4. Altitude: This is the height above the sea level and as one ascends along mountain slopes, vegetation zones are realized and different vegetation types adopt to different climatic conditions.

A SKETCH MAP OF EAST AFRICA SHOWING VEGETATION DISTRIBUTION



MOUNTAIN VEGETATION PYRAMID IN TROPICAL REGIONS



CHARACTERISTICS OF TROPICAL (EQUATORIAL FORESTS)

1. They have three canopies/ layers.
2. They are ever green.
3. They have buttress roots.
4. They are branches at the bottom.
5. They are umbrella shaped.
6. They have broad leaves.
7. They have climbers/ Lianas
8. They have tall trees.
9. They have huge trunks.
10. They have mixed species.
11. They have little or no under growth.
12. The forests are dense/ dark.

CHARACTERISTICS OF SAVANNAH WOODLAND

1. Trees are moderately spaced.
2. There is dense undergrowth of grass and scrub.
3. Trees are only green during rainy seasons because during dry seasons they tend to shade off their leaves.
4. Trees are Umbrella shaped.
5. Trees have medium height.

CHARACTERISTICS OF SAVANNAH GRASSLAND

1. The trees are scattered.
2. Grass is the dominated plant.
3. Annual rainfall is often around 762mm and it may go up to 1000mm near equatorial regions.
4. Humidity is usually high during summer seasons.
5. Summers are usually hot with temperature of around 32^0C (78^0 F)

CHARACTERISTICS OF MANGROOVE FORESTS.

1. They have hard wood species.
2. They have medium height trees.

3. They have aerial roots.
4. They have short stumpy trunks.
5. They have broad leaves.
6. They are ever green.
7. They are dense with bush stand.
8. They have leathery foliage.
9. They have twisted trunks.

CHARACTERISTICS OF MONTANE FORESTS

1. They have a single canopy.
2. They have needle like leaves.
3. They have soft wood forests.
4. They exist in pure stand.
5. They are dominated by coniferous and decidous trees.
6. They have thick cover of moss/ cabbage leaf growth and tree ferns.

FORESTRY IN EAST AFRICA

Forestry refers to activities associated with forests like scientific research, lumbering e.t.c. In East Africa, there exists both hard and soft wood trees.

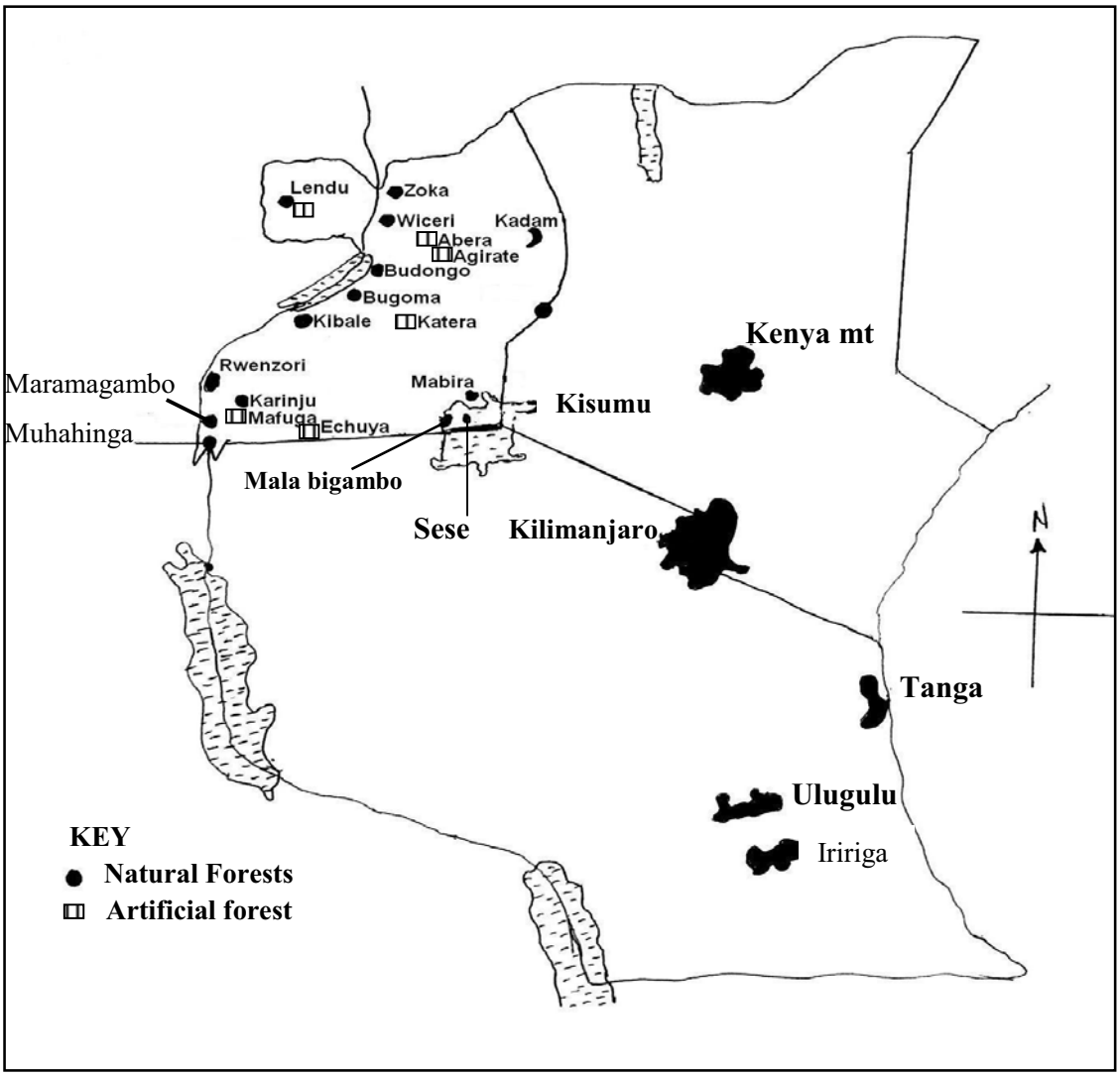
Soft wood trees	**Hard wood trees**
Cyprus	Ebony
Wattle	Mahogany
Eucalyptus e.t.c	Mivule e.t.c.

FACTORS AFFECTING DISTRIBUTION OF FORESTS IN EAST AFRICA

1. **Fertile soils:** Areas with fertile soils attract dense forests
2. **Heavy rainfall:** Areas which receive heavy rainfall like those of equatorial regions tend to have dense forests.
3. **Population:** Population increases affect forests due to the need for land for agriculture, settlement and industrialization.
4. **Man's activities** like construction, industrial development which lead to clearance of forests.
5. **Relief:** This is the physical appearance of the landscape. Some forests do well at a height of 1000 metres high while others do not.
6. **Government policy:** Some forests exist where they are because they were gazatted by the government for a number of reasons.

7. **Altitude.** This refers to the height above the sea level. As one ascends a mountain slope, different vegetation zones are realized and different vegetation types adapt to different conditions.

A SKETCH MAP OF EASTAFRICA SHOWING FOREST DISTRIBUTION.



IMPORTANCE OF FORESTS IN EAST AFRICA.

1. Forests play a very big role in controlling the run off of water over the land surface hence protecting the soil from agents of soil erosion
2. Forests shape the climate of the area where they exist. Forests lead to the formation of rainfall especially convectional rainfall.
3. Forests are sources of fuel for both domestic and industrial use. Firewood from these forests is the main source of energy for rural population.

4. Forests are used for education purposes. Learners especially students of higher institution use forests for research purposes.
5. Forests and the animals which dwell in them attract many tourists e.g. Mgahinga and Bwindi impenetrable forests are home to mountain gorillas.
6. Forests are sources of medicine. Herbs and medicine which cure diseases like malaria, cough e.t.c. come from forests.
7. The exploitation of forests leads to the generation of revenue to the East African governments through taxes imposed on the companies exploiting the forestry resources.
8. Employment opportunities are obtained from these forests e.g. forest rangers, lumberers, researchers, transporters e.t.c
9. Forest products such as timber once exported and sold, they fetch foreign exchange to the economies of East Africa.
10. Forests lead or boost industrial development due to availability of forestry resources which act as raw materials in many industries.

PROBLEMS FACING THE FORESTRY INDUSTRY OF EAST AFRICA

1. Forests face a problem of pests and diseases which attack the trees. This reduces their economic value
2. Many of the valuable forests are located in far remote areas, so it becomes difficult to transport timber from these forest regions to the market centres.
3. There is a problem of lack of enough valuable tree species like mahogany, ebony e.t.c.
4. There is a problem of fire outbreak which causes extensive distinct of forests.
5. The exploiters face a problem of wild animals like lions which attack them.
6. Some forests are located in highland areas. This makes them inaccessible hence their exploitation becomes very difficult.
7. There is a problem of lack of enough capital to buy the exploiting equipment such as cranes for lifting for lifting heavy logs, tractors for carrying heavy timber e.t.c.
8. There is a problem of limited market for the forest products in East Africa as applied to America and other European countries.
9. In addition to that above, there is a problem of lack of i.e skilled manpower for the exploiters.
10. Political instabilities in some parts of East Africa like in northern Uganda hinders the exploitation forestry resource.

SOLUTIONS TO THE ALREADY IDENTIFIED PROBLEMS IN EAST AFRICA

1. The East African governments through mass media and local authorities have provided education to the people surrounding forests on the need to protect the forests from further destruction.
2. Other sources of energy such as bio-mass from agricultural wastes like coffee husks e.t.c. have been encouraged to reduce the rate at which forests are cut down for fuel.
3. Re-afforestation programmes have been put into place in areas where forests have been cleared.
4. The three East African countries have put up strict laws against the forest encroachers.
5. Programmes to regulate and control tree cutting in already gazatted natural forests and those on private land have been put in place through patrolling these forests.
6. Afforestation programme to plant trees which grow faster like eucalyptus tree has been encouraged.

FISHING IN EAST AFRICA

Fishing refers to the extraction of aquatic life such as fish, whales, crustaceans, sea weeds, sponges e.t.c.

Fishing can be carried out in swamps, rivers, lakes, oceans, ponds e.t.c.

FISH SPECIES CAUGHT IN EAST AFRICA

There are two major types of fish caught in East Africa and these are

(i) Demmersal fish

(ii) Pelagic fish

(i) Demmersal fish: These are types of fish which swim and live in deeper water near to the sea bed.

(ii) Pelagic fish: These are types of fish which live in water lose to the surface and they include sardines, mackerel e.t.c.

METHODS OF CATCHING FISH IN EAST AFRICA

There are two ways of catching fish in East Africa and these are

Traditional methods

Modern methods

Traditional methods: These are primitive methods of catching fish. They include baskets, hooks, traps, spears, poison e.t.c.

Modern methods: These are used for commercial fishing and they include trawling, purse seining, lining, gill nets e.t.c.

(a) Long lining method: This is used to catch large fish like catfish which live at the bottom of the sea.

(b) Trawling: This is used to catch fish which live in deeper waters e.g. the cod.

(c) Trolling: This is used to catch fish which live near the surface of the sea, lake, ocean e.t.c. and fish caught using this method include mackerel, sardines e.t.c.

METHODS OF PRESERVING FISH IN EAST AFRICA

(i) Salting

(ii) Sun drying

(iii) Smoking

(iv) Fish canning

(v) Deep freezing

(vi) Frying e.t.c.

FACTORS FAVOURING THE DEVELOPMENT OF FISHING INDUSTRY IN EAST AFRICA

1. Availability of capital to buy the fishing equipments such as motor boats, nets e.t.c.
2. Presence of fish food called planktons which live in cool well aerated shallow waters.
3. Good government policy which attaches concern on the size of nets used in the fishing grounds. This protects young fish from being caught.
4. Availability of modern methods of preserving fish e.g. deep freezer, fish canning, refrigerator motor vehicles e.t.c.
5. Availability of a ready market for fish in urban centres.
6. Presence of quick means of transporting fish from fishing grounds to market centres.
7. The existence of estuaries, deltas and inlets where fish can flourish which are also good sites for establishment of ports.
8. Availability of a variety of fish species which attract many fishermen.
9. Presence of large fishing grounds such as lakes, rivers, oceans and swamps.

IMPORTANCE OF FISHING INDUSTRY TO THE ECONOMIC DEVELOPMENT OF EAST AFRICA

1. The fishing industry of East Africa has led to the development of industries such as fishing and canning industries. This has reduced on the problem of over dependency on agricultural sector.
2. The fishing industry and fish related activities provide employment opportunities to people of East Africa.
3. Fish caught in East African fishing grounds provide proteins to people and at the same time improves on people's diet.
4. The activity of fishing has led to the development of infrastructure such as roads, ports, schools, hospitals e.t.c.
5. Fishing provides foreign exchange to the East African countries through exportation of fish to countries like Japan and European countries.
6. The fishing industry has led to the development of urban centres e.g. Dar – es- Salaam, Mombasa, Bukoba e.t.c.
7. Fishing is a source of income to the local people and this has improved on their standard of living because now people can afford medication, clothings e.t.c.
8. It is a source of government revenue through taxes imposed on the people involved in the fishing activities such as industries processing fish, licenses offered to people, allowing them to carry out fishing e.t.c.

PROBLEMS HINDERING THE DEVELOPMENT OF FISHING INDUSTRY IN EAST AFRICA.

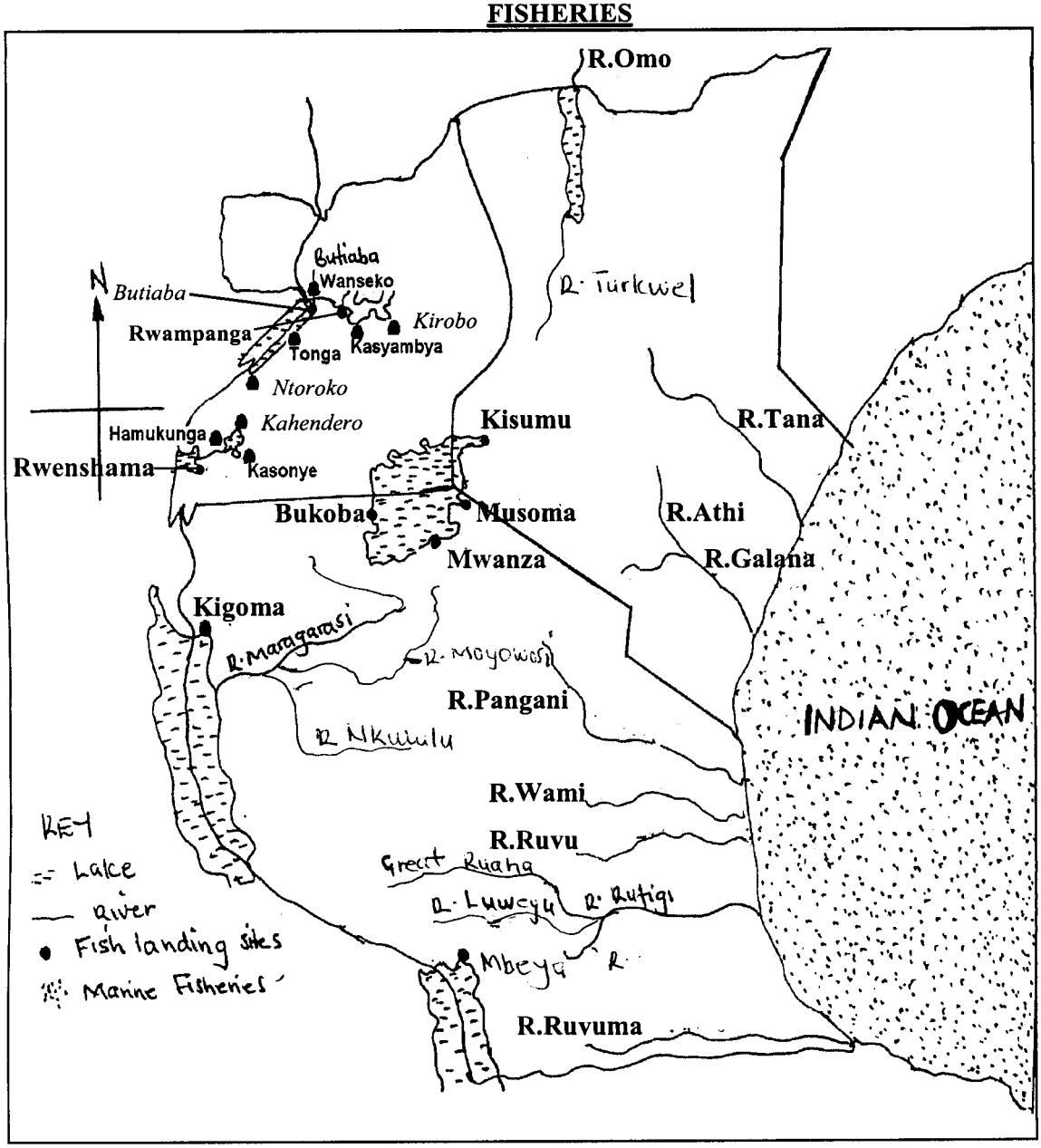
1. There is a problem of water hyacinth on some water bodies of East Africa e.g. L. Victoria. This affects the fishing activities because it hinders the movement of boats, especially the small boats.
2. The fishing industry faces a problem of relief. Some lakes like those located in rift valley areas are not accessible due to steep escarpments bordering the rift valley. This hinders the development of communication routes.
3. The fishermen face a problem of too much wind during specific seasons on seas and oceans. This wind destroys nets, capsizes boats and leads to drowning of fishermen
4. There is a problem of over fishing due to poor fishing methods. This depletes water bodies.

5. The fishing industry suffers from competition from other fish producing countries like Norway, Japan e.t.c. These countries can afford o preserve fish and sell it at higher prices.
6. Many of the fishing grounds are located in far remote areas and so transportation of fish to the market centres is very difficult and costly.
7. There is a problem of poor storage facilities which lead to a lot of waste.
8. The existence of wild animals such as hippos which attack people hinder fishing activities.
9. Lack of enough local market due to some tribes like Bahima who do not eat fish affect the fishing activities.
10. The fishing industry of East Africa faces a problem of water piracy. This is the theft of fish and fishing gears especially at night.

SOLUTIONS TO THE IDENTIFIED PROBLEMS

1. The problem of water hyacinth has been solved through application of biological methods where weevils which eat the weed have been introduced to eradicate the weed.
2. Introduction of better fish preservation methods such as refrigerated trucks which enable fish to reach distant markets.
3. Programmes to rehabilitate feeder roads linking the fish landing sites to market places have been put in place.
4. Over fishing problem has been controlled by giving licenses to fishermen to regulate the fishing activities.
5. Regular patrol of the waters of East Africa by the fisheries authorities to stop water piracy and foreigners from fishing East African waters.
6. Standard gill net sizes have been recommended and poor fishing methods such as poisoning e.t.c. have been banned to overcome the problem of indiscriminate fishing.
7. The problem of water pollution has been solved through treating industrial wastes before they are discharged into East African lakes.

A SKETCH MAP OF EAST AFRICA SHOWING FRESH AND MARINE FISHERIES



TOURISM AND WILDLIFE IN EAST AFRICA

Wild life refers to animals, birds and insects living in their natural habitats e.g. swamps. Water bodies e.t.c.

Tourism refers to all services rendered to tourists e.g. accommodation, transport e.t.c.

Tourists are people who travel and visit places for pleasure.

MAJOR SOURCES OF TOURISM IN EAST AFRICA

The major sources of tourism in East Africa include

(i) Mountains both block and volcanic

(ii) Wild animals in National parks, game reserves and sanctuaries like zoos

(iii) Rift valley and features located in it such as lakes, fault scarps e.t.c

(iv) Glacial features like peaks, hanging valleys e.t.c.

(v) Hunting and sporting

(vi) Sun bathing and swimming.

(vii) Coastal land forms

(viii) Historical sites e.g. tombs e.t.c.

FACTORS THAT HAVE FAVOURED THE DEVELOPMENT OF THE TOURISM INDUSTRY IN EAST AFRICA

1. Beautiful scenery
2. Good transport facilities
3. Good political atmosphere
4. Government policy towards tourism.
5. Advertisement.
6. High standard of services e.g. hotels, lodges e.t.c.

IMPORTANCE OF TOURISM TO COUNTRIES OF EAST AFRICA

1. It leads to provision of employment opportunities to people like game rangers, hotel managers e.t.c.

2. It leads to the provision of foreign exchange from people who visit East African tourist attractions.

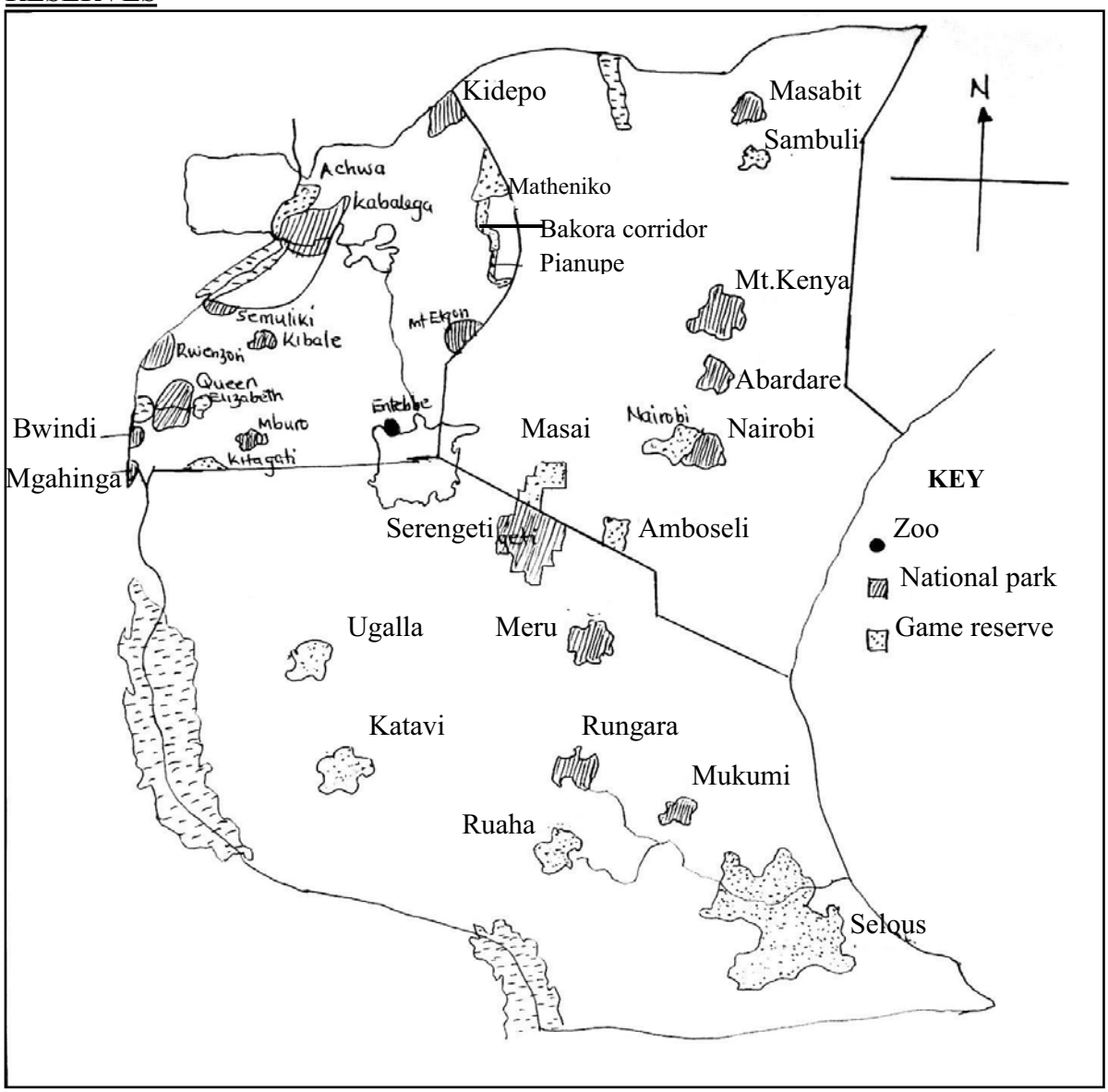
3. It promotes international co-operation between East African countries and the outside world.

4. It leads to the development of infrastructure like roads, hospitals, hostels e.t.c. in areas where there are tourist attractions.
5. It encourages conservation of wildlife due to benefits realized from them.

PROBLEMS FACING THE TOURISM INDUSTRY OF EAST AFRICA

1. The tourist industry of East Africa faces a problem of competition with other land uses. As population increase, more land for farming, industrial development and settlement is required. This leads to the encroachment of people on national parks and game reserves.
2. It faces a problem of poaching. This is the illegal hunting and killing of wild life. This is a threat to the wild life and it leads to disappearance of some animal species.
3. The tourism industry of East Africa is poorly advertised both at home and abroad to attract many tourists.
4. There is a problem of lack of enough capital for the development of infrastructure such as roads, hotels lodges which are needed b tourists.
5. The tourism industry of East Africa faces a problem of political instabilities in some parts of the region for example in the northern part of Uganda where rebels have been a problem to any economic development in the area.
6. Some tourist resorts are not accessible because they are located very far in remote areas and they are rarely visited due to poor road, railway system linking them.
7. It faces a problem of hostility from some tribes like the Karimojong in the north eastern part of Uganda. This scares away many tourists that would have liked to visit National parks like Kidepo national park, game reserves like Matheniko.
8. There is a problem of lack of skilled personnel in the field of tourism in East Africa who could have handled and managed the tourism industry.
9. Language problem also affects the tourism activities and at the same time limits the number of tourists especially those from non- English speaking countries such as Turkey, China, Japan e.t.c. from visiting East African resorts.

A SKETCH MAP OF EAST AFRICA SHOWING MAJOR GAME PARKS AND RESERVES



STEPS TAKEN TO IMPROVE THE TOURISM INDUSTRY IN EAST AFRICA

1. Tourism has been advertised both at home and abroad through mass media to attract more tourists.
2. There is employment of skilled manpower in the tourist industry in all fields to manage the tourist attraction centres.
3. There is improvement on transport and communication network. Many roads linking national parks, game reserves and other related tourist attraction centres have been rehabilitated.
4. The East African governments have tried to improve on the political atmosphere in the region.
5. The local population has been encouraged to visit these tourist attractions so as to widen the market for the tourism industry in East Africa.
6. East African governments have encouraged privatization in terms of hotel management.
7. There is a programme put in place to ease the entry requirements for people who come as tourists in the region.

INDUSTRIALISATION IN EAST AFRICA

This refers to the expansion of industries producing manufactured goods.

Manufacturing is the changing of raw materials into finished goods.

There are three major types of industries in East Africa and these are

(i) Primary industries

(ii) Secondary industries

(iii) Tertiary industries

(i) Primary industries: These are extractive industries and these include fishing, mining, agriculture, quarrying e.t.c.

(ii) Secondary industries: These get goods from primary industries as raw materials and turn them into finished goods. Under secondary industries, we have heavy and light industries. Heavy industries include iron and steel rolling, vehicle manufacturing, ship building e.t.c.

(iii) Tertiary industries: These are industries which provide services like teaching, lawyers, insurance, finance, ware housing, e.t.c.

FACTORS INFLUENCING THE LOCATION OF INDUSTRIES IN EAST AFRICA

1. **Transport:** Industries are located in areas which have well developed transport systems. This is because it becomes easier for them to acquire raw materials and at the same time distribution of manufactured goods to market centres or consuming places.
2. **Market:** Some industries like bread making industries in most cases are located near consuming place. This is due to their perishability.
3. **Raw materials:** Industries which use large quantities of bulky raw materials which lose weight in the process of manufacturing in most cases are located near the source of raw materials because it is cheaper to transport finished goods than transporting raw materials.
4. **Power supply:** This is one of the major factors determining the location of an industry. Many industries are located near the source of power because transportation from far distances is very expensive.
5. **Government policy:** Government may play a big role in the location of an industry or industries due to a number of reasons e.g. for regional balance, health reasons or for political reasons

6. **Political climate:** Industries may be located in given areas because it is politically stable as opposed to other places. e.g. industries have been attracted to Nairobi, Dar-es-Salaam, Kampala and in many urban centres because these area have been politically stable.
7. **Availability of land:** Industries are located in areas where there is enough land for expansion so industries will always be located where there are chances for them to expand.
8. **Industrial linkage:** Industries tend to be located where other industries have been established. This is because some industries use others out puts as their inputs. e.g. sweets industries use sugar from sugar industries, bread industries need flour from grain millers. So this linkage attracts industries to be located where others are located.
9. **Water supply:** Industries need water because water is used as a coolant, as raw material in drinks industries e.t.c. so industries find themselves located near the source of water for reasons given above.

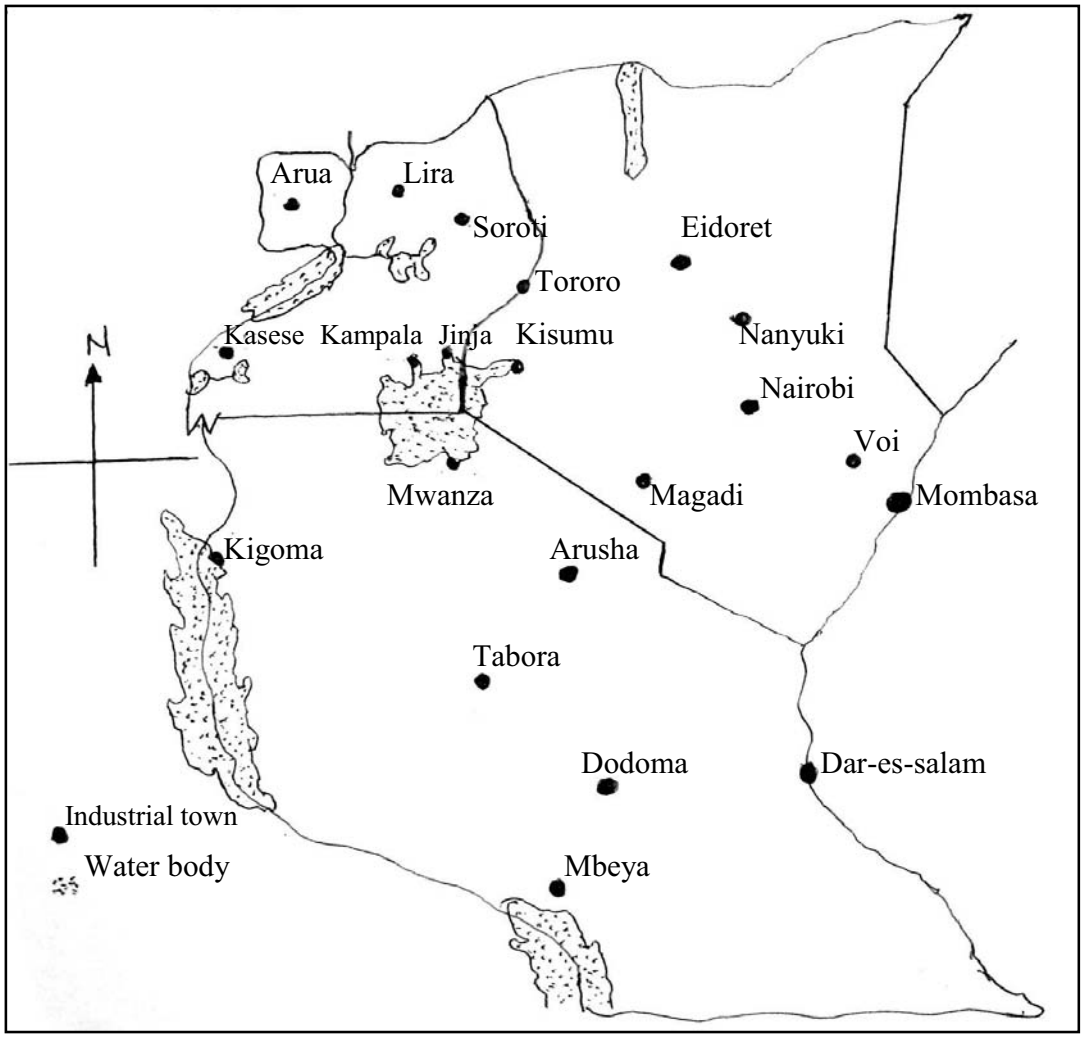
MERITS OF INDUSTRIALIZATION TO EAST AFRICA

1. Industrialization leads to the development of infrastructure e.g. roads, schools, hospitals e.t.c.
2. It leads to the provision of employment opportunities to the people of East Africa hence solving unemployment problem.
3. It leads to diversification of the economy from over dependency on agricultural economy.
4. Industrialization leads to the exploitation of natural resources such as forests, minerals e.t.c.
5. It promotes international relationship with other foreign countries through interaction.
6. Industrialization leads to the provision of foreign exchange through exportation of industrial manufactured goods.

PROBLEMS FACING INDUSTRIALIZATION IN EAST AFRICA

1. Industrial development in East Africa faces a problem of lack of enough skilled man power to handle industrial work.
2. It faces a problem of lack of enough market for industrial manufactured goods.
3. There is a problem of competition from industrialized countries like Japan, China, USA, e.t.c
4. Industrial development in East Africa faces a problem of lack of enough raw materials needed by industries such as petroleum, iron ore, coal e.t.c.
5. There is a problem of poor means of transport to transport raw materials and finished goods to market centres. This is so because most of the feeder roads are poor and affected by weather.
6. Industrial development in East Africa is still poor in some parts because of political instabilities. This scares away industrialists who would have come to invest in Africa.

MAJOR INDUSTRIAL TOWNS OF EAST AFRICA



TRANSPORT AND TRADE IN EAST AFRICA

Transport: This refers to the movement of people and goods from one place to another.

Trade: This is the buying and selling of goods with the intention of making profits.

There are two types of trade and these are international and home trade.

International trade involves the exchange of goods and services between two countries and this is of two types

(i) Bi-lateral trade

(ii) Multi-lateral trade

(i) Bi-lateral trade: This refers to the exchange of goods and services between countries.

(ii) Multi-lateral trade: This refers to the exchange of goods and services amongst countries.

FACTORS AFFECTING INTERNATIONAL TRADE

1. Population size
2. Cultural differences
3. Means of transport used
4. Price control
5. Import tariffs (taxes)
6. Customs duties

TERMS USED IN INTERNATIONAL TRADE

(i) Visible trade: This refers to the trade which deals with imports and exports of tangible products like manufactured and agricultural goods.

(ii) Invisible trade: This is the trade which deals with services (intangible) such as expatriates, tourism e.t.c.

(iii) Balance of trade: This is the difference between the value of imports and exports in monetary terms in a given year.

(iv) Foreign exchange: This is the exchange of currency of one country into the currency of another country.

(v) Foreign exchange rate: This refers to how much money of one country is required for a certain amount of money of another country.

(vi) Balance of payment: This is the statement made every year by a country showing its currency transaction of its visible and invisible trade.

ADVANTAGES OF INTERNATIONAL TRADE

1. The most important advantage of trade between nations is that, it enables a country to get what it cannot produce herself. e.g. Uganda imports machinery, crude oil e.t.c.

2. It enables a country to dispose off her surplus goods which would otherwise be destroyed.

3. It leads to a certain degree of dependence of the country on another. This is not desirable but has an advantage in promoting peace in the world.

4. It promotes healthy competition among local and foreign producers. In the absence of international trade, local manufacturers may establish monopoly and charge high prices.

5. In time of calamities e.g. floods, drought, supplies may be obtained from other countries through international trade.

6. International trade provides a better use of country resources. This is mainly through specialization where a country exports its resources most efficiently.

7. International trade widens the size of the market for the country's products. This enables countries to export their produce.

TRANSPORT

Transport as earlier defined is the movement of people, goods and services from one place to another.

TYPES OF TRANSPORT IN EAST AFRICA

In East Africa, there are three major types of transport used and these are

(i) Land transport

(ii) Air transport

(iii) Water transport

Land transport: This type of transport includes road, railway, human porterage, animals like horse, camels e.t.c.

Air transport: This deals with aircraft.

Water transport: This deals with the use of ships, boats e.t.c. This type of transport is cheaper than any other type of transport.

In East Africa, human porterage is the most common transport used because of the low technological advancement and poverty. It is cheaper and can be used where other forms of transport are non existent.

Animal transport in East Africa is commonly used in semi-desert areas like north eastern areas of Kenya and animals used include camels, horses, donkeys e.t.c.

ADVANTAGES OF ROAD TRANSPORT

1. Road transport is very easy and cheap since roads are very easy to construct compared to any other type of transport like railways, airfields e.t.c.
2. It is good for carrying goods over short distances since it takes a very short time compared to other types of transport.
3. It links other means of transport e.g. water, air, railway e.t.c.
4. Road transport is more flexible as opposed to any other type of transport i.e. it is the easiest to move from one route to another.
5. Special arrangements can be made incase of road transport i.e. road transport has no specific time table to follow as compared to air and railway transport.

ADVANTAGES OF RAILWAY TRANSPORT

1. It is not affected by traffic congestion like road transport therefore very little time can be wasted and unnecessary delays cannot exist.
2. It is suitable for carrying bulky goods for long distances which may require bigger spaces and at the same time heavy.
3. It is cheaper for transporting so many people and cargo for long distances.
4. It is not affected by bad weather as compared to road and air transport. This means that it can be used at all seasons.
5. It follows a specific time table or schedule so this reduces delays and time wastage.
6. It is not easily affected by high way robbery since it stops at specific points or stations.

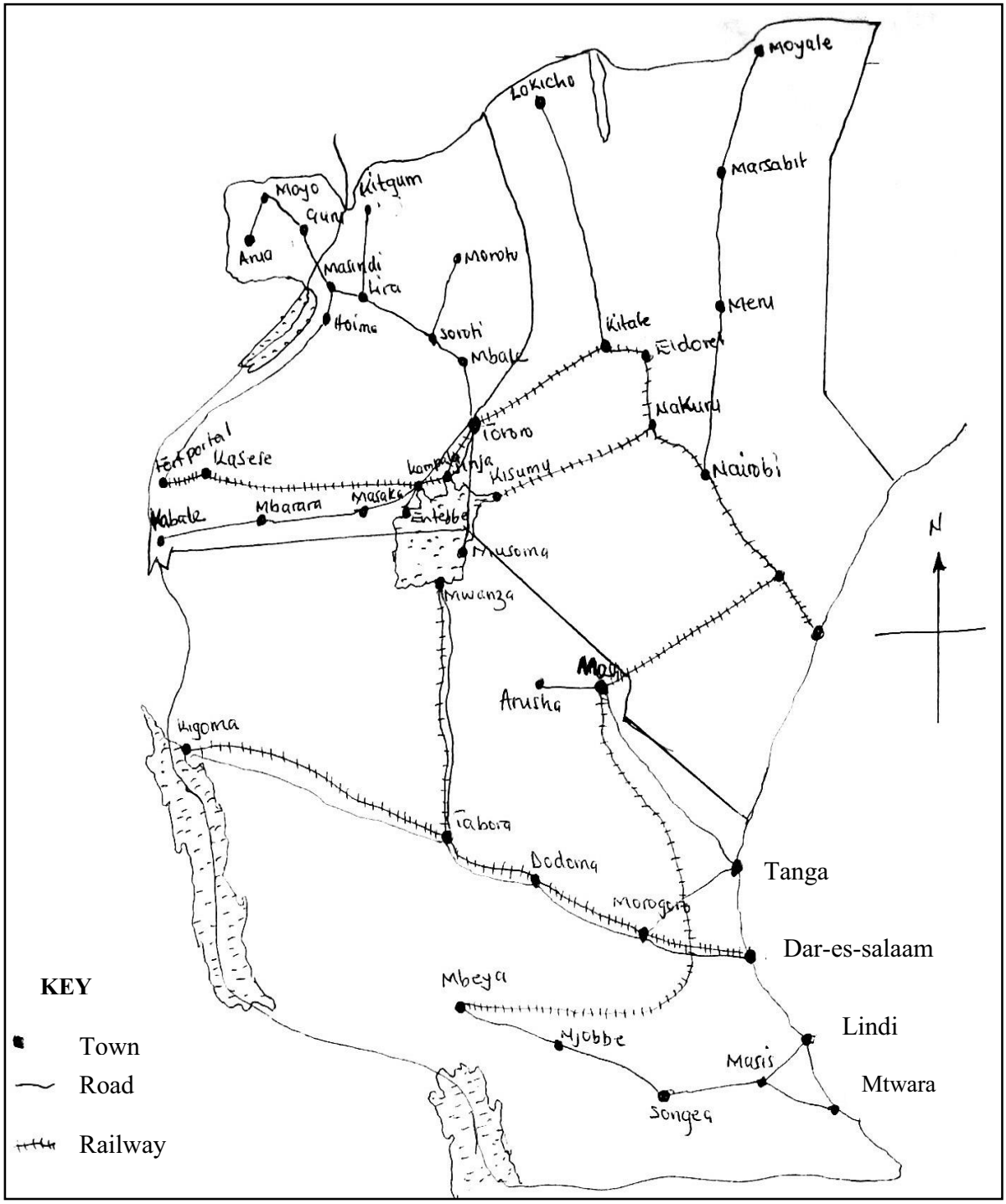
ADVANTAGES OF WATER TRANSPORT

1. It is cheap for bulky goods.
2. There is no traffic congestion on water as it is on road.
3. It is good for carrying fragile goods because it has limited shocks.
4. High way robbery is very rare.
5. Automatic machines are used in loading and offloading the cargo and this makes work easy.

ADVANTAGES OF AIR TRANSPORT

1. It has a fixed time schedule it follows. It follows a fixed time schedule for arrival and departure therefore o delays are normally made on the way.
2. Maximum security is highly observed such that the chances of losing property are highly minimized.
3. It is the most comfortable type of transport used in East Africa as compared to other types of transport.
4. It is suitable for long distances that is transporting goods and people from country to another.
5. It is the fastest means of transport and therefore suitable for perishable and urgently needed goods.

A SKETCH MAP OF EAST AFRICA SHOWING MAJOR TOWNS, ROAD AND RAILWAY NETWORK



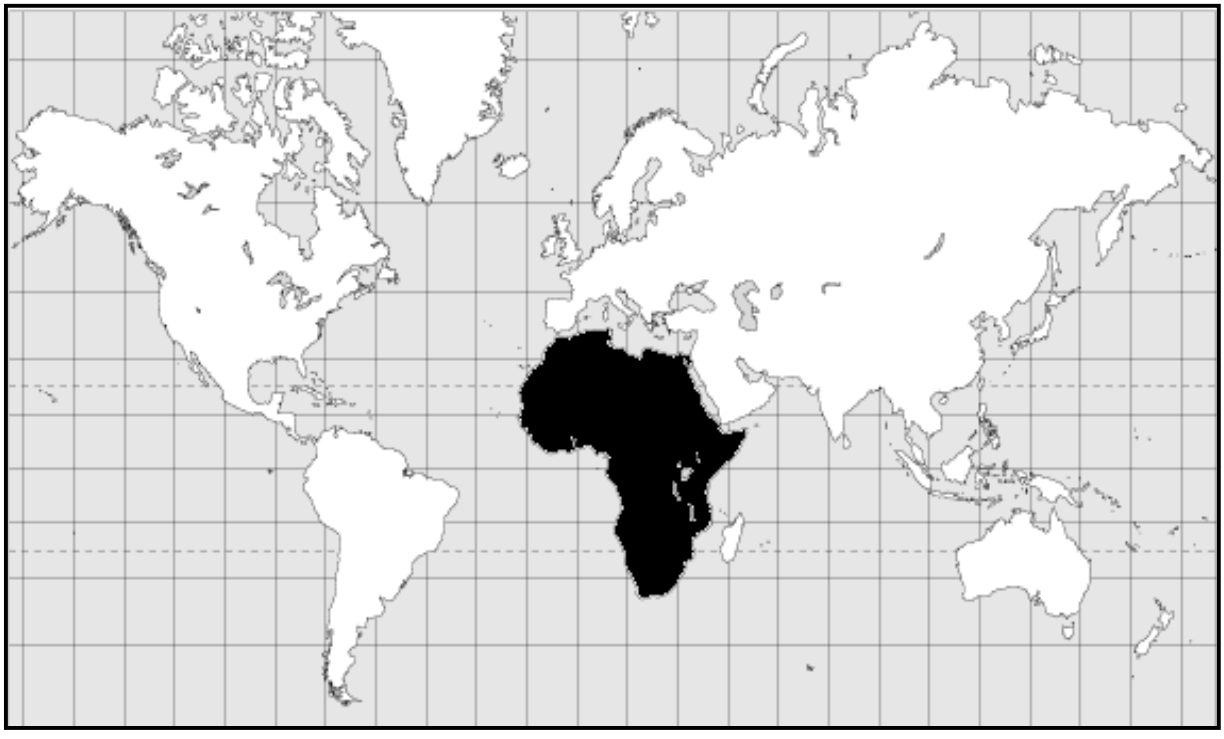
PART FOUR

THE REST OF AFRICA

INTRODUCTION

Africa is the second largest continent in the world. It covers a total area of 30,335,000 km^2. Africa is connected to Asia by a narrow isthmus and Suez Canal to the north east. The Suez Canal joins the Mediterranean to the Red sea. Africa is neighboured to the east by the Indian Ocean. There are several small islands with in the Indian Ocean which are considered part of Africa. These include the Comoros, the Seychelles, Mauritius and Madagascar which is the largest. The Atlantic Ocean lies to the west coast and separates it from the Americas. The Cape Verde and Canary islands lie in this region. Africa is separated from Europe by the Mediterranean Sea. Europe is not far away. There is a narrow strip of water called the straight of Gibraltar, separating Africa from Spain in southern Europe.

AFRICA ON THE WORLD MAP



THE LOCATION OF AFRICA

Africa is crossed by three important latitudes. They are; equator which crosses it almost in the middle, the tropics of Cancer and Capricorn in the north and south respectively. It is also crossed by the longitude 0^{o}, the prime meridian (Greenwich), which passes through Accra, Ghana. Africa stretches from latitude 0^{o} for about 3,800km to the Cape in the south and 4,100km to the northern tip in Tunisia. Africa lies approximately between latitudes 38^{o}N and 34^{o}S and longitudes 10^{o}W and 51^{o}E.

AFRICA'S POSITION AND SIZE



THE RELIEF OF AFRICA

Africa's relief consist of a vast expanse of plateaux which rises higher in the East but gradually rolling down towards the West. Their monotony are broken down by the great shallow basins and their river systems, by the deep cut of the rift valley, inselbergs and mountains. Generally, the relief of Africa can be classified into five main physical regions namely; coastal plains, the plateaus, basins and divides, the rift valleys and the mountains.

1. The coastal plains

Africa's coastal plains vary in width. Most of these are narrow and rise quickly to join plateaus inland. The East African coasts are specially fringed by coral reefs. Much of Africa's coastline is very smooth with very few indentations. Africa lacks a good number of harbours due to the shallowness of the continental shelf. The few existing harbours have been artificially created.

An indented coastline exists on one part of West Africa where the sea reaches far inland via river valleys forming Rias. A ria is formed when the sea level rises and invades low parts of the land along river valleys. It may also be formed if part of the land sinks.

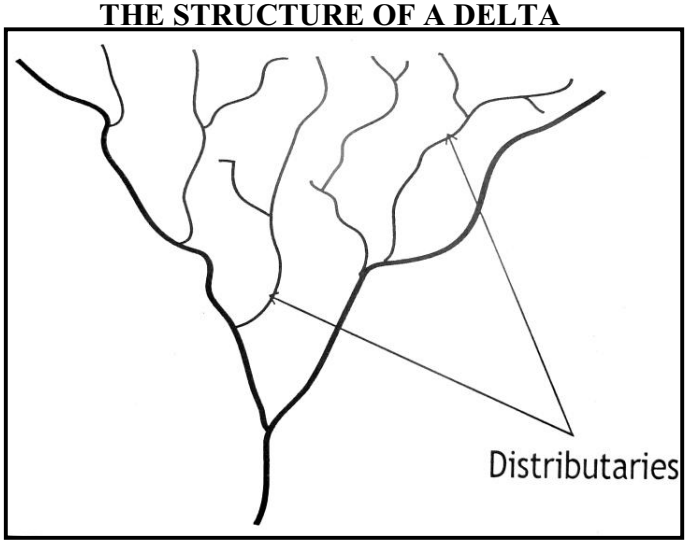
There are a number of coastal features resulting from the ocean waves erosion and deposition. Materials constitute sand, mud and gravels build up to form bays, spits or bars, lagoons, mangrove, swamps and salt mash.

The coast land is also composed of deltas, estuaries and coral reefs. The coral reef are found in areas with warm ocean currents, silt free and salty water. Deltas of some big rivers are great triangular areas of very flat low lying ground seen where the river enters the sea.

Factors for the formation of delta.

1. The speed of the river; the river must have low speed and must be in its old stage.
2. Supply of load of raw materials.
3. The strength of the tidal current; the tidal current must not be very strong to remove the deposited materials.

THE STRUCTURE OF A DELTA



TYPES OF DELTA

a. Arcuate

This is triangular in shape with several distributaries for example for R. Nile and R. Niger deltas. Such deltas are formed where off shore currents are strong to round deltas, sea shore currents are strong to round deltas, seaward edge with fine coarse material.

b. Birds foot

This constitutes of fine materials like silt which is deposited in the sea where there is low wave energy. The river in channel divides into few long distributaries bordered by levees e.g river Nyando in Kenya (Kano plains) and R. Omo in Ethiopia, their deltas looks like a bird's foot.

c. Estuaries

This is a wide open mouth of the river formed when the lower part of the rivers drowns or when a strong tide removes the deposits from the mouth of the river. For example the rivers Tana, Rufigi and Ruvuma.

2. The plateaux

The plateau forms the monotonous relief of Africa. It varies between 800 metres and 3200 metres above sea level. They have resulted from long periods of erosion which have removed large quantities of soil from the continental surface to the sea beds. They are known by different names like; Ahaggas, Tibesti, Jebeimarra, Futa Jalon and the Adamawa.

3.The low plateaus/ Basins and divides

Basins

These are broad, shallow, saucer-shaped basins, bordered by plateaux, fault blocks and mountain ranges. The basins have been major depositional areas for the rock waste eroded from the plateau surface and they have gradually subsided leaving between them mountain divides.

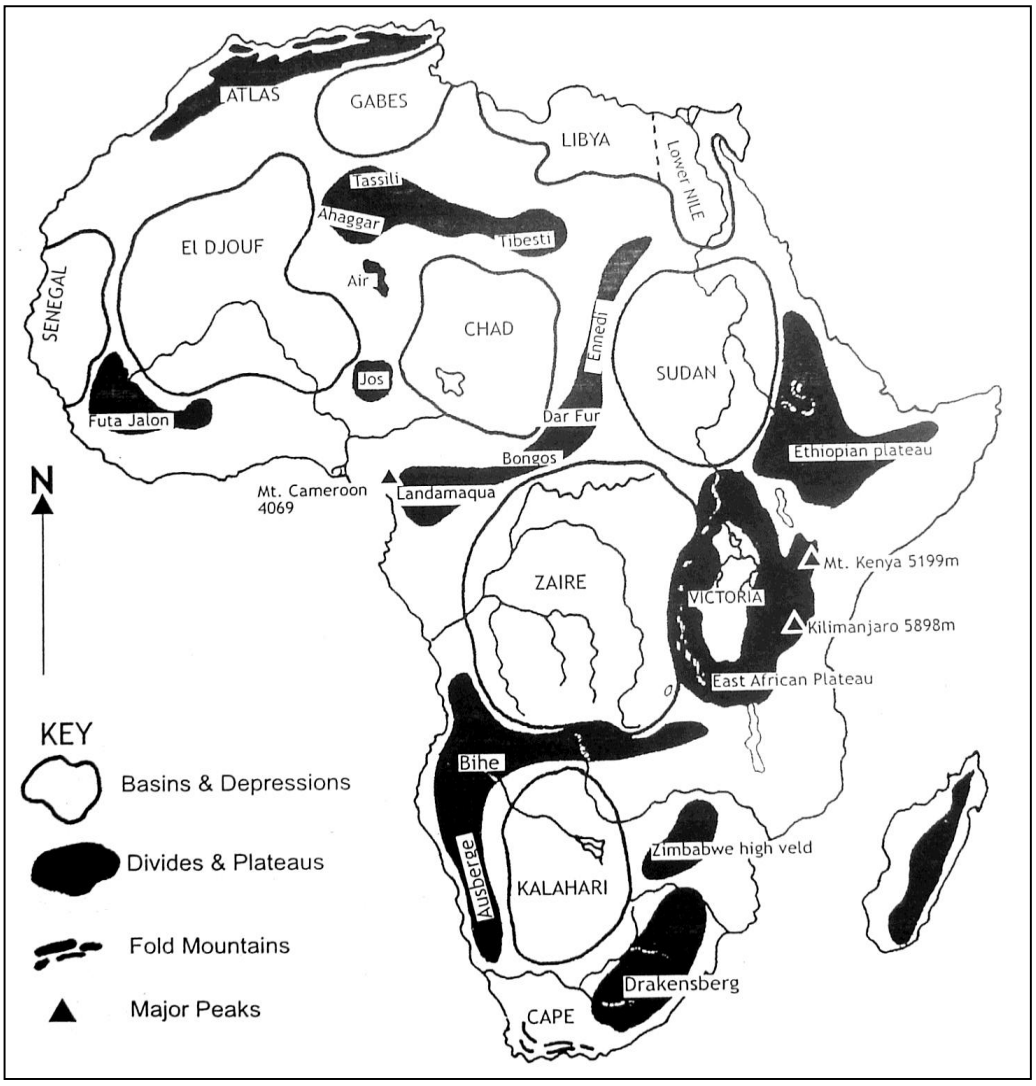
The main Africa basins

i. Congo basin covering 4.1 million square kilometres.
ii. The Chad basin
iii. The El Djouf basin
iv. The Sudan basin
v. The Kalahari basin
vi. The Victoria – Kyoga basin
vii. Gabes
viii. Senegal basin
ix. Libyan basin.

Divides

These are sharp dividing rims bordering basins. They may consist of higher parts of the plateau, for example Jos plateau, Futa Jalon, Ahaggar and Tibesti plateaux. Other important divides are the Drunkensburg and Maluti mountains between the Kalahari and the East coast plain, the Ennedi Darfur and Bogos between Chad, the Sudan and the Congo basin, and the Bihe between the Congo and Kalahari.

AFRICA BASINS, DIVIDES, AND MOUNTAINS



4. The rift valleys

The African rift valley system is a part of the Great rift valley from the Jordan valley in the Middle East through the Red sea to Mozambique. The rift valley system has been formed between two major fault lines. It is about 7200km long, nearly one fifth of the circumference of

the earth. About 5600km of the rift valley system are in Africa. It is the largest rift valley system ever on any continent.

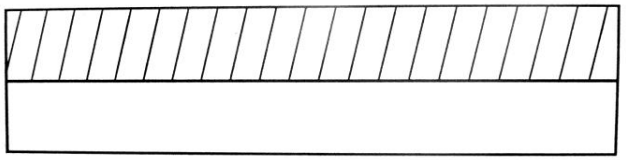
The rift valley passes through Ethiopia, Kenya Tanzania, Malawi and ends in Mozambique. In Tanzania, it is joined by a western branch which starts from northern Uganda. The rift valley floor contains several lakes into which many rivers drain. Because they have no outlets, many of these lakes are salty.

FORMATION OF THE RIFT VALLEY

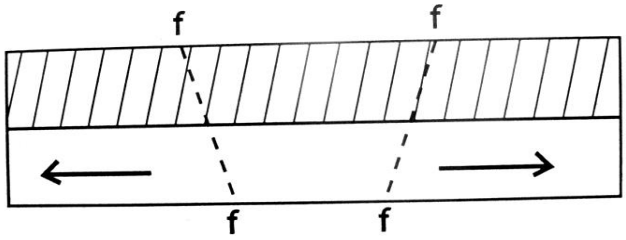
There are two theories probably believed to have led to the formation of the rift valley i.e. tension and compression forces.

(a) Formation of the rift valley by tension

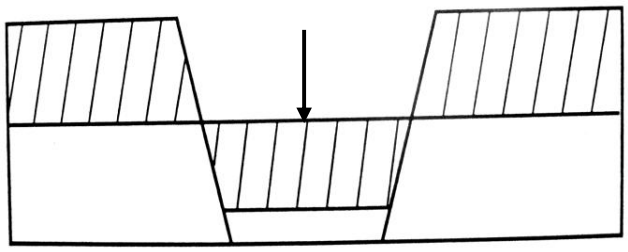
It is believed that lines of weakness or fault lines develop within the earth crust as a result of tension forces tension forces leading to the breaking down of the land. The central block which is then forced to sink as a result. This was followed by the central block sinking, thereby forming a rift valley.



Layers of rocks in the earth's crust before faulting



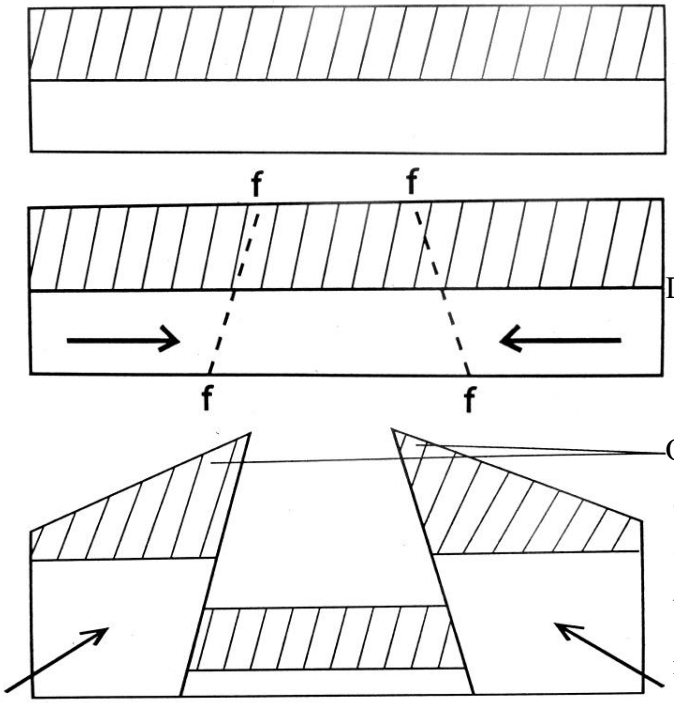
During tension, fault lines developed



Eventually the central block subsided and a rift valley was formed

(b) Formation of the rift valley by compression

It is assumed that fault lines (lines of weakness) develop in the earth's crust. Then the adjacent blocks of land compress against the central block. The central block is forced to override the central block thus a rift valley was formed.



Land before compression

During compression, faults developed

Over hanging parts removed by erosion, land on either side of the faults rose up over the crust between the faults to form a rift valley

THE IMPORTANCE OF A RIFT VALLEY.

i. It contains lakes with minerals, for example L. Magadi with soda ash.

ii. It contains lakes used for fishing and transport.

iii. The gentle slopes of the rift valley are important for agriculture.

iv. The rift valley floor contains a natural habitat for wildlife.

v. To some extent, a rift valley provides natural demarcations for political divisions.

vi. A rift valley portrays a magnificent scenery which attracts tourists.

vii. The rift valley floor provides pastures for cattle rearing.

Viii. The gentle slopes of a rift valley attract settlements.

PROBLEMS FACED BY PEOPLE LIVING NEAR RIFT VALLEYS.

i. The steep sides of the rift valley discourage transport development

ii. Some parts of the rift valley contain infertile soil which discourage agriculture.

iii. Some lakes of the rift valley are salty for example lake Magadi.

iv. There are hot temperatures at lower altitude leading to increased evaporation.

v. The lee-ward side of the rift valley is usually dry which hinder cultivation.

vi. Land slides are common.

vii. Sometimes rift valley are used as hideouts for law breakers for example ADF rebels in Western Uganda.

viii. These places usually suffer from floods.

ix. They suffer from diseases such as malaria, sleeping sickness and bilharzia.

x. There is usually water shortage due to drought.

xi. Soil erosion is common.

5. The mountains

Mountains are highland areas whose altitude rises over 800 metres above sea level. Africa's mountains may be classified into three groups following their mode of formation. These are

(a) Volcanic mountains

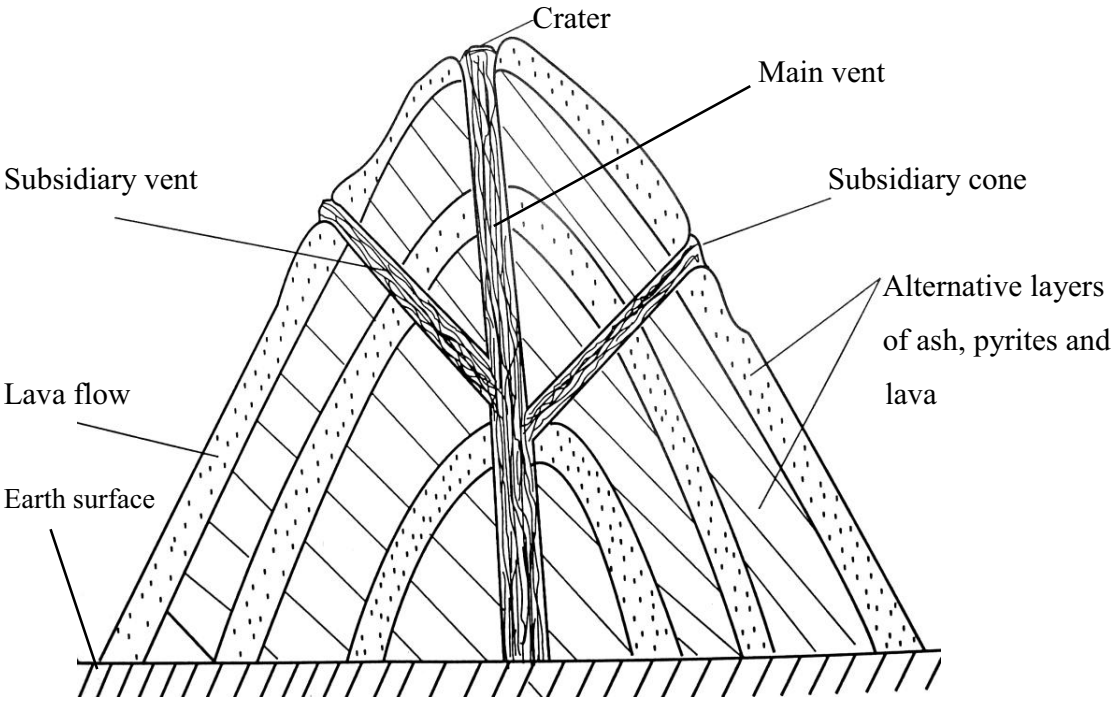
(b) Fold mountains

(c) Block/ horst mountains.

Volcanic mountains

Volcanic mountains originated from areas where faults occurred in the earth's crust. Successive movement and out pouring of volcanic materials from underneath the earth's crust to the earth's surface poured out to build up volcanoes. Volcanic materials included magma, cinders, ash, pyrates and gases. The extruded materials cooled down, solidified and built around the vent to form a cone or a dome, with a funnel shaped depression at the top known as a crater.

THE STRUCTURE OF A VOLCANIC MOUNTAIN



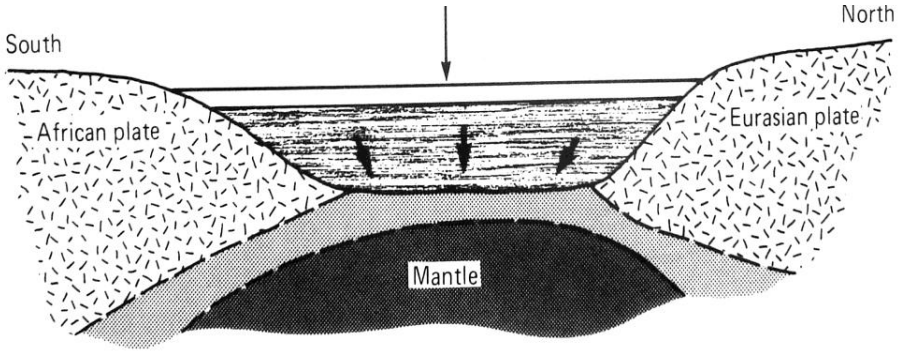
THE FORMATION OF FOLD MOUNTAINS

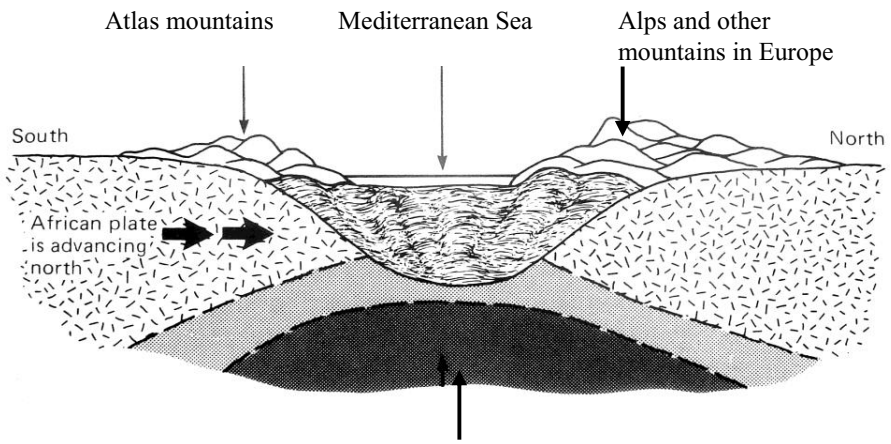
Fold Mountains are a result of complex processes involving accumulation of sediments beneath the sea and later compressed by lateral forces within the earth's crust. Fold mountains in North Africa are believed to have been formed as a great thickness of sediments accumulated in the sea between the continents of Africa and Europe. The height of the sediments caused the sea floor to sink so allowing sediments to accumulate. As the African plate moved north, colliding with the Eurasian plate, the sediments between were squeezed resulting into folded mountains.

The Formation of Fold Mountains in North West Africa and Southern Europe

A great thickness of sediments accumulated over millions of years in a deep ocean. the height of the sediments caused subsidence of the ocean floor.

A great thickness of sediments accumulated of millions of years in a deep ocean. The weight of segments caused subsidence of the ocean flow. This is known as a geosyncline





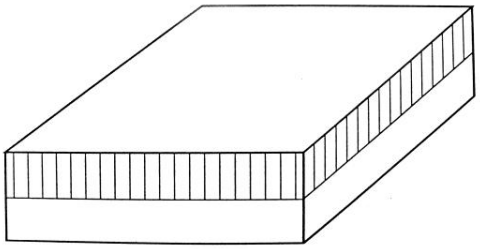
The sediments have been crushed and squeezed by pressure from the advancing African plate against the resistant mass of the Eurasian plate

The rocks were folded and faulted, some were metamorphosed and injected by magma. The whole mass was uplifted. The result is two ranges of Fold Mountain

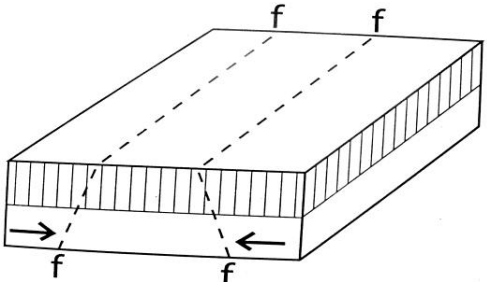
The sediments have been crushed and squeezed by pressure from the advancing African plate against the resistant mass of the Eurasian plate. The rocks were folded and faulted.
Folding is the most clearly developed in sedimentary rocks. Sediments deposited on the sea floor accumulate in layers. Over millions of years a great thickness of sediments may accumulate and then if lateral pressure is applied when they are still relatively plastic, they readily fold up, forming synclines and anticlines.

Block/horst Mountains

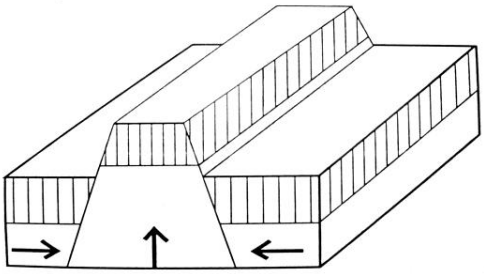
These mountains develop after faulting. They normally accompany rift valley formation.



Layers of rocks in the earth's crust before faulting due to compression



During compression fault lines (f f) developed



Eventually central block was forced to rise to form a block mountain.

Examples of block mountains include Rwenzori, at the border of Uganda and DRC, Usambara ranges, Ulunguru, Uruswa and Kungwe in Tanzania.

THE INFLUENCE OF RELIEF FEATURES ON HUMAN ACTIVITIES

Rift valley

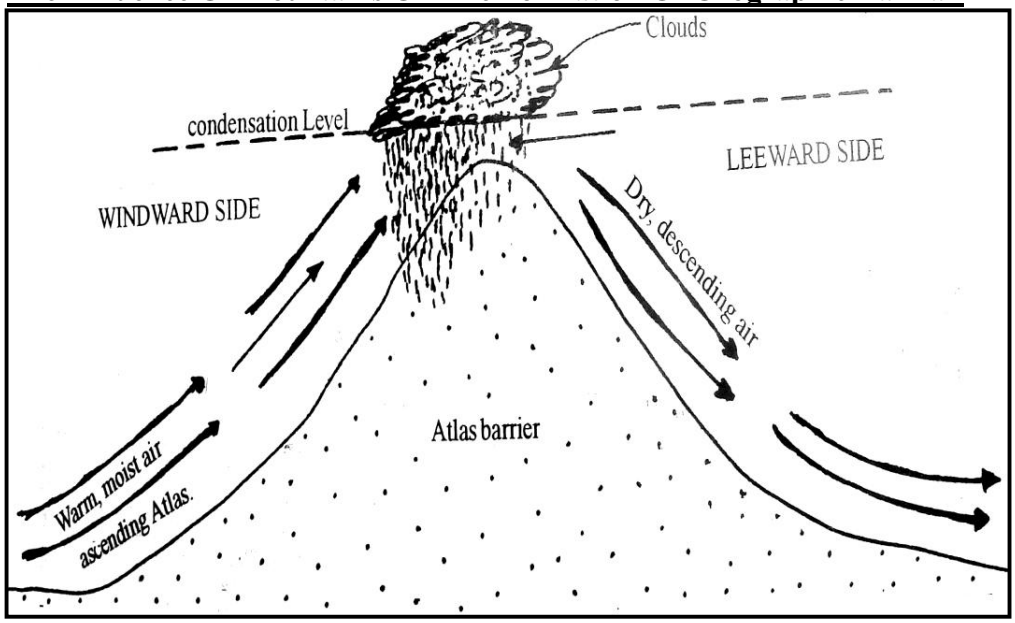
The physical geography of the rift valley has enormous influence on the human geography of the regions through which it passes.

1. In pre-historic times, early man was attracted to the rift valley lakes around which large herds of animals grazed.
2. The rift valley, with the neighbouring highlands, has high escarpments, volcanoes and lakes, areas of great forest and extensive grasslands. Parts of these have been made into game parks which, with the great scenic beauty, make the rift valley a major attraction to tourists.
3. The rift valley lakes are a source of salt and soda ash.
4. Some rift valley lakes are used for fishing.

Mountains

1. The highland and mountain areas with volcanic soils are agriculturally rich. For example the Ethiopian highlands support heavy coffee growing in the region.
2. Mountains are regions of higher rainfall totals and cooler temperature and they are comparatively free of diseases. Consequently much of the area of these highlands is intensively cultivated and densely populated; though in the highest there are forest resources.
3. Mountains provide a great potential for the tourist industry. This provides the country with foreign exchange.
4. Mountains provide great water catchment for various rivers thereby providing great potential for hydro-electric power stations
5. Mountains are regions of dense forests thus providing a basis for the development of forestry industry.
6. Mountain slopes are known to be rich in mineral deposits thus providing a basis for mining, which provides foreign exchange, employment and other benefits associated to mining.
7. Mountains posses a pleasant and cool climate which attract dense settlement.
8. There are places for recreation e.g. mountaineering.

The Influence Of Mountains On The Formation Of Orographic Rainfall



- There is heavy rainfall on the windward side, while there is little or no rainfall at all on the lee ward side.
- High mountains have great influence over the nature of temperature experienced. The higher one goes up the mountain, the cooler it becomes. This is commonly termed as environmental lapse rate (E.L.R). This is estimated at $1^{o}C$ per 100 metres one goes up.

Problems Associated With Areas Near Mountains

1. There is a problem of landslides along the slopes of mountains. This may cause destruction of property and sometimes human life.
2. Volcanic mountains may cause death and destruction of property during volcanic eruptions.
3. Volcanic soils tend to lose their fertility very quickly and also experience a high rate of leaching.
4. Mountains are barriers for easy communication. Road construction and other means of transport are very difficulty to establish on mountains.

Solutions to the above problems.

1. Afforestation on steep slopes in order to bind the soil particles together and avoid landslide.
2. The people should be advised to avoid settling in areas which suffer from earthquakes, volcanic eruptions and land slides.
3. The government should set up vigilant geological department to monitor endogenic earth movements and alert the people whenever there is eminent danger.
4. Introduce land consolidation to overcome land fragmentation.
5. Introduce irrigation farming on the leeward side of the mountain which does not receive adequate rainfall.
6. Encourage cutting terraces, practicing contour farming and mulching.

THE CLIMATE OF AFRICA

The term climate refers to the average atmospheric conditions for a place recorded for a very long period of time, for example 35 years. The climate of a place is determined by the elements of weather i.e. rainfall, temperature, humidity, sunshine, pressure, cloud cover, wind direction and strength are measured for a very long period of time.

Factors Affecting The Climate Of Africa

1. Altitude

Altitude is the height of land above sea level. The sun's rays heat the earth's surface which in turn passes on earth heat to the air. At sea level, more heat is retained because of the denser atmosphere. The denser atmosphere releases slowly the insolation. At higher altitudes the air is thinner, so that there is a rapid transfer of heat to the atmosphere thus making low temperature at higher altitudes. The rate at which the temperatures decrease with altitude is fairly constant at $6.4^{o}C$ per 100 metres or $1^{o}C$ per 156 metres. This is known as environmental lapse rate. This explains why highland areas are colder than lowland areas and why Africa's high mountain tops are covered with snow all the time. The major effect of altitude is that the higher the altitude, the cooler the climate. The figure below shows how temperature lowers as one climbs a high altitude area such as a mountain.

2. Aspect

This is the effect of uneven distribution of sun's light due to the alignment of mountain slopes in relation to the sun's pattern of movement. Mountain slopes that face towards the equator have higher temperatures than those facing northwards. For example the south facing slopes of the Atlas and north facing slopes of the Drakensburg.

3. Latitude

Latitude means the distance of a place north or south the equator. It is measured in degrees, the equator is found at 0^{o}. The North pole is $90^{o}N$ and the South pole is $90^{o}S$.Latitudes near the equator are called low latitudes. Those that are very far from it are called high latitudes. The light from the sun reaches the earth in a parallel beam. Where this beam meets the earth's surface at right angles the light is concentrated but where the beam meets the surface at an oblique angle the light is diffused. Low latitude areas receive vertical sunlight. They are always hot. High

latitude areas receive slanting sunlight. They are much cooler. There is a greater loss of insolation at higher latitudes where the rays have to pass through the atmosphere obliquely, so that the amount of absorption and reflection is greater.

4. Africa extends beyond the tropics into temperate latitudes; Cape Algulhar in South Africa lies 35^{o}S and Cape Bon in Tunisia at 37^{o}N

5. The coastal alignment

The continent has a relatively straight coastline and so, overall, a very compact shape.

6. Africa does not have great mountain ranges such as the Andes or Himalayas, acting as a barrier to the movement of air.

7. Ocean currents

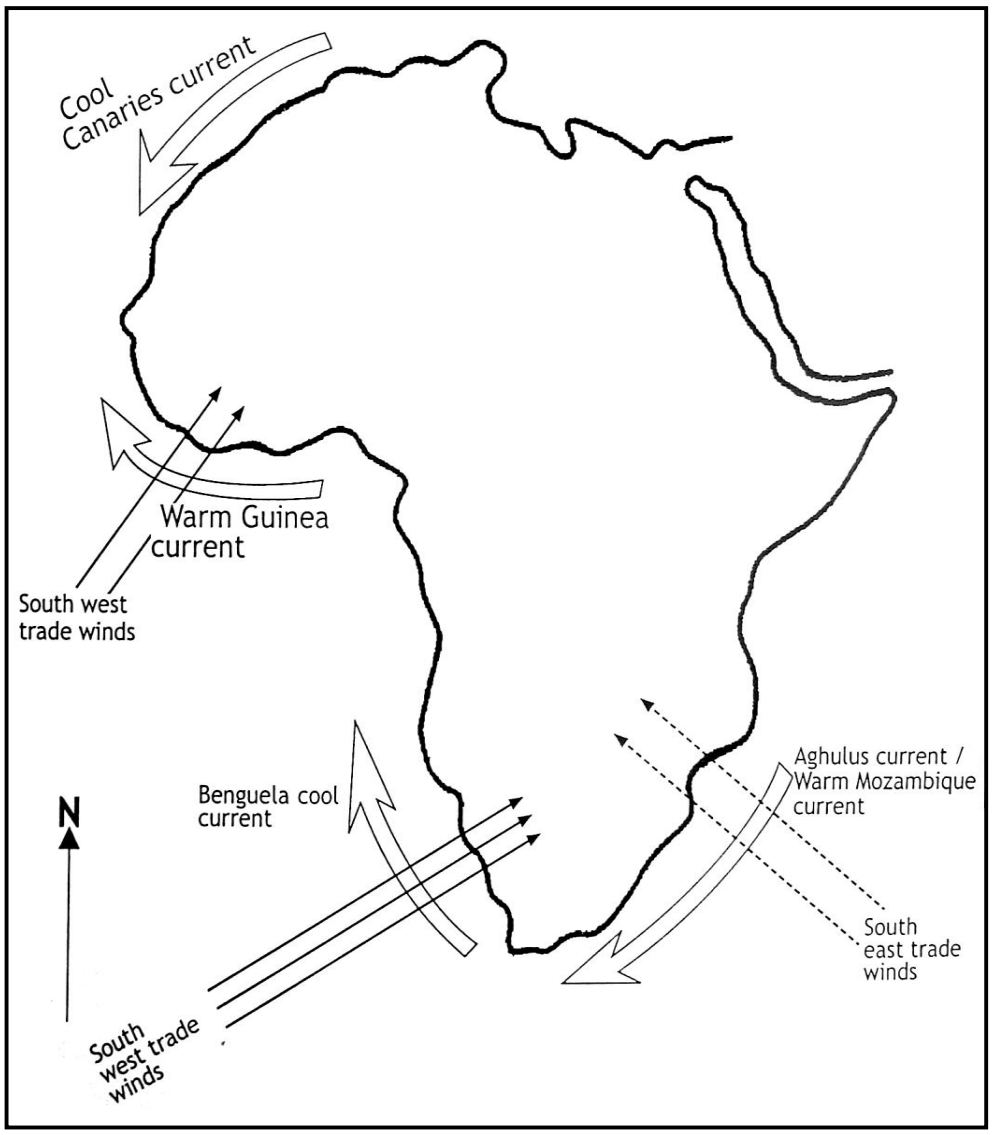
An ocean current is a mass of surface ocean water flowing. The presence of ocean currents sometimes has a considerable effect on the climate of coastal areas particularly

(a) where warm ocean current pass towards or besides a colder continent

(b) where cold currents pass the equator beside a warmer continent.

The cold Benguela current flows northwards through the South Atlantic Ocean along the coast of Namibia and Angola, cooling the air above. Consequently, when the on shore winds reach the land, they are warmed up, resulting in evaporation rather than condensation. When the warm, south east trades blow from off land, they are cooled, and persistent mists and fogs are formed. Like wise, warm Mozambique current brings a lot of rain as the offshore winds are warmed by this current, and therefore able to carry more moisture.

MAP OF AFRICA SHOWING MAJOR OCEAN CURRENTS AND TRADE WINDS



8. Distance from the sea

Areas in the interior have extreme temperatures. Coastal areas near the sea have their temperature modified by the sea, during summers when the temperatures are high. During winter season when the temperatures are lowest, the sea raises the temperatures of the adjacent lands. Coastal areas also receive more rainfall than areas in the interior.

9. Vegetation

Forested areas have a lot of humidity through evapo-transpiration and thus receive more rainfall and low temperatures while semi-arid areas receive low rainfall amounts with high temperatures.

10. Water bodies

The presence of water bodies especially the inland bodies bring about cool and wet conditions.

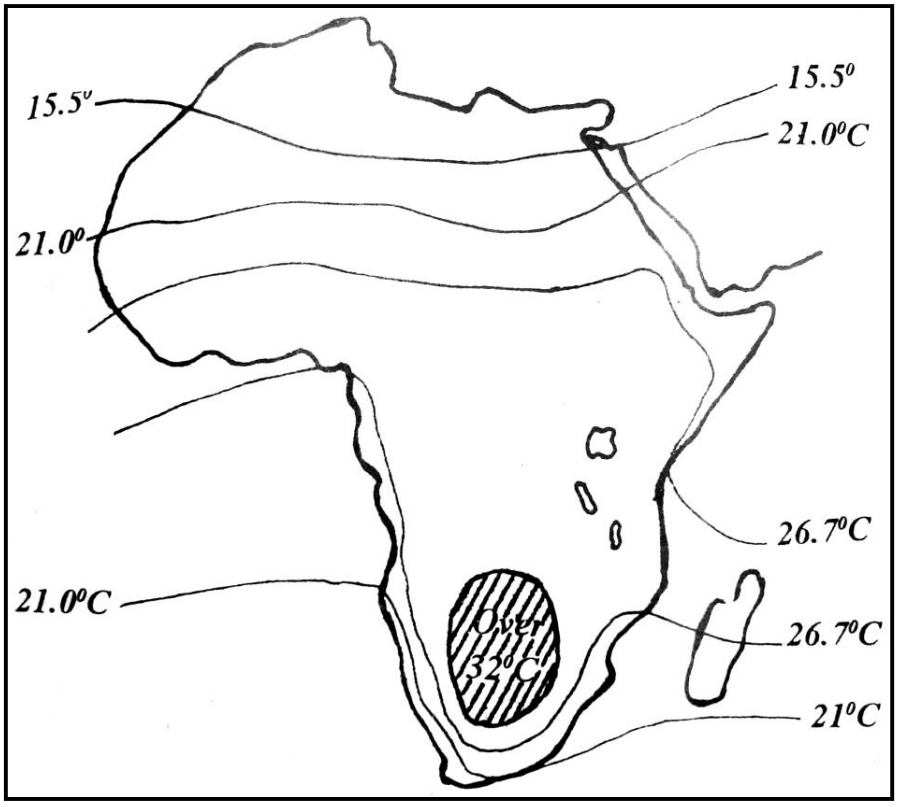
11. Relief

Highland areas receive relief rainfall and have lower temperature than highland areas which lack hills and mountains to trap rain bearing winds.

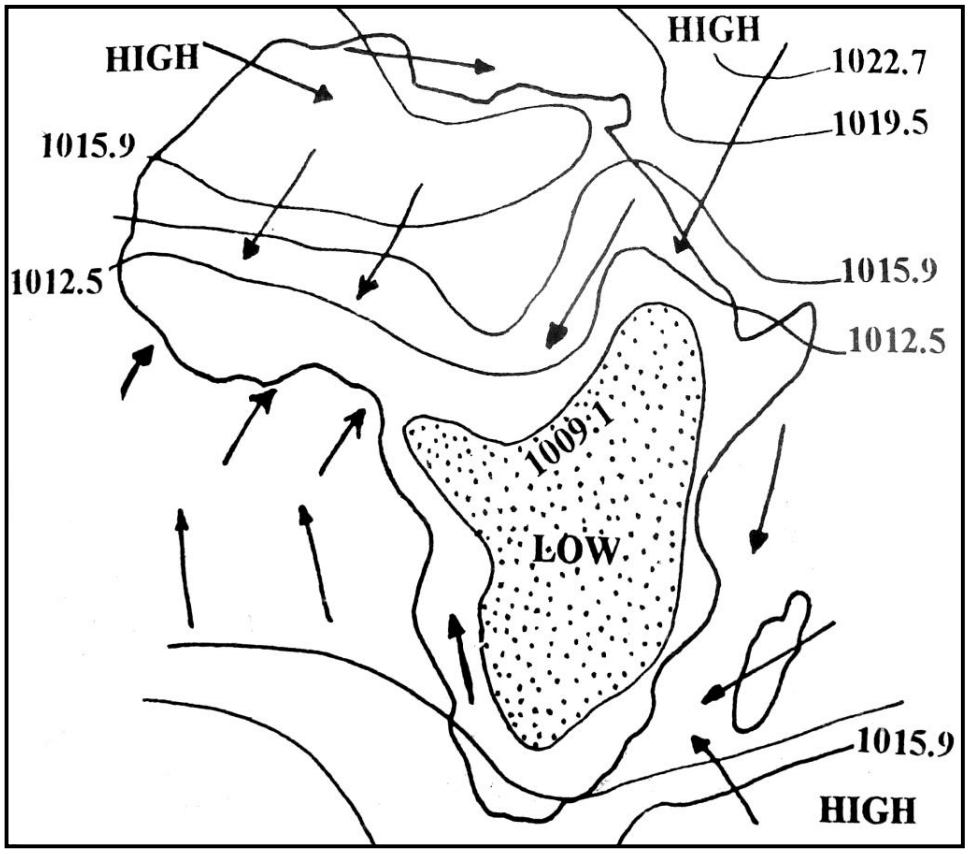
12. The position of the sun

The position of the sun overhead influences the position of the Inter Tropical Convergence Zone (ITCZ). ITCZ is a frontal zone where air masses converge. Air masses of different characteristics meet i.e. the North East trades and the moist South Westerlies.The ITCZ moves north and south following the position of the overhead sun. The positions of the sun in January and December are in the southern hemisphere. The sun produces intense heating in Botswana, Zambia, Zimbabwe and most of the southern half of Africa has temperatures between 22^{o}C and 27^{o}C.High temperature in the south causes a concentration of low pressure zone with relatively high pressure zone over the cooler south Atlantic and south Indian Ocean.

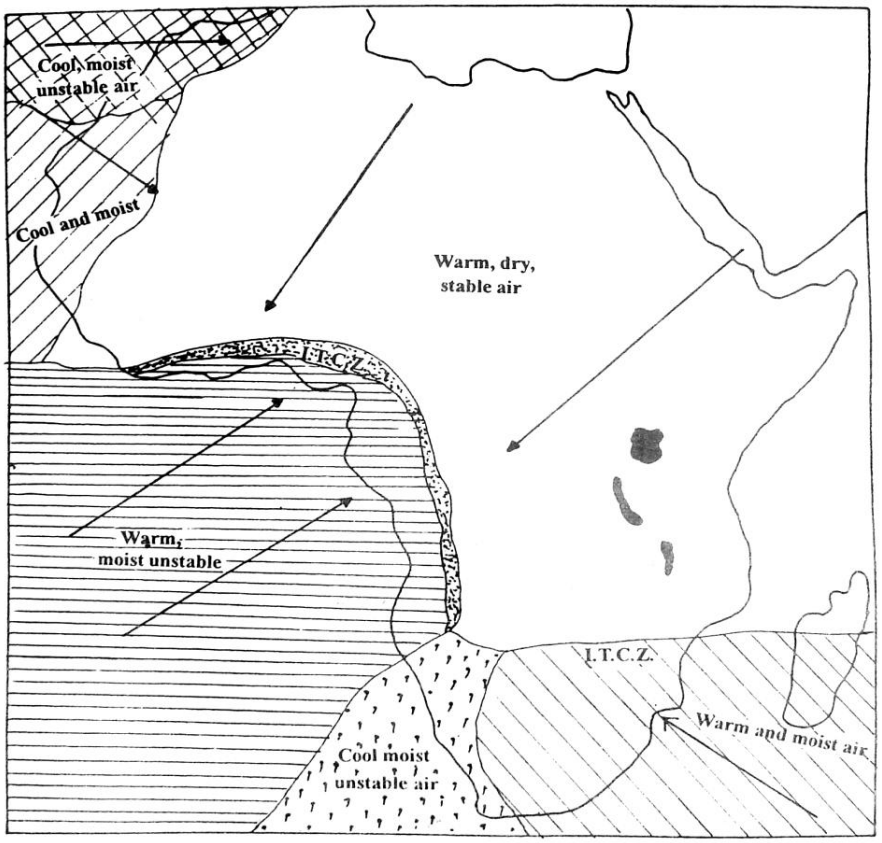
January actual surface temperature



Pressure and winds general conditions from November to April



January diagrammatic representation of air masses and position of air mass front.



In contrast, the northern hemisphere is relatively cool with mean temperatures of 50^{o}F (10^{o}C) in the Atlas region and 60^{o}F (15.5^{o}C) in the Sahara desert. The intensity of insolation over southern Africa from November to April causes low pressure conditions in this region. While relatively high pressures develop over the cooler South Atlantic and Indian Ocean, over cooler North Africa, high pressure develops.

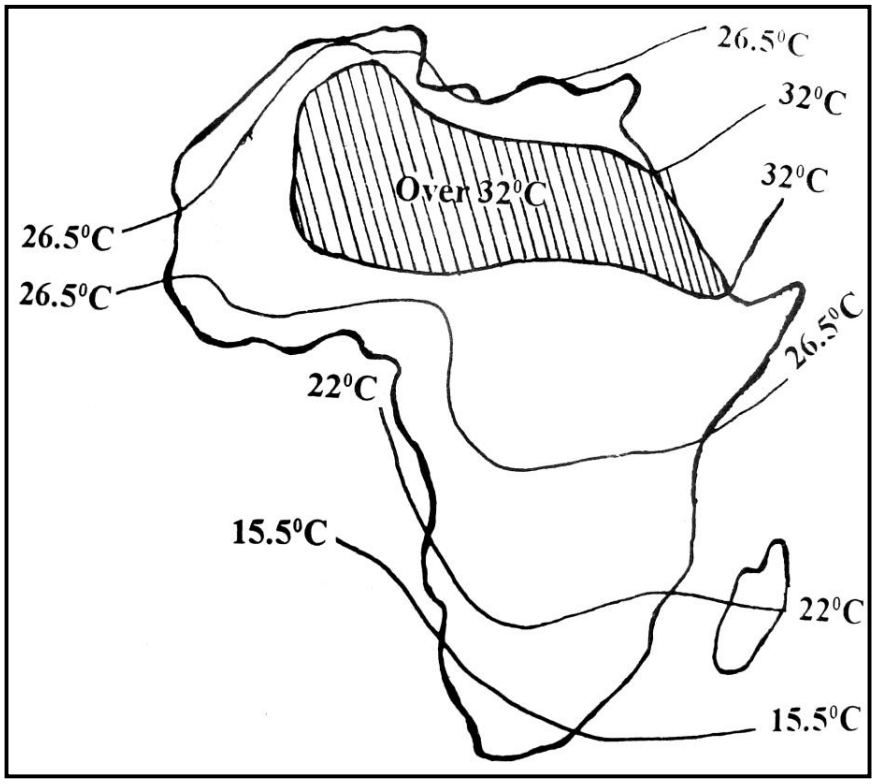
Winds from the northern high pressure zone penetrate southwards through the interior of the continent towards the low pressure zone of the south. The North Eastern Hamattan winds from the Sahara bring the hazy dust laden atmosphere experienced in West Africa during the early part of the year. Along the Eastern coast, the North-East trades and Asiatic monsoon winds also penetrate southwards to converge with Easterly trade winds and Atlantic south-westerlies on to the low pressure system of the south.

The whole of the Sahara, West Africa and the northern Congo are influenced by dry, stable air. The eastern part of Africa receives similar dry air from Arabia born by the North East trade winds. Towards the south east, this air mass has picked up moisture over the Indian Ocean and becomes warm and moist. Easterly trade winds bring similar conditions to Madagascar, Natal, Coast and the eastern Veld. Warm, moist, generally unstable air affects most o the western coast south of the equator.

The Northern Hemisphere's Summer Climatic Conditions

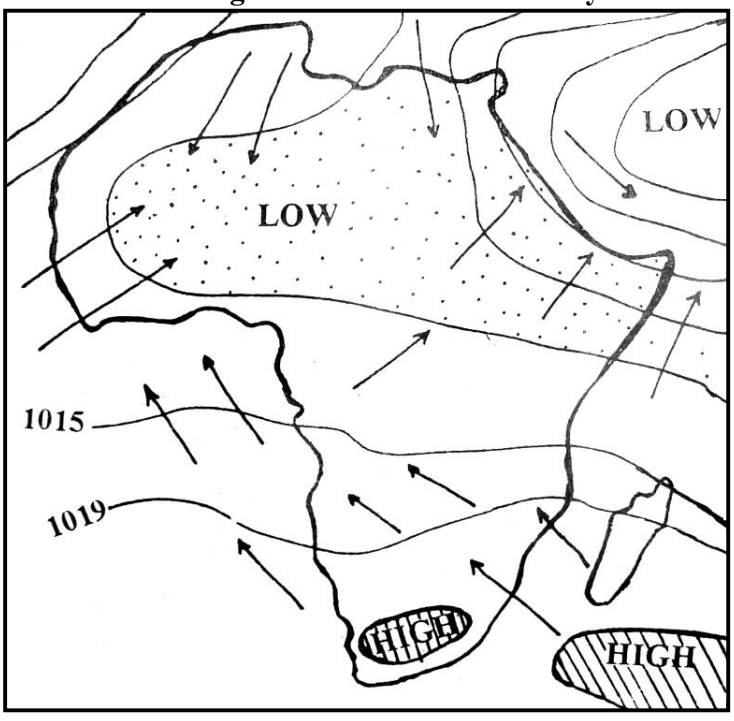
The sun is overhead the northern hemisphere and tropic of Cancer in June. This constitutes a summer season here and winter season in the southern hemisphere. This creates temperatures rising to over 38^{o}C. The whole of western and central Africa has mean actual temperature between 15^{o}C and 25^{o}C, while the south is quite cool with actual temperatures below 15^{o}C.

July: actual surface temperature



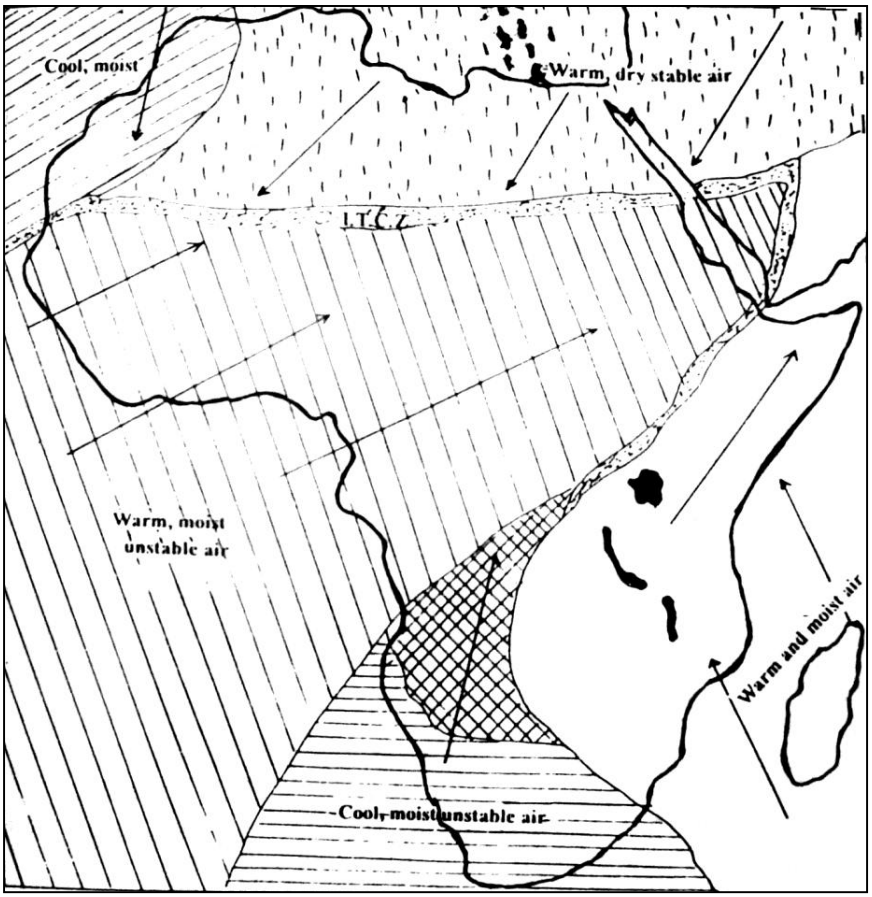
In July, a broad zone of low pressure exists from the west coast to as far as the southern Sahara. A high pressure zone lies over South Africa south of Capricon. Low pressure systems move eastwards sometimes affecting the southern tip of the Cape.

Pressure and wind general condition from May to October



The South East trade winds of the south Atlantic move across the equator and are drawn in across the coast of West Africa by the low pressure zone of the Sahara to become powerful South West moonsoon winds heavily laden with moisture. The North East trades retreat to become a weak zone of winds.

July: Air mass movement and position of air mass



CLIMATIC ZONES OF AFRICA AND THEIR ECONOMIC USE

Equatorial climatic zone

1. Equatorial climates are limited to areas within 10^{o} North or South of the equator.
2. Experiences high daily temperature ranging from $24^{o}C$ to $26^{o}C$
3. Receives heavy rainfall which is well distributed throughout the year.
4. Rainfall is usually convection in type and falls in afternoons, accompanied by thunderstorms and lightning.
5. Humidity over them is very high throughout the year.
6. Days and nights are approximately of the same length.
7. The sun is overhead twice a year.
8. They lie under low doldrums throughout the year.

Economic uses

1. Cultivation of perennial crops on plantation farms e.g. rubber, cocoa, palm oil e.t.c.
2. Lumbering e.g. Congo, Gabon e.t.c.
3. Tourism
4. Fishing
5. Hunting and gathering

Problems faced

1. The warm and humid conditions favour the breeding of diseases and pests.
2. Soil erosion due to heavy rainfall.
3. Floods due to heavy rainfall.
4. Soil erosion due to excessive deforestation.
5. Degeneration of valuable and durable trees.
6. Poor transport and communication due to thick forests, swamps and water logging.
7. Attacks from wild animals.
8. Forests sometimes are hideouts for rebels and criminals.

Savannah climate

Savannah climate are found between 5^{o} and 15^{o} North and South of the equator. They form the largest climatic region in Africa. They extend from Senegal in the West throughout Eastern Africa, and south to the northern part of Africa.

Characteristics of savannah climate

1. The region experiences distinct seasons of alternate wet and dry seasons
2. Summers are hot and wet with temperatures around $32^{o}C$ and winters are warm and dry with about $20^{o}C$.
3. They receive convection type of rainfall which usually falls in summer. Winters are usually dry.
4. They receive annual rainfall of around 760mm, but at may increase towards the equator.
5. Humidity over this region is high during the summer season.
6. Highest temperature in the northern hemisphere occurs in April and in the southern Hemisphere in October.
7. Savannah climate is also known as tropical climate, it can be said to be hot and wet summers and cold and dry winters.

Economic uses

1. Lumbering from the woodland
2. Bee keeping
3. Tourism in the game parks.
4. Livestock keeping (pastoralism and ranching)
5. Cultivation of cereal crops such as millet, maize, sorghum and the like.
6. Cultivation of cash crops such as cotton, tobacco, simsim and the like.
7. Mining
8. Charcoal burning.
9. Hunting and gathering from the wood land.

Problems faced by people in this climatic region.

1. Prevalence of pests and diseases such as tsetse flies.
2. Wild bush fires especially during summer.
3. Overgrazing due to overstocking.
4. Soil erosion due to overgrazing and bush burning.
5. Illegal hunting of wild animals leading to the extinction of rare species of wild animals.
6. Excessive cutting of adequate capital to modernize their economic activities.

Mediterranean climate

It occurs in North Africa around the Mediterranean sea and southern Africa in the area around Cape Town in the republic of South Africa.

Characteristics

1. It has hot and dry summers and warm and wet winters.
2. The mean monthly temperature vary from warm to hot, with the hottest months in January and February, around 21^{o}C.
3. Rainfall is moderate ranging from 760mm in the east to 40mm in the west.
4. Humidity over this region is very low and the sky is usually cloudless.
5. The region experiences off shore winds which blow during the summer season and these are dry winds which do not bring rainfall.
6. The on shore westerly winds usually blow during the winter season and they bring a lot of rainfall.
7. It is bright, sunny, hot and is characterized by dry summers and mild rainy winters.

Economic uses

1. Growing of cereal crops such as wheat, oats, barley.
2. Cultivation of potatoes, citrus fruits, grapes and apples.
3. Mining of oil and phosphates.
4. Keeping sheep and goats.
5. Lumbering i.e. cutting the oak tree for wood curving.

Problems faced in regions of Mediterranean climate

1. Un reliable rainfall
2. Salinity
3. Soil erosion

Temperate climate

In Africa its found in the Veld of South Africa.

Characteristics

1. The mean monthly temperatures range from cool in June at 10^{o}C to hot in December and January with 20^{o}C.
2. The annual temperature is moderate at 10^{o}C.
3. The annual rainfall total is also moderate at 710mm.
4. Rainfall is concentrated in the summer months from October through March.
5. The winters are generally dry.
6. The climate is warm to hot, humid summers and dry cool winters.

Montane climate

1. It is found in the highland areas of Africa.
2. Its temperatures range from 14^{o}C to 17^{o}C.
3. It receives heavy rainfall in the middle of the year and rainfall ranges from 13mm to 299mm.

Economic uses

1. Lumbering from Montane forests
2. Transhumance agriculture
3. Tourism due to the magnificent mountain scenes

Problems faced

1. Over population in fertile watered places

2. Land fragmentation due to ruggedness

3. Transport and communication

4. Drought on the lower ridge.

5. Steepness of the upper slopes.

Desert climate

1. It is found in the desert areas of Africa.

2. These regions are characterized with low rainfall and high evaporation.

3. They receive between 3mm to 10mm of rain a year.

4. True deserts exhibit climatic extremes of 58^{o}C during day time in the hot season.

5. At night the temperature falls drastically to 4^{o}C.

6. The skies are cloudless and burning hot days giving way to clear parking cold nights.

Economic uses

1. Nomadic pastoralism; rearing camels, sheep and donkeys.

2. Mining oil.

3. Cultivation around oasis.

4. Irrigation farming.

Problems faced

1. Over population in fertile and watered places.

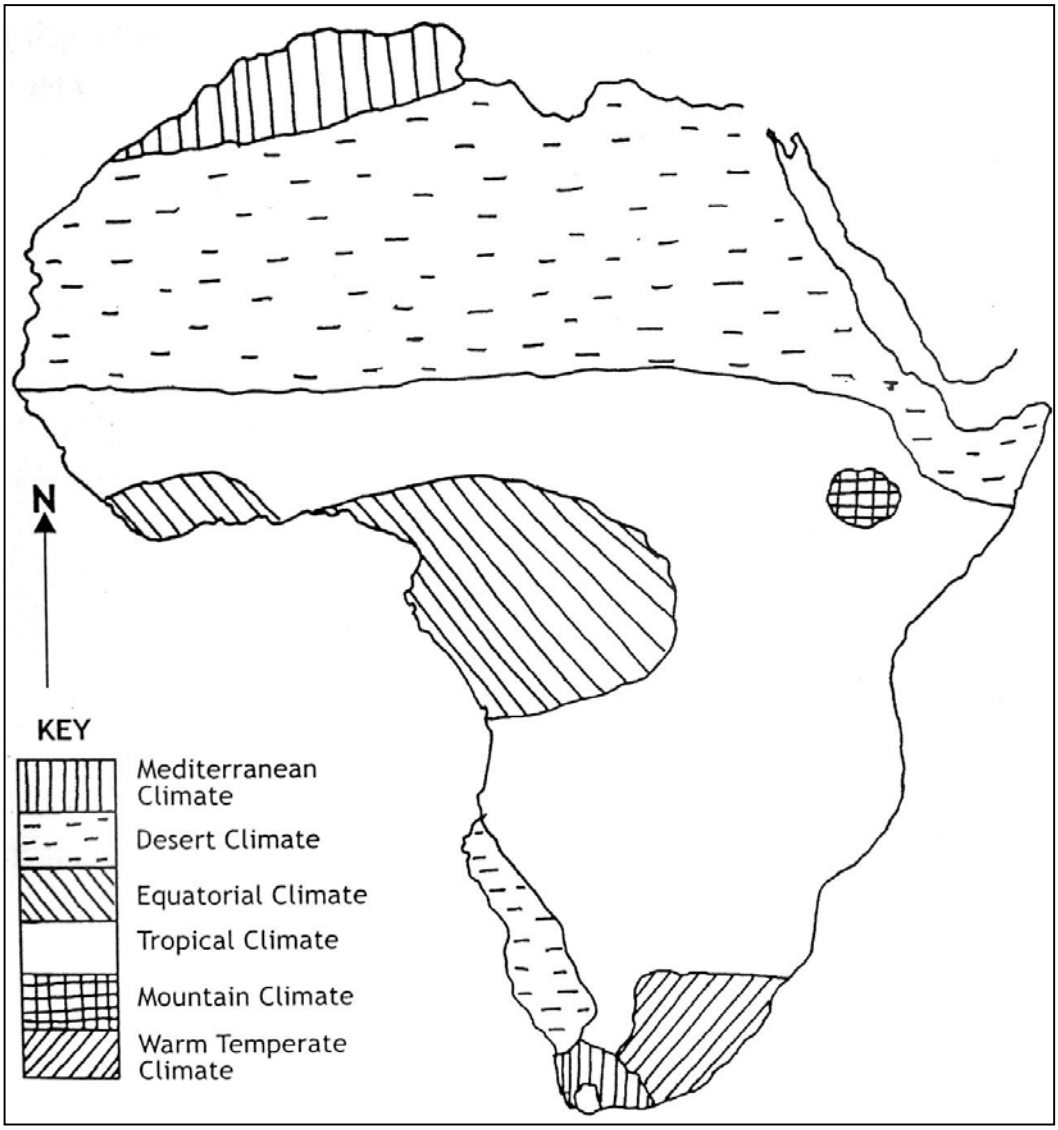
2. Dust storms.

3. Very hot temperatures leading to high rate of evaporation

4. Animal diseases.

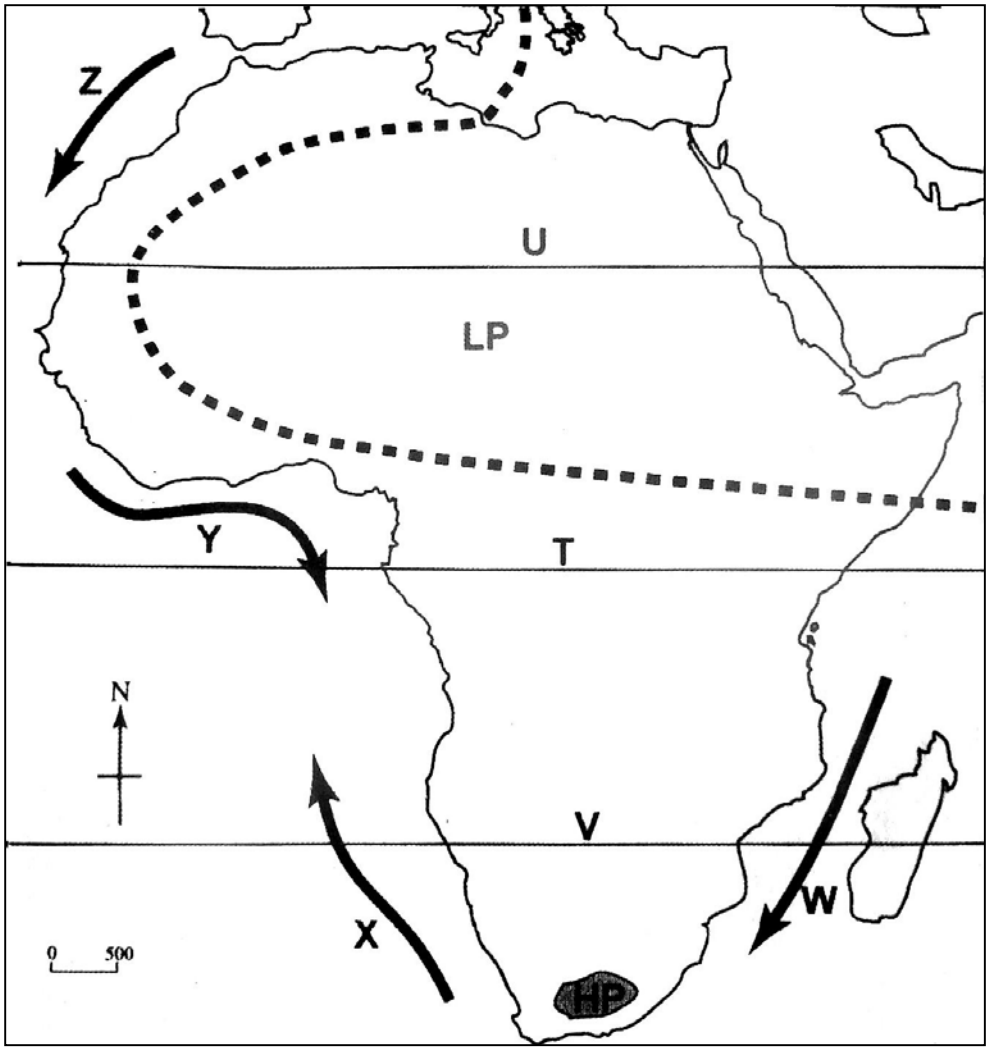
5. Shortage of water and pasture for their animals.

CLIMATIC REGIONS OF AFRICA



REVIEW QUESTIONS

1. Below is a map of Africa showing ocean currents and the position of pressure belts during the months of May to October. Study it and answer the questions that follow.



KEY

Pressure belt

Ocean currents

Lines of Latitudes

LP **Low pressure region**

HP **High pressure region**

a) Name

i) the lines of latitude marked T, U, V

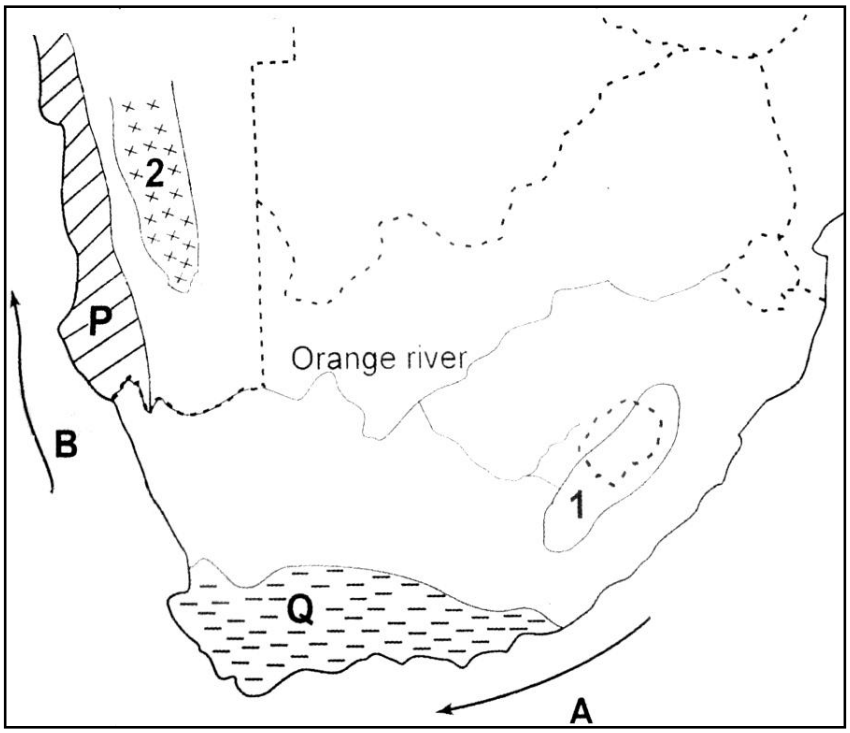
ii) the ocean currents marked W, X, Y and Z

b) i) Describe the characteristics of ocean currents W and X

ii) What is the effect of ocean currents W and X on the adjacent lands/

c)What are the causes of high and low pressure belts shown on the map?

2. Below is a sketch map of Southern Africa. Study it and answer the questions that follow.



International boundary

a) i) Name the relief features marked 1 and 2

ii) Name ocean currents marked A and B

b) State the main characteristics of regions marked (i) P and (ii) Q

c) Besides fishing, mention other economic activities carried out in the regions marked

(i) P (ii) Q

d)With specific examples chosen from either region P or Q, describe the factors which have favoured the economic activities in the region chosen

e) Why is fishing more developed along the coast of P than of Q?

3. Study the statistics in table 1 below and answer the questions that follow

month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temp(^{o}C)	18	19	19	18	17	16	16	14	15	17	18	17
rainfall(mm)	3	3	7	3	…..	….	….	….	….	….	….	…..

a) Name

i) the coolest month of the year

ii) the hottest month of the year

iii) the annual temperature range

b) i) Describe the rainfall distribution pattern

ii) In which hemisphere might station Q be found. Give a reason to support your answer

iii) What type of climate is experienced at station Q.

c) i) Name a country where the station is likely to be found.

ii) What type of vegetation is likely to be found in station Q?.

iii) What do temperature figures for each month represent ?

4. Study the statistics in the table below and answer the questions that follow**.**

month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temp(^{o}C)	23.9	23.9	23.3	21.7	18.9	17.8	16.7	17.2	18.9	20	21.7	22
rainfall(mm)	109.2	121.9	129.5	96.2	50.9	33	27.9	38.1	74	109.2	121.9	119

a) State

i) the coolest month of the year

ii) the annual temperature range

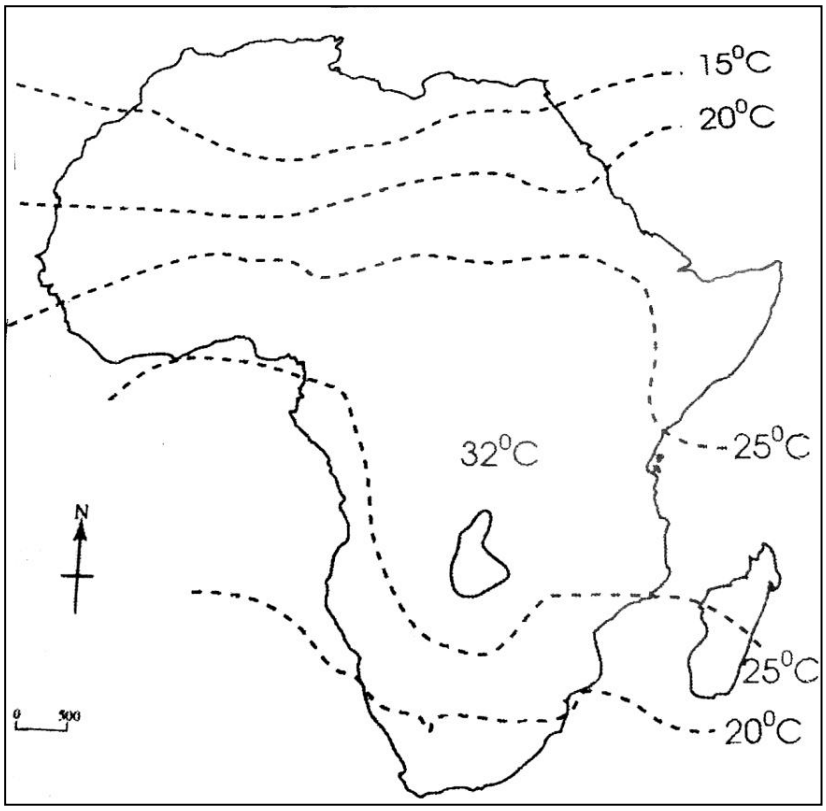
b) i) Describe the rainfall pattern at station A

ii) Suggest the hemisphere in which the station is likely to be located. Give reasons to support your answer.

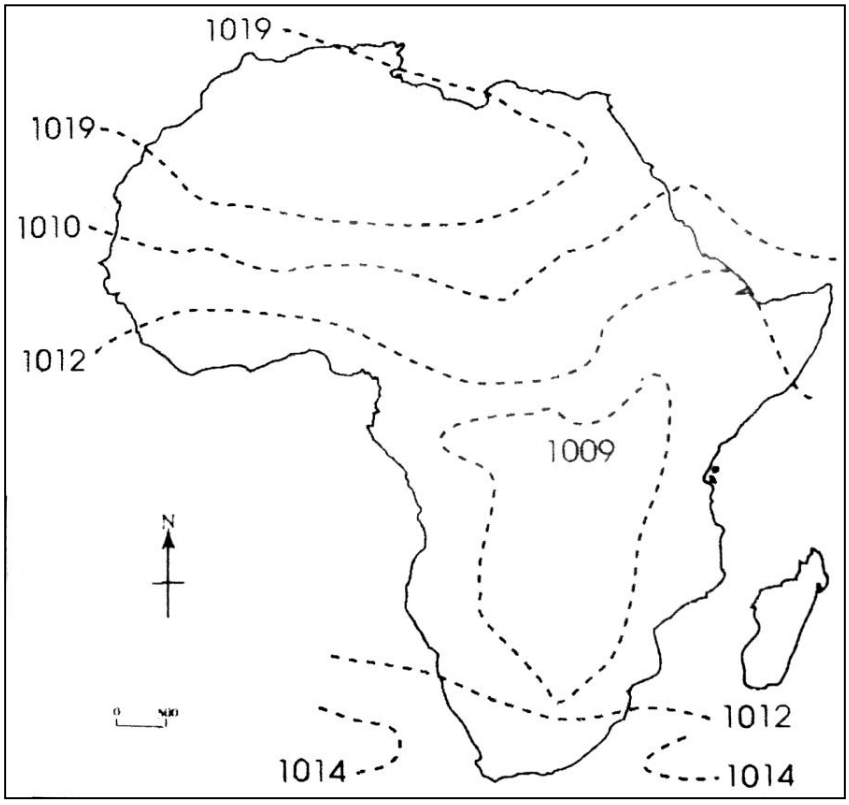
c) i) name a country where such a station can be found.

ii) What economic activities take place in the area?

5. Map A: Temperature distribution in Africa



Map B: Pressure distribution in Africa



The maps above show the climatic conditions over the continent in December.

Map A shows the distribution of temperature

Map B shows the distribution of pressure.

Study them carefully and answer the following questions

a) i) Name the lines showing temperatures on map A

ii) Name the lines showing pressure on map B.

b) On map A, mark the following (i) equator (ii) Tropic of cancer

c) On map B shade:

i) the areas with low pressure

ii) the areas with high pressure

d) i) Using arrows, show the direction of the prevailing winds on map B

ii) Name the prevailing winds

iii) With reference to map A and B state the relationship between temperature and pressure in Africa during the November – April season.

6. a) Draw a sketch map of Africa and on it, mark and name the following climatic regions:

i) Desert ii) Tropical/Savannah iii) Equatorial iv) Mediterranean

b) Describe the characteristics of the Mediterranean type of climate.

c) i) For any one country located within the equatorial region of Africa, mention the economic activities carried out.

ii) Explain the influence of climate on any one economic activity mentioned in c(i) above.

7. Study the table below showing climatic statistics for stations A and B and answer questions that follow.

STATION A

month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temp(^{o}C)	23	23	23	22	22	22	21	22	22	22	22	23
rainfall(mm)	40	70	150	230	205	115	65	80	195	225	150	50

STATION B

month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temp(^{o}C)	24	23	22	21	20	18	1	18	20	23	24	24
rainfall(mm)	200	175	100	25	20	…	…	…	…	50	100	175

a) For station A

i) Name the hottest months

ii) Name the coolest month

iii) Calculate the annual temperature range.

b) For station B

i) Name the wettest month

ii) Calculate the total annual rainfall.

c) Describe the climatic characteristics for

i) station A

ii) station B

d) Giving reasons, suggest three economic activities that could be possibly carried out in the area around station A.

8. The table below shows the climate of Durban, Natal province of the Republic of South Africa. Study it carefully and answer the questions that follow.

month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temp(°C)	25	26	24	22	20	17	17	18	19	21	23	24
rainfall(mm)	112	125	135	85	50	25	25	37	75	125	125	125

Source: Minns W.J. geography of Africa New Edition p 39

a)Draw a suitable statistical diagram to represent the information in the table.

b) Calculate:

i) annual temperature range

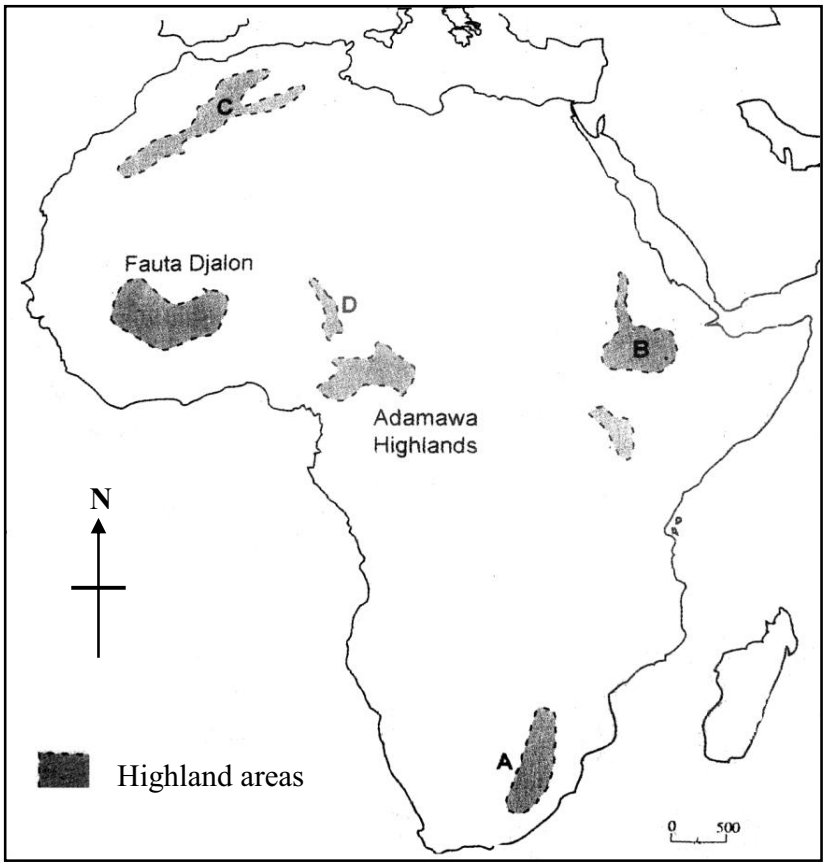
ii) total annual rainfall

c) i) Describe the relationship between temperature and rainfall at the station.

ii) Suggest the factors responsible for the relationship described in c(i) above.

d) Explain the effect of climate on agricultural activities in the Natal province.

9. Study the relief map of Africa below and answer the questions that follow.



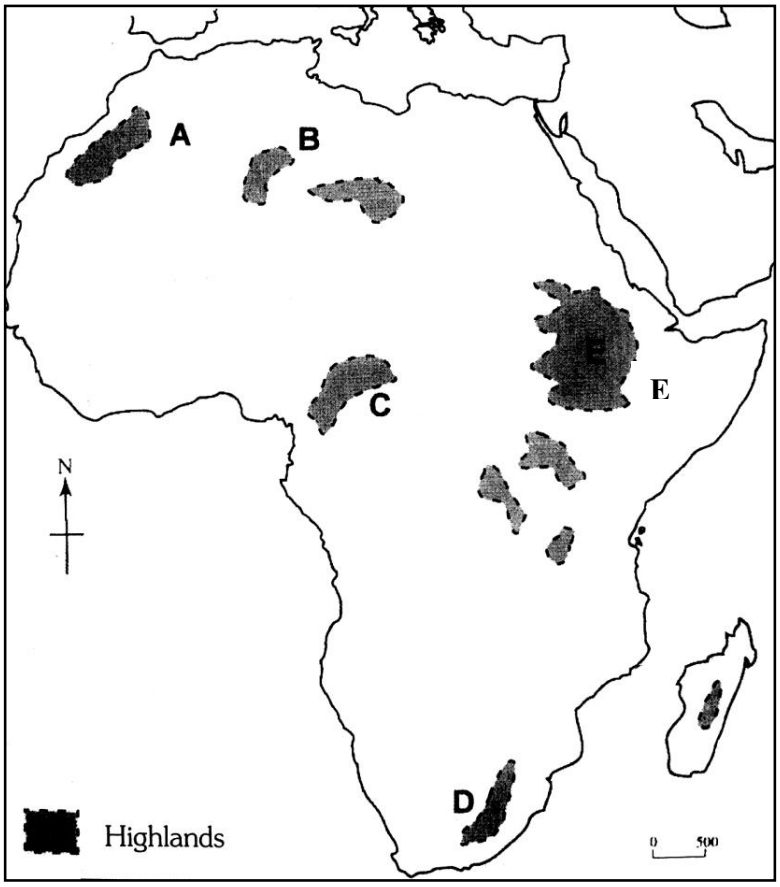
a) Name the highlands marked (i) A (ii) B (iii) C (iv) D

b) With the help of diagrams, describe the formation of either highland B or C

c) i) Explain how any of the highlands named in (a) above influence rainfall distribution in the region.

ii) Describe the relationship between rainfall distribution and land use in the region chosen in c(i) above.

10. Below is a map of Africa showing highland areas. Study it and answer the questions that follow.



a) i) Name the highlands marked A, B, C and D.

ii) With the help of diagrams, explain how any of highlands marked A – E was formed

b) i) What economic activities take place in highlands marked E?

ii) Describe the physical processes that have favoured the economic activities named in b(i) above.

c) i) Mention the problems faced by farmers in the highlands named in b(i) above

ii) How can the problems mentioned in c(i) above be solved?

11. a) Draw sketch map of Africa and on it, mark and name the following mountains and highland areas

i) Atlas mountains ii) Futa Jalon highlands

iii) Ethiopian highlands iv) Drakensburg mountains

b) With the help of diagrams, describe the formation of the Atlas mountains.

c) With reference to any one of the mountains and highland areas named in (a) above.

i) Explain its value to the surrounding areas.

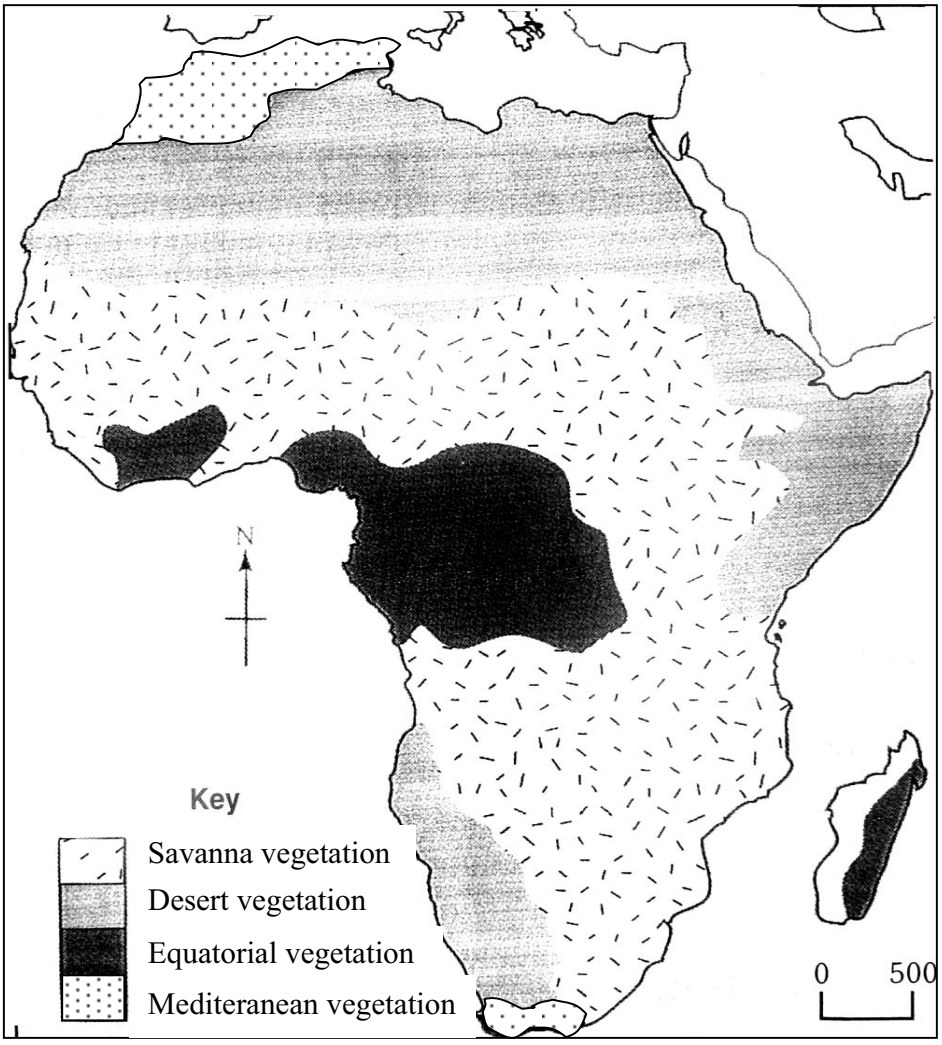
ii) Outline its problems to people living in the area.

iii) Suggest ways in which problems outlined in c(ii) above can be solved.

VEGETATION OF AFRICA

Vegetation constitutes of the plants that grow in an area. These are trees and grasses that grow from the soil of a given locality. They may either grow naturally or artificially. Natural vegetation develops on its accord following the physical conditions such as climate and the nature of soil. Different climate supports different vegetation. Therefore, there are different types of vegetation in Africa following its climatic pattern. These types are reflected on the map below.

MAP OF AFRICA SHOWING DISTRIBUTION OF VEGETATION



Equatorial forests

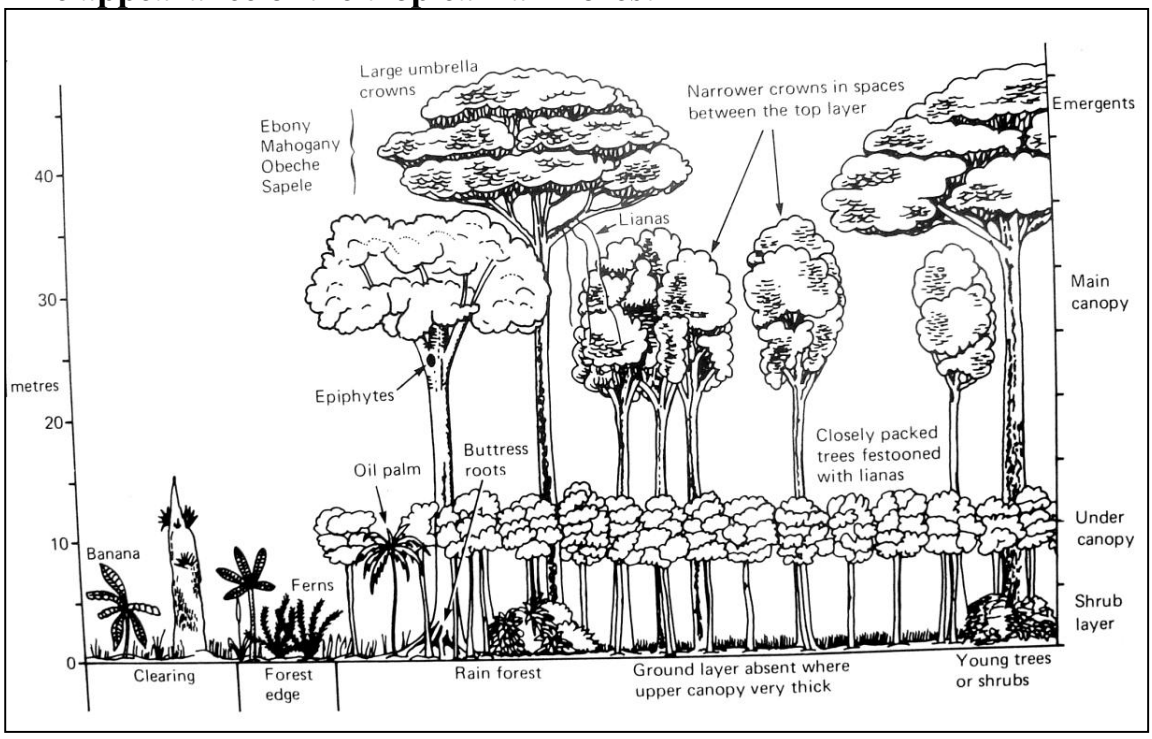
This is luxuriant forest vegetation in which different types of trees occur. They grow mainly in the hot, rainy and humid conditions of Africa mainly in such countries as; Democratic republic of Congo, southern Nigeria, Gabon, Ghana, Congo, along the West African coast and other countries which are crossed by the equator. These forests are also known as rainforest because so much rain falls there.

Characteristics of Equatorial forests(rain forests)

i. They are broad leaved and evergreen forests.

ii. The forest is arranged in layers of canopies. The main canopy reaches about 30 metres and forms a continuous layer as the crown of the trees merge with each other. Towering above are the emergents which may be 50 metres tall, whist a third layer of small trees form an under canopy. This can easily be shown by the diagram below.

The appearance of the tropical rain forest



iii. They contain many tree species which do not appear in pure stands.

iv. It contains thick undergrowth.

v. The trees are mainly hard wood.

vi. They contain large buttress roots.

vii. There are heterogeneous species including climbing plants such as lianas.

viii. Humidity content over them is very high throughout the year.

ix. They receive heavy rain fall which is well distributed throughout the year.

Economic uses of Equatorial rain forests

i. They are source of durable and expensive hard wood.

ii. They have encouraged lumbering activities.

iii. The forest margins are good for growing crops such as palm oil, cocoa, rubber.

iv. Their environment is condusive for growing a variety of crops, vegetation and fruits such as bananas, pineapples, mangoes, rice, yams, sweet potatoes, sugar cane, ground nuts, tobacco and ginger.

v. It is good natural habitat for thousands of wild animals thus a potential tourism industry.

Savannah

This covers the greatest part of Africa. The savannah vegetation varies with the amount of rainfall from woodland with long grass, or Guinea savannah, through Sudan savannah which has short grass and scattered trees to open, short grasslands with thorny bushes in the Sahel lands. See the photograph below.



Acacia trees and thickets in the dry savannah near Olduvai gorge, Tanzania.

Characteristics of savannah vegetation

i. Grasses grow up to 2 metres in the humid areas close to the equatorial forest outskirts and become shorter and tufted towards the desert.

ii. There are few trees which are scattered and shed their leaves during the dry season.

iii. The tree species found here such as Shea butter tree, Boabab, Acacia and locust bean tree store water in the trunks as a means of survival during the dry season. These trees also grow long roots in order to reach underground water table.

iv. The Acacia trees are the commonest trees throughout the savannah lands. They have an umbrella shape with thorny branches and small leaves.

Economic uses of savannah vegetation

1. Savannah vegetation provides a good natural habitat for a variety of wild animals, thus supporting the tourism industry. Therefore there are many national parks, game reserves and sanctuaries that have been gazatted for wild life.
2. Savannah grasslands support a great variety of trees, including many which are of economic importance for example Shea butter nut, Baobab, Acacia, silk cotton tree, Borassus palm and locust bean tree.
3. Farming is possible especially the growing of annual crops during the short rains.
4. The Accacia savannah provides good pasture for grazing cattle.

The desert vegetation

Permanent vegetation growth is limited to oases and places where the water table is very close to the surface of the ground. The vegetation in such areas consists of isolated plants which have very long roots and fleshy branches, with thorns but without leaves. In some other areas, the seeds lie in the sand. When this occurs, the seeds germinate very rapidly, grow flowers and produce new seeds. With in a few days of the rain, a pasture flowers, nutritious to camels, appears. Then the seeds are carried by the wind, to be covered by sand and wait the next rains which may not be for several years.

Economic uses of the desert vegetation

1. In the deserts, the inhabitants have successfully adapted to the desert and they are growing some crops especially where the rocks containing water (aquifers) reach the surface of the ground and form oases. Crops such as millet, vegetables, dates and citrus fruits are grown.
2. The desert inhabitants for example the Berbers, Tuaregs of savannah desert and Khoekhoe and San of the Kalahari semi-desert practise nomadic pastoralism and they rear animals such as camels, sheep and goats.
3. In the savannah at Kufra, pilot irrigation farming have been developed.
4. The existence of significant mineral deposits such as oil and natural gas in Libya, Algeria and Sudan have brought intensive development in mining.
5. Tourism has potential in the deserts.

Mediterranean vegetation

This is found at the tips of the continents, that is in the northern parts of Morocco and Algiers as well as the southern tip of South Africa. The Mediterranean vegetation varies from evergreen forest to scrub woodland. The most common tree in the forests is the oak. Most of the plants adapt to the long dry season so they have long tap rots and shinny waxy leaves. The trees have thick barks to reduce loss of water.

Economic uses of Mediterranean vegetation

1. The Mediterranean climate is condusive for growing crops such as cereals, wheat, vines, olives, vegetables and citrus fruits.
2. With irrigation, a range of vegetables and fruits are grown.
3. There is fishing from the Mediterranean sea and Atlantic ocean.
4. The long, hot, dry summers in the lands around the Mediterranean sea are very attractive for holiday camping.

Factors for the distribution of vegetation in Africa.

1. Climate

The climate of a given area greatly determine the nature of plants life to grow, for example areas with heavy and reliable rainfall such as the Congo region support the growth of thick and luxuriant forests while areas with low and unreliable rainfall have light and poor vegetation.

2. Altitude

The vegetation changes with changes in height above sea level. In the low altitudes, savannah vegetation is common above sea level to 3000 metres, mountain forests thrive. The high altitudes are characteristics by heath and Moorland.

3. Soils

Areas with deep fertile soils promote the growth of thick forests, while those with light infertile soils encourage the growth of light vegetation such as thickets.

4. Relief

Flat lands and gently rolling areas encourage grasslands, while the valleys supports swamps and the mountainous regions accommodate forests

5. Drainage

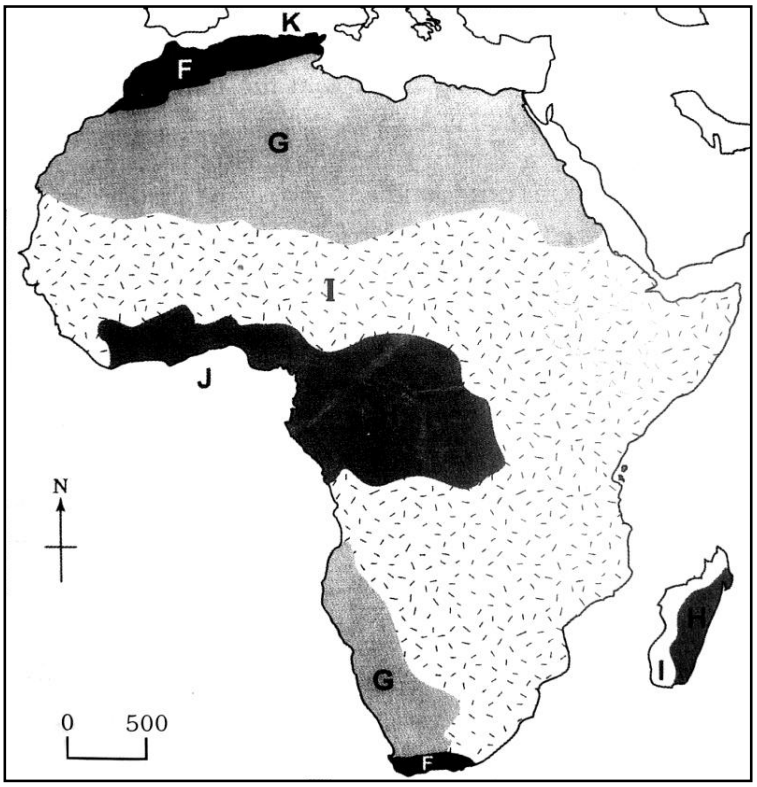
Poorly drained areas such as valleys promote the growth of swamps whereas those which are well drained encourage grasslands and forests.

6. Man's activities

The extent of man's activity in a given area determines the nature of vegetation growing there. Man may change and influence natural vegetation through bush burning, cultivation, deforestation, bush burning as well as deforestation.

REVIEW QUESTIONS

1. Study the map below and answer the questions that follow.



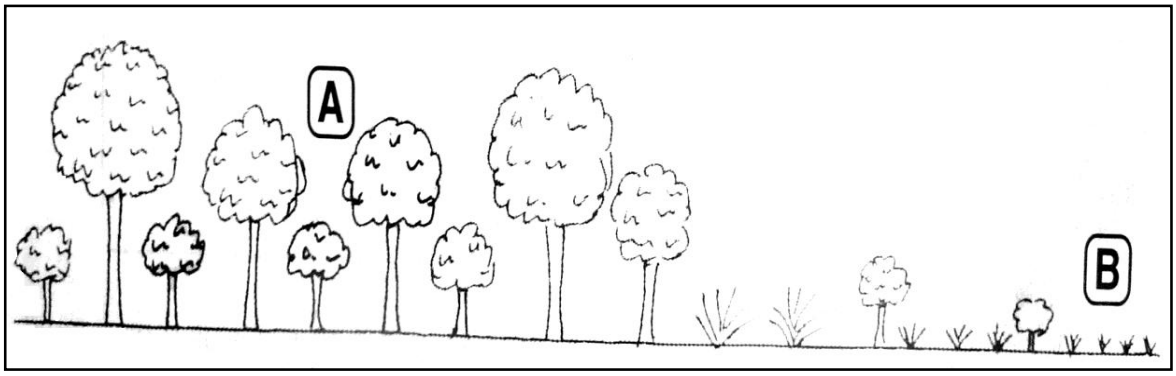
a) i) Name vegetation types marked F. G H and I

ii) Describe the characteristics of vegetation type marked I?

iii) What are the uses of vegetation type marked I?

b) Explain the factors that favour the vegetation types between points J and K.

2. The figure below shows a cross-section of the natural vegetation zones of Africa. Study it and answer the questions that follow.



a) Name

i) The vegetation type marked A and B

ii) The climatic region in which each vegetation type named in (a) (i) above is found.

b) i) Describe the main characteristics of each vegetation types described in (b) (i) above

ii) Give two reasons to explain the difference in vegetation types described in b(i) above.

c) i) Name one country outside East Africa where both types of vegetation are found.

ii) For the country named in c(i) above, state three economic activities carried out in areas covered by each vegetation.

d) i) Describe four ways in which these economic activities have affected the vegetation types A and B

ii) Name two ways in which vegetation types A and B can be protected.

3. a) Draw a sketch map of Africa and on it, mark and name the following:

i) Vegetation types:

1. Equatorial forests
2. Mediterranean forests
3. The sahel/ semi arid vegetation

ii) Latitudes

1. Equator
2. Tropic of Cancer
3. Tropic of Capricorn

b) Describe the characteristics of the:

i) Mediterranean vegetation

ii) Sahel/ semi arid vegetation

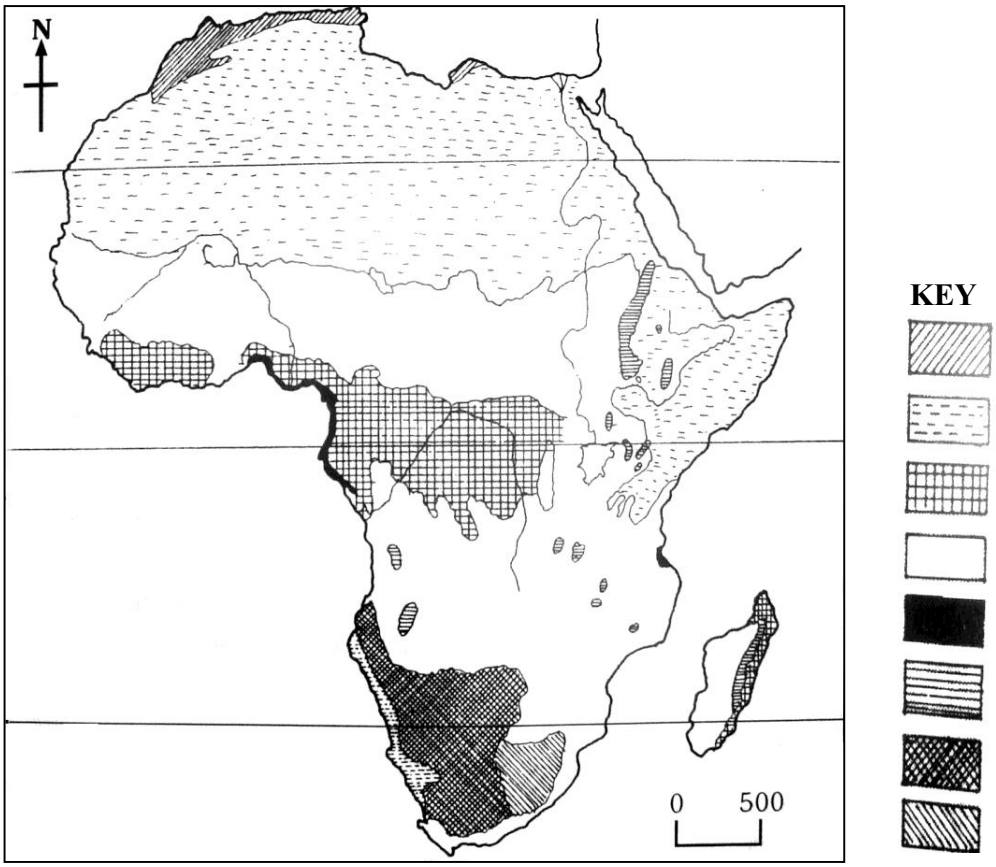
c) Identify the

i) Economic activities carried out by people living in the sahel region

ii) Problems faced by people living in the sahel region

d) For any one country in the sahel region, outline the steps being taken to solve the problems identified in c(ii) above.

3. The figure below shows the distribution of vegetation in Africa. Study it carefully and then answer the following questions.



a) Complete the key by naming the vegetation types as represented on the map

b) i) Mention three factors which have influenced the distribution of tropical forests in Africa.

ii) What are the characteristics of tropical rainforests.

c) Imagine you were a new settler in Zaire (Congo) basin: Explain how you would develop the area.

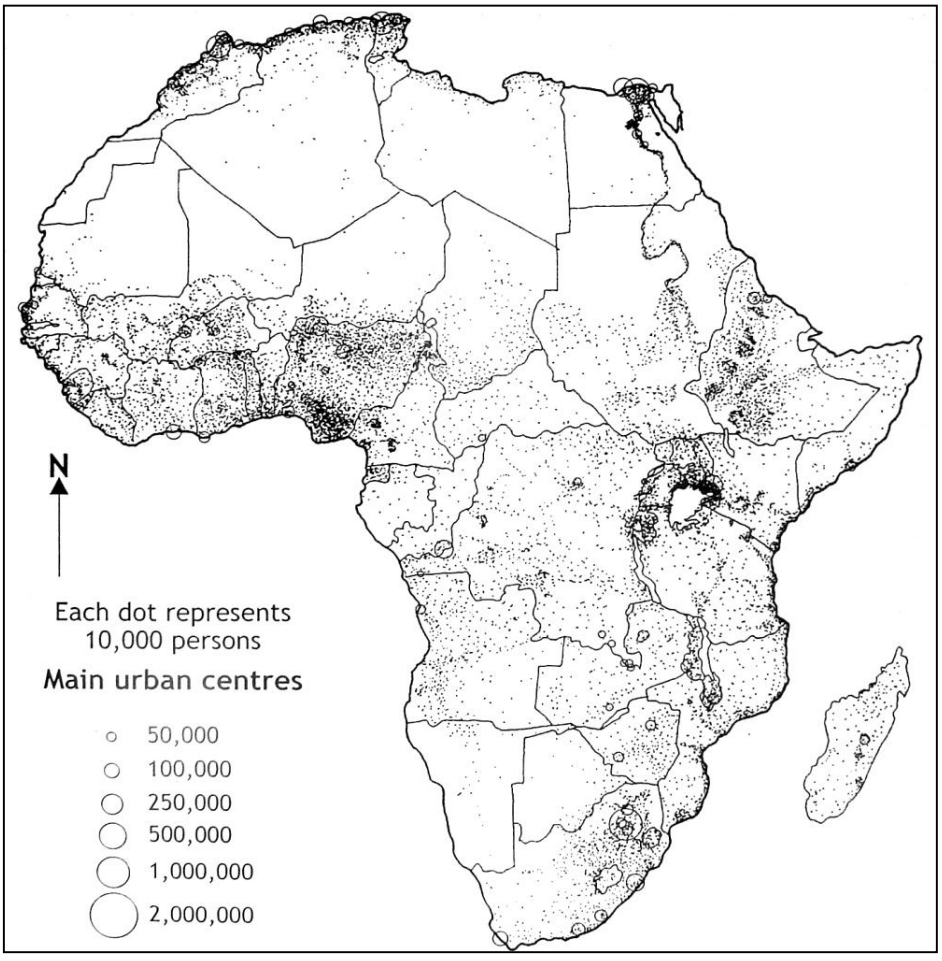
d) Give five reasons why forests should be conserved in Africa.

e) What problems are likely to be faced in conserving forests?

POPULATION

The number of people living in a given area at a particular time is referred to as population. The population of a given area is not static, it is dynamic, it keeps on changing by either decreasing or increasing. At the beginning of the 20th century, the population of Africa was estimated to be over 650 million people representing only 10.7% of the world's total population. This population spread over the continent's total area of 30 300 000sq km. This indicates an average population density of 22 persons per km^2. This is a very sparse population density compared to other continents for example Netherlands has a population density of 380 persons per km^2. The population in Africa is unevenly distributed. Some areas of Africa are almost inhabited, while others are densely populated.

MAP SHOWING POPULATION DISTRIBUTION IN AFRICA



Areas with dense population in Africa

1. The Nile valley in Egypt
2. The Niger delta in Nigeria
3. The Magrib region of North West Africa.

4. The Ethiopian highlands
5. Dakar- Barthust region of West Africa.
6. The lake shore areas of East Africa
7. The Johannesburg industrial region of South Africa
8. The Eastern coastal areas of Africa.
9. The Kano – Katsira region of Northern Nigeria.
10. The Shaba copper belt of DRC Zambia region.
11. The West African coastal areas i.e. Ghana, Ivory Coast, Liberia and Guinea.

Areas with sparse population in Africa

1. The desert and semi desert areas for example Sahara desert and Kalahari desert.
2. The areas covered by tropical rain forests for example the Congo basin.
3. Rugged and mountainous areas for example Rwenzori mountains
4. Swamp areas especially at the coast and the shores of lakes
5. Areas which are affected by vectors which cause diseases to man e.g. tsetse flies for example Miombo woodland.

Factors affecting population distribution in Africa

Physical factors

1. Climate

Areas which experience conducive climates especially adequate and reliable rainfall together with mild and moderate temperature attract a dense population than desert and semi desert lands with low and unreliable rainfall.

2. Relief

The nature of relief greatly influences population by either attracting or discourage settlement. For example, in extremely high relief regions, the temperatures are too cold for human settlement and the ruggedness too hinder construction of homes and communication lines. On the other hand, gently rolling slopes attract dense settlement because they are easy to construct communication lines and settlement.

3. Vegetation

Dense forests such as those in the Congo basin, hinder rapid population settlement because they are very difficult to clear, water logged and contain vectors that cause diseases to man and there

are wild animals which are dangerous to human life. On the other hand, savannah grasslands are densely populated because they are easy to clear and their climate is conducive for human survival.

4. Drainage

Low lying areas are prone to floods and are avoided for settlement for example the Niger delta region.

5. Biotic factors

The presence of pests and diseases for example tsetse flies and mosquitoes make large areas depopulated.

Human factors

1. Government policy

The government policy may either attract or discourage settlement. Some areas may be gazatted by law for example national parks, Game reserves or forest reserves. Government may also encourage settlement by establishing settlement schemes and resettle people from the densely populated areas.

2. Utilisation of natural resources

The exploitation of natural resources for example minerals may attract human settlement while seeking for employment.

3. The influence of slave trade

The present settlement in some parts of Africa reflect a historical episode of human trade where large numbers were carried away causing depopulation. This is basically seen in the region of the middle belt of West Africa and the Nyika area of Kenya- Tanzania.

4. The influence of ancient kingdoms

Ancient political kingdoms were strong and able to defend its population. Thus, there are dense populations in those areas which were once under strong kingdoms; for example Buganda, Yorubaland and Iboland.

5. Political stability

Political stability encourages settlement hence dense population.

6. Science and hygiene

This is related to the improvement in the level of science and technology leading to decline in infant mortality and death rates.

7. Urbanisation

The growth of towns and cities is also a very important facilities influencing population distribution in Africa. Urban centres provide a good number of functions which attract people to them. For example cheap power, trading activities, good accommodation, good medical care, cheap and constant transport, clean water, higher institutions of learning, government offices, recreation centres, and the like.

POPULATION GROWTH

The population of the world has grown rapidly during the few decades of 1960s and 1970s. The term population growth refers to the consistent change in the size of the population by increasing in numbers of people living in a given place. When the population of an area increases very rapidly then we talk of population explosion.

Factors for population explosion

Any change in the size of the population of the world is determined by three conditions namely;

(i) Birth rate

(ii) Death rate

(iii) Migration

Birth rate and death rate

If more people are born in a particular year than they die, the population will grow. On the other hand, if the number of deaths were to be greater than the number of births, then the population would fall. The birth rate is the number of births in a particular year per 1000 of the total population. It is worked out by multiplying the number of births in a year by 1000 and dividing the result by the total population at the middle of the year. The death rate is the number of deaths in a year per 1000 of the total population. It is worked out by multiplying the number of deaths in

a year by 1000 and then dividing the result by the total population at the middle of the year. The difference between the birth and death rate is called the rate of the natural increase.

Migration

If people emigrate (leave their country to live in another one), automatically the numbers will fall. Like wise, if people immigrate (move into the country from another), then the numbers will rise. The movements of population in Africa are related to different kinds of people such as; traders, pilgrims, nomadic pastoralists, fishermen, refugees and labourers.

Factors for migration

(i) Search for fertile soils.

(ii) Search for employment opportunities from urban centres, industrialized zones and mining belts.

(iii) Some people are forced to move due to political instabilities, natural catastrophes. Religious persecution and tribal conflicts.

(iv) Over population due to population explosion leading to shortage of land, vegetation and so on.

(v) People move due to excitements offered by the urban centres which may provide an incentive to the rural population to move into them.

Advantages of a fast growing population

(i) It provides cheap labour.

(ii) It provides a large labour force to recruit into the national organs of security to defend the country and protect the people, for example police, local defence units. The army and the like.

(iii) It provides large and ready internal market.

(iv) It encourages innovations.

(v) It provides a wide tax base for the government.

Population problems

(i) Unchecked rapid population may out space the rate of economic growth and puts strain on the natural resources and this may lead to land fragmentation, environmental degradation and exhaustion.

(ii) A high population puts pressure on social services such as schools, health centres and the like. This increases government expenditure and leads the country into debt.

(iii) A high population may lead to the development of slums and its related social and economic problems such as prostitution, robbery, unemployment and lead the country into debts.

(iv) Low rates of economic development due to lack of adequate funds resulting from heavy expenditure on consumption.

(v) There is a problem of food shortage.

(vi) There is unemployment leading to a high crime rate like pick pocketing, prostitution, e.t.c.

(vii) Poor sanitation is common

(viii) There is easy spread of diseases due to overcrowding and poor sanitation.

(ix) Conflicts and disputes are common due to inadequate supply of land, equipment, economic resources and so on.

Solutions to the problems of a high population

1. Industrialization is seen as one solution to Africa's population problems. This will provide both employment and market for food crops.
2. The second strategy is to encourage family planning education. The masses should be encouraged to use birth control method to produce children whom they can manage to support.
3. Women and girls should be encouraged to stay longer in school before marriage.
4. Polygamy should be discouraged.
5. The masses should be educated on the problems and advantages of big and small population.
6. The governments should set up stringent measures to reward families with a small population by giving them gifts and punish those with a big population by taxing them heavily.

Causes of low population density in Africa

(i) Political instability

(ii) Government policy of gazetting areas as national parks, game reserves, wetlands and the like.

(iii) Remoteness and lack of transport and communication to link up those areas.

(iv) Occurance of pests and disease.

(v) Un conducive climatic conditions especially very hot temperatures in the deserts and semi desert and very cold temperatures on high altitudes.

(vi) Poor soils especially sand loose soils.

Problems of low population areas.

1. There is low tax base.
2. Under utilization of resources.
3. There is vacant room for settlement giving opportunity for rebels and robbers to have safe heavens.
4. There is limited labour supply.
5. Does not encourage innovations.
6. It is uneconomical to provide social and economic infrastructure to a small population.
7. A small population offers a small market for goods and services.

Solutions to problems in low population density areas

1. Voluntary immigration should be discouraged.
2. Encourage resettlement schemes.
3. Establishing small scale industries to encourage immigration.
4. Development of social and economic infrastructure.
5. Improvement in farming systems by introducing scientific methods of agriculture.
6. Gazatted areas should be let free for human settlement and occupation.
7. Provision of water supplies through construction of boreholes, valley dams and the like.

Population distribution and problems.

A case study: EGYPT

Egypt's population is concentrated along the Nile valley and in the Nile delta region. Egypt has a total population which is over 50 million. The total population which is ever increasing rapidly at a rate of 2.5% each year and it is expected to accelerate during this 21st century.

Reasons why population in Egypt is concentrated along the Nile and in the delta region.

1. Availability of water for irrigation, domestic and industrial purposes.
2. Presence of fertile alluvial soils resulting from the Nile deposits
3. The Nile water is used for navigation purposes.
4. The location of major towns and cities e.g. Alexandria, Cairo, Elmanshda, El-kubra and many others.
5. The availability of electricity from the dams.
6. The nature of the land which is gently sloping.
7. The government policy of building industries and power stations in the region.
8. The presence of modified mild climate along the Nile which is conducive for human settlement.

Causes of population explosion in Egypt

1. Advanced medical knowledge and techniques that greatly reduced the risk of diseases.
2. Religious objections to use of contraceptives and birth control methods.
3. A tradition of early marriages.
4. Rapid growth of industries and urbanization.
5. Improved social and economic infrastructure.
6. Good governance and political stability.
7. Immigrations. There are many people who have migrated to Egypt especially from Europe, Middle East and Asia.

Problems of a high population in Egypt

1. Severe shortage of land. The available land holdings are too small to provide a descent standard of living. There are large number of landless labourers.
2. The detrimental effect of high dependence ratio due to a big population under the age of fifteen.
3. Strain on the natural resources and social services.
4. Wide spread unemployment, poverty and standards of living.
5. Strain on government resources which may result into banning from outside donors.

Solutions to the population problems in Egypt

1. Increasing the land under cultivation through land reclamation by building more dams, barricades and canals for irrigation.
2. Application of fertilizers and modern methods of agriculture to increase food production.
3. Accelerate industrialization to provide employment and obtain more foreign exchange to put up social infrastructure and pay for food imports.

REVIEW QUESTIONS

1.(a) Define the term population

(b) Define the term population structure

(c) Identify regions or countries of Africa with high population densities.

(d) What factors favour high population densities for any one region you have identified above.

(e) Name four regions or countries of Africa with low population densities.

(f) What conditions bring about low population densities in any one region above?

2. Study the statistics showing Africa's population growth (1950-1990) and answer the questions below.

YEAR	POPULATION
1950	199 000
1960	270 000
1970	344 0000
1980	453 000
1990	616 000

(a) Draw a line graph to show the trend of population between 1959 and 1990

(b) Using both the table and the graph drawn, describe the trend of population growth in Africa.

(c) State the period in which Africa experienced the

(i) lowest population growth

(ii) highest population growth

(d) With reference to anyone African country (outside East Africa) outline the

(i) advantages

(ii) disadvantages of a high population growth rate

3. Study the passage below and answer the questions which follow.

"In many areas, there are clear connection between environmental factors and link between the high density of population. The link between the Nile valley and population distribution is obvious in Egypt."

(a) (i) Name environmental factors that have influenced population distribution in Africa.

(ii) What non- environmental factors influence population distribution in Africa.

(b) (i) Name one country in Nile valley not mentioned in the passage

(ii) With the help of a sketch map, describe the population distribution in Egypt.

(iii) Explain the factors responsible for the population pattern in (b) (ii) above.

AGRICULTURE IN AFRICA

Agriculture refers to the growing of crops and rearing of livestock. The greater part of Africa's population lives directly off the land either by cultivating crops or rearing of livestock. The agriculture sector can be divided into two broad groups:

1. Arable farming(growing of crops)
2. Livestock rearing

Arable farming in Africa

This includes

i. Indigenous subsistence farming which includes shifting cultivation and bush fallowing.
ii. Commercial/ plantation or estate farming
iii. Small scale/ small holder farming
iv. Intensive market gardening
v. Irrigation farming

Agriculture is still the main source of livelihood in Africa because the majority of the population still rely on it. To a large extent, Africa's agriculture is still dominated by indigenous form of farming. Plantation farming and intensive market gardening are not fully developed.

Reasons why modern farming is not fully developed in Africa

i. Low levels of education in many parts of Africa.
ii. The nature of land tenure systems in Africa which does not allow development of modern farming system.
iii. There is lack of capital to modernize farming conditions in many parts of Africa.
iv. There are problems of pests and diseases
v. There is limited agricultural research facilities.
vi. There is poor information insermination
vii. Frequent occurance of political instabilities.

Subsistence farming

Characteristics of subsistence farming

1. The area cultivated is small; rarely more than a few hectares of land is under cultivation.
2. The farms are often fragmented each consisting of several scattered plots.

3. Crop yields per unit area are low.
4. Much of the work on the farm is done by hand, using simple tools such as pangas, axes and digging sticks.
5. The labour on the farm is provided by family.
6. Much of what is produced is consumed by farmer and his family. There is generally very little or none at all surplus for sale.
7. Few crops are grown which tend to be starchy e.g. cassava, yams millet and maize.
8. Crop yields are supplemented by hunting wild animals in the forest, fishing in the nearby rivers and gathering fruits in the village vicinity.

The main forms pf subsistence farming considered here are

a) shifting cultivation
b) Rotational bush fallowing.

Shifting cultivation

This is the most primitive type of subsistence farming. A farmer clears a small piece of land of about half a hectare and plants his crops in this clearing. After a few harvests have been taken from the plot for 1-3 years, crop yields decline and the farmer abandons that particular plot and makes the clearing else where. The shifting cultivator clears land through burning and use of elementary tools like pangas, hoes, digging sticks and through axes. He then sows seeds in the intermixed ash and soil. Several different kinds of crops are grown on the same piece of land. Little attention is given to crops until they sprout and ripen. When crop yields decline, usually after about three years, the patch is abandoned and a fresh area cleared.

Characteristics of shifting cultivation

1. Sites called the ladongs are usually selected in virgin forests by experienced elders
2. The forests are cleared by fire and use of elementary tools like pangas, hoes, digging sticks and axes.
3. The cultivated plots are usually small about 1-3 acres.
4. The cultivated plots are scattered and separated from one another by dense forests.
5. Different types of crops are grown on the same piece of land.
6. Little attention is given to the crops until they sprout and ripen.
7. Family labour is used.
8. When crop yields decline, the patch is abandoned and fresh clearing is made in another area. The cultivator rarely returns to the original clearing.
9. Produce is for home consumption with no surplus for sale

Identification of areas where shifting cultivation is practiced

Shifting cultivation is practiced by different tribes in different countries in Africa. The most ones are:

1. The Bemba people of northern Zambia
2. The Azande people in Congo
3. The Chipinga district of eastern Zimbabwe
4. Benue valley in Nigeria
5. Central African Republic

Advantages of shifting cultivation

1. Coastal movement ensures fresh sites which are fertile
2. The constant movement results in less risk of diseases
3. Soil erosion is not a serious problem since small patches are exposed and these support many crops.
4. Burning adds ash to the soil which improves its fertility.
5. The organization of work allows time for other activities such as fishing and hunting.
6. It requires less labour to produce a given amount of food.
7. Burning provides an effective way of dealing with the weed problem which faces many tropical farmers.

Disadvantages of shifting cultivation

1. Although burning initially helps to increase the fertility of the soil by addition of ash, it also destroys large quantities of organic matter and bacteria hence affecting the soil farming process.
2. Destruction of natural forests which have taken over hundreds of years to grow.
3. A lot of time is wasted clearing land each time the farmer shifts to a new site.
4. It does not encourage the growth of cash or monetary economy.
5. It hinders the development of infrastructure such as roads, health centres, schools e.t.c as people are ever shifting.
6. It can only be practiced in areas with low populations
7. Low crop yields are obtained.
8. It is an uneconomical way of using land.

Why is shifting cultivation disappearing in Africa

1. The population is rapidly increasing and there is therefore little land available where farmers can keep shifting.
2. The rapid population growth has led to increased demand for food. Better forms of farming therefore had to be adopted to increase food production.
3. The introduction of perennial crops such as bananas, coffee, cocoa, rubber and others which are grown throughout the year.
4. The introduction of monetary economy which necessitates surplus production for sale instead of producing for the family only.
5. Shifting cultivation has many disadvantages that farmers are abandoning it for better forms of crop cultivation.
6. The coming of white settlers who introduced better forms of crop cultivation e.g. plantation agriculture.

Rotational Bush Fallowing

This type of farming is closely related to shifting cultivation. However, the main distinction between the two is that in rotational bush fallowing when the crop yields decline, the land is left to rest (fallow) in order to regain its fertility. It is later recultivated. Rotational bush fallowing is replacing shifting cultivation in many parts of tropical Africa e.g. Nigeria, Ghana, Zambia.

Characteristics of rotational bush fallowing.

1. A piece of land is cultivated and when crop yields decline, it is left to fallow in order to regain its fertility before being re-cultivated.
2. Farming is based on permanent and semi-permanent settlements. There can be a movement of compounds but within the same general area.
3. Elementary tools such as hoes, pangas and axes are used.
4. Labour is provided by the family.
5. Both food and cash crops are grown.
6. Land is divided into numerous plots some under cultivation while others are under fallow.

Advantages of bush fallowing.

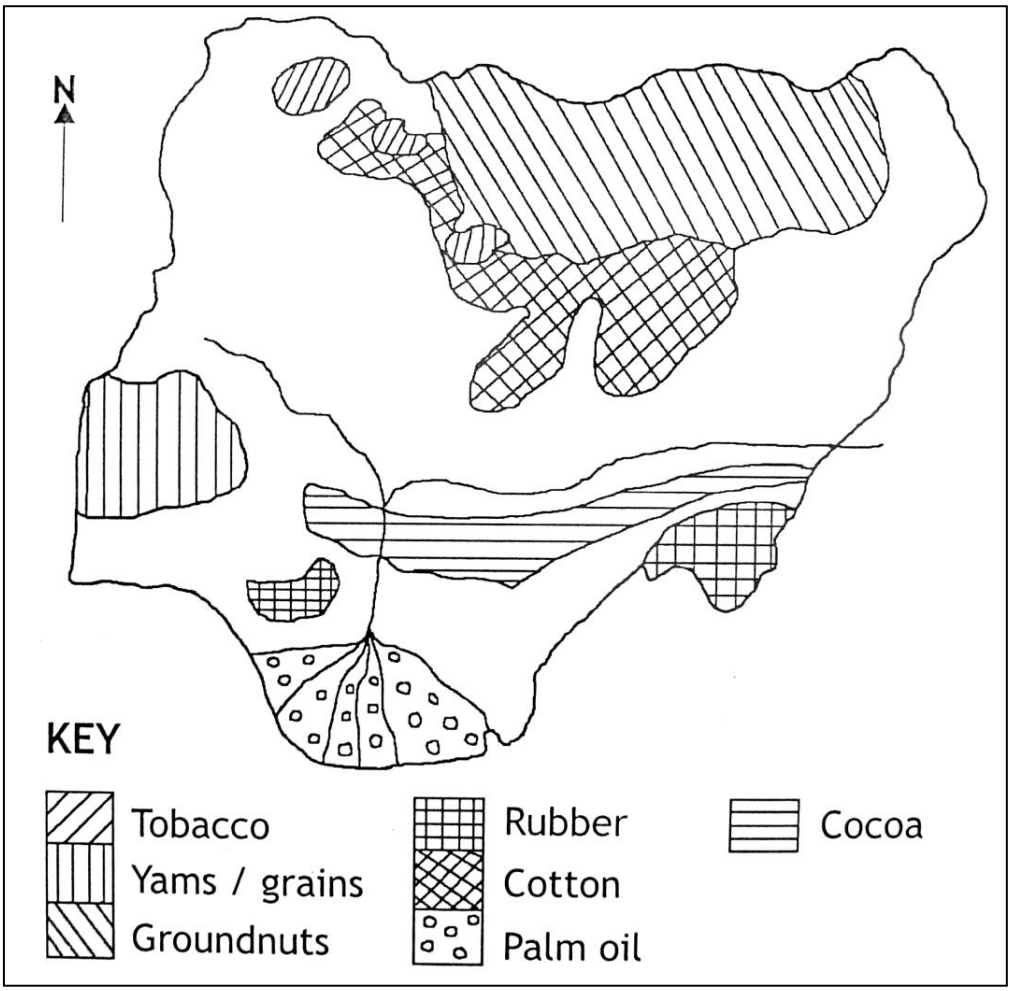
1. Soil fertility is maintained
2. Higher crop yield
3. Less labour is required to produce a given amount of output
4. It avoids problems of clearing bushes as experienced in shifting cultivation.

5. THE CHANGE FROM SUBSISTENCE TO A MARKET ECONOMY.

Arable Farming In Nigeria

Oil palm is the most important crop grown in Nigeria. The main oil palm growing area is bounded by towns of Port **Harcourt**, **Onitsha** and **Oron**. Other crops grown include cassava, yams, cocoa, ground nuts, cotton and rubber.

MAP OF NIGERIA SHOWING MAJOR CROPS GROWN



Conditions that have favoured oil palm growing in Nigeria.

1. High temperatures over 21^{o}C and above.
2. High rainfall of 1500mm and above which is well distributed throughout the year
3. Low altitude
4. Well drained soils

Other countries producing oil palm in West Africa include: Sierra Leone, Ivory Coast, Guinea, Liberia, Togo, Guinea Bissau and Ghana.

Harvesting and processing of oil palm

In order to harvest the fruit, the farmer usually climbs the trunk with the aid of a rope and cuts down the ripe bunches. The traditional method of obtaining oil from the pericarp is to pick the fruit from the bunch and then boil it and bound it. When this has been done, the oil is squeezed out from the pericarp by hand. Inside the fruit itself, there is a hard nut which contains kernel. The nuts are dried and then cracked by hitting them with a hard hammer or stone so that the palm kernel oil is extracted. Most of the work is done by women. Today, a number of oil mills have been established in the palm growing areas of Nigeria. These are able to extract up to 85% of the oil content.

Uses of oil palm.

1. Used in cooking e.g. making soup
2. Used in the masking of slain and hair oil.
3. Drinks e.g. palm wine
4. Dried shells and fibre used as fuel
5. Used in making of soap and cosmetics
6. The leaf ribs are used for local building purposes.

Marketing of oil palm

Apart from being consumed locally, oil palm is exported to USA, Belgium, Holland, Germany and Italy.

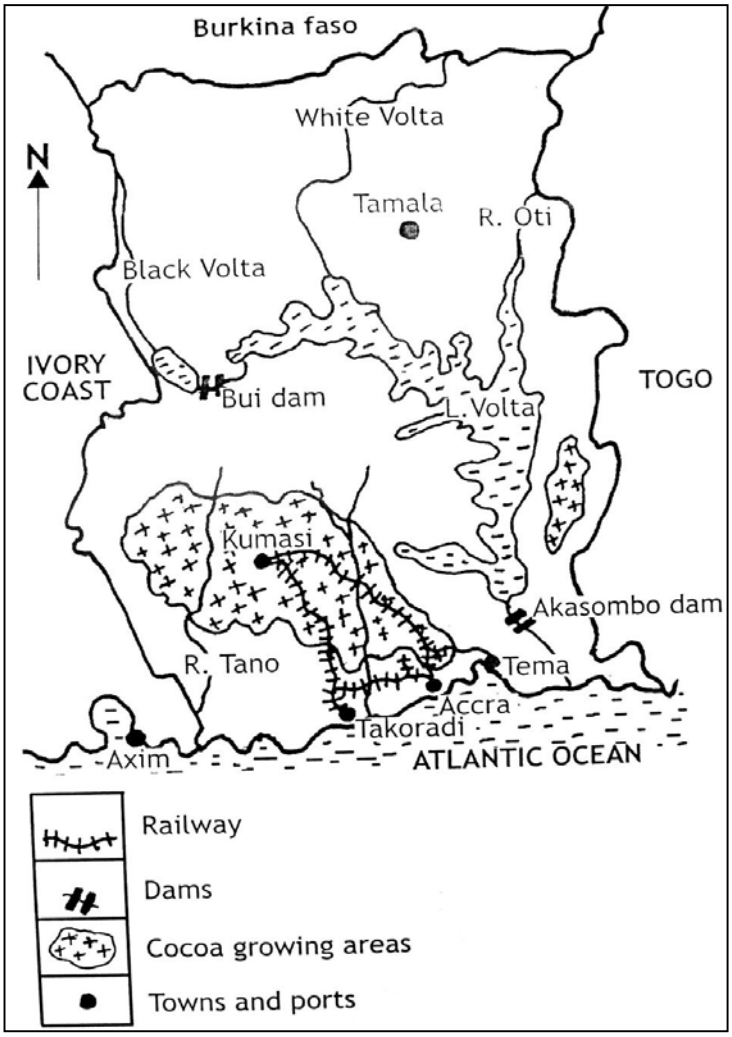
Problems facing oil palm farmers

1. Diseases such as freckle and anthcrose which destroy the plants
2. Growth of weeds which are deep rooted e.g. Siam
3. Competition from other oils
4. Low levels of technology are used e.g. climbing the trees with a panga in order to harvest the oil palm
5. Shortage of labour

COCOA GROWING IN GHANA

Most of Africa's cocoa comes from Ghana and Ivory Coast, although many other West African countries such as Nigeria and Cameroon also produce it. Ghana's main cocoa lands are found in the south-west of the country.

COCOA GROWING LANDS OF GHANA



Factors that have favoured cocoa growing in Ghana

1. High rainfall of over 1000mm which is evenly distributed throughout the year
2. High temperatures of over 21^{o}C
3. Deep well drained soils
4. Shelter from strong winds
5. Shade from strong sunlight to protect the young cocoa trees
6. Low altitude
7. Availability of cheap labour
8. Availability of extensive land
9. High humidity

Harvesting of cocoa

The cocoa trees begin bearing fruits between three to five years. In Ghana there are two harvests each year between September and January and between April and August. The farmers use a tool known as a cutlass to harvest the lower ones and a knife at the end of a long pole for higher ones. The pods are gathered into piles on the ground.

Processing of cocoa

Once the pods have been cut and piled on the ground, they are split open using pangas. The beans are removed and placed on the ground and covered with leaves to ferment. The fermentation process takes six days. The fermented beans are then placed on the mats on raised platforms and allowed to dry in the sun. When the beans are thoroughly dry, they are packed into sacks and then taken to buying centres.

Marketing of cocoa

The whole crop is bought by the state cocoa marketing board which fixes the prices to be paid to farmers. Much of the crop is exported through port Takoradi and Tema to Europe.

Uses of cocoa

1. Beverage or drink which is actually called cocoa
2. Used in making of chocolate
3. Cocoa butter

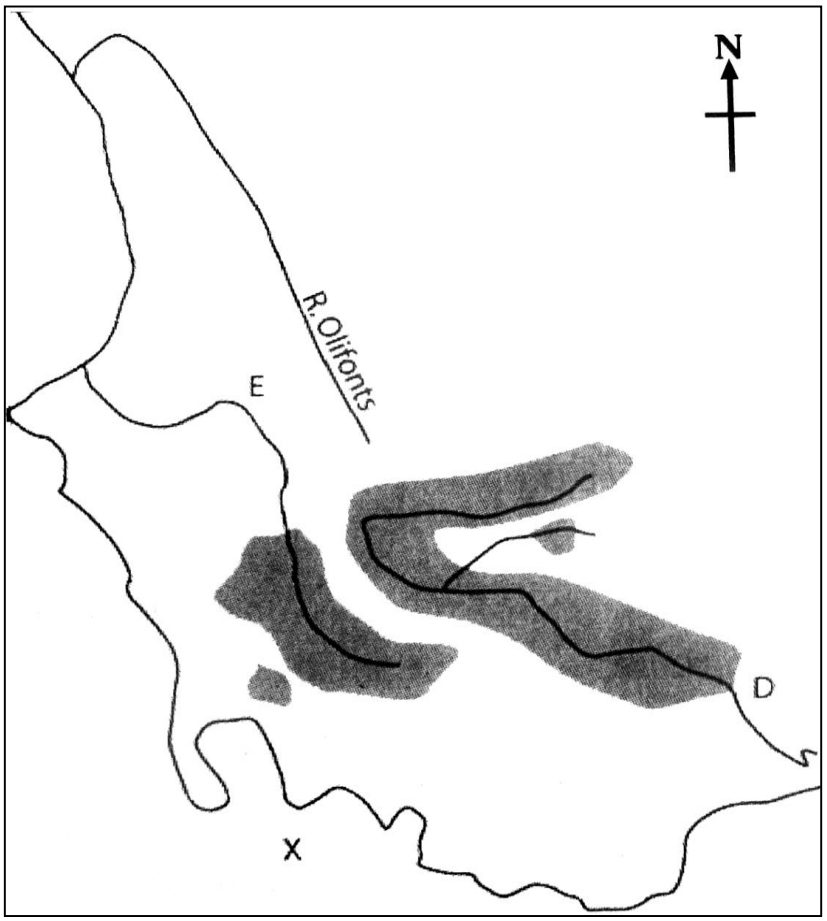
Problems facing cocoa farmers

1. Pests and diseases e.g. the swollen shoot disease, black pod disease and capsid pest which cause great damage to the cocoa tree
2. Price fluctuations on the world market hence affecting the incomes of the farmers
3. Shortage of labour especially during the busy periods due to rural-urban migration
4. Poor developed transport routes which make marketing of cocoa very difficult

VITICULTURE IN SOUTH AFRICA

The growing of grapes to produce wines is termed as viticulture. There are many vineyards (grape farm) in the south west Cape area of South Africa, the most important areas being found on the flat valley land of the great Berge and Breed rivers of the nearby mountains.

AREAS OF VINE IN SOUTH AFRICA



Key

Areas of viticulture

The vine yards do not only produce grapes but also other fruits such as apricots and peaches which are used in the jam and canning industries.

Conditions that have favoured vine growing in South Africa

1. The Mediterranean climate with warm summers and cold winters
2. Availability of water for irrigation from river Breed
3. The presence of fertile well drained soils
4. Sunny, dry summers which favour harvesting of the crop.
5. Availability of cheap labour during harvesting

Harvesting, processing and marketing of vines

Vines are harvested by picking. Both regular labourers who live on the farms and hired labour especially women are used. The grapes are picked and put in baskets. The baskets are then loaded on lorries and transported to wineries of Pearl and Stellenbosh. At the wineries, the grapes are unloaded and put into a machine which crushes them and extracts juice. The juice is left to ferment for many days and as a result alcohol is formed. After fermentation, the wine is put into huge barrels to await bottling. South African wine is exported to Britain, France, Germany, Netherlands, Belgium and Sweden.

Problems facing vine growing in South Africa

1. Shortage of rainfall e.g. in the Worcester region
2. Shortage of labour during the harvesting period
3. Soil exhaustion due to over cultivation
4. Diseases e.g. fungoid diseases
5. Soil erosion due to steep slopes

Measures taken to solve the above problems

1. Irrigation farming to supplement the available rainfall
2. Application of fertilizers and manure to maintain soil fertility
3. Use of hired labour during the busy periods
4. Spraying chemicals to control diseases
5. Terracing of steep slopes to reduce soil erosion

Apart from South Africa, other African countries producing grapes include Egypt, Ethiopia, Algeria, Morocco and Zimbabwe.

FARMING IN SOUTH AFRICA

Viticulture

This is the growing of vines .In the republic of South Africa ,vine growing is carried out in the south western part of cape province along the villages of Breede and Berge rivers .The towns of Pearl, Worcester and Stellenbosch are famous for vine products.

Methods of growing vines

1. Irrigation farming in areas where rainfall is little and unreliable.
2. Crop rotation and field fallowing. Vines require soils rich in soil nutrients and they utilize a lot of it as they grow.
3. In highland areas, terracing is practised.
4. The vines are well spaced 2 metres apart from each other.
5. The vines are usually pruned in winter to control overgrowth.
6. The soils are always planted with rye after harvesting
7. Application of fertilizers and animal manure to improve soil fertility.
8. Weeding and spraying of the vines.

Harvesting vines.

Vines are harvested using hired manual labour. Harvested grapes are collected in baskets and transported to vineries by lorries.

PLANTATION AGRICULTURE

This is a very distinctive form of cultivation where one crop is grown on large scale for sale.

Characteristics of plantation agriculture

1. Crops are grown on large estate covering thousands of hectares
2. Plantations specialize in the growing of a single crop. This practice is known as monoculture
3. Large number of workers are employed. Where sufficient labour is not available, it has to be recruited from other areas
4. A great deal of capital is usually involved. This is because many plantations have their factories, machinery, transport systems e.t.c.
5. Crops grown on plantations are intended for sale
6. High out put or crop yields
7. Many plantations in Africa are owned by foreign investors
8. Plantations are scientifically managed
9. Plantations are highly mechanized

Factors that have favoured the establishment of plantations in Africa

1. Good transport and Heavy rainfall which is well distributed throughout the year especially in areas having an equatorial climate.
2. High temperatures throughout the year
3. Well drained fertile soils
4. Sparse population hence extensive land for establishing plantations
5. Generally flat landscape which favours mechanization
6. Ready market for the crops grown
7. Government policy which encourages plantation agriculture
8. Availability of capital
9. communication routes

Advantages of plantation agriculture

1. Generation of employment opportunities to many people
2. Generation of foreign exchange through exports
3. Source of revenue to host government through taxation of workers' wages, export duties and company land rents
4. Source of raw materials for industries e.g. rubber for tyre industries
5. Plantation authorities usually establish social infrastructure such as schools, health centres, recreational facilities which do not only benefit the workers but also people in surrounding areas.
6. Regular supplies of produce are guaranteed by plantation system
7. Plantation workers train on the job and gain specialized skills such as repair and maintenance of farm machinery
8. Plantations carry out research involving breeding of improved crop varieties
9. Plantations encourage the development of out growers. These are farmers near the plantation who grow the same type of crop as on the plantation. They benefit from advice, inputs as well as ready market provided by the plantation authorities.
10. Large scale production encourages economy in production
11. Plantations ensure no wastage. Wastes are used as fuel or fertilizers e.g. crushed stems of sugar canes are used as fuel.

Demerits or Disadvantages of plantation agriculture

1. The growing of the same type of crop year after year leads to soil exhaustion and erosion.
2. Many plantations in Africa are owned by foreigners who repatriate their profits to their mother countries
3. Plantations concentrate on the production of single crop and suffer greatly when world market prices drop
4. The concentration on the growing of a single crop leads to easy spread of diseases
5. Plantations require large land areas which results in displacement of people
6. Plantations have been one of the major causes of population migrations, particularly of the young able bodied men to seek and the elderly flock who are less efficient hence a decline in food production.
7. Many plantation crops take several years to mature e.g. rubber takes six year, cocoa five years, oil palm three years.

CASE STUDIES OF PLANTATION AGRICULTURE

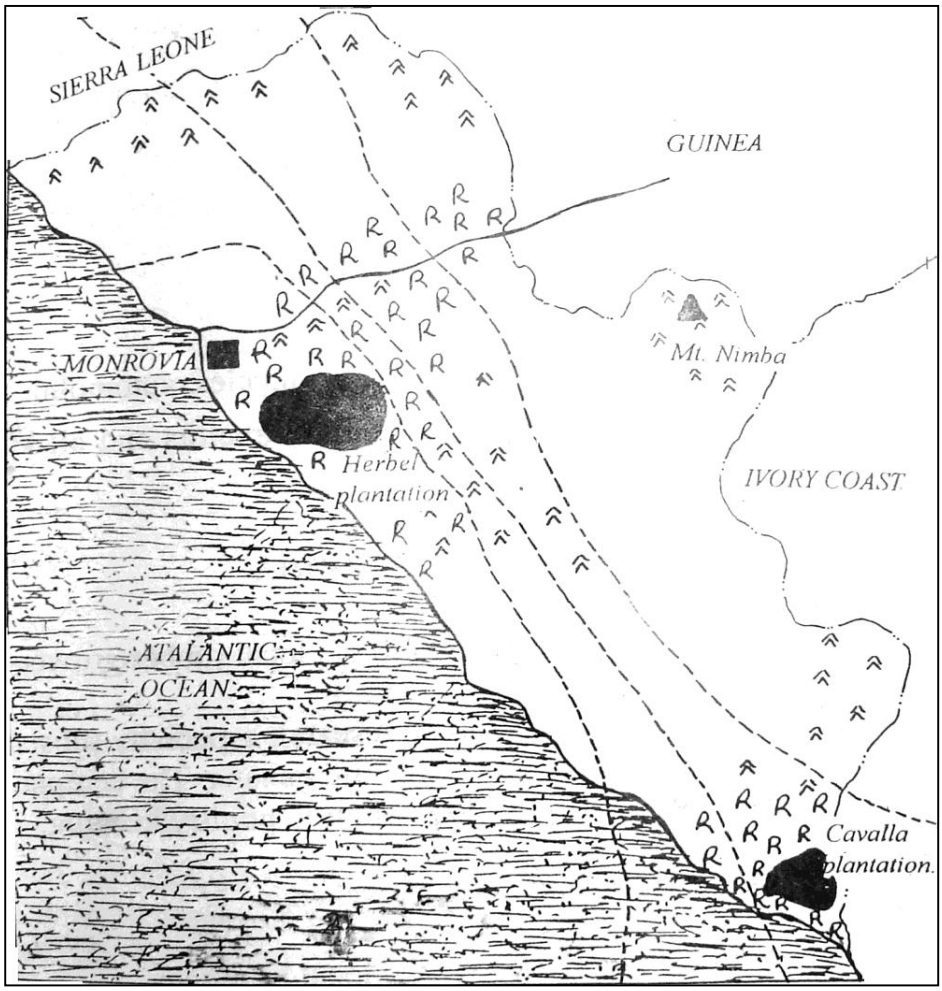
Case studies can be drawn from the following:-

1. Rubber in Nigeria
2. Sugar cane growing in Natal, South Africa.

RUBBER GROWING IN LIBERIA

In Liberia, rubber plantations were started by two companies namely Firestone and Harbel from USA. The main plantations are St. Harbel on the Farmington river, 25km from the coast, while the second lies inland on the Cavalla river. The Harbel plantation is over 34,000 hectares.

SKETCH MAP SHOWING RUBBER GROWING AREAS IN LIBERIA



Conditions that have favoured rubber growing in Liberia

1. Heavy rainfall of over 2500mm a year
2. High temperatures of 24^{o}C to 27^{o}C
3. Well drained fertile soils
4. Low altitude
5. Availability of extensive land
6. Availability of cheap labour

How rubber is tapped

The tappers make a slanting cut in the bark of the tree trunk. Each cut is 'V' shaped and the milky white latex bleeds from the bark and runs down the groove in a cup fixed below the slanting cut. The tappers tap every morning and collect the latex in the afternoon. After the same trees have been tapped for six months, they are given a long rest period and other trees take their turn.

Marketing of rubber

The milky liquid known as latex is transported to factories by mainly road and railway transport. At each factory, latex is processed either for home consumption or for export. The major port used for exporting rubber is Monrovia. Rubber is exported to countries such as Britain and USA.

Uses of rubber

1. Making of vehicle tyres
2. Making of soles of shoes
3. Rubbing out pencil errors on paper

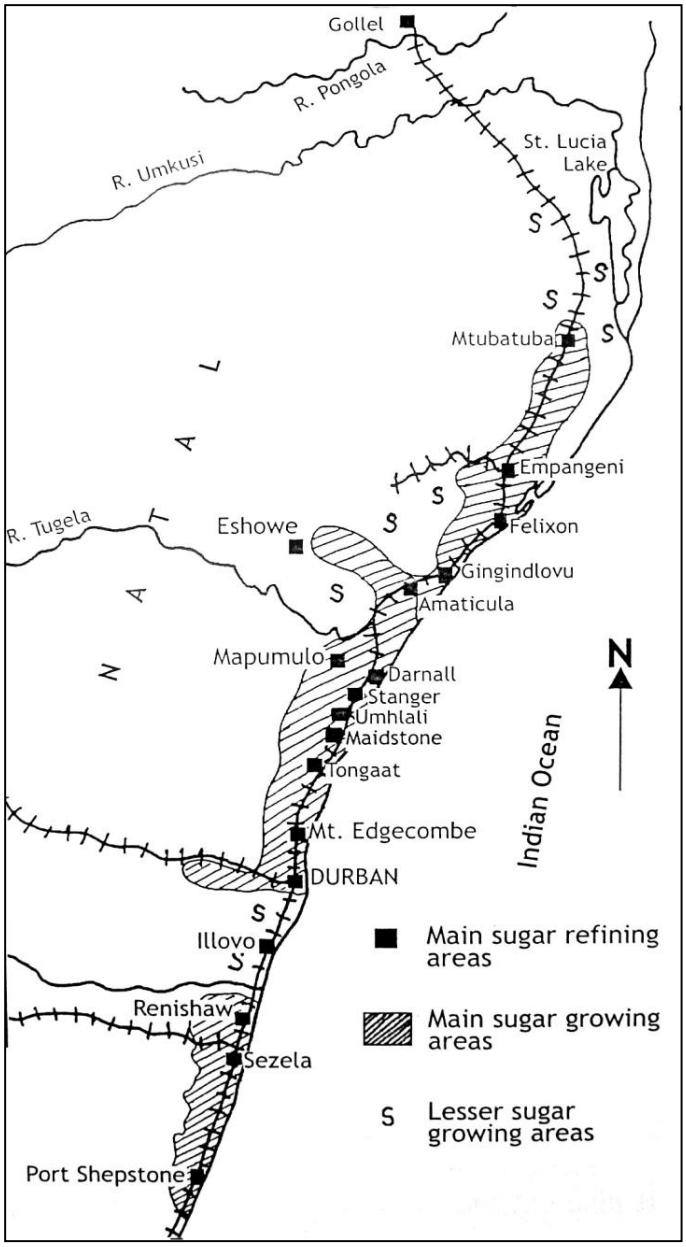
Benefits of rubber growing to the Liberian economy.

1. Rubber is a major export thus earning Liberia foreign exchange
2. Rubber growing has stimulated the growth of industries making tyres and shoes
3. Generation of employment opportunities to many people
4. Development of road and railway network
5. Assistance given to out growers in form of advice and buying the entire production
6. Research in tropical diseases is carried out
7. Provision of social services such as health centres
8. Generation of government revenue through taxes imposed on the plantations

SUGAR CANE GROWING IN NATAL SOUTH AFRICA

The Natal region of South Africa is one of the major sugar cane producing regions on the African continent. Sugar canes are grown on plantations. Other African countries growing sugar canes on plantations are Congo- Kinshasa, Angola, Zambia, Nigeria, Zimbabwe and Swaziland.

SUGAR CANE GROWING AREAS IN NATAL SOUTH AFRICA



Conditions that have favoured sugar cane growing in Natal

1. High temperature of 21^{o}C and above. The warm Mozambique current has an effect of raising the temperatures along the eastern African coast. On the other hand, the cool Banguela along he Namib coast caused a considerable drop in temperature hence discouraging sugar cane growing yet they lie at the same latitude.
2. Availability of high rainfall over 1000mm and above brought about by the warm Mozambique current.
3. Availability of water for irrigation where rainfall is inadequate.
4. Availability of fertile well drained soils

5. Generally flat land which has enabled mechanization.
6. Availability of large sum of capital.
7. Large market for the sugar.

Uses of sugar

1. Home uses include sweetening of tea, coffee e.t.c baking and generally cooking.
2. Chemical uses include production of drugs, acids, medicines, explosives
3. Wastes are used as fuel
4. Molasses

Most of South Africa's sugar is exported to the United States, Japan, Canada and United Kingdom.

LIVESTOCK KEEPING IN AFRICA

Nomadic pastoralism

This is a form of subsistence agriculture in which pastoralists move from one place to another in search of water and pasture for their livestock. It is the simplest and most primitive way of livestock rearing.

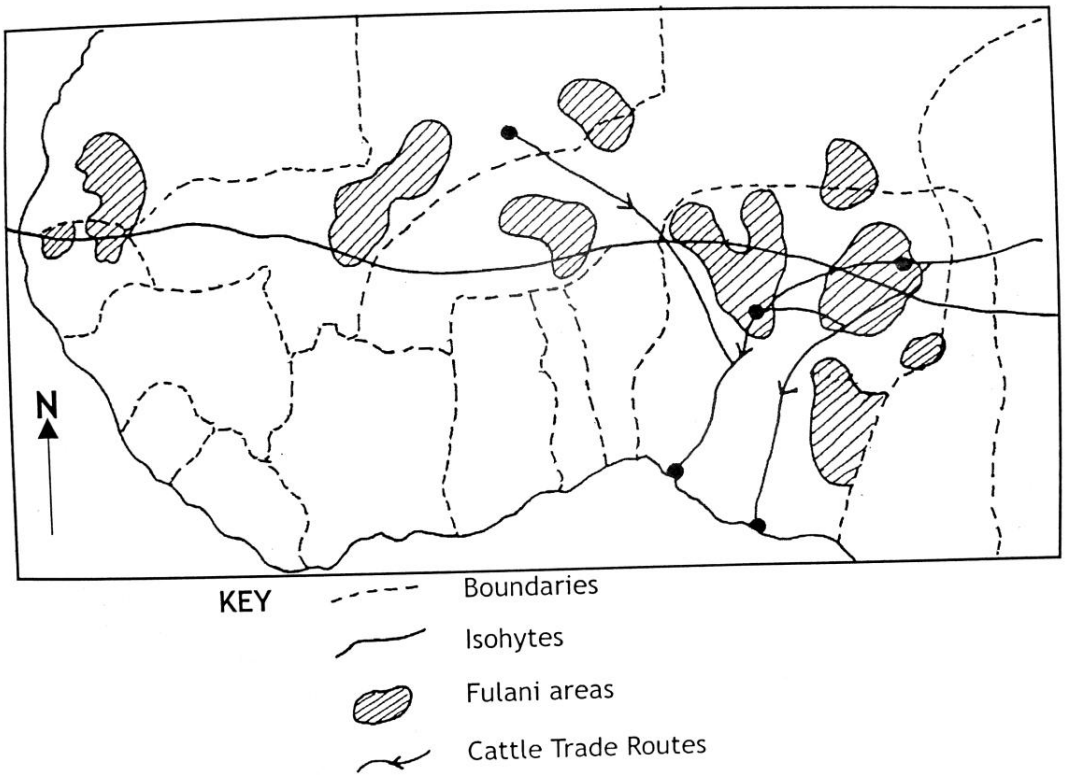
Characteristics of nomadic pastoralism

1. They occupy large areas which receive unreliable rainfall
2. Large numbers of animals are kept beyond the carrying capacity of land.
3. The animals depend on natural pastures
4. Traditional breeds of animals are kept which are often of low quality yielding low milk and poor quality meat.
5. The animals are kept for subsistence. None are sold.
6. Grazing is carried out communally.
7. Movements are necessary to ensure sufficient water and pasture for the livestock.
8. Overgrazing resulting from overstocking is a common feature.
9. Burning of grass is done at the end of the dry season in anticipation of fresh pastures on the start of the wet season.

THE FULANI OF WEST AFRICA

The Fulani pastoralists number over 7 million and are spread throughout the Sahel and savanna zones of West Africa from Senegal to Lake Chad. They are therefore found in Nigeria, Mauritania and Cameroon. The Sahel zone consists of countries of Mali, Niger, Senegal, Mauritania, Chad and Burkina Faso. Other pastoral tribes of Africa are found in the semi-desert of Somali and the Kalahari fringes of Botswana.

DISTRIBUTION OF FULANI IN WEST AFRICA



Factors favouring nomadic pastoralism in parts of West Africa

1. Rainfall is low and unreliable and it is distributed in only three months. Arable farming is therefore impossible and pastoralism offers the best alternative land use.
2. The long period of drought lasting about 9 months necessitates movement in search of water and pasture.
3. The population is very sparse between 1-10 persons per square kilometer. There is therefore vast land where the pastoralist can keep shifting to.
4. Shortage of water and pasture which necessitates movement in search for them.
5. Communal ownership of land hence free movement of pastoralists and their cattle.
6. The short savanna grass provides natural pasture for the livestock.
7. Traditional way of life of pastoral tribes.



Activities of the Fulani during the dry season

During the dry season, the grass withers, pools and streams dry up and the Fulani move southwards keeping close to the water course and where there is pasture. However, they cannot move up the coastal belt because of the presence of tsetse flies and climate not favourable for cattle keeping due to too much rainfall and humid conditions. Also during the dry season, roots and berries are collected. Wells are dug and the cattle are spread out in search of water. Burning of grass as they move from one area is common to ensure an early growth of grass at the beginning of the wet season.

Activities of the Fulani during the wet season.

As the wet season approaches, the Fulani move northwards with their herds to seek the tsetse fly free uplands of Bamenda, Futa Jalon, Jos, Bauchi and the Cameroon. During this season, de-ticking and felling of trees to make enclosures to protect the herds, making butter as well as shifting camps for short distances are done.

Uses of cattle to the Fulani

1. Source of food in terms of milk, blood and meat
2. Source of income from the sale of butter and milk
3. Source of clothing

Problems faced by the Fulani pastoralists

1. Low and unreliable rainfall results into shortage of water and pasture for livestock
2. Drought leads to cattle deaths.
3. The cattle are made to move long distances in search of water and pasture and most of them lose weight or die.
4. Over stocking which results into overgrazing and shortage of pasture.
5. Pests and diseases which attack the animals e.g. tsetse flies spreading nagana. Pests including rinder pest and ticks which reduce the weight and quality of animal products.
6. Movement of long distances to the market in the south.
7. Attacks from wild animals especially hyenas.
8. Clay soils which are water logged during the dry season make movements difficult. There is also discomfort in living in muddy camps during the wet season
9. Grass burning leads to the growth of tough and non-nutritious grasses
10. Congestion of livestock at water points especially during the dry season,
11. Periodical invasion of locusts causing wide spread destruction of grass, plants and leaving the land bare to agents of soil erosion.
12. Traditional local breeds of cattle are reared which yield low milk and meat
13. Poor transport and communication network.

Measures being taken to solve the problems faced by Fulani pastoralists.

1. Construction of permanent water points e.g. boreholes, wells, valley dams and tanks.
2. Provision of veterinary services e.g. drugs, dips and artificial insemination
3. Establishment of ranching schemes in order to promote a more settled life.
4. Encouraging selling of animals to reduce cattle numbers
5. Cross-breeding in order to improve the quality of local breeds.
6. Improvement in pasture through growing of fodder crops to supplement animals feeds. This is done under irrigation.
7. Construction of feeder roads to improve movement.
8. Agricultural extension to educate the farmers of better methods of livestock rearing.
9. Setting up of processing plants to take up produce from farmers.

REVIEW QUESTIONS

1. a) Describe the conditions that have led to:

i) Nomadic pastoralism in the Sahel region

ii) The establishment of demonstration ranches in Botswana

b) Explain the problems faced by:

i) nomadic pastoralists in the Sahel region

ii) demonstration ranchers in Botswana

c) Mention the:-

i) benefits of demonstration ranchers to Botswana

ii) efforts being taken to improve the livestock industry in the Sahel region.

2. a) Draw a sketch map of West Africa and on it, mark and name:

i) Areas occupied by the Fulani nomads

ii) Any two countries in which Fulani live

iii) the 1000mm isohyte

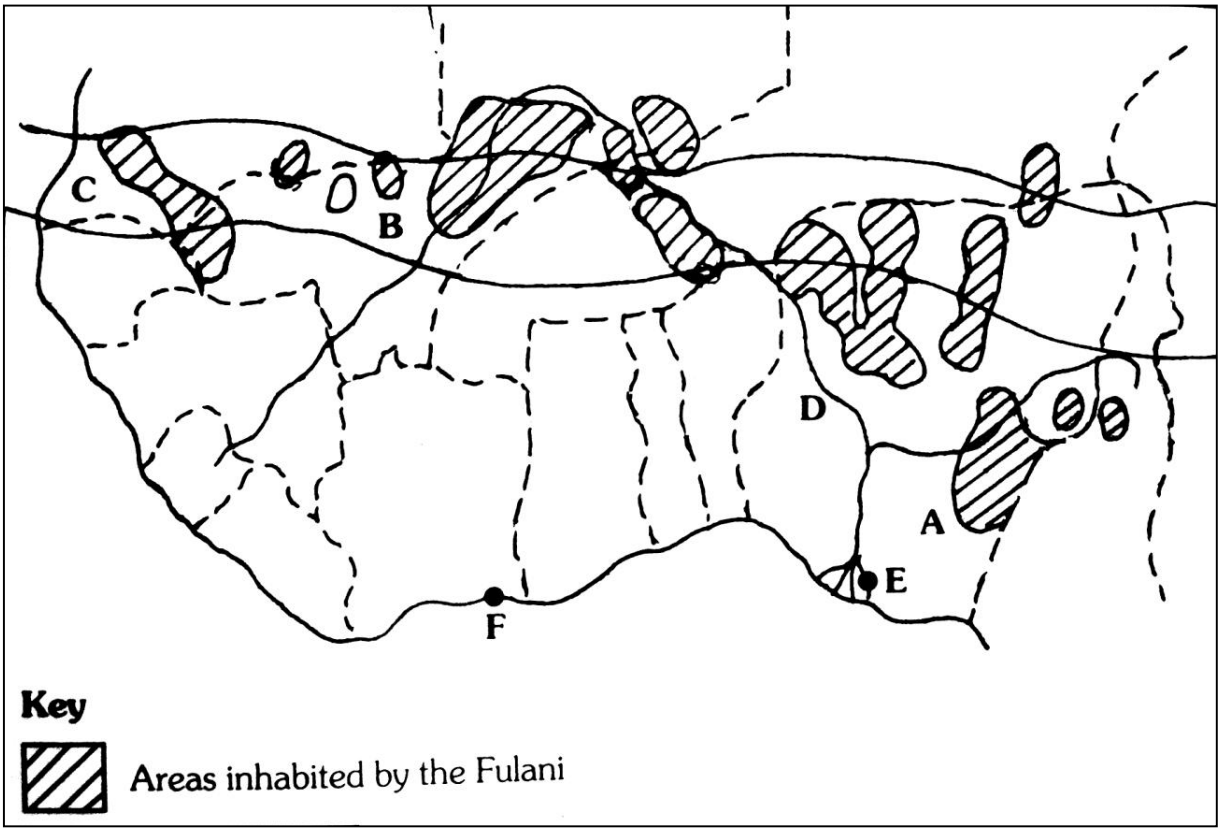
iv) any two slave trade routes.

b) Explain factors which have favoured nomadism in the area shown on the sketch map.

c) Outline the problems faced by Fulani nomads

d) With reference to any one country inhabited by the Fulani identify the steps being taken to solve the problems they are faced with.

3. Study the sketch map showing areas inhabited by the Fulani and answer the questions which follow.



a) Name the

i) countries marked A, B and C

ii) rivers marked D

iii) towns marked E and F

b) Explain factors which limit the:

i) Northward movement of the Fulani.

ii) Southward movement of the Fulani.

c) Referring to country marked A:

i) Describe the characteristics of nomadic pastoralism practised by he Fulani.

ii) Identify the steps being taken to mordenise the livestock industry

iii) Explain the contribution of the livestock industry to any one country inhabited by the Fulani.

RANCHING

A welcome feature of recent development in animal husbandry has been the movement from pastoralism to ranching. With United Nations or government help, nomads in many countries are being encouraged to settle down and adopt ranching as a way of raising cattle.

Characteristics of ranching

1. The farms are sub-divided into a series of fenced off sections called paddocks. The cattle are moved from paddock to paddock in such a way that once a paddock has been grazed, it has enough time to fully recover its grass cover before it can be used again.
2. The carrying capacity of land is strictly followed. There are never too many animals which lead to overgrazing.
3. Animals are provided with permanent water systems in each paddock to avoid long treks to water points.
4. Supplementary food for the livestock is always available e.g. fodder crops.
5. Animals are grazed on permanent farms.
6. The livestock is reared for commercial purposes.
7. Selective breeding is done to produce high quality breeds.
8. Record keeping is done.

From the above, one can see that this is a departure from the traditional system of livestock rearing. Ranching as a method of livestock rearing solves many problems of nomadic pastoralism. The most notable ranching schemes in Africa are found in Botswana, Nigeria, Bie plateau of Angola, Zambia and Zimbabwe.

RANCHING IN BOTSWANA.

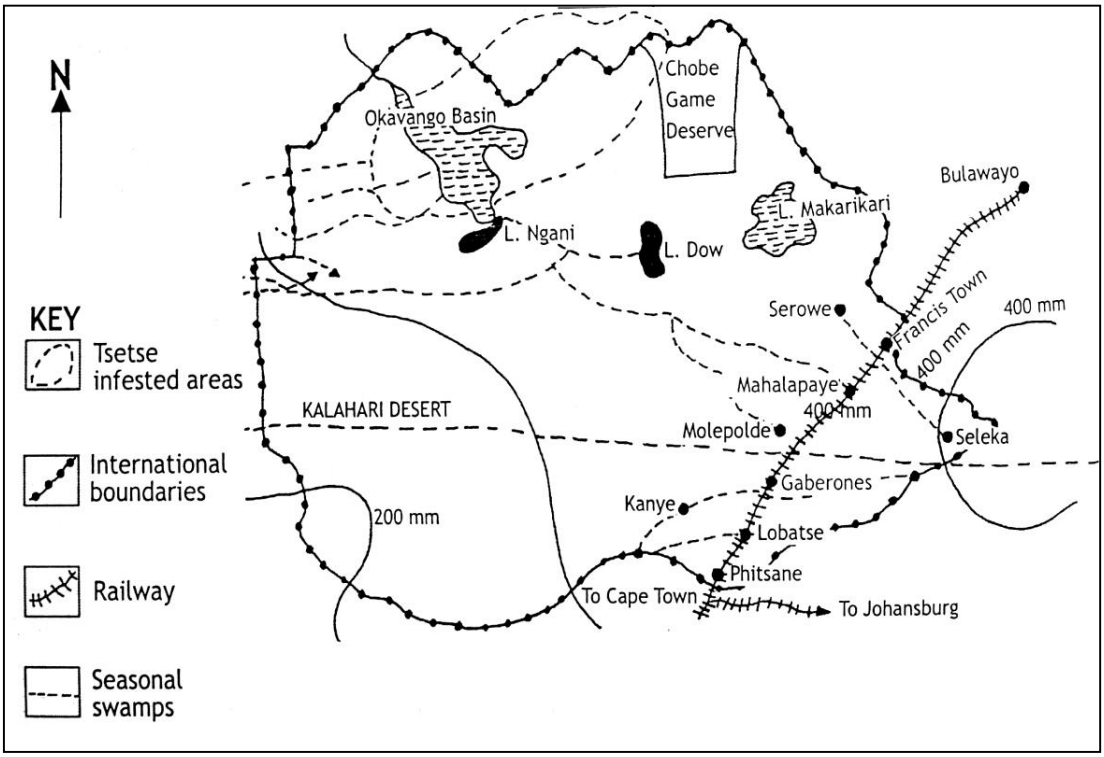
Botswana is a country which until recently was dependent on cattle and cattle products for export earnings. Most of the country receives low and unreliable rainfall and frequent droughts caused the cattle to die in thousands. There was therefore need to modernize the livestock industry and this was first done by setting up demonstration ranches.

Conditions that have favoured the establishment of demonstration ranches in Botswana.

1. To teach farmers modern methods of animal rearing e.g. principles of paddock grazing, how to build simple dams and cattle dips e.t.c.
2. Government policy to improve on beef production and management.
3. Availability of capital to set up demonstration ranches from government and European Economic Community.
4. Availability of both domestic and foreign market for beef. Botswana exports most of her beef (meat) to United Kingdom via South Africa Railways.

5. Presence of large tracks of land due to very low population density of less than 10 persons per square kilometer.
6. Low and unreliable rainfall which is unsuitable for crop production. Animal rearing therefore had to be developed.
7. The local breeds were poor and had to be improved.

MAP OF BOTSWANA



Most of the demonstration ranches were set up at Kanye as indicated on the map above. Kanye was chosen because of:

a) Nearness to the market e.g. Gaberones city

b) Nearness to transport routes especially the railway line.

c) Availability of water from seasonal rivers.

d) Availability of land area with low population density.

e) Closeness to the large abattoir and meat factory at Lobatse.

Problems faced by demonstration ranches in Botswana.

1. Resistance from some farmers to change from traditional methods of livestock rearing.
2. Long periods of drought which result into shortage of water for the animals
3. Limited surface water bodies resulting into dependence on underground water.
4. Poor and insufficient pasture due to low and unreliable rainfall.

5. Pests and diseases e.g. those brought by ticks.
6. The sparse vegetation accelerates the role of soil erosion.

Benefits of demonstration ranches in Botswana

1. Many farmers have learnt modern methods of livestock rearing.
2. There has been increased productivity from the livestock industry
3. Farmer's incomes have increased so is their standards of living.
4. There is improvement in marketing of beef and other cattle products through the Botswana Meat Commission. (BMC)
5. Development of factories and meat packers e.g. at Lobatse.
6. Farmers are provided with advice from agricultural assistants and officers
7. Income to government through the export of beef.

Marketing

The Botswana Meat Commission is responsible for buying cattle from farmers. From Kanye, the cattle are driven to the nearest station in the east and railed down to Lobatse to the abattoir and factory in which meat is packed and frozen. Botswana beef is exported to South Africa, Zambia and Britain. Other exports of Botswana include diamonds and copper.

The major problems faced by Botswana in exporting her exports are

a) She is a landlocked country with no easy access to the sea.
b) Export routes are long and transport costs are high. For example Gaberones to Cape Town is 1,520km by railway, 1715km to Maputo and 1,720km to Beira.

REVIEW QUESTIONS

1.(a) (i) Outline the characteristics of shifting cultivation.
(ii) Mention two areas outside East Africa where shifting cultivation is carried out.
(b) Explain why shifting cultivation is carried out in any area mentioned in (a) (ii) above.
(c) State the disadvantages of shifting cultivation.
(d) (i) State any other traditional farming systems in Africa.
(ii) Giving examples outline the steps being taken to improve traditional farming in Africa.

2.(a)(i) What do you understand by shifting cultivation?
(ii) Briefly describe how shifting cultivation is carried out.
(b) (i) Give three differences between shifting cultivation and rotational bush fallowing.
(ii) Name one tribe in Africa which practices shifting cultivation.
(c) (i) Why is shifting cultivation not possible in Africa today?
(ii) State three reasons to explain the problems African countries face in trying to turn to scientific methods of farming.

3. (a) Draw the map of Ghana and on it mark and name
(i) the cocoa producing area
(ii) the railway line used to transport cocoa
(iii) two ports through which the crop is exported.
(b)(i) State four physical conditions suitable for cocoa growth.
(ii) Mention two other crops which can grow under the same conditions as those you have stated in b (i) above.
(c) Describe how cocoa is grown.
(d) What problems are faced by cocoa producers?
(e) (i) Name three products of cocoa
(ii) Name the districts in Uganda where cocoa is grown.

4. (a)(i) Name one country in Africa where cocoa is grown
(ii) Outline the conditions that have favoured the growing of cocoa in the country you have mentioned in a (i) above.
(b) (i) Name any one other crop that grows under similar conditions as those of cocoa.
(ii) Describe how cocoa is processed.
(c) (i) List two uses of cocoa.
(ii) State three problems facing cocoa farmers
(d) (i) Name the port through which the country in a (i) above exports her cocoa.
(ii) Name any two other cocoa producing countries in Africa

5. (a) (i) Draw a sketch map of Liberia showing the rubber growing areas.
(ii) List four conditions that favour the production of rubber.
(b) (i) How is rubber tapped?
(ii) Outline three problems that rubber growers face in its production.
(c) (i) Name two countries where rubber produced in Liberia is exported to
(ii) How is the rubber transported?
(d) (i) State three uses of rubber.
(ii) Name one other country in Africa where rubber is produced.

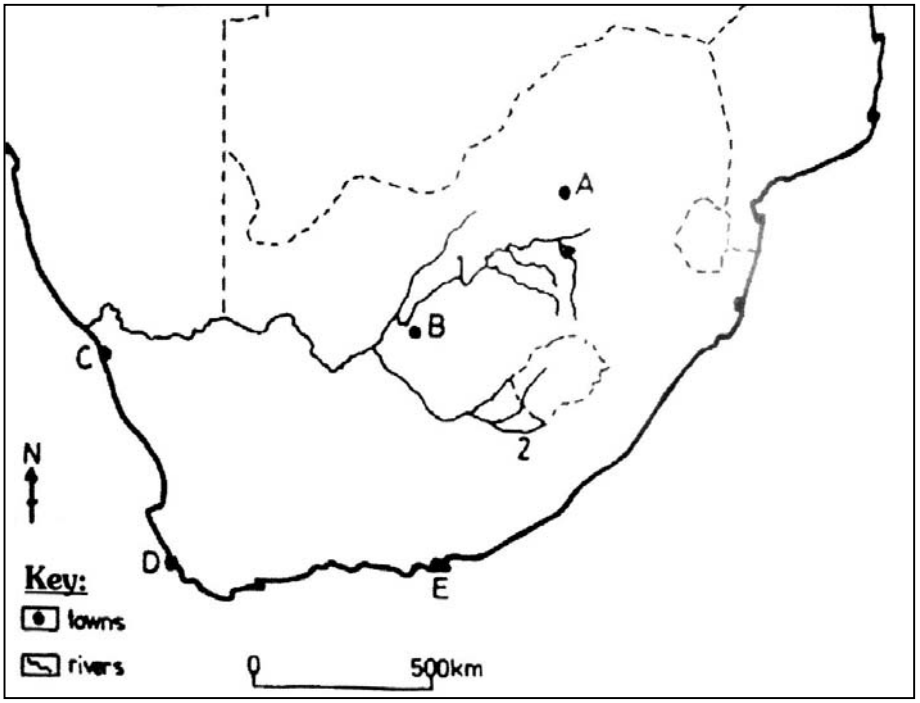
(e) i. How is palm oil processed by Nigerians?
ii. Explain three problems involved in the production of palm oil in Nigeria

6. (a) (i) What is plantation agriculture?
(ii) Name two countries in Africa where plantation agriculture is practiced.

(b) State the conditions favouring plantation agriculture in any one country in Africa.

(c) What are?
i. the advantages
ii. the disadvantages of plantation agriculture

7. Outline map of South-Western part of Cape province in the Republic of South Africa



a) On the map
- **(i)** mark and label areas where viticulture is practiced.
- **(ii)** Name town marked A, B, C.
- **(iii)** Name rivers D, E.
- **(iv).** Name the water body marked X

(b) (i) Describe four different methods of growing vines in the areas indicated in a (i) above.
- **(ii)** What is being done to obtain good quality and high yields?

(c) How are the grapes;
- **(i)** harvested?
- **(ii)** transported to the vineries?

8. (a) Draw a map to show the main sugar cane growing areas in Natal province of South Africa.

(b) Natal and Namibia lie more or less at the same latitude. Why is it that sugar canes are not grown on the Namibian coast?

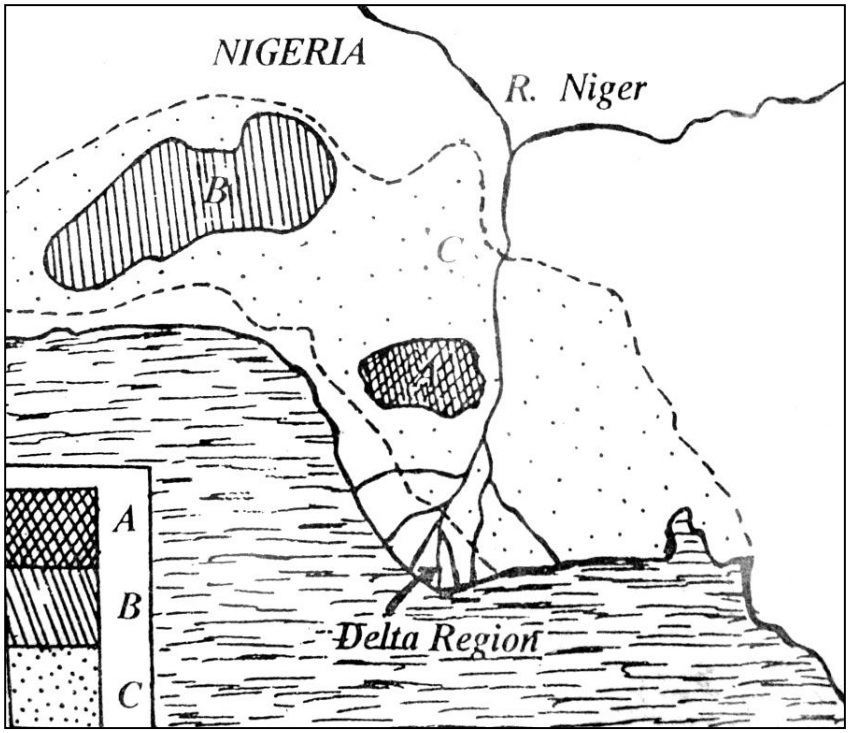
(c)(i) List six advantages of plantation agriculture

(ii) What problems do plantation farmers face?

(d) (i) Name two other countries in Africa (outside East Africa) where sugar cane is grown on plantations.

(ii) List the bi-products of sugar

9. Map of Southern Nigeria Showing the Major Crops Grown.



a) Which crops are grown in the areas marked?
(i) A **(ii)** B **(iii)** C

(b) Describe the physical factors which have led to the growing of the crop shown on the areas on the map.

(c) (i) State the methods used in the growing of the crop at area marked
A
B

(ii) What are the advantages and disadvantages of the methods named in c (i) above?

10. (a) Draw a sketch map of West Africa and on it mark and name
i. areas occupied by Fulani nomads
ii. the 1000mm isohyets

(b) Explain the factors that have favoured nomadism in the area shown on the map.

(c) Outline the problems faced by Fulani nomads.

(d) With reference to any one country inhabited by the Fulani, identify the steps being taken to solve the problems caused by the nomads.

11. (a) Describe the reasons that have led to
i. nomadic pastoralism in the Sahel region
ii. the establishment of demonstration ranches in Botswana

(b) Explain the problems faced by
i. nomadic pastoralism in the Sahel region
ii. the establishment of demonstration ranches in Botswana

(c) State the
(i) benefits of demonstration ranches in Botswana
(ii) effort being taken in the Sahel region to improve livestock industry.

FISHING IN AFRICA

INTRODUCTION

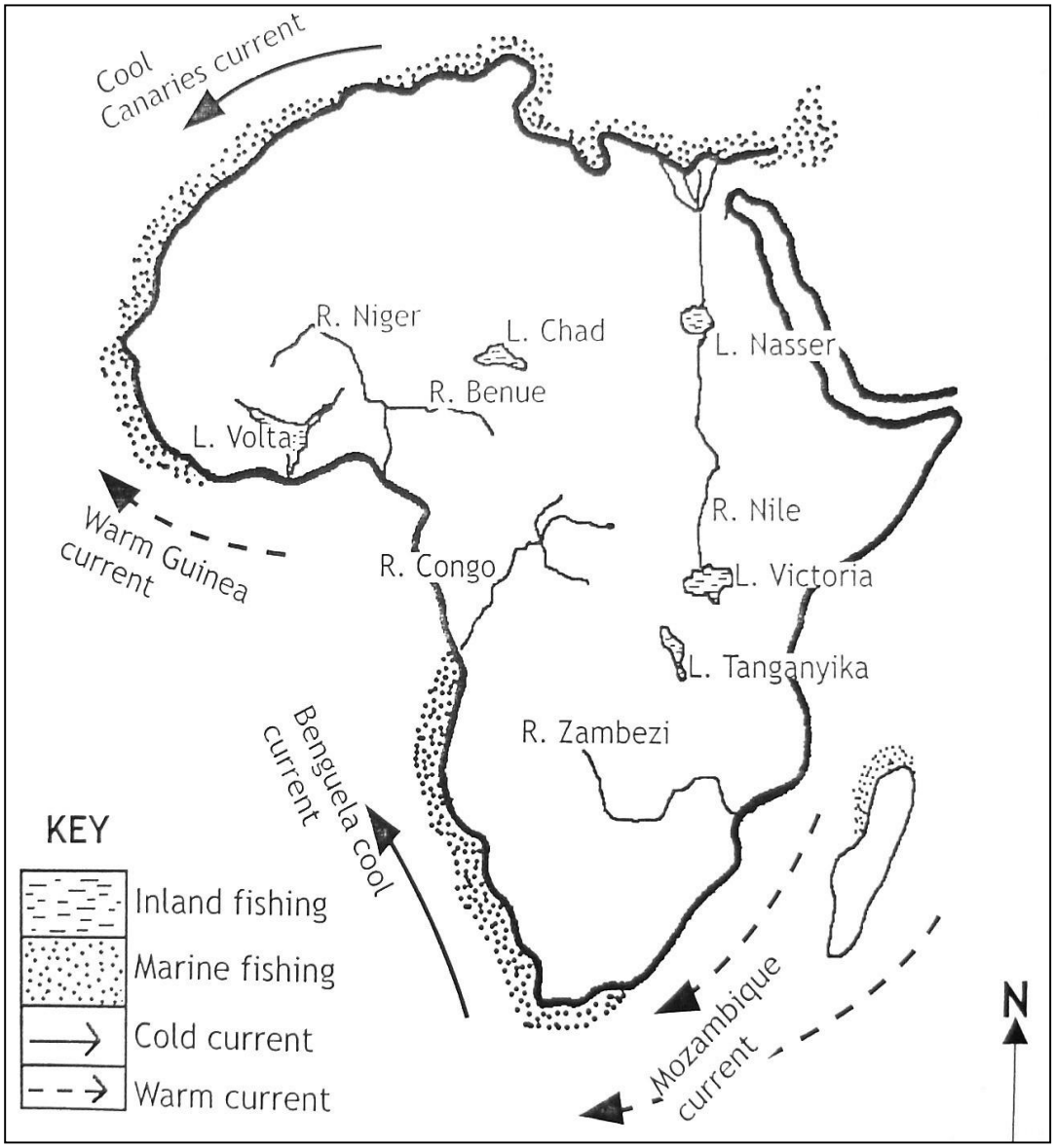
The tern fishing simply refers to man's activities that involve the exploitation of water resources such as fish, seals, crabs, prawns, lobsters, oysters, sea weeds and whales. Fishing is one of the most important activities of man today.

AFRICA'S MAJOR FISHING GROUNDS

The major fishing grounds in Africa include.

(i) The Moroccan coast in the Northwest.
(ii) The South African coast.
(iii) The Southwest African coast (Namibia)
(iv) The West African coast.
(v) The East African coast.
(vi) The in-land fresh water fishing grounds e.g. L. Victoria and L. Tanganyika.

AFRICA MAJOR FISHING GROUNDS



The fishing industry in Africa is generally not well developed. Africa is not catching enough of her own fish. Other countries are doing this, mainly the rich which can afford big ships and expensive equipment. However, the situation is gradually changing and fishing activities are increasing.

SOURCES OF FISH

1. **Inland lakes, rivers and swamps.** The most important lakes include L. Chad, L. Malawi, L. Tanganyika, L. Chilwa, L. Nasser and L. Kariba. The most important sources of fish caught from the inland fisheries are Nile perch and Tilapia. (fresh water fish)
2. **Seas:** Africa's seas provide some of the best fishing grounds in the world. The fishing grounds are used along the coasts of South Africa, Namibia, Angola, Nigeria and Ghana. Pelagic and demmersal fish are caught. (marine fish)

In addition to the above sources, artificial ponds have been constructed and fish introduced into them. Artificial ponds are widely used in Zaire, Malawi and the activity is referred to as fish farming.

Factors which favour fishing in Africa

1. Presence of a number of fishing grounds e.g. lakes, rivers, swamps, ponds and seas.
2. The presence of a shallow continental shelf which is generally less than 62m in depth. This encourages sunlight filtration thus encouraging growth of plankton which fish feed on.
3. The meeting of warm and cold ocean currents helps to oxygenate the water providing ideal conditions for fish growth. It also provides conditions for growth of plankton which fish feeds on e.g. the cold Benguela current flows northwards to the warm equatorial region.
4. Existence of a large population of people to provide market for the fish.
5. The presence of a long coastline.
6. The indented coastline e.g. coastal areas of Nigeria and Ghana make it easy to construct harbours and landing sites.
7. Improved and skilled personnel with modern fishing tools.
8. Abundance of fishing species most preferably for commercial value.
9. Improved transport network that connects fishing grounds to market.
10. Government policy that supports fishing.
11. Favourable climate for fishing metabolism.
12. Improved preservative facilities.

IMPORTANCE OF FISHING

1. It's a source of food rich in proteins.
2. It provides income for the fishermen.
3. It earns foreign exchange when exported.
4. Other fish products are produced e.g. glue, cooking oil, fish meat, fertilizers, animal feeds, cosmetics, and lubricants.
5. It has led to development of sea ports for example Cape Town and Casablanca.
6. It leads to the development of important infrastructure e.g. roads, training institutions, processing factories etc.
7. It provides area for research and study purposes.
8. It provides sites for tourism in form of sport fishing.

PROBLEMS FACING FISHING IN AFRICA

1. Inefficient fishing techniques of curing, storing, catching, and transporting the fish.
2. Poor refrigeration for example the rivers, in the Western part of upper Volta are well stocked with fish but storage facilities and transport are lacking.
3. Fishing by non-African countries off the coast of Africa especially in West Africa by ships from other countries such as Japan and Russia.
4. Absence of deep bays penetrating into the interior to establish good ports.
5. The presence of water weeds.
6. Indiscriminate fishing leading to extinction of fish.
7. Coral reefs tear off nets and polyps compete for planktons.
8. Under fishing.
9. Prolonged droughts reduce water levels in the lakes leading to the death of fish and interfering with multiplication of plankton.
10. There is a problem of competition from other leading exporters of fish and fish products.
11. Lack of adequate market for fish with in Africa due to traditional beliefs and low income.
12. Lack of adequate capital to invest in the industry.
13. Competition for fishing grounds among countries e.g. countries like France, Spain and Poland have their fishing vessels off the coasts of Mauritania, Senegal and Guinea. There is a problem of fishing rights.
14. Poorly developed transport routes such that fish caught cannot easily be marketed.
15. Most of Africa lies within the tropics with high temperature all year round. This result in rapid deterioration of fish once caught.
16. Political instability which has characterized many African countries which prevents long term planning necessary for the development of the fishing industry.

POSSIBLE SOLUTIONS TO THE PROBLEMS AFFECTING THE FISHING INDUSTRIES

1. Encouraging fishermen to form cooperative fishing societies to overcome the problem of capital, transportation and market for fish.
2. Government should extend loans to fishermen to set up processing plants.
3. Government should endevour to look for markets on behalf of the fishermen.
4. Improvement on the existing transport routes to enable easy and quick marketing of fish.
5. Government should provide training and resources into the fisheries to over come the dangers of over fishing and poor exploitation of the water resources.

6. The government should put in place laws discouraging indiscriminate fishing especially in the inland water bodies.
7. There is need to re-stock the already over fished water bodies through transferring small fish species from one water body to another or by introducing new fish species.
8. There is need to fight against pollution along the African coasts so as to ensure survival of the fish species.

METHODS OF CATCHING FISH IN AFRICA

Both simple and modern methods are used for catching fish in Africa.

SIMPLE METHODS OF CATCHING FISH

1. **Spearing, use of bows and arrows, and the use of poison** are the simplest methods of catching fish. However in many countries they are dying out.
2. **Use of light:** Fishermen lower the open net into the water and shine a lantern above the water which attracts swarms of small fish. The nets are then quickly scooped up into the boat. This method is used for catching fish such as Dagga in L. Tanganyika.
3. **Use of baskets:** There are different methods of catching fish using baskets
   (a) Baskets are placed in water and people are made to stamp their way through the water to frighten the fish into the baskets where they are caught.
   (b) Another basket method involves the use of cone shaped baskets which are held in swiftly moving waters so that unsuspecting fish are caught and lifted out before they can escape.
4. **Hook and line method:** It involves a line carrying a bait. It can only catch one fish at a time.
5. **Beach seining:** This method is used in the shallow waters where nets are aerated from the shore. One end of the net is tied on the canoe and is cast into the water while the other end is held at the shore. Ropes are pulled from the shore to get the fish trapped. This method is common along West African coasts e.g. in Ghana and Nigeria.

MODERN METHODS OF CATCHING FISH

1. **Long lining:** This involves the use of a long line of rope that trails behind the boat. On the rope, hundreds of baited hooks on several strings which are thrown in water. The rope is then pulled back into the ship or boat and the fish are removed from the hooks.
2. **Purse seining:** This involves the use of two boats, one large and one small with gill nets. The nets are supported at the top by floats and at the bottom by weights.

The small boat suspends the net in the water by pulling it around a shoal of fish. The fish get caught by the gills within the net. The fish is then pulled into the big boat and transported to the shore.

3. **Trawling:** This involves the use of a cone shaped bag which is dragged along behind the ship. The fish get caught as the mouth of the trawl net is open. The trawl net is then closed and the fish is emptied into the ship.

FOR DIAGRAMS ON MODERN FISHING METHODS, REFER TO PAGES 80, 81 AND 82

METHODS OF PRESERVING FISH

Most fish caught in Africa is consumed fresh, but as fish spoils very rapidly under hot tropical conditions, if the catch is not to be consumed immediately, it must be preserved in some way. Simple methods of preservation are used and among these are smoking, drying, salting and frying. However today there is increasing use of refrigerators and refrigerated trucks for preserving fish and for fish canning.

MARKETING OF FISH

Although much fish is consumed by the catching industries, some is exported. Countries exporting fish include South Africa, Namibia, Angola, Morocco, Mauritania, Mali, Nigeria and Chad.

Uses of fish

1. Fish is used as food and is one of the most valuable sources of protein
2. Fishing leads to generation of employment opportunities to fishermen and other fish related services.
3. Fish is used in the manufacture of animal feeds
4. Used in the manufacture of fertilizers
5. Fish is used as leather material for shoes, belts and bags.
6. Fish is exported earning the respective countries foreign exchange.
7. Fish is used in the manufacture of edible oil used in cooking.

HOW THE FISHING INDUSTRY IN AFRICA CAN BE IMPROVED

1. Introduction of improved methods and techniques of fishing e.g. motorized vessels, trawling and purse seining
2. Introduction of better fish preservation methods e.g. cold storage or refrigeration
3. Training of staff in the management and control of fisheries.
4. Formation of fishing co-operatives to raise capital collectively.
5. Construction and rehabilitation of existing transport routes to link fish landing sites to the markets.
6. Setting up of fish processing factories.
7. Educating people on the value of eating fish.

THE WEST AFRICAN FISHERIES

Fishing is an important occupation along many parts of the West Africa coastline and many of the rivers and lakes are also intensively fished. Countries such as Ivory Coast, Mali, Mauritania and Senegal are able to provide a small surplus of fish for export.

The bulk of West Africa's annual catch of fish comes from the sea. The methods of fishing used vary but most are still simple. In the shallow waters of coastal lagoons, beach seining and fish traps are commonly used. In Ghana, gill nets are used for catching pelagic fish such as herrings. Deep sea fishing is still in its infancy but so far well developed in Senegal, Ghana and Ivory Coast. Methods of fishing used include trawling, purse seining and lining.

Physical conditions that have favoured the development of the fishing industry in Africa

1. Presence of an extensive continental shelf.
2. Abundance of plankton which fish feeds on.
3. Indented nature of the coastline with sheltered harbours suitable for the construction of fishing ports.
4. The meeting of cold and warn ocean currents provides ideal conditions for fish growth e.g. the Guinea and Canaries respectively.
5. Shallow continental shelf that permits penetration of light necessary for plankton growth.

Problems facing the marketing of fish in West Africa

1. Poor storage facilities for fish.
2. Poor transport routes linking the landing sites to the markets.
3. Low and fluctuating prices.

4. Poor preservation methods are used and often fish goes bad before being sold.
5. Inferior fish species hence limited market.
6. Poor quality fish producers.

FISHING IN LAKE CHILWA IN MALAWI

Lake Chilwa is a small lake measuring about 38km by 27km. The swamps surrounding open water cover the same area. It is an extremely shallow lake with a depth rarely exceeding 2.5 meters.

Despite its small size and shallowness, it is well known for large quantities of fish caught in it.

TYPES OF FISH CAUGHT

There are three main types of fish caught from L. Chilwa. These are:

a) Mlamba
b) Tilapia or Makumba
c) Matemba

Methods of fishing

a) Fish traps: These are baskets made of split bamboo canes. The fish swim into the large opening which gradually narrows into a small entrance. Once they are through the small entrance into the basket, the fish cannot find their way out again. The baskets are put in swamps or where a stream enters the lake.

b) Lines: Lines with baited hooks are also used. The lines may carry up to several hundred hooks. The hooks are baited with snails or worms. The fishermen collect the fish every two hours and bait the hooks again. This method is usually used to catch Mlamba fish.

c) Spears: Occasionally, men make spears by lying a piece of sharp metal to a pole. This method is used when the Mlamba are swimming through swamps as they go to breed. The water is very shallow and they can be seen easily.

d) Gill nets: This is the most important method used for catching fish on the lake. The nets re made from Nylon threads. The size of the hole in the net or its mesh, determines the smallest size of fish which can be caught. The larger fish can get through past their gills but can get no further. The nets are usually spread out in the open water about 30 meters long.

e) Trawling: This involves the use of two boats with engines which pull a net behind them. The net is called a trawl and fish is trapped in it.

PRESERVATION OF FISH

Most of the fish caught at L.Chilwa is preserved by drying in the sun, smoking and to a lesser extent salting.

Problems facing fishing on L. Chilwa.

1. Poor methods of fishing are used e.g. basket trapping.
2. Poor preservation methods are used e.g. sun drying and smoking fish does not last long.
3. Over fishing.
4. Fluctuation in the water level during alternative wet and dry seasons. During the wet season the water level falls and this reduces fishing activities.
5. The lake is extremely shallow hindering the use of large boats.
6. Indiscriminate fishing which results into catching of many immature fish.
7. Inadequate capital to modernize fishing activities.
8. Poor storage facilities.

REVIEW QUESTIONS

1. Read the passage below and answer the questions that follow.

Africa would appear at first to possess considerable advantages for the development of the fishing industry……Yet it is unfortunately true that the African share of the total catch of fish is only about 6%, and many African territories actually import fish.

Source Jarrett H.R Africa: The New Certificate Geography Series (5th Edition) p 99

a) Outline the factors which "appear" to favour the development of the fishing industry in Africa.

b) Explain the conditions responsible for the low level of development for the fishing industry in Africa,

c) **i.** State any two countries in Africa which export fish.

ii. For any one country stated in c) i) above, identify the steps being taken to improve the fishing industry.

2. FISH PRODUCTION IN SELECTED COUNTRIES OF WEST AFRICA 1984 ('000 tonnes)

Country	**Quantity produced**
Chad	120
Ivory Coast	100
Ghana	220
Mali	120
Mauritania	50
Nigeria	460
Senegal	340

a) i. Draw a bar graph to represent the information contained in the table.

ii. How much fish was caught in the landlocked countries?

b) Describe the:

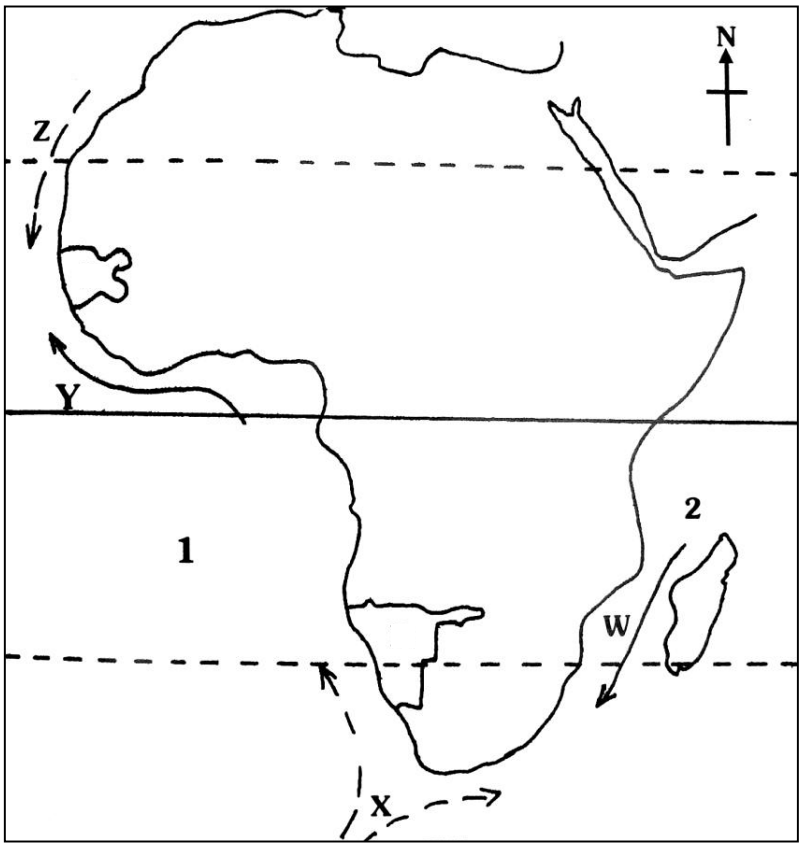
i. physical conditions that led to the development of the fishing industry in either Nigeria or Ghana

ii. fishing methods used in the country selected in b) i) above.

c) i. State any three uses of fish in the country you have selected.

ii. Outline the difficulties faced in the marketing of fish in West Africa.

3. **MAP OF AFRICA SHOWING OCEAN CURRENTS**



a) Name the

i) Oceans marked 1 and 2

ii) Ocean currents marked X, Y, and Z

b) i) Describe the characteristics of currents W and X.

ii) Explain the effect of currents X and W on the fishing in the adjacent areas.

c) For the area adjacent to either ocean current Y or W, outline the;

i. problems facing the fishing industry

ii. steps being taken to improve the fishing industry

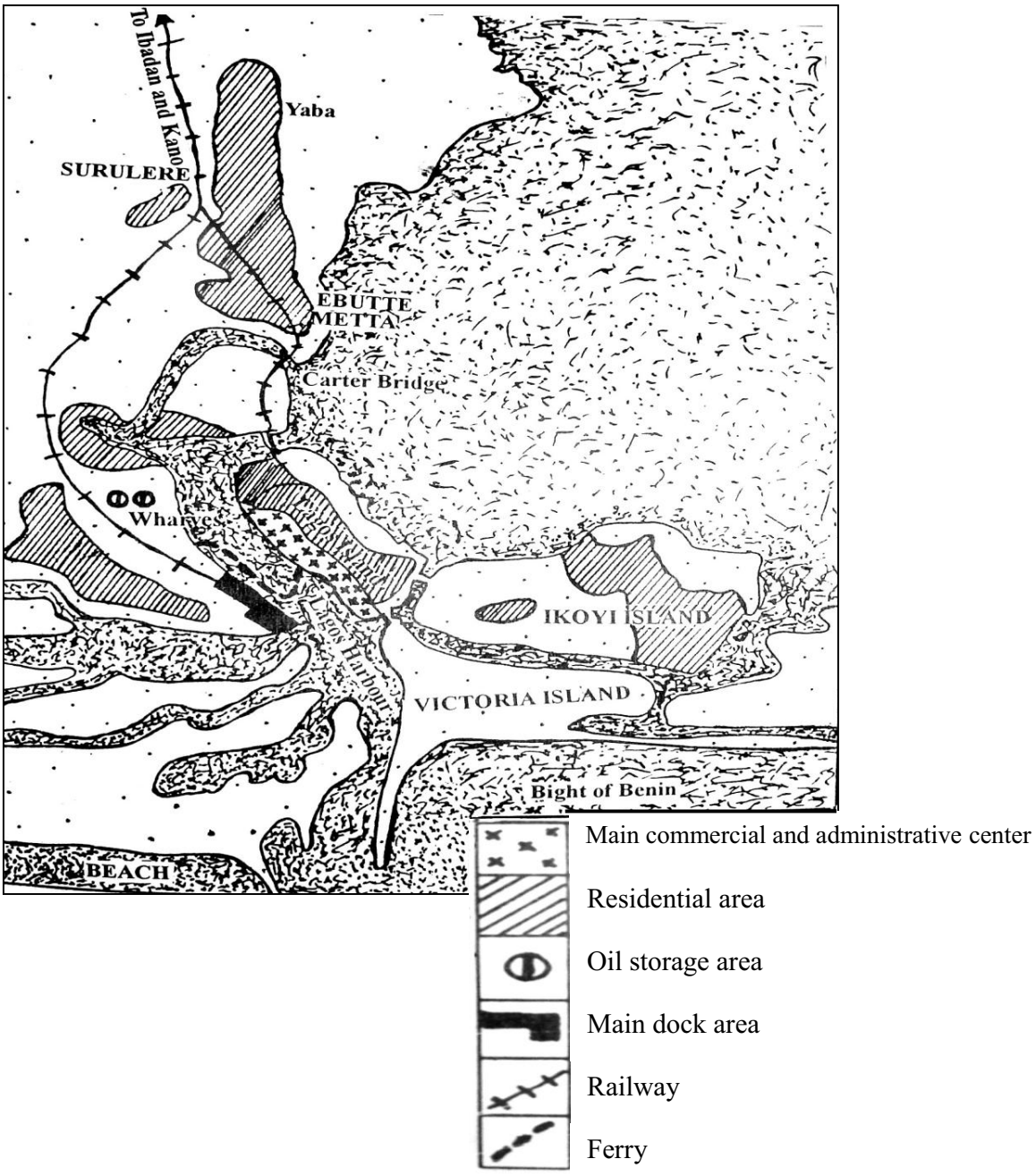
GROWTH OF TOWNS AND PORTS

Africa has experienced rapid growth of towns and ports in the recent years. Some of the most important towns and ports include Cairo, Lagos, Cape Town, Harcourt, Port Elizabeth and Maputo. Some of the above are discussed in detail below.

The development of Lagos.

The development of Lagos is probably the best example of the development of the major town and port in Africa. It shows how history, physical geography, and economic development have contributed to the growth of a major city and port.

THE SITE OF LAGOS



Factors that led to the growth of Lagos as a port.

1. Location at the head of Lagos lagoon. The break in the long sand bar provided an entrance to the calm waters of the lagoon and safety from the ponding surf.
2. The presence of a well sheltered harbour
3. The presence of the islands of Lagos and Apapa mainland for loading and un loading facilities e.g. the construction goods, sheds.
4. Easily defensible position.
5. Presence of a deep dredged channel of over 8 metres deep connecting the port to the open sea.
6. Due to its location, it acts as an entre-port. This is the point through which exports and imports pass.
7. Low tidal range.
8. Ice free conditions hence used all year round.
9. Easy access to the hinterland.

Problems facing Lagos as a port.

1. Traffic congestion due to ever increasing traffic
2. The low lying altitude results into flooding after heavy rains.
3. Inadequate supply of fresh piped water due to rapid population growth.
4. Communication between Lagos island and the mainland is difficult.
5. Pollution of air and water due to many industries.

Exports handled by Lagos port.

Lagos port handles 60% of Nigeria's exports. They include cocoa, ground nuts, rubber, hides, skins and palm oil.

Imports handled by Lagos port.

Imports through Lagos port include; cars, electrical machinery, lorries, constructional steel, fuel oils, salt and sugar.

Factors that have led to the development of Lagos as a town.

1. Historical factors; Lagos was extensively used as a slave trading center and later as a colonial town.
2. Rich hinterland with agricultural resources such as palm oil, rice, yams, ground nuts, cassava e.t.c and minerals e.g. oil
3. Well developed transport and communication lines by road, railway and air.
4. Lagos was for long the capital of Nigeria. This attracted a number of administrative offices.
5. High population density of over 2500 people per square kilometre.

Functions of Lagos town.

1. Industrial centre

Industries found in Lagos include textile, baking, printing, plastics, motor vehicle assembly, saw milling and vegetable oil milling.

2. Financial centre

Lagos is a leading financial centre with major banks, insurance companies, financial houses and others.

3. Commercial centre

Lagos has various trading activities in shops and markets.

4. Administrative centre

Lagos has many offices dealing with public administration, ministry offices, and head offices of state run organizations.

5.Residential town

Lagos is a residential town housing thousands of people working in industries, administration and other sectors.

6. Cultural centre

Lagos has many education institutions, art galleries, entertainment centres and religious buildings.

7. Nodal point

Lagos is a centre from which major air, road and railway routes radiate from. It is also the busiest sea port in Nigeria.

Problems facing Lagos town

1. Removal of capital city from Lagos to Abuja. This hopes to reduce the number of administrative jobs and associated jobs such as printing. This is to help reduce congestion.
2. Increasing the number of states from 12 to 19 and each state with its own capital for administration.
3. Expanding the town to accommodate the population.
4. Construction of bridges between the island and the mainland. e.g. Carter bridge and Eko bridge.
5. Encouragement of self help projects in order to generate employment opportunities.
6. Development of health care centres such as hospitals and clinics.
7. Environmental awareness programmes are in place to reduce the effects of pollution. Proper disposal of industrial and domestic waste to reduce pollution and improve sanitation.
8. Tighten the security in order to enforce the law and reduce crime.
9. Expansion of the town vertically by building sky scrappers. This will solve the problem of limited land for expansion.
10. Construction of housing estates to reduce the development of slums.

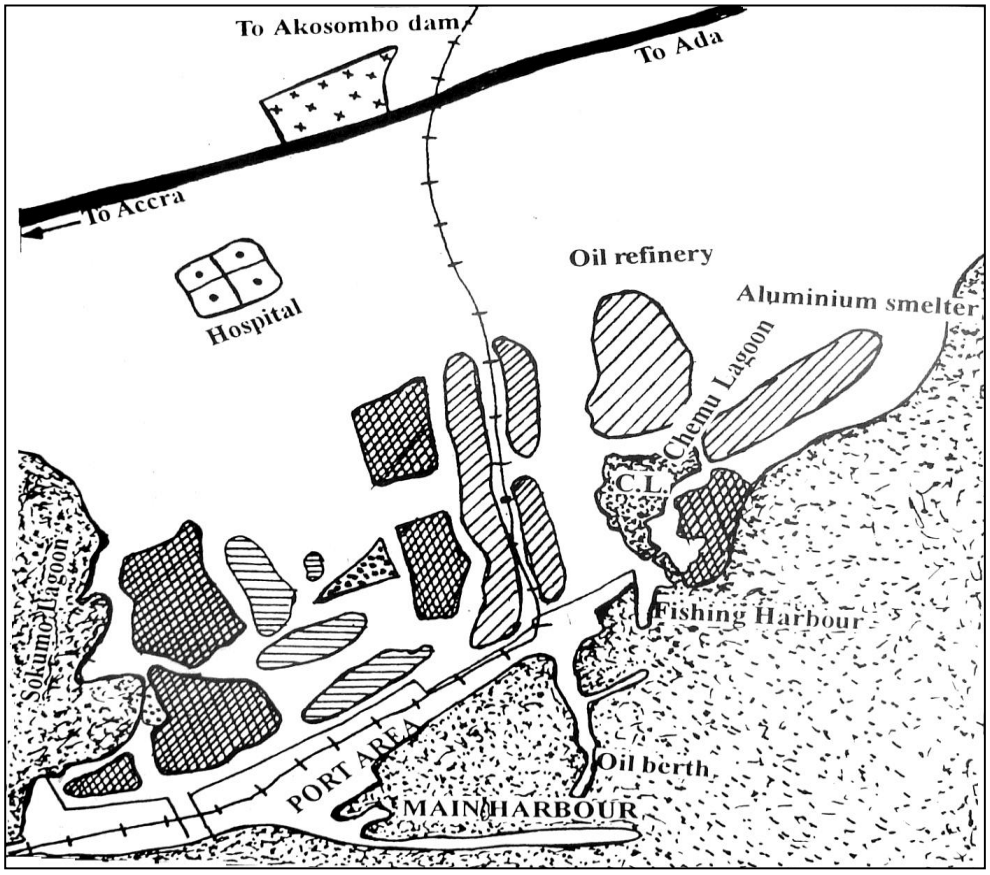
TEMA PORT

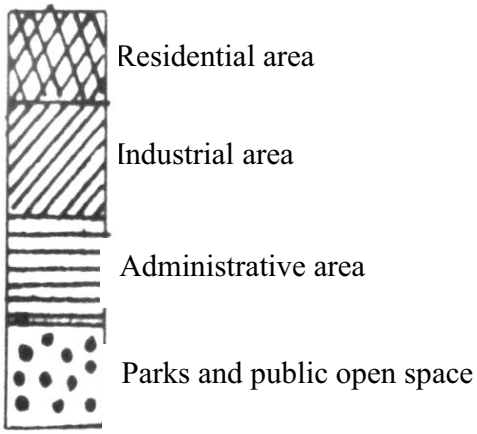
The site of Tema port is 30km East of Accra in Ghana. The port has rapidly developed and it has reduced strain on ports such as Takoradi.

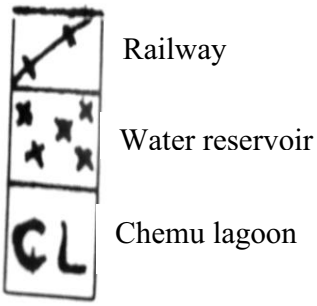
Factors that have favoured the location of Tema port

1. Presence of deep off shore water.
2. Presence of well sheltered harbours as shown on the map above.
3. Low tidal range.
4. Easy access to the hinterland.
5. Availability of building stones in the nearby Shai hills.
6. Closeness to the Volta project.
7. Presence of calm waters of the lagoon.

SITE OF TEMA







Functions of Tema port

1. Entre-port through which exports and imports pass.
2. Industrial centre e.g. Aluminium smelting, oil refining, lorry assembly, paint, cement are some of the industries at Tema.
3. Commercial centre with many shops, markets e.t.c
4. Residential centre with many housing estates, road, railway, and water routes.
5. Communication centre linked to major road, railway and water routes.
6. Fishing port.

Problems affecting the development of Tema port

1. Congestion
2. Overcrowding
3. Lack of room for expansion
4. Silting of the harbours
5. Pollution from industries

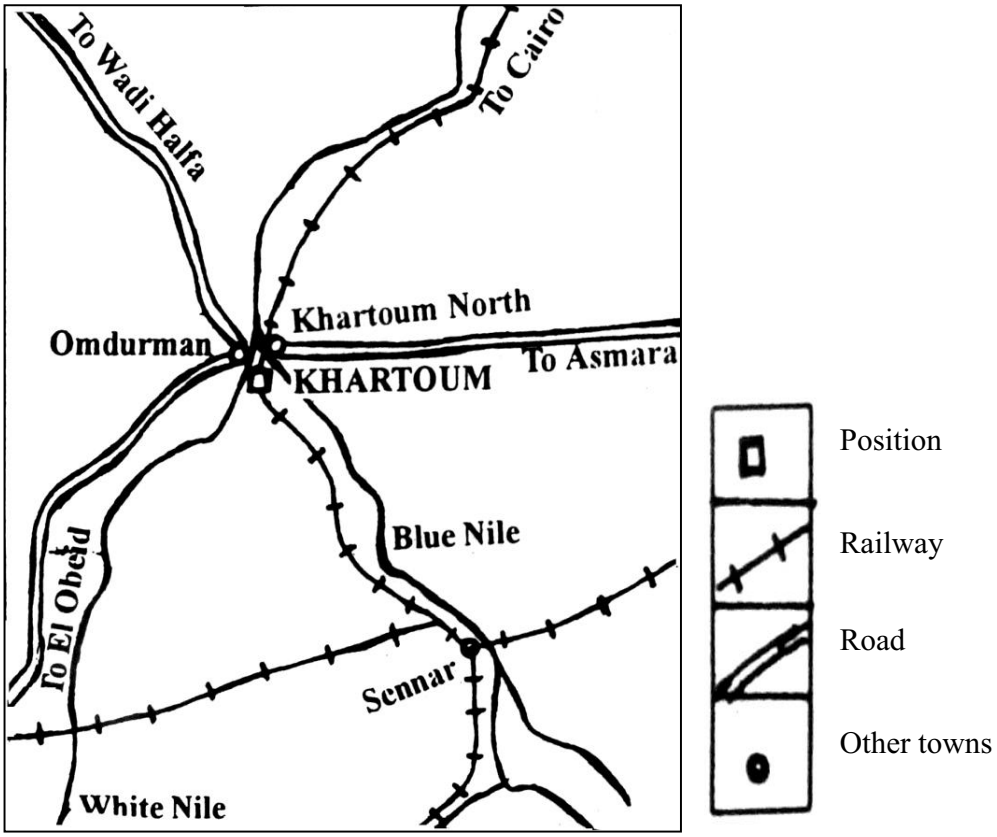
Steps being taken to solve the above problems

1. Dredging of the harbours to reduce silting
2. Expansion of the port area
3. Proper disposal of industrial wastes
4. Developing the port vertically to reduce congestion.

KHARTOUM CITY IN SUDAN

Khartoum is the capital city of the Sudan republic. It lies at the confluence of the White and Blue Niles, the two rivers joining and flowing northwards as the Nile river.

THE SITE OF KHARTOUM



Factors for the growth of Khartoum

There are various reasons why Khartoum is located where it is. These include;

1. There was large area of gently sloping relief therefore easily settled.
2. Most of Sudan is arid. Khartoum was situated where the Blue Nile and White Nile meet hence availability of large volumes of fresh water.
3. Easy to defend position due to water barriers.
4. Presence of river Nile as a means of transport. In addition, it was easy to construct roads and railways in the region due to relatively flat relief.
5. Presence of fertile soils brought down by the Blue Nile river which attracted the settlement.
6. More or less centrally located in the middle of Sudan to serve as the capital city.

Functions of Khartoum

1. Administrative centre: Khartoum is the capital city of Sudan with most of the government ministry headquarters.
2. Industrial centre with industries such as textiles, repairing, grain milling, glass ware, pottery and others.
3. Commercial centre: Khartoum is a market centre for livestock, cloth, spices, and many other commodities.
4. Residential city with millions of residents who work in industries and other sectors.
5. Education function with many schools, colleges and universities.
6. Communication centre with roads, railways and water routes radiating form it. The city's airport is situated on the mainly European airline routes serving Africa.

Problems facing Khartoum city

1. Congestion which results in overcrowding.
2. Traffic jams due to high vehicle density.
3. Pollution of the environment by industries.
4. Shortage of housing hence slum development.
5. Limited land for expansion.
6. Inadequate social services.

CAIRO CITY IN EGYPT

Cairo is the largest city in Africa and the Arab world with a population of 6 million people.

Factors that have favoured the siting of Cairo city

1. The position at a natural focal point of river Nile and overland routes.
2. Low relief making settlement easy.
3. Availability of large volumes of fresh water from river Nile.
4. Central position in the fertile agricultural area. Food could be produced to feed the growing urban population.
5. High population density.

Functions of Cairo city

1. Administrative centre for Egypt and great political centre for Egypt.
2. Tourist centre with some of the world's most tourist attractions. e.g. the pyramids
3. Industrial centre dealing in grain milling, textiles, brewing and cement manufacture.
4. Communication centre e.g. Cairo airport stands at the junction of routes from Europe, the Middle East, Asia and Africa.
5. Residential function housing more than 6 million people.
6. Great commercial centre: Cairo city faces many problems similar to other cities in Africa such as traffic congestion, overcrowding, slum development and soaring land values.

REVIEW QUESTIONS

1(a) Draw a sketch map to show the position of either Lagos or Cape Town and on it mark and label its hinterland

(b) Explain the factors that led to the development of the port chosen in (a) above.

(c) Name three commodities handled by the port.

(d) **(i)** State other functions of the port chosen in (a) above.

(ii) Outline the problems facing this port.

2. (a) Draw a sketch map to show the position of Khartoum

(b) i. Suggest reasons why Khartoum is located where it is.

ii. Outline its functions

(c) i. State the problems faced by the inhabitants of Khartoum.

ii. How are the above problems being solved.

3 (a) Draw a sketch map of Lagos town and on it mark and name

i. Lagos lagoon

ii. Islands: Victoria and Ikoyi

iii. Lagos harbour

iv. Apapa residential area

v. The industrial area

vi. The railway line

(b) Explain the factors which led to the development of Lagos town

(c) Outline the functions of Lagos town.

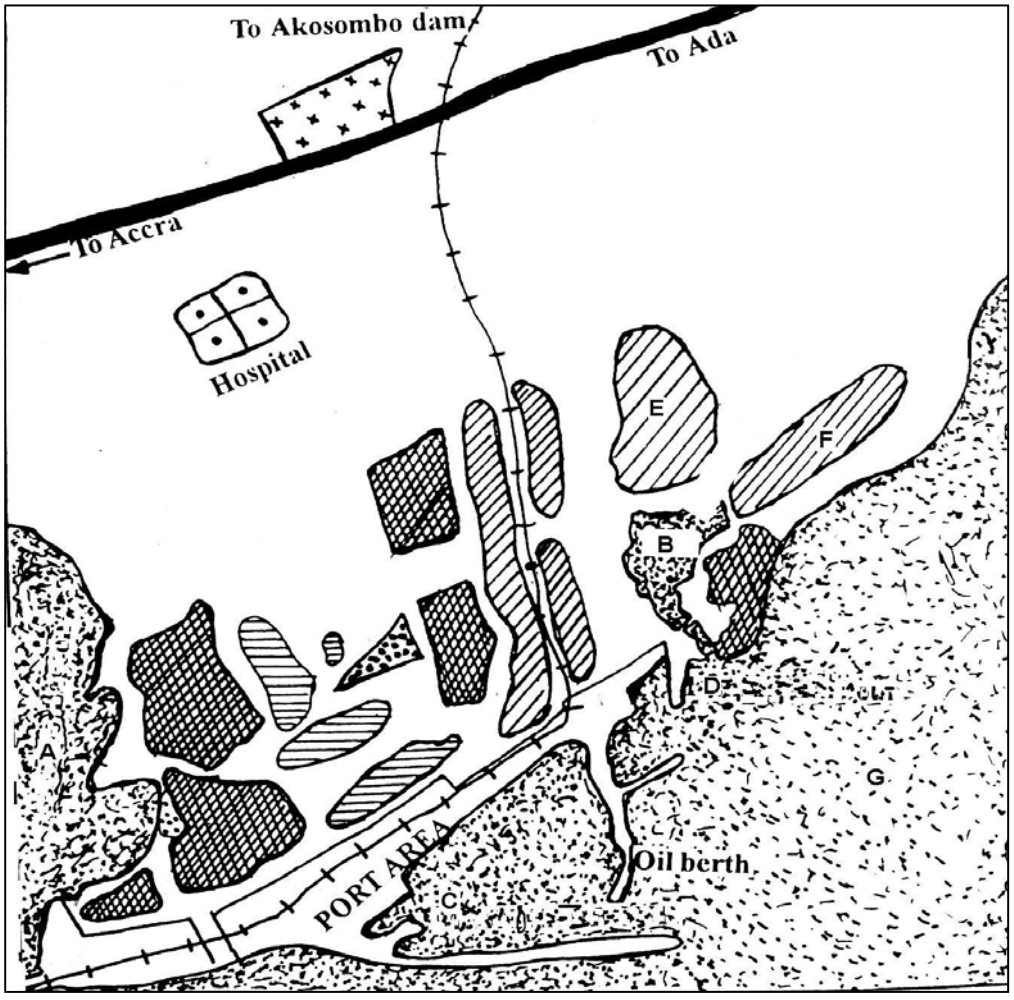
(d) Describe

i. problems facing the development of Lagos town

ii. measures being taken to solve the problems mentioned in d(i) above.

4.

SITE OF TEMA



(a) Name the

(i) lagoon marked A and B

(ii) harbours marked C and D

(iii) industries marked E and F

(iv) ocean marked G

(b) Explain the factors which have favoured the location of Tema port.

(c) Outline the functions of Tema port

(d) Describe the;

(i) problems affecting the development of Tema port

(ii) steps being taken to solve the above problems.

TRANSPORT AND COMMUNICATION IN AFRICA

Transport refers to the physical movement of people and commodities from one place to another. Transport is essential for the economic development of any country or region. Generally, Africa has a poorly developed transport, and communication system. The major modes of transport in Africa include;

(a) Road transport

(b) Railway transport

(c) Water transport

(d) Air transport

THE TRANS AFRICA HIGHWAY

The Trans Africa highway is at the moment only an idea. The route is supposed to run from Mombasa (Kenya) through Uganda, Congo (Zaire), Central African Republic, Cameroon to Lagos in Nigeria. It is true that parts of it already exist as tarmac roads but else where it is only to muddy track.The highway has encouraged unity among the African states where it passes.

Aims of the Trans – Africa highway

1. To encourage trade among the African states. This is because most of the exciting routes are from the interior to the coast rather between individual countries.
2. To open up land locked countries such as Uganda and Central African Republic such that they have an easy access to the sea.
3. The highway has encouraged the exploitation of natural resources e.g. forests in Congo and fish in western Uganda.
4. The highway has stimulated the growth of towns which act as nodal points e.g. Nairobi, Kampala, Tibati, Mamfe and others

5. The highway has opened up markets for both agricultural and industrial products.
6. The highway encourages the spread of new ideas necessary for economic development.

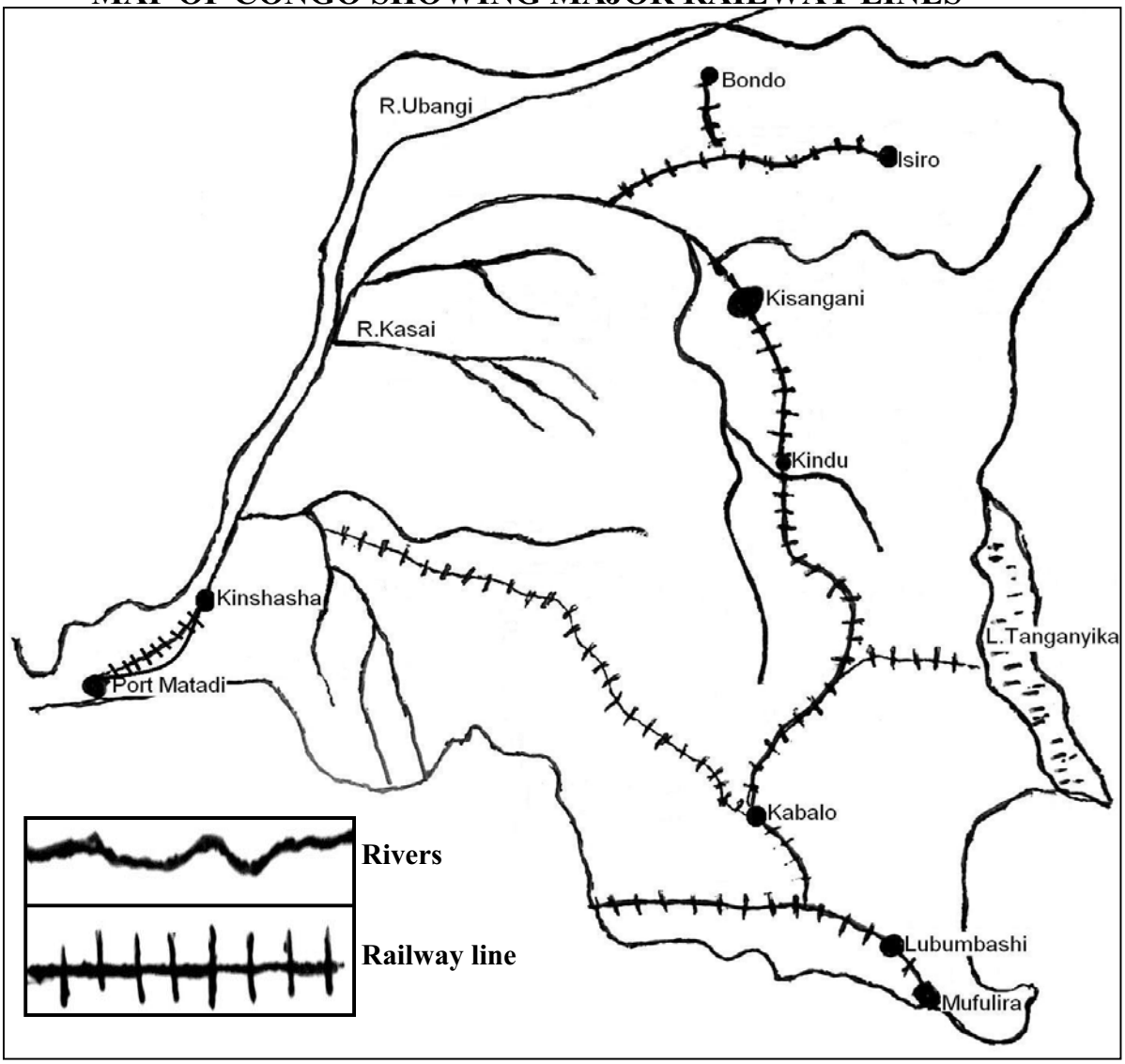
Shortcomings of the Trans Africa highway

1. Some sections of roads e.g. in the Central African Republic are poor quality marrum roads difficult to use especially in the wet season when they become muddy.
2. Differences in political ideologies reduce the use of the highway e.g. border closures, refusal of entry e.t.c
3. Political instabilities in the region hinders the use of the highway.
4. High costs of maintenance by the individual countries.

TRANSPORT IN THE DEMOCRATIC REPUBLIC OF CONGO (ZAIRE)

Generally, Congo has poorly developed transport routes. The main modes of transport used are railway and road transport.

MAP OF CONGO SHOWING MAJOR RAILWAY LINES



Factors that influenced the distribution of railway network in Congo

1. Resources

The presence of natural resources for example minerals in the south and agricultural materials have encouraged the development of railway systems.

2. Relief

Highlands in the east have hindered railway construction while the low lands in the central parts have made railway construction easy.

3. Tourism

Areas with tourist attractions have railway lines constructed.

4. Towns and Industries

Areas such as Kinshasa, Shaba, Lubumbashi with urban centres and industries have influenced the construction of railway lines.

5. Drainage

There are many rivers, water falls and rapids in between hindering navigation. Short railway lines have been constructed to link the navigable lines.

WATER TRANSPORT IN CONGO

Of the rivers in tropical Africa, the Congo (Zaire) is of particular importance for navigation. It has much more even flow than most tropical rivers. Of the river's 4350km length, 2700km are navigable e.g. several of its tributaries such as the Kasai, the lower Congo (Zaire) is navigable for ocean going vessels as far as port of Matadi some 130km from the sea. Kinshasa is the busiest river port.

Water transport has been difficult to develop in Congo because

a) Various water falls and rapids along the river's courses.

b) Many rivers which are capable of carrying much trade flow through sparsely populated areas.

c) The rivers tend to meander making the distance covered by them much longer than a similar journey over land.

d) Lack of capital to develop port facilities.

e) The rivers flow through in hospitable land so that they are of little economic significance.

f) Floating vegetation like the water hyacinth

Problems facing the transport sector in Congo

1. The country is too big to be effectively served by road and railway network.
2. The country experiences an equatorial type of climate with heavy rainfall washing away vital section of railway lines and making roads too muddy to be used.
3. The presence of water falls and rapids along the river courses and their tributaries thus making river transport difficult.
4. Transshipment is costly due to costs incurred in loading and unloading from railway to water and vice-versa.
5. Problems resulting from transshipment such as delays and damage to the goods.
6. The thick impenetrable rainforests are difficult to clear and making construction of roads and railways difficult and costly.
7. Dependence on other countries for import and export of goods e.g. goods from eastern Congo are largely imported and exported through Uganda and Kenya.
8. Poor planning of transport services
9. Lack of adequate capital to develop transport routes and facilities.
10. Low levels of technology.

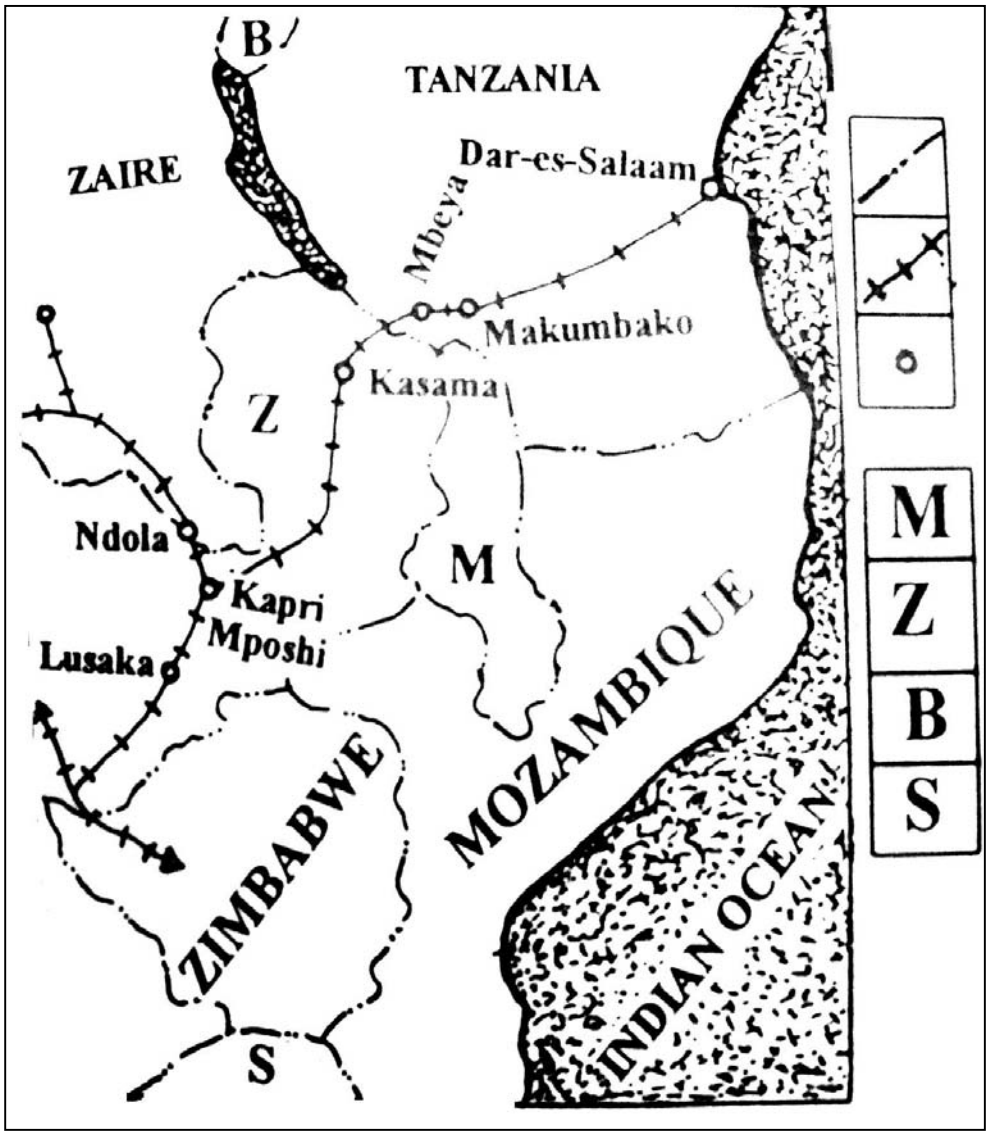
Steps being taken to solve the problems facing the transport sector in Congo

1. Since large areas are covered by impenetrable rainforests. Air transport for both domestic and international connection is being developed.
2. Government policy to be linked to other countries of Africa e.g. through trans Africa highway
3. Containerization of the ports and harbours for effective handling of goods and reduce delays.
4. Building of railway lines e.g. from Maunda to Matadi to avoid expenses of transshipment
5. Development of other ports e.g. at Banana to establish straight link between Shaba and Zaire ports.

THE TANZAM OR TAZARA RAILWAY

The Tanzam railway found in Tanzania and Zambia runs from Kapiri Mposhi in Zambia to Dar-es-salaam in Tanzania. It covers a distance of about 1023km. the railway line was a joint project between government of Tanzania and Zambia.

MAP SHOWING THE TAZARA OR TANZAM RAILWAY



Aims of constructing the Tanzam or Tazara railway

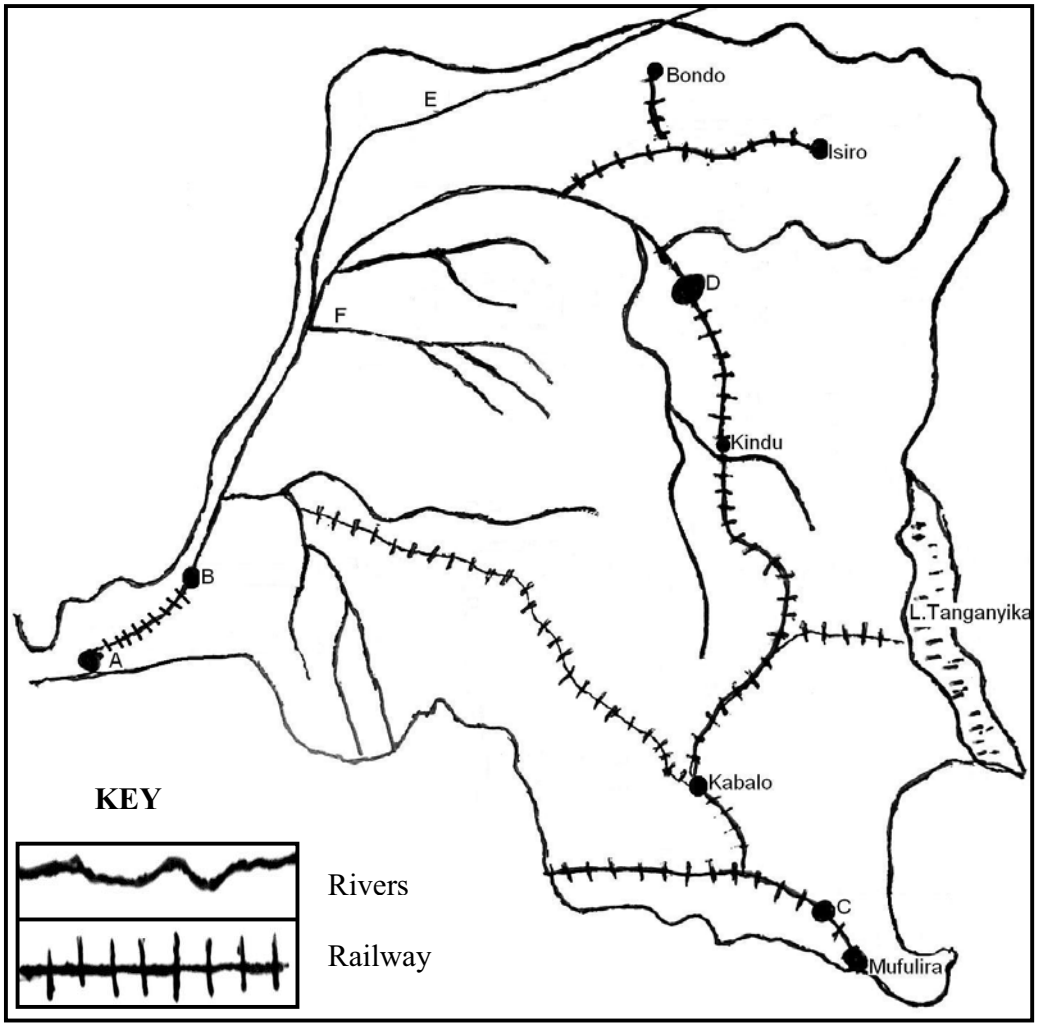
1. To provide Zambia with an alternative route to the sea for both her exports and imports. Independence struggles of Zimbabwe and Mozambique had seriously affected Zambia's only sea route to Beira port. The Benguela railway to Lobita in Angola was too long for economic use.
2. To open up remote parts of southern Tanzania which have resources of coal and iron ore but largely lacked transport system.
3. To reduce transport costs in exporting and importing goods to Zambia.

Benefits of the Tanzam railway

1. The railway line has provided land locked Zambia with reliable access to the sea through a sister state Tanzania.
2. The railway line has opened up remote places of Tanzania and the productivity of the region has increased. e.g. the growing of rice and sugar canes in the Kilombero valley.
3. The railway line has strengthened political ties between Tanzania and Zambia.
4. The railway line has stimulated the exploitation of minerals e.g. copper
5. Importation of heavy machinery and bulky oil has been made easier.
6. The project has provided employment opportunities to drivers, technicians among others.
7. The railway line has contributed to the development of Dar-es-salaam port.
8. Stimulation of industrial growth since raw materials and manufactured goods could easily be transported.

REVIEW QUESTIONS

1. SKETCH MAP OF THE DEMOCRATIC REPUBLIC OF CONGO



(a) Name the;

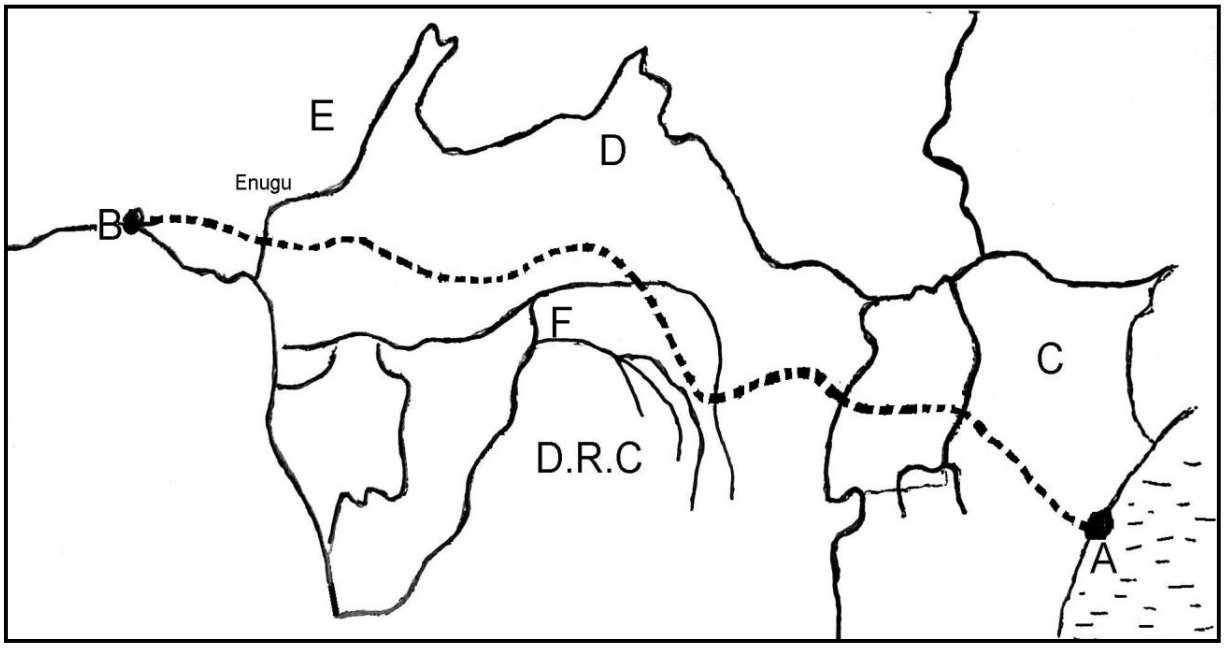
(i) tributaries marked E and F

(ii) town marked B, C and D

(b) Describe the factors which have influenced the distribution of the railway network in the Democratic republic of Congo.

(c) Identify the problems facing the transport sector in the DRC.

2. THE PROPOSED TRANS AFRICA HIGHWAY





The Trans Africa high way

(a) Name:

i. ports A and B

ii. countries C, D and E

iii. river F

(b) (i) State the easiest means of transport between Nairobi and Enugu.

(ii) List three commodities that will be transported along this route.

(c) Describe the obstacles in the construction of the highway

(d) Give reasons to explain why it is necessary to construct this highway.

IRRIGATION FARMING

INTRODUCTION

The term irrigation farming simply refers to the process whereby water is occasionally or constantly applied to the growing crops. Irrigation farming is practiced under the following conditions.

(i) Where an area receives little and unreliable rainfall, unable to sustain crop growing.
(ii) Where the area is experiencing a high evaporation rate making rainfall unreliable.
(iii) Where there is need to increase on agricultural productivity of the area, especially food crops in order to produce enough food.
(iv) Where the crops grown require excess water during their growth e.g. vegetable.

FACTORS FOR SUCCESSFUL IRRIGATION

(i) Availability and accessibility of water resources.
(ii) Relief which is gently sloping.
(iii) Good soils such as loam soil.
(iv) A large capital base and technical know how since the equipment used may be advanced scientifically.

TYPES OF IRRIGATION

(i) Basin irrigation, commonly known as flood irrigation. This type of irrigation was practiced in Egypt for a long time.
(ii) Perenial Irrigation which involves supplying water to the growing crops throughout the year.
(iii) Annual irrigation
(iv) Tank irrigation, occasional rainfall water is tapped and stored so that it can be used during the dry season.
(v) Well irrigation, water is collected from the well by a shaft.

METHODS OF IRRIGATION

(i) Overhead sprinkler i.e. water is pumped through a tube up to the air and sprinkles in form of rain.
(ii) Drip irrigation, this involves setting up of pipes with small holes in them. Water drips out through the holes at a low pressure.
(iii) Canal irrigation, this involves construction of water cannals serving the growing crops where water is needed. This method of irrigation is commonly carried out in gently sloping area.

FARMING IN SUDAN UNDER IRRIGATION

In Sudan more than 75% of all the crops are grown under irrigation. Irrigation farming refers to a process whereby water is occasionally applied or constantly applied to the growing crops.

THE GEZIRA SCHEME

The Gezira irrigation scheme together with its Manaquil extension lies in the huge wedge of land between the Blue and White Niles. It was set up in 1925 by the British colonial government and it was handed over to the Sudanese government on independence.

The Gezira is the largest irrigation scheme in the world. Irrigation goes on all year round using a method called gravitational flow.

Crops grown under irrigation

The main crop grown in the Gezira is cotton. Other crops grown are groundnuts, wheat, lubia and sorghum.

Conditions favouring cotton growing under irrigation on Gezira scheme

(i) The nature of the landscape (relief): The landscape is extremely flat and monotonous. This has provided a number of advantages including:-

1. Easy construction of canals
2. Easy mechanisation
3. Easy construction of transport network.
4. Gravitational flow of water through the canals due to the gentle sloping nature of the land.

(ii) Presence of water from the Niles for irrigation.

(iii) Availability of capital.

(iv) Presence of fertile loam soils at the initial stages.

(v) Clay soils which do not easily let water to go, so the canals do not require concrete.

(vi) Presence of labour.

(vii) Hot and dry climate that discourages multiplication of pests.

AIMS OF THE SCHEME

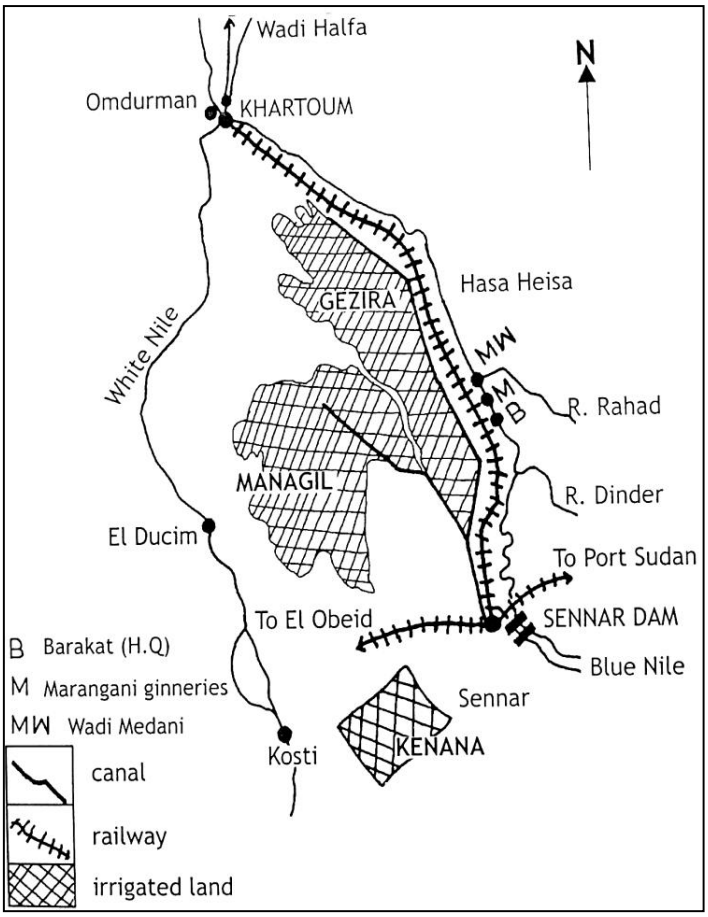
1. Provision of suitable land for cultivation.

2. Provision of employments for the Nomads.

3. To increase on government revenue through the growing of cotton.

4. To provide enough subsistence food crops and reduce famine and malnutrition.

THE LOCATION OF GEZIRA SCHEME



Organisation of Gezira scheme

The scheme is organised by the Gezira board which is concerned with the overall running and administration. The scheme is divided into rectangular blocks of cultivable land. Each tenant farmer possesses between 10-20 ha which are sub-divided into four sections. Of the four sections under a tenant, two are under fallow, one is used for cotton growing and the other for growing of food crops such as beans, maize and the like for home consumption.

The Gezira board provides all the required farm inputs such as seeds, fertilizers, machinery, technical advice and land. In turn, the tenant is supposed to pay for all these after harvesting his cotton crop. The produced cotton is marketed by the Gezira board and the obtained cash is shared in the following ratios

50% to the tenant farmers

36% to the Sudan government

10% to the Gezira board

4% to social services and village councils

BENEFITS OF GEZIRA SCHEME

1. The scheme earns foreign exchange through cotton exports.
2. The scheme provides employment opportunities to various groups of people in Sudan.
3. There has been great improvement in food hygiene and nutrition habits through home economics education to the schemes women.
4. Afforestation programmes have been encouraged on the scheme.
5. Dairy farming has been encouraged on the scheme.
6. Tenant farmers have been provided with clean water from the many deep wells constructed on the scheme.
7. Tenant farmers have been trained in modern methods of farming so as to maintain productivity of their farms.
8. Tenant farmers have been encouraged to develop and maintain their own food gardens. This has greatly improved on food supply to the region and this has reduced on the problem of famine.
9. There has been industrial development at Marangan
10. There has been improvement in infrastructure such as roads and railways.
11. There has been improvement in the standards of living through provision of housing facilities.

PROBLEMS FACING GEZIRA SCHEME

1. There are some crop pests and diseases like black arm worms and leaf curl.
2. The presence of rhizome like weed called Seid which compete with the growing crops in terms of soil nutrients.
3. Canals are blocked by silt due to deposition of the suspended material in them.
4. The scheme experiences a problem of Bilharzia which is a water bone disease.
5. Sometimes the farms allocated to the tenant farmers have been too large to be managed by single families effectively.

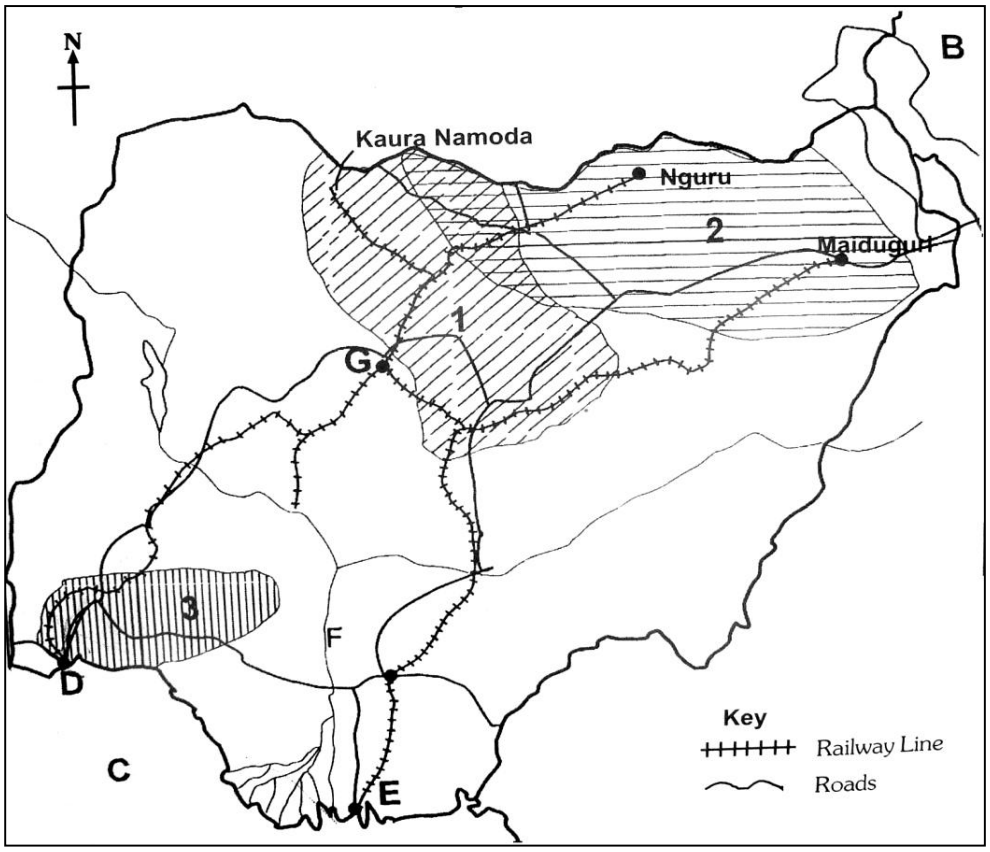
POSSIBLE SOLUTIONS TO THE PROBLEMS FACING GEZIRA SCHEME.

1. Crop diversification, where land acreage under cotton is gradually being reduced and crops such as wheat and groundnuts are being emphasized.
2. Constant dredging to control silting.
3. Spraying the weeds.
4. Development of other new schemes alongside the Gezira scheme e.g. The Rahad project, the Damazan irrigated ranch and Kenana sugar plantation.

REVIEW QUESTIONS

1.

MAP OF NIGERIA



Using the map of Nigeria provided above

(a) Name the following

i) countries **A** and **B**

ii) the water body marked **C**

iii) ports **D** and **E**

iv) town **G**

v) river **F**

(b) i) What is a hinterland?

ii) State two ways in which port **D** is linked to its hinterland

iii) Name one agricultural products from each of the areas 1, 2 and 3 which are exported through **D**

iv) Name two minerals exported through port **E**

(c) i) Explain the factors which led to the location of port **D**

ii) State the problems facing port **D**

iii) Suggest solutions to the problems stated in (c) (iii) above.

Answers

(a) (i) Country **A** is Benin while country **B** is Chad.

(ii) The water body marked **C** is Atlantic ocean.

(iii) Port **D** is Lagos; Port **E** is Harcourt.

(iv) The town marked **C** is Kaduna

(v) The river marked **F** is river Niger.

(b) (i) The term **hinterland** refers to an area which is served by a port. These areas tend to be rich in minerals and agricultural products as well as industrial goods, such ports serve a rich hinterland.

(ii) Port **D** is connected to its hinterland by road and railway network.

(iii) The agricultural products from areas **1**, **2**, **3** are:-

1- cotton **2-** groundnuts **3-** cocoa and oil palm

(iv) The two minerals exported through port **E** are oil and aluminium.

(c) Factors which have led to the location of port Lagos are

1. The presence of deep sea water which could enable big and small ships to sail and anchor.
2. The site is well sheltered from the ocean winds by the sand bars and lagoons.
3. The site has a wide and rich hinterland and it serves many countries including Benin, Chad and Nigeria. These countries produce a wide range of agricultural produce for example cotton, oil palm, groundnuts, cocoa, rubber and the like.
4. The site had been serving as an administrative centre for a long time.
5. The site has ice free conditions hence could function the whole year round.
6. It is a cultural centre with a number of mosques and museums.
7. It is an education centre, with a number of schools and universities.
8. It is a transport centre having an international airport linking it to many African countries and to the rest of the world.
9. Lagos was extensively used by slave traders
10. Lagos is located in an area which is densely populated and this has facilitated rapid economic development.

Problems facing port D

1. There is a problem of congestion. This has greatly limited further expansion of the city.
2. There has been a problem of pollution of the surrounding environment especially air and water. This is mainly because of the number of industries and cars which pour into the atmosphere carbonmonoxide that pollutes the air.
3. There is lack of water and sufficient supply of electricity power that would enable expansion of industry.
4. Transport is expensive.
5. There is high crime rate because of high population and unemployment.

Solutions to the problems facing port D

1. Generation of sufficient electric power and supply of water through construction of dams.
2. Proper disposal of waste products through improving the drainage system.
3. Construction of more roads and under ground channels to reduce transport costs and traffic jam.
4. Encouraging urban to rural migration
5. Enforcing the laws to curb high crime rate.

2. (a) (i) Outline the characteristics of shifting cultivation

(ii) Mention two areas outside East Africa where shifting cultivation is practised.

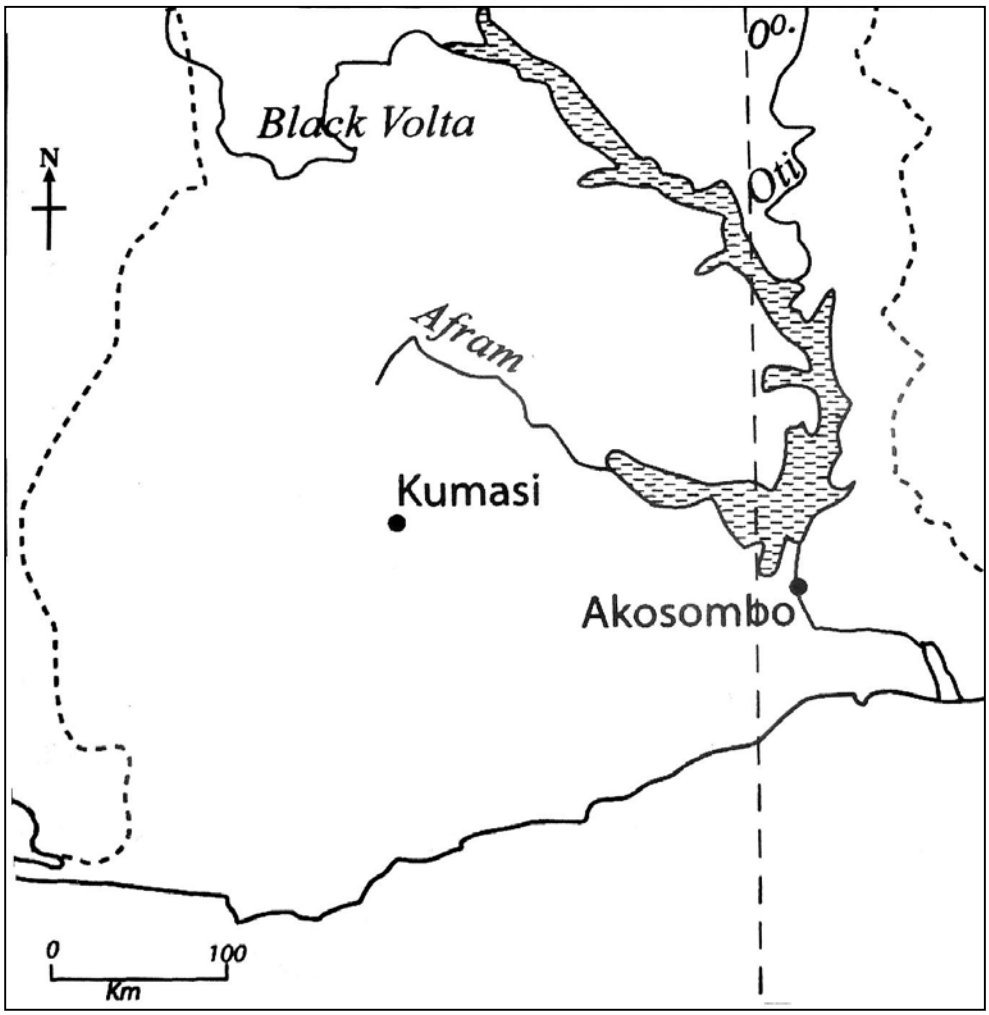
(b) Explain why shifting cultivation is practiced in any area mentioned in (a)(ii) above.

(c) State the disadvantages of shifting cultivation

(d) (i) State three other traditional farming systems in East Africa

(ii) Giving specific examples, outline the steps being taken to improve traditional farming system in Africa.

3. On the outline map of Ghana provided, mark and name



(a) (i) the cocoa producing areas

(ii) the railway line used to transport cocoa.

(iii) two ports through which the crop is exported

(b) (i) State four physical conditions suitable for cocoa growing

(ii) Mention two other tree crops which can be grown under the same conditions as those you have stated in (b) (i) above.

(c) Describe how cocoa is grown

(d) What problems are faced by cocoa producers.

(e) (i) Name three products of cocoa

(ii) Name three districts in Uganda where cocoa is grown.

4. (a)(i) What physical factor favours the development of rubber plantation in Liberia

(ii) Describe the methods of collecting latex

(iii) What are the uses of latex.

(b)(i) What problems are faced by the rubber plantations in Liberia

(ii) In which ways has the Liberian government tried to solve the problems stated in (b) (i) above

(c) Name three other countries in Africa where rubber is grown in plantations

5. Study the table below showing palm oil production in selected countries in Africa

Country	**'000' tonnes**
Sierra Leone	50
Cameroon	84
Ivory Coast	135
Zaire	175
Nigeria	680

Source: R.G.White Africa New Edition

(a) (i) Draw a bar graph to show oil palm production in the selected countries.

(ii) State two elements about oil palm production in Africa revealed by the graph and the table

(iii) describe the natural conditions favouring oil palm production in any one of the selected countries in the table above.

(b) Give the main uses of palm oil

(c) What problems face the oil production?

6. Draw a sketch map of southern Nigeria and on it mark and label the following

(i) Areas favouring growing cocoa, rubber and palm oil.

(ii) Ports: Lagos and port Harcourt

(iii) Rivers: Niger and Benue

(b) Describe the conditions that have favoured the growing of the crops named in (a) (i) above.

(c) Explain the contribution of the agricultural sector to the development of Nigeria.

(d) Outline the

(i) problems facing agriculture and southern Nigeria

(ii) steps being taken to solve the problems outlined in (b) (i) above.

7. (a) What is meant by the term plantation agriculture?

(b) Name any two countries outside East Africa where plantation agriculture is practised.

(c) For any one country named above in (b)

(i) state the crops grown under plantation agriculture

(ii) describe the conditions favouring plantation agriculture

(d) Explain the:

(i) advantages

(ii) disadvantages of plantation agriculture in any one country named in (b) above

MULTI PURPOSE RIVER PROJECT IN AFRICA

A multi purpose river project works to harness the values of a river by collecting its flow

The major multi purpose river projects in Africa

(a) the Aswan high dam in Egypt

(b) the Volta project in Ghana

(c) Kariba dam on river Zambezi

(d) Orange river scheme on river orange in South Africa

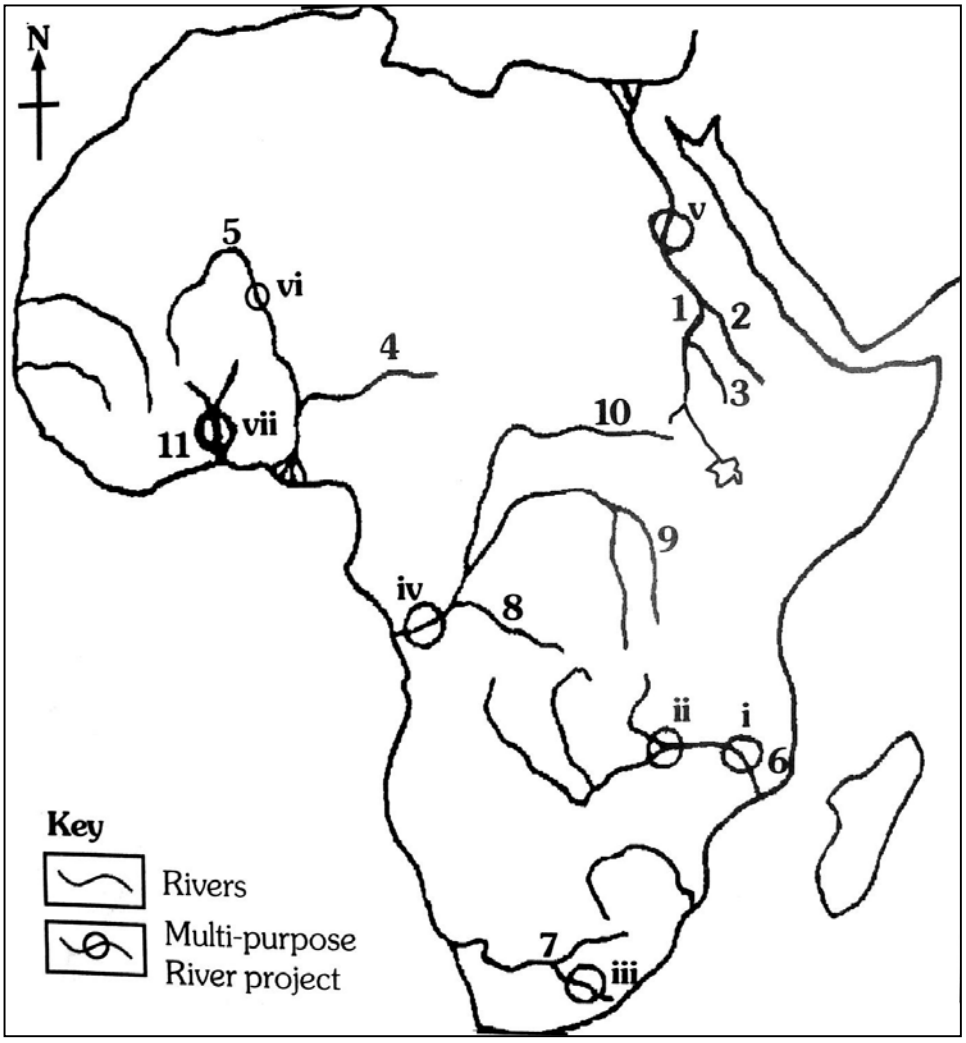
(e) The Kaborabosa dam on river Zambezi in Mozambique

(f) Akasombo dam on river Volta in Ghana

(g) Kainji dam on R. Niger in Nigeria

(h) Nzilo dam on river Congo in DRC

THE LOCATION OF MAJOR MULTI PURPOSE RIVER PROJECTS IN AFRICA



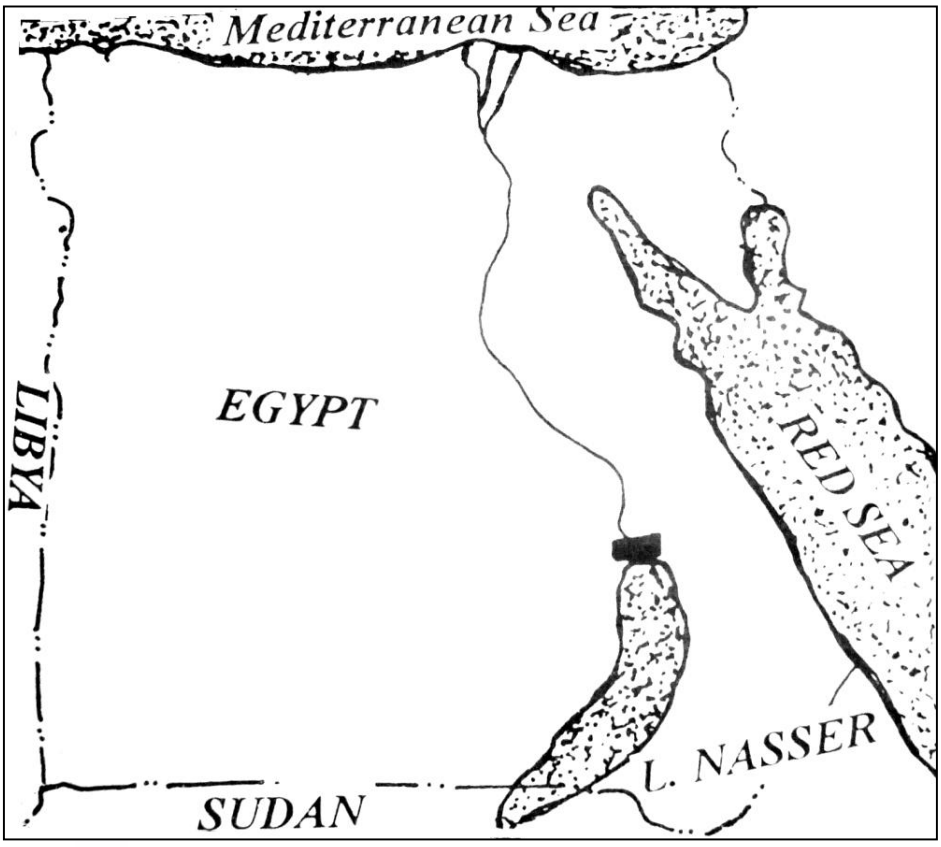
THE ASWAN HIGH DAM

It is found in Egypt along river Nile. It was first built in 1903 but it was not enough. The second phase was began in 1956/7. Behind the Aswan high dam a large man made lake called Lake Nasser was created. It is the second largest man made lake in the world after Lake Kariba. Lake Nasser stores 106,000 million cubic metres of water for perennial irrigation. The dam generates a total of 2.1 million kilowatts.

The aims of the project were

1. Provision of hydro electric power
2. Expansion of irrigated areas and increasing food production
3. Control the menace of floods along the Nile which used to affect and destroy property especially during the wet seasons.
4. Store water for irrigation during shortage of water.
5. Generate more employment opportunities for the rapidly increasing Egyptian population.

THE LOCATION OF ASWAN HIGH DAM AND LAKE NASSER





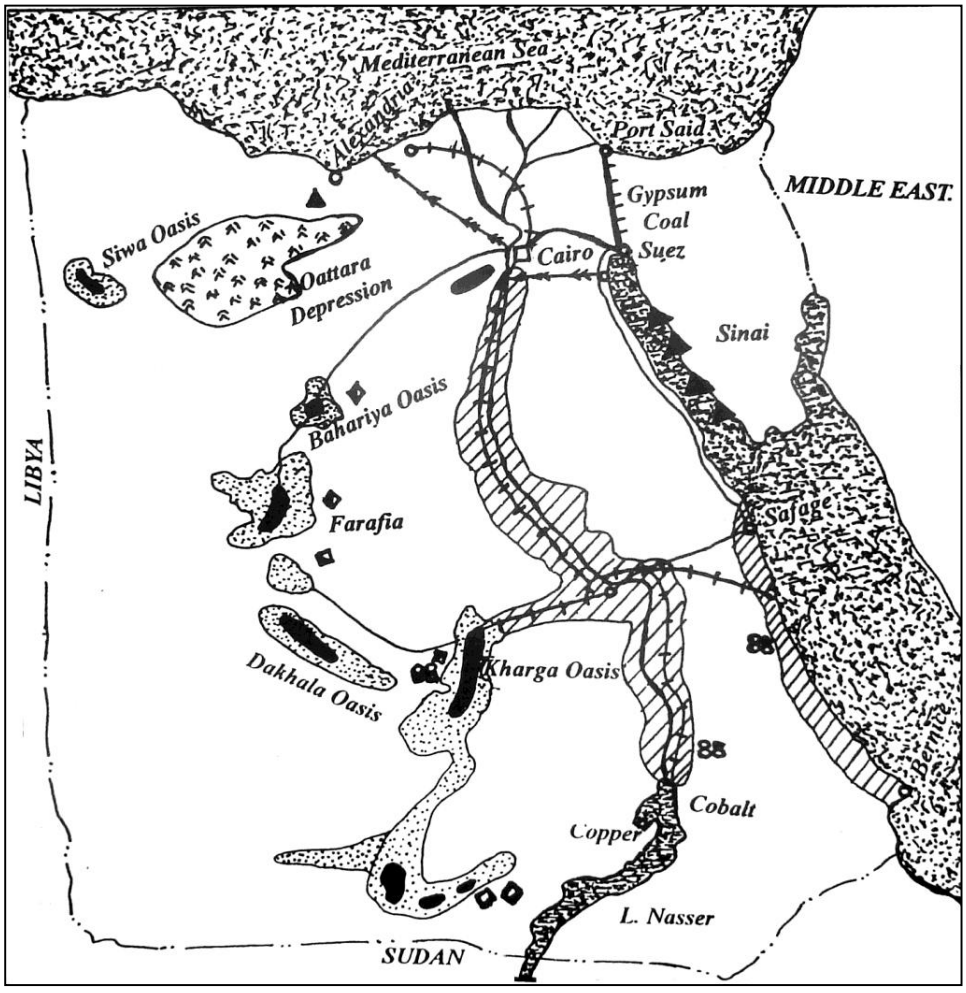
International boundaries

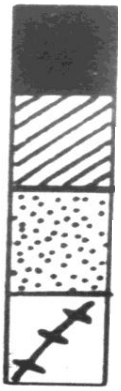
Location of Aswan high dam

Benefits of the project

1. There has been an additional 690,000ha of cultivable land reclaimed after the control of floods of river Nile.
2. There has been control of the flow of river Nile
3. Hydro electric power has been generated and this has led to the development of manufacturing industries.
4. There has been some improvement in transport especially navigation along the Nile on L. Nasser
5. Lake Nasser has facilitated the development of the fishing industry
6. There has been a reduction in the costs incurred on the importation of petroleum products
7. Post Aswan development. This has resulted from cheap HEP which has made it possible to develop a number of industries and policy of electrification of the rural areas. This has encouraged exploitation of various minerals in the country.

DEVELOPMENT PROJECTS AROUND ASWAN





Salt pans

New Electrification

Artesian water

Railway



Road

Oil fields

Lines of Artesian basins

Problems of the project

(i) There is a problem of water logging in areas where canals carry water through the canals.

(ii) Loss of silt to the bed of lake Nasser and behind barrages since the Nile no longer overflows its banks to spread silt and alluvial materials to the banks and in the fields, the silt is now wasted in lake Nasser.

(iii) Displacement of people and resettling them i.e. it involves a lot of money; provision of double increase of land, irrigation and electric power, market centre, social and economic infrastructure.

(iv) Fishing at the coast declined because nutrients were not being deposited there.

(v) Coastal areas are becoming more saline due to sea water infiltration as less of fresh water reaches the coast.

(vi) Spread of water borne diseases such as bilharzia

(vii) Reduction in the size of the Delta due to decline in the supply of silt and other alluvial materials.

(viii) The Egyptian government incurred a big debt to the government of Sudan due to the extension of lake Nasser in Sudan.

(ix) Increased pollution in the area due to rapid industrialization.

(x) There is large loss of water through massive evaporation from lake Nasser.

Steps being taken to solve the problems

(i) Resettling the displaced people

(ii) Payment of the government of Sudan for the extension of lake Nasser into Sudan.

(iii) Dredging of silk from Lake Nasser

(iv) Disease vectors have been controlled by spraying and through use of pesticides.

(v) Construction of roads and railways to ease problems of Navigation brought by the dam.

(vi) Application of fertilizers to maintain soil fertility.

(vii) Safe disposal of industrial waste to control pollution.

THE VOLTA PROJECT: GHANA

It is one of the earliest multi purpose river projects in Africa. It was proposed in 1910's and construction work started in 1966.

The aims of the project were:-

1. To generate hydro electric power
2. To produce enough food through improvement of agriculture by controlling river Volta and preserve water for irrigation
3. To control the highly seasoned Volta river at Akasombo
4. To provide inland water way across the Volta and connect southern Ghana to the northern parts of the country.

Physical and human factors that led to the establishment of the scheme in the area where it was built

Human factors

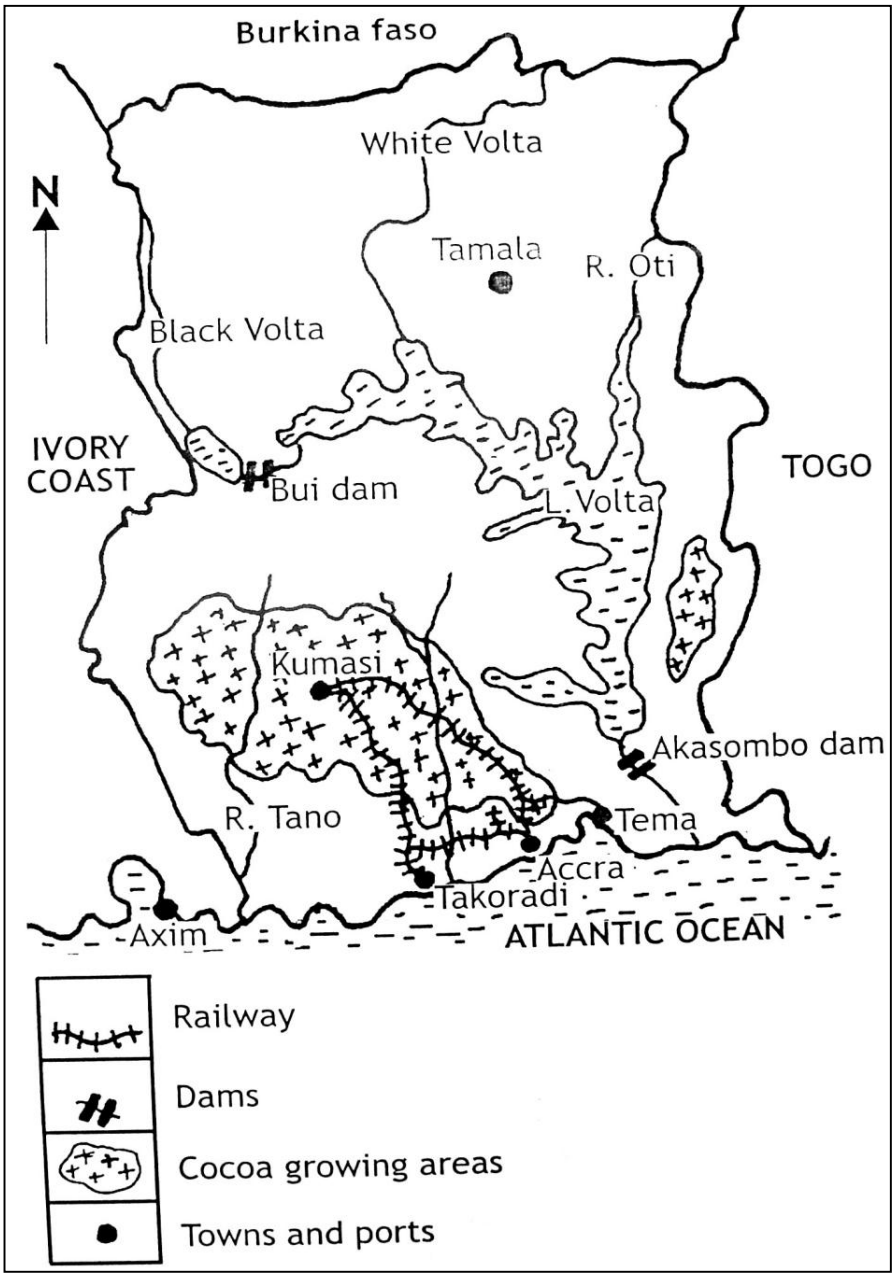
1. Availability of capital to establish the scheme
2. Availability of market from domestic and industrial users
3. Availability of skilled man power to set up the project
4. Good government policy to set up industries which require a lot of power
5. Need to overcome the use of thermal power which was very expensive.

Physical factors

1. Presence of hard rocks on which the dam was constructed
2. Presence of a very narrow gorge
3. Steep gradient on which water flows
4. The area has a water fall that is high enough
5. Existence of a large river.

The construction of Akasombo dam led to the creation of a man made lake called lake Volta. This great lake covers three percent of Ghana and stretches 320km which is approximately 8750 square km. Lake Volta is the world's third largest man made lake. The dam generates 350MW of hydro electric power. It distributes electricity over a 800km long transmission network.

THE LOCATION OF VOLTA RIVER PROJECT



The benefits of the scheme

1. There has been generation of cheap Hydro Electric Power
2. It has facilitated rapid industrial development
3. The scheme earns foreign exchange through power export to Togo and Benin.
4. There has been some improvement made in agriculture through irrigation.
5. Fishing has been developed over lake Volta.
6. The lake has improved navigation between the north and south of the country.
7. The scheme acts as a tourist attraction.

8. The scheme provides employment opportunities to the people.
9. There has been improvement in the people's standard of living through distribution of electricity to their homes.

Problems resulting from the construction of the scheme

1. Some 700 villages were displaced by the lake.
2. Some 50,000 people were displaced from their original homes and were resettled to 54 well planned town ships.
3. 7000 families have been given 17000ha of land which proved costly to the government.
4. It led to wide spread of bilharzia to nearby villages.
5. The man made lake created is unable to be used by big vessels because it is shallow and contains tree stumps.
6. The fertile alluvial soil which would have been used for agriculture is to date wasted in the lake

THE KAINJI DAM PROJECT IN NIGERIA

The dam is situated on river Niger in Nigeria. It is Nigeria's largest hydro electric power station. The dam is situated about 1000km from Niger's mouth. Construction started in 1957 and was completed in 1969.

The aims for this project were

1. To produce hydro electric power
2. To control flooding in the lower Niger.

Reasons for choosing the site where the dam was constructed

1. The valley is narrow at this point.
2. There was an island in the middle of the river that gave builders dry land to work on.
3. There was sufficient water supply.
4. The area was thinly populated

The benefits of the dam

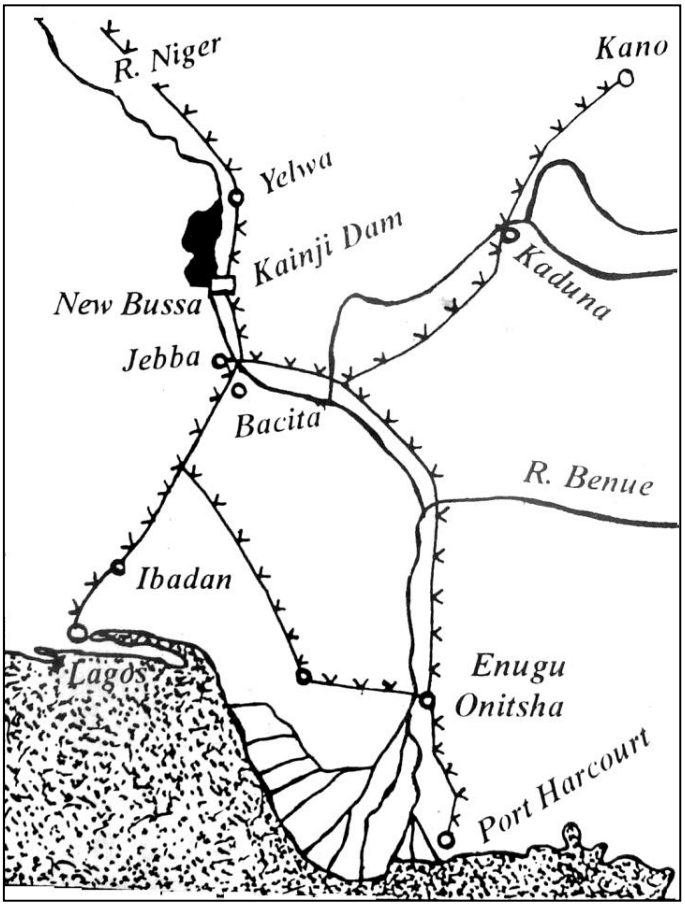
1. There has been improvement made in transport along this river because the lake submerged the rapids.
2. There has been flood control.

3. There is availability of water for irrigation.
4. There has been improvement in agriculture and provision of food supply in the region
5. Large amount of HEP has been generated.
6. Large amount of foreign exchange is earned through exportation of HEP to Niger and Benin.
7. The project has provided employment opportunities to the people of Nigeria.
8. There is provision of clean water for home and industrial use.

Problems created by the project

1. Many people were displaced because many villages were submerged. The 4000 people living in Bussa had to be moved to a new site which was costly.
2. There was an interruption in the volume of water along the river as some of it was held back in the artificial lake.
3. The rising water level of artificial lake created behind dam, covered the village of Agwara and over 5000 people ha to be evacuated.
4. The construction of an 8m high circular dyke to protect Velwa town proved to be costly.

THE LOCATION OF KAINJI DAM



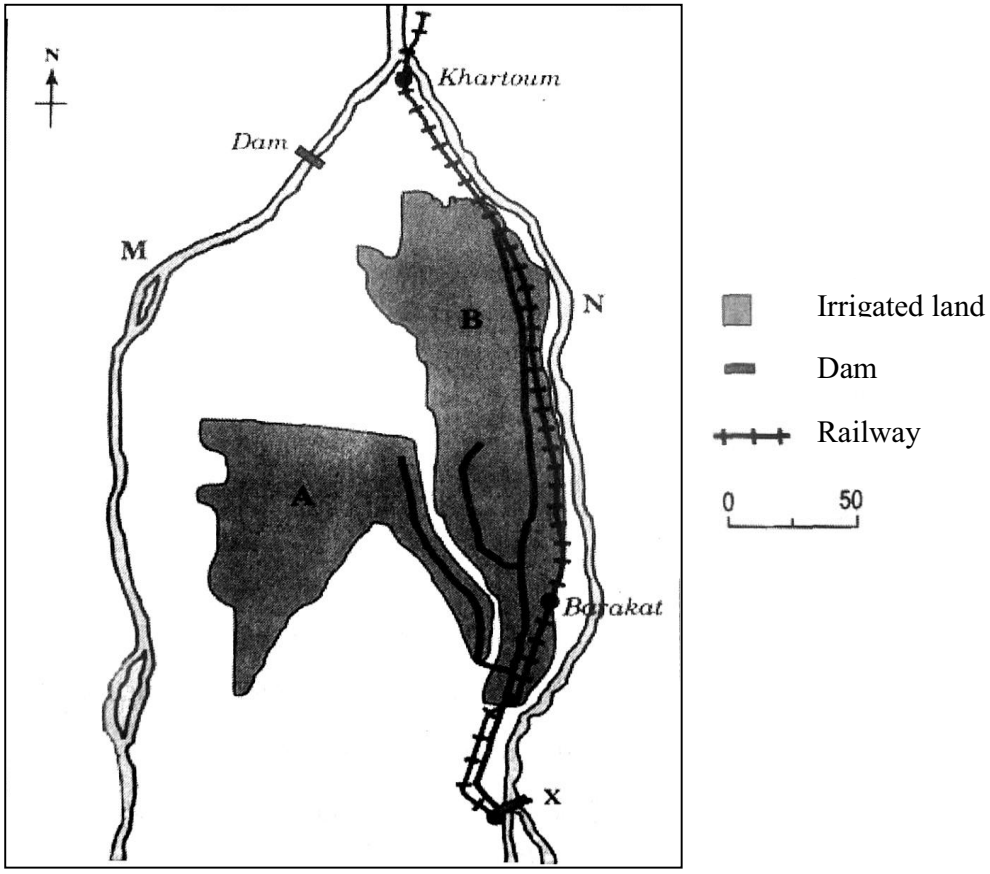
REVIEW QUESTIONS

1. (a) Describe the general characteristics of the areas under irrigation in Africa.

(b) What reasons could explain the fact that not all arid areas under irrigation in Africa?

(c) Distinguish between gravity flow irrigation and sprinkler irrigation.

2. Study the map of the Gezira irrigation scheme provided below and answer the questions that follow.



(a) Name

(i) Dam **X**

(ii) The two irrigation blocks marked **A** and **B**

(b) Describe the factors which favoured the establishment of Gezira irrigation scheme.

(c)(i) State the problems that have faced the Gezira irrigation scheme

(ii) State the problems stated in (c) (i) above being solved.

(d) Name two other schemes which are being developed in the region by the Sudan government.

3. a. (i) What is meant by the term multi purpose scheme?

(ii) Explain the physical and human factors that led to the establishment of Akasombo dam

(b) Outline;

(i) the benefits of the scheme

(ii) problems resulting from the establishment of the scheme

4. For either Kariba dam, Kainji dam or Aswan high dam

(a) Draw a sketch map to show the location of the area covered by the project.

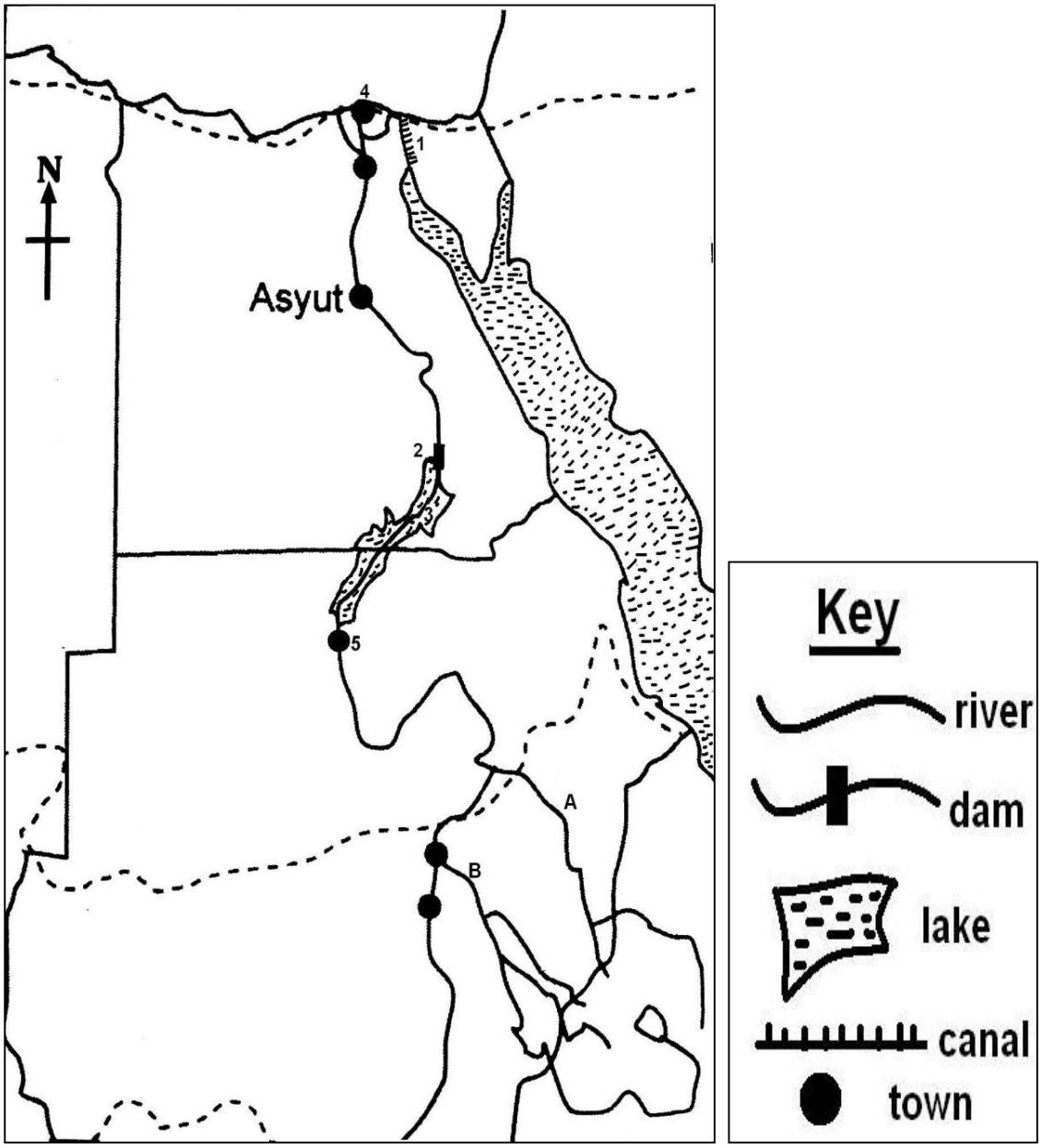
(b) Give reasons why that site was chosen?

(c) What were the objectives of setting up the project?

(d) How has the project benefited the people of the area?

(e) What problems have been caused y setting up the project?

5. Study the sketch map showing part of the Nile valley and answer the questions that follow.



(a)(i) Canal marked **1**

(ii) Dam marked **2**

(iii) Lake marked **3**

(iv) Towns marked **4** and **5**

(v) Rivers marked **A** and **B**

(b) Explain the;

(i) factors which led to the establishment of dam marked **2**

(ii) importance of the dam to the people living in the areas

(c) Identify the problems that resulted from the establishment of the dam.

(d) Outline the steps being taken to solve the problems in (c)

FORESTRY IN AFRICA

Forestry is concerned about the conservation and exploitation of forest resources. Africa is endowed with thousands of square kilometres of forest land. These forests can be categorized as tropical rainforest, savanna wood lands, Mediterranean forests, Montane forests and vast man planted forests. The tropical rainforests are the most important.

Purposes of forests in Africa

1. They are a source of fuel and building materials.
2. Tropical wood land yield a lot of useful gums and resins which is used in confectionary and in the making of inks.
3. Forests are source of fruits and nuts such as palm oil and kernels which are used in the making of vegetable oil.
4. It is a source of raw materials for handcrafts for example piassava fibre which is used in the making of stiff brushes, kapok fibre used in the making of sleeping bags and Toquilla fibre used in the making of panama hats.
5. It is a source of tinning materials.
6. They are a source of drugs and medicine for example Cinchona tree which is used in the making of Quinine.
7. Forests are used for wax which is used in the making of floor and furniture polishes.
8. Forests help in controlling soil erosion and enriching the soil with fertility from the decaying leaves.
9. Forests provide natural habitat for many hundreds of wild animals and birds which support the tourist industry.

LUMBERING

This refers to the commercial extraction of timber from the forests. It is organised in several stages which include; preparation of the area to be exploited by surveying it, planning routes to make it accessible, felling the trees using axes, hand saws and power saws. The logs are dragged to the collection point where they are transported to the mines.

To preserve the forests when the timber has been extracted, new seedlings are planted in places of the felled trees (re-afforestation).

Wood products

(a) Lumber **(b)** Ply wood **(c)** Fibre board **(d)** Pulp and paper

(e) Synthetic textiles

Problems facing African forests

1. Depletion of forests due to uncontrolled deforestation
2. Destruction of several hectares of forests by fire.
3. Severe soil erosion in some parts of tropical forests
4. A wide range of pests and diseases destroying a number of trees each year.

Possible solutions to the problems facing forests in Africa

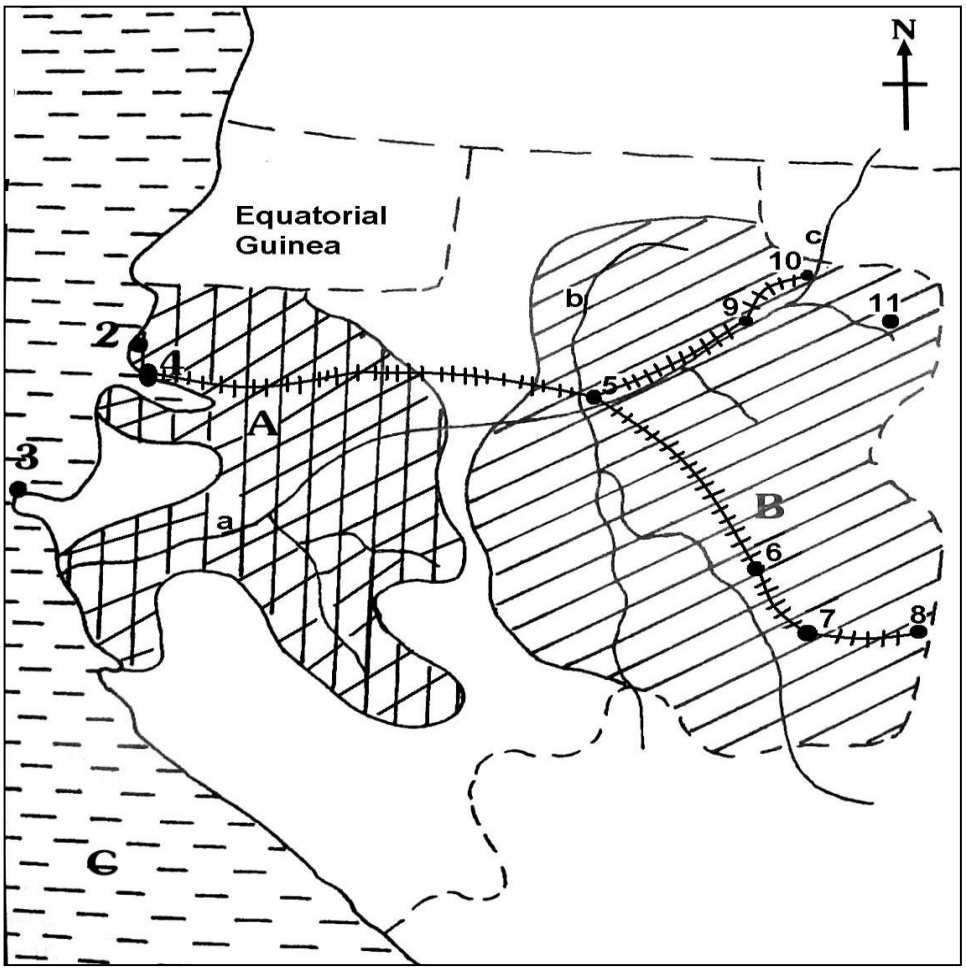
1. Re-planting trees in logged areas (silvicultre)
2. Planting new areas with forests (Afforestation)
3. Careful and controlled cutting of trees by selecting only mature trees and avoid harming the young ones.
4. Guard forests against outbreaks of fire.
5. Protect the trees from pests and diseases by spraying them.
6. Control population explosion in order to reduce on problems of population encroachment on forests minimize the industrial wastage of the forests raw materials for example avoid grading pulp from different valuable trees and re-use of waste paper in the production of new print and other interior paper products.

Reasons why African forestry industry is not fully developed.

1. They lack capital to invest in forestry industry.
2. There is a problem of lacking skilled labour.
3. There is a problem of poor transport.
4. Most forests in Africa are now experiencing a severe problem of soil erosion.
5. The gestation period of most of valuable trees is very long and this does not match with the demand for them.
6. The tropical forest jungle environmental conditions threaten the life of forest workers.
7. The size of trees felled in Africa is too large with great weight makes it difficult for the transportation of logs to the saw mills.
8. The buttress roots which are common presents problems when felling.
9. African forests contain a thick undergrowth which makes accessibility hard.
10. Lack of pure stands of valuable trees.
11. Lack of constant market for the tropical land wood.

The commercial exploitation of forest in Africa is mostly practised in West Africa and Central Africa where there are vast cover of thick forests. Among the countries where commercial exploitation takes place include Gabon, Ivory Coast, Ghana, Central Africa Republic, DRC and others. The common commercial species felled include Mahogany, Ebony, Okoume, Mvule, Musizi, Rosewood, Green heart, Camphor and the like.

FORESTRY IN GABON



Key

a River Ogowe
b River Abama
c River Okano
• Towns
Atlantic Ocean
Railway
A Exhausted forests
B Virgin forests

2 Owendo **4 Libraville** **6 Mainana** **8 Franciville** **10 Belinga**
3 Port Gentil **5 Boou** **7 Moanda** **9 Makokou** **11 Mekambo**

Gabon is a land of dense tropical forests which cover practically all the country except in the south and east. These forests center the most valuable tree species known as Okoume. Okoume has light valuable wood which is used in the making of ply wood. The tree takes 60 years to mature. The country too has valuable reserves of Ebony and Mahogany. The forested area is conservatively transversed by the river system of Ogowe river and its tributaries.
Gabon was the leading exporter of timber in the whole Africa till 1950s. Today, about 750 000 tonnes of wood are exported annually worth US $ 17 million.
In Gabon, production of timber is carried by both large timber companies and family units. Family units contribute 15% of the total production.
Large companies are granted concessions in the forest and work them out systematically. The forest concessions are divided into rectangular blocks which are further subdivided into smaller blocks and shared among teams of men.The teams of men are led by supervisors who move through a block of forest to be exploited marking trees for cutting. The selected trees are then cut, trimmed and hauled by a tractor through the forest to base collecting points usually situated near a river.Water transport is the most used means of transport. River Ogowe has played a very important role.
Logs are rolled into water and lashed together in huge rafts and rowed by tug boats down stream to the saw mills along the lower Ogowe. Port Gentil is one of the largest mills and biggest exporter of plywood in the world. Exploitation of wood in Gabon is handled by African Co-operative Agency of Equatorial Woods.

Factors which have favoured the development of forestry in Gabon

1. The presence of valuable tree species such as Okoume, Ebony and Mahogany.
2. The presence of river Ogowe which conveniently transverses the forested area ensuring easy and cheap transportation if the logs.
3. The availability of dense forests which ensures a constant source of wood for exploitation.
4. Availability of capital which was provided by large foreign companies.
5. Availability of skilled labour which was provided by the foreign companies.
6. The presence of a constant market for the forest products.

Benefits of forestry to Gabon

1. There has been provision of employment opportunities to the local Gabonese.
2. Forests provide sufficient revenue to the economy so as to make a favourable balance of trade.

3. It has promoted industrial development in the country especially wood producing industries.

4. There has been encouragement of the development of transport routes to the interior especially the building of railway line.

5. It has enabled Gabon to diversify their economy.

6. Exploitation of forestry resources have helped to generate financial resources enabling exploitation of other resources such as oil milling, iron ore and agriculture.

7. There has been improvement made between Gabon and those importing countries in terms of international relations.

8. Many foreign investors have been attracted to the country hence investing even in other sectors.

Problems facing forestry in Gabon

1. Exhaustion of forest cover due to continuous tree cutting especially in the coastal areas.

2. Difficulty in construction of roads and railways because of the terrain and heavy rainfall.

3. Lack of pure stands leading to waste of time and energy.

4. Lack of adequate market.

Measures to solve the problems

1. Forest conservation measures including Afforestation and re-afforestation have been undertaken.

2. Improvement on the infrastructure especially transport interms of roads and railways have been made.

3. Extensive market research has been conducted from outside countries.

4. There has been diversification from the dependence on forests to other sectors such as mining and agriculture.

REVIEW QUESTIONS

1(a) (i) Mention three factors which have influenced the distribution of tropical rainforests in Africa

(ii) What are the characteristics of tropical rainforests?

(b) Imagine you were a new settler in DRC (Congo basin). Explain how you would develop the area.

(c) Give five reasons why forests should be conserved in Africa

(d) What problems are likely to be faced in conserving the forests?

2.(a) What factors have favoured the development of forestry in Gabon?

(b) What other economic activities are carried out in Gabon

(c) Mention five products of forests.

MINING IN AFRICA

Mining refers to the extraction of mineral wealth from under ground.

Methods of mining

There are various methods of mining ores from the earth crust. Depending on the mode of occurrence of minerals, ease and cost. The methods include

(a) Open cast mining

(b) Underground mining method

(c) Placer method

Open cast mining

This involves striping off a few metres of the unwanted overburden materials lying on top of the mineral deposit and it nearby. The mineral bearing rock can be removed by digging, loosened by explosives, or evacuated using modern machines such as shovels and dragline excavators.

Underground mining

This method is used to extract minerals which lie deep in the earth's crust and covered by a great thickness of other rocks. Shafts are dug deep into the earth crust, from which horizontal tunnels are driven out wards reaching the mineral bearing rocks. The mineral bearing rocks are loosened by blasting using explosives and then transported along the tunnel to the shaft by light railways or conveyor belts. The ores are then brought to the surface in a lift which moves up and down the shaft.

Placer mining

This method is used to extract minerals which occur in deposits in the beds of some rivers, river banks and flood plains. Such minerals occur in small particles having been broken down from the original mineral bearing rock, transported and re-deposited elsewhere for example particles of gold, tin or platinum may occur in sand, and gravel in the flood plain. The deposits of minerals can be received by placer mining.

Reasons why mineral resources in Africa are not fully developed.

(i) Lack of capital

(ii) Lack of skilled labour force

(iii) Inadequate occurrence of mineral deposits.

(iv) Low and poor grades of African mineral resources.

(v) Lack of developed transport network.

(vi) Heavy rains which affects transportation.

(vii) The mountain terrain of most mineral bearing areas which affects easiness to exploit them and increases costs.

(viii) Constant political instabilities which affects the level of exploitation.

(ix) There is limited research for most of Africa's mineral resources

(x) Price fluctuation for Africa's minerals.

(xi) Lack of adequate power supply.

(xii) Competition from other sectors of the economy for resources.

IRON ORE MINING IN AFRICA

Iron ore is by far the most important mineral resource in Africa. Iron ore is found in vast quantities with high quality in Africa. Among African countries which produce iron ore include Liberia, Swaziland, South Africa, Mauritania, Angola, Egypt and Algeria.

IRON ORE MINING IN LIBERIA

In Liberia rich iron ore fields are located on the western slope of Mt. Nimba in the eastern parts of the country at Bong, in the central and in the Bie and Bomi hills in the North western parts of the country. Mining in Liberia is conducted by foreign companies mainly the Liberian American Swedish mineral company. In Liberia, iron ore mining is done by open cast methods. Iron is transported to crushing mills using dumper trucks. It is further transported by railway to Bong mining company's pier loading terminal at Monrovia port for exportation.

Much of Liberia's iron ore is exported to USA, Japan and some western European countries including Britain. Exports of iron ore are handled at port Buchanan

Advantages of iron ore mining in Liberia

1. Iron ore mining has led to the development of well built settlements having schools, hospitals, shops, markets and security station which have generally benefited the local population.
2. There has been some improvements made in international relations between Liberia and the countries importing her iron ore.
3. The iron ore mines have provided potential markets for the locally produced food stuffs.
4. There has been provision of employment opportunities to the local Liberians.
5. Iron ore mining has helped to diversify the Liberian economy from dependence on rubber exports.

6. it has helped to bring about some improvement on port facilities such as port Buchanan
7. The country earns a considerable amount of foreign exchange from iron ore exports.
8. Iron ore mining has accelerated the rate of development and maintenance of transport systems in Liberia. For example the mining centres have been connected to the coast with railway lines and other means of transport.

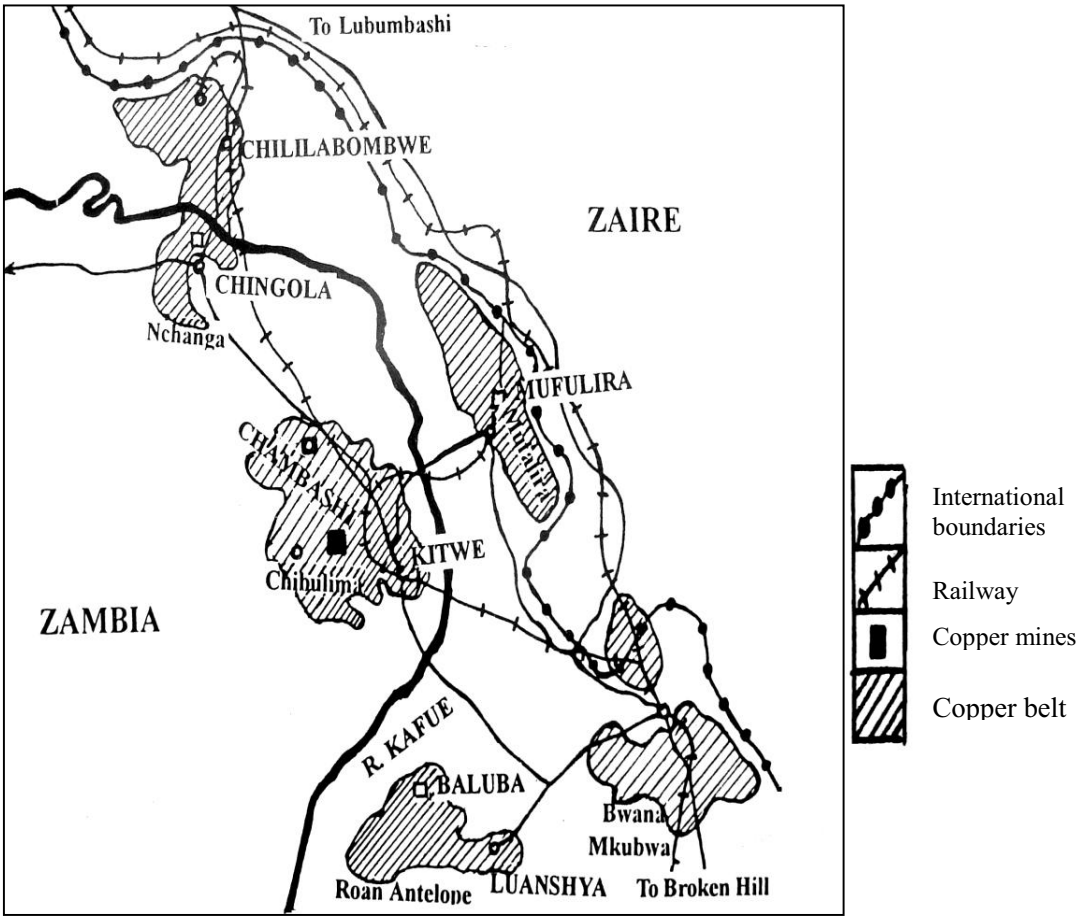
COPPER MINING IN AFRICA

The leading producers of copper in Africa include Zambia, DRC, South Africa, Zimbabwe, Namibia, Mauritania and Uganda. Copper from these countries is mostly exported to western European countries and Japan. Africa has the largest potential of producing 20% of the world's total copper production.

COPPER MINING IN ZAMBIA

Copper mining in Zambia started in 1909 when the southern railway reached Kabwe. Copper exploitation was delayed by diseases, inaccessibility, technical ignorance and the 1st world war.

THE ZAMBIAN COPPER BELT



Copper ores in the Zambian copper belt are mined at various centres throughout the belt. For example Nkana mines, the Roan Antelope, Mufulira, Nchanga, Chibaluma, Chingola, Booncrof, Chambishie and Bwana Mlambwa mines.

Factors favouring the development of copper mining in Zambia.

1. The presence of large copper deposits.
2. Availability of capital to invest in the mines which was provided by the Anglo-American corporation.
3. Availability of power from Kariba dam and later from Kafue river which helped smelt and mine the copper.
4. Good transport network especially the well developed railway system.
5. Availability of market opportunities from foreign countries such as Japan, and the industrialized countries of Western Europe.
6. There was availability of large labour force both skilled and unskilled to work in the copper mines. The skilled labour force was provided by foreign company.
7. The presence of water for use in the industry from R. Kafue for cooling and cleaning the machines.
8. Availability of high level of technology which was provided by the foreign companies.

How copper is mined in Zambia

Both open cast and underground methods are used in mining of copper.

Processing copper ore.

At the processing plant, the ores are crushed together with sulphides and oxides into powder. Then this powder is mixed with water to form a thin mud. The sulphide ores are then precipitated by adding sodium salts. The copper sulphide is then dried and smelted. To precipitate the oxide, sodium hydroxide is added together with palm oil and fuel oil. Lime and sulphuric acid are then added to leach the mixture. Copper is then separated by electrolysis.

Transporting and marketing of copper from the Zambian copper belt.

The most quickest and efficient transport route is through Zimbabwe to Biera in Mozambique. Other countries are; the route through Angola, the route through Malawi and the Tazara railway which connects Ndola to Dar-es-salaam.

Economic importance of copper mining to Zambia's economy.

1. Copper is used as a raw material in many industries in Zambia. It has therefore encouraged industrial development.
2. The country earns foreign exchange through copper exports.
3. There has been provision of employment opportunities to people.
4. Copper mining has led to the growth of towns; such as Ndola, Kitwe, Chingola and the like.
5. Copper mining has led to the establishment of good housing, schools, health centres and recreation facilities.
6. There has been subsequent mining of other minerals in the copper belt e.g. cobalt, gold and silver.
7. It has encouraged the growth and development of agricultural food products to tap the market from the miners.
8. Copper mining has helped to improve on the international relations between Zambia and the countries importing her copper.

Problems facing the copper mining industry in Zambia.

1. There is a general problem of price fluctuation of copper in the international market.
2. Copper requires great fuel during the process of refining.
3. Zambia is a land locked country, therefore transport routes go through other countries hence incurring high costs of transport, custom duties and delays in crossing the borders.
4. Political instabilities in the neighbouring countries which may lead to closure of transport routes.
5. Competition for market with other copper producing countries, namely DRC.
6. Depreciation and break down of machines.
7. Exhaustion of copper from some mines for example Bwana Mkubwa.
8. Environmental degradation through air, soil and noise pollution.

Solutions to the problems facing the copper mining industry

5. Recruitment of labour from the neighbouring countries and workers such as school leavers and prisoners.
6. Construction of hydro electric power stations to produce adequate power to reduce importation of coal.

7. Diversification of Zambia's economy by encouraging agriculture, trade and tourism.
8. By recycling of copper wastes to avoid pollution.
9. By conducting a broad market research to widen market for copper.
10. By opening up alternative transport routes to avoid closure with distabilised countries e.g Tazara railway.
11. To promote good co-operation and friendly relations with the neighbouring countries to continue use of transport routes through these countries.
12. Replacement of old and worn out dated machinery with new machinery.

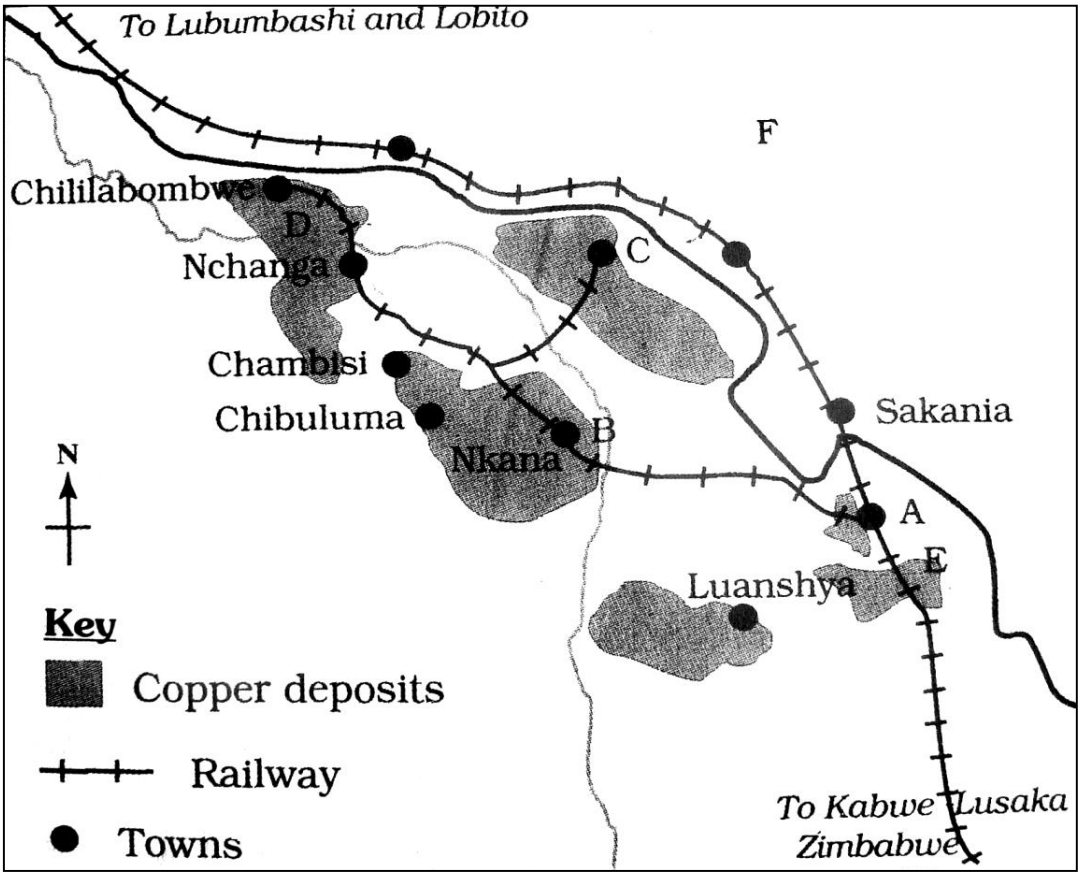
Problems facing miners when extracting copper

1. Too much heat and pressure
2. Lung disease called silicosis due to inhaling too much dust.
3. Noise pollution during drilling and breaking down of hard rocks using explosives
4. Death of miners due to collapsing roofs of mines.
5. Floods which may cause death for example hundreds of people died at Mufulira due to floods and it was closed for almost a year.
6. Sometimes the miners get lost from underground due to many tunnels undergrounds.

REVIEW QUESTIONS

1. Mention two types of mining
2. Briefly describe each method of mining
3. Give two advantages and two disadvantages of each
4. Mention any two other major copper producing countries in Africa
5. How do miners protect themselves as they go underground in the mines.
6. Mention any other minerals found in the Zambian copper belt
7. Which is the major town in the Zambian copper belt
8. In which mine is it found
9. Name the ports through which Zambia exports her copper

10.



The above figure shows Zambia's copper belt. Use the figure to answer the following questions.

a) i) Name towns A, B, C

ii) The copper mine D, E (iii) Country F

b) i) Describe how copper is mined

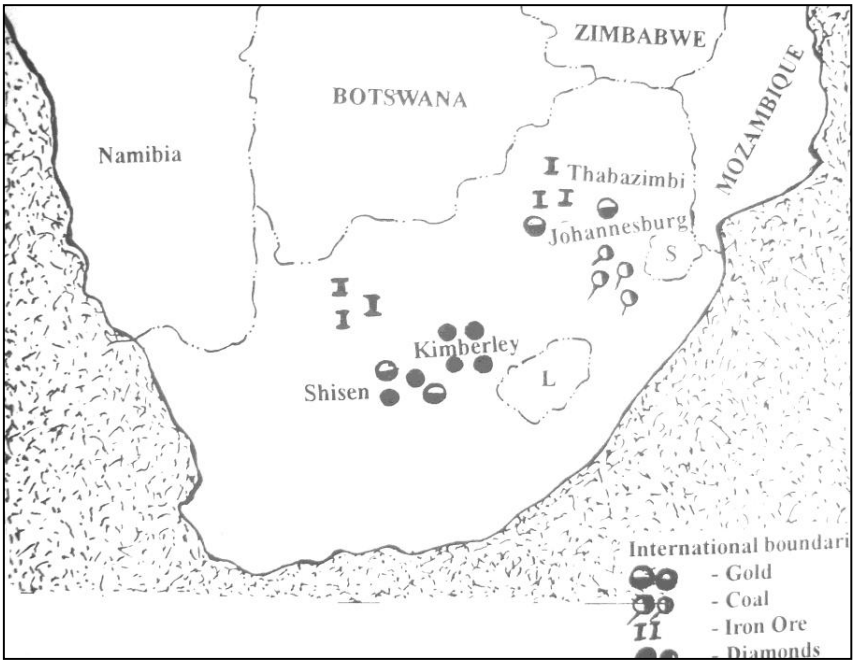
ii) State three ports through which Zambia can export her copper.

c) i) Give two countries where Zambia copper is exported

ii) Name three uses of copper.

d) Mention three problems which Zambia faces as a result of depending on the copper industry.

THE DISTRIBUTION OF MINERALS IN SOUTH AFRICA



FACTORS FOR THE DEVELOPMENT OF THE MINING INDUSTRY IN SOUTH AFRICA

(i) Availability of mineral resources in large quantities and being of high quality. E.g. coal, gold, iron ore, and tin.
(ii) Improvement made in transport network, especially rail transport.
(iii) Cheap labour required in mining provided by the migrant workers from the Black South Africans and migrant workers from the neighbouring countries.
(iv) Availability of market for the minerals mined.
(v) Capital required to invest in the mining section was provided by the European investors and investors from USA.
(vi) Skilled labour and technical know how provided by the European investors.
(vii) Availability of power from hydro-electricity, coal and nuclear power from Uranium.

EFFECTS OF MINING ACTIVITIES ON THE PHYSICAL ENVIRONMENT OF SOUTH AFRICA.

(i) Environmental pollution.
(ii) Mining leaves large scars (pits) on the surface of the earth.
(iii) Mining can facilitate the occurrence of soil erosion and landslides in areas where it's being carried out.
(iv) Mineral exhaustion in an area may lead to the decline of the area, with severe problems of unemployment and declining industry.

PROBLEMS FACING THE RAND

- There is inadequate water supply
- There is inadequate iron and steel because of the rapid rate of industrialisation.
- Racial conflicts which lead to destruction of property and lives.
- Man has destroyed the physical environment and has caused environmental degradation.
- Congestion and slums have developed around the mines as a result of many people working in and looking for jobs in the mines.
- The industries especially those that have come up as a result of mining have caused air and water pollution.

GOLD MINING IN AFRICA
Today Africa produces nearly 55% of the world's total gold. South Africa is the world's largest single producer and in 1975 South Africa produced 52% of the world's total output of 1454 metric tonnes.
Other important countries in producing gold include; Ghana, Zimbabwe, DRC, Kenya, Uganda and Tanzania.
Uranium is an important mineral mine with Gold. This is a source of atomic energy. The Uranium reserves in South Africa are estimated to be 270,000 tonnes, second to Canada, Africa possesses 40% of the world's Uranium deposits where 25% is in South Africa and the rest in Niger, Gabon, Central African Republic, DRC and Namibia.

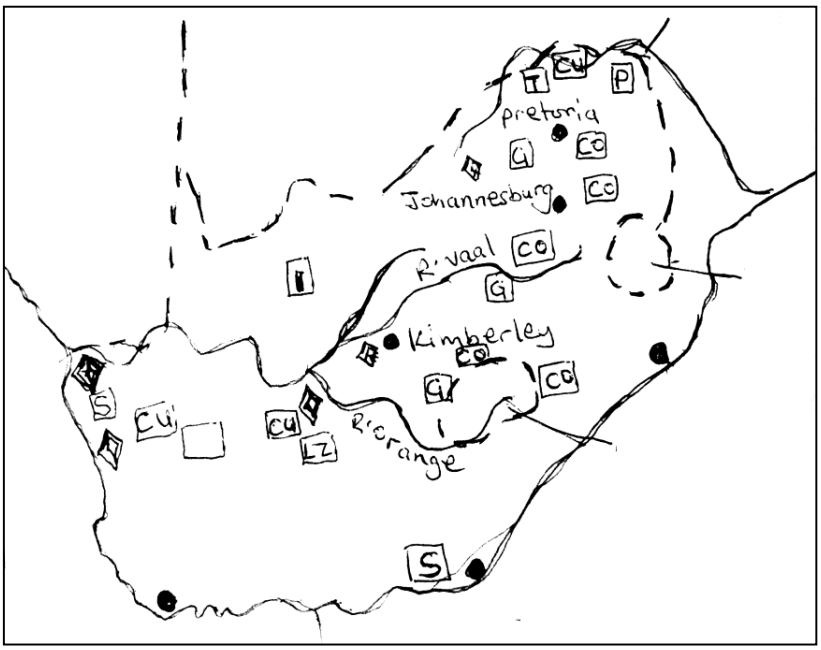
GOLD MINING IN SOUTH AFRICA
Gold was first discovered near Olifants river in Transvaal in 1868 and later in Witwatersrand in 1886.
The Orange Free State Gold field is the youngest of all the fields and today stretches 50km from North to South from Allanridge to Virginia. There are 12 mines in operation today.

In South Africa, gold is mined from Orange Free State and Transvaal. There are three major goldfields found in these states namely; Witwatersrand, Orange Free State goldfields and Far East Rand gold fields, Gold in South Africa is mined using the open cast method.

PROCESSING GOLD.
Gold ores are ground to fine pieces and mixed with water to produce slimes which are passed through a Cyanide solution. The Cyanide dissolves the gold but not Uranium. The gold bearing solution is drawn off to leave filter cake which is fed into Sulphuric acid tanks which dissolves the Uranium and this liquid is filtered and purified with chemicals.

DIAMOND MINING IN SOUTH AFRICA
Diamond mining is a precious stone valued for being transparent, sparkling, brilliant and very hard. Diamond occur as scattered crystals in an igneous rock called Kimberlite which forms pipe dykes or volcanic plugs deep under ground in South Africa. Great deposits of diamonds are found at Kimberley, Pretoria, Rloemfontein, Jagersfontein and Konffiefontein. They are processed in Johannesburg, where most of South Africa's diamond cutting factories are located.

THE DISTRIBUTION OF SOUTH AFRICA'S MINERAL WEALTH



KEY

◇	
S	G
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FACTORS THAT HAVE FAVOURED THE MINING OF DIAMONDS IN THE REPUBLIC OF SOUTH AFRICA

1. Availability of diamond deposits at Kimberley, Pretoria, Bloemfontein, Jagersfontein and Koffiefontein.
2. Good labour supply both skilled and unskilled.
3. Large market both internal and external.
4. Good communication network, especially railway and road network.
5. Availability of power from hydro-electricity, coal and nuclear power.
6. Availability of capital to exploit diamond.

METHODS USED IN THE MINING INDUSTRY

1. Open cast mining method for those minerals that do not lie deep underneath the earth surface e.g. gold
2. Underground mining method for those minerals e.g. copper. This involves digging deep underground and place vertical shafts into the ore body. Horizontal shafts are dug. The ore is

then blasted and falls into the horizontal shafts. The ore is carried by conveyors to the vertical shafts then carried to the surface.

3. Placer mining or alluvial mining. This type of mining is used where minerals occur as a placer deposits, the original mineral bearing rock having been broken down by the natural processes of erosion and transported and deposited by running water, e.g. particles of gold, tin or platinum may occur in the sands and gravels in the beds of some rivers.
   The simplest method of recovering these deposits is by panning. This involves digging out the sand or gravel from the bed of the river and sift them.

PROBLEMS FACING THE MINING INDUSTRY IN THE REPUBLIC OF SOUTH AFRICA

1. There is a problem of price fluctuation on the international market especially copper, for example in 1971, the price of copper per tonne reached £ 425 on London market, however, this dropped to £ 400 in 1972, it again rose to £ 900 by the end of 1973 and by mid 1974 it reached £ 1400 per tonne. Once again in 1975 it dropped to £ 513. Such price fluctuations mean that the government is unable to plan far a head, since it is not sure of what amount would be realized.
2. Inadequate water supply especially on the rand where water divide occur.
3. Racial conflicts leading to the destruction of property and lives.
4. At times there is shortage of labour because of competition for labour among industries.
5. High costs of mining especially deep underneath mining which required extra sofiscated gadgets such as cooling system, fresh air facilities, vertical and horizontal shafts, conveyor belts and the like.
6. Labour strikes due to under payment and delay in payments.
7. Noise pollution during drilling and break down of hard rocks using explosives.
8. Depletion of some minerals leading to the closure of some mines.
9. Death of miners due to collapsing of roofs of mines.
10. Too much heat and pressure.
11. Long disease called Silicosis due to inhaling too much dust.
12. Some time the miners get lost underground due to many tunnels underground.
13. Floods which may cause death.

STEPS BEING TAKEN TO SOLVE THE PROBLEMS FACING THE MINING INDUSTRY IN SOUTH AFRICA.

1. Recruitment of migratory labour from the neighbouring countries.
2. Increasing on the workers wages and improving the conditions of working so as to attract workers from other sectors of the economy.
3. Pay workers readily to avoid strikes.
4. Provide cooling system and oxygen underneath the mines to over come too much heat and pressure.
5. Diversify the economy to enable the country have other sources of income to reduce on the effect of price fluctuation.
6. Conduct a broad market research to widen market for minerals.
7. Replacement of old and worn out machinery with new machinery.

THE IMPORTANCE OF MINING SECTOR TO THE REPUBLIC OF SOUTH AFRICA.

1. Government earns revenue from taxing the mines and people who work in the mines.
2. It has led to urbanization e.g. Pretoria, port morth, Johannesburg, Kimberly, Bloemfontein e.t.c.
3. It has led to the development of social and economic infrastructure.

4. Mining has provided power from coal.
5. Mining has provided industrial raw materials thus industrialisation.
6. Mining has strengthened international relations with other countries which import the raw materials.
7. Government earns foreign exchange from the industrial exports.
8. Mining provides employment to the people of South Africa.

1. Gold production in Africa and the rest of the World (1975)

Country	Tonnes	%
South Africa	758.5	……
Ghana	21.4	1.5
Zimbabwe	18.1	1.3
Zaire	……	0.4
Rest of the World	651.1	44.1
World total	**1 454.0**	**100**

Study the table above and answer the following questions

a) Calculate

i) the percentage of world gold production from South Africa.

ii) the amount of gold, in tones, produced by Zaire

iii) the difference in tones between the world's leading producer and the lowest producer of gold.

b) i) In which two states of South Africa is gold mined?

ii) Which are the three major gold fields found in the states named in b (i)?

iii) Name two minerals which occur in deposits with gold.

c) i) State the methods used to mine gold in South Africa.

ii) How is gold processed?

iii) What three problems are associated with the method described in c) ii) above?

2. a)Draw an outline map of Nigeria and on it, mark and label where the following minerals are mined

(i) oil (ii) iron-ore (iii) coal (iv) tin

b) What factors have favoured the mining of any two of the minerals mentioned in (a) above.

c) Giving specific examples, explain how the minerals mentioned in (b) above have led to the growth of industries in Nigeria.

3. a) Draw a sketch map of South Africa and on it mark and name any one area where each of the following minerals are mined.

i) Gold ii) Diamonds iii) Coal iv) Iron-ore

b) What factors have contributed to the development of the mining industry in South Africa?

c) Describe the effects of mining activities on the physical environment of South Africa.

4. The table below shows the production of crude oil in Libya between 1968 and 1979. Study it and answer the questions that follow.

Year	Metric tonnes
1968	125.0
1970	159.3
1972	105.0
1974	73.0
1976	93.0
1978	98.7
1979	99.2

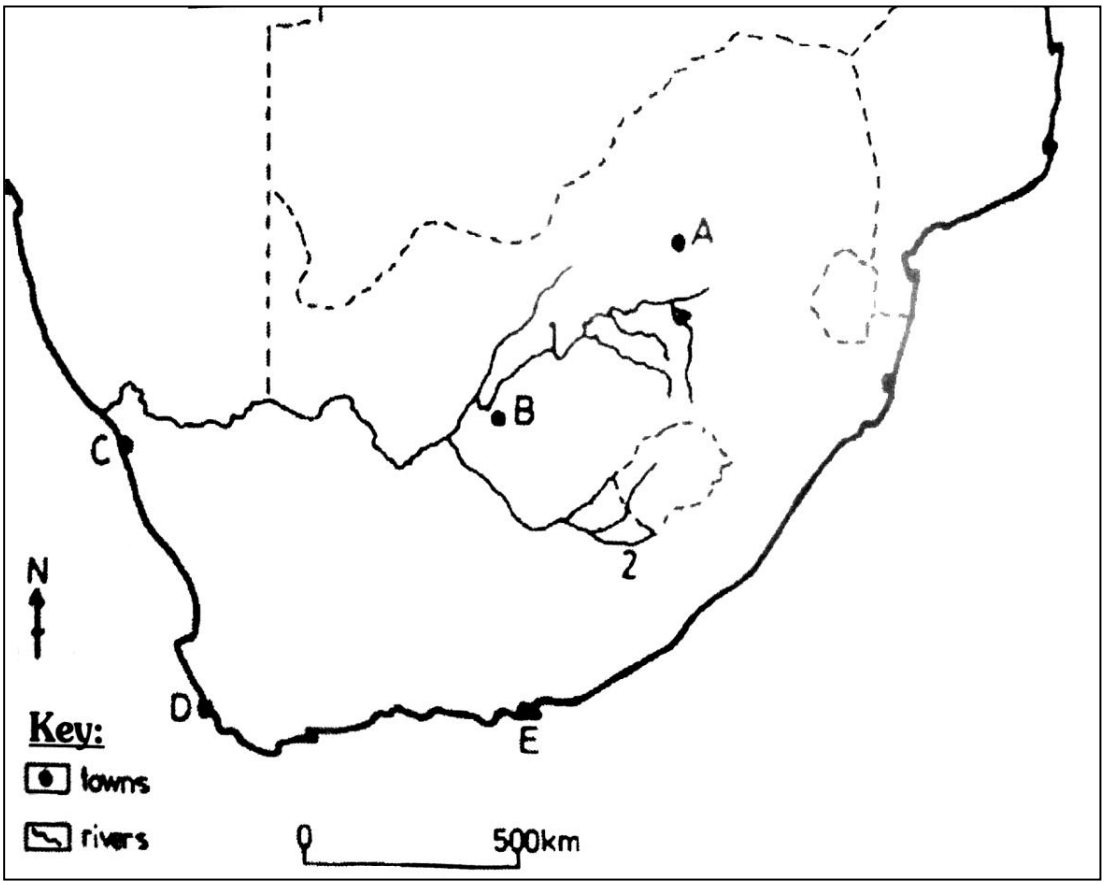
SOURCE: Minns, W.J. "A Geography of Africa."

a) Using the figures provided in the table, draw a bar graph to illustrate the production of crude oil in Libya between 1968 – 1979

b) Outline the problems Libya is experiencing in the exploitation and marketing of oil.

c) What is the importance of mineral oil to Libya?

5. Study the map of South Africa below and answer the questions that follow:



a) Name the:

i) Diamond mining centre A, B and C

ii) Ports marked D and E

iii) River marked 1 and 2

b) Explain the factors which have favoured the mining of diamonds in the Republic of South Africa.

c) Describe the methods used in the mining industry of the Republic of South Africa.

d) Identify problems facing the mining industry in the republic of South Africa.

6. Study the table below showing iron ore production in the Republic of South Africa (1975- 1990) and answer the questions that follow.

Iron ore production in the Republic of South Africa ('000s metric tones)

Year	Iron ore production ('000 metric tones)
1978	12 297.7
1980	26 310.0
1985	24 414.0
1990	30 347.0

Source: UNDP: World resources, A guide to global environment (1992-3). Towards sustainable development.

a) Draw a bar graph to show the information given in the table

b) i) Describe the trend of iron ore production in the Republic South Africa between 1975 and 1990.

ii) Calculate the percentage change in iron-ore production between 1975 and 1990

c) Explain the importance of the mining sector to the Republic of South Africa.

d) Identify the;

i) problems affecting the mining sector in the republic of South Africa.

ii) steps being taken to solve the problems id d(i) above.

7. Study the table showing the exports of Zambia and answer the questions that follow.

Commodity	Percentage
Copper	82.7
Cobalt	12.1
Zinc	2.6
Lead	0.6
Tobacco	0.4
Others	1.6
Total	**100%**

Source: Adapted from white, R.G Africa: Studies of East Africa students page 183

a) Draw a pie chart to show the composition of Zambia's exports.

b) i) Name the dominant mineral exported by Zambia

ii) Calculate the percentage contribution of mineral exports

iii) State two mining centres in Zambia.

c) Explain the factors which have favoured the development of the mining sector in Zambia.

d) Outline the:

i) problems resulting from over-dependence on one dominant export commodity.

ii) steps being taken to solve the problems in d(i) above.

8. The table below shows the value of major exports in Liberia(Us $ million) 1976 – 1980. Study it and answer the questions that follow.

export	1976	1977	1978	1979	1980	total export value
iron ore	331.6	273.5	274.3	290	310.2	1479.6
rubber	53.3	59.1	69.1	87.8	102.2	3715
logs	34.6	29.3	46.7	50.1	65.3	226
diamonds	16.6	21.4	30.3	39.6	3.5	141.4
coffee	4.5	6.6	43	25.3	27.1	106.6

Adapted from Minns Africa pg. 79

a) Draw a bar graph to show the total export value for the period 1976- 1980

b) Giving evidence from the table

i) Explain how Liberia has diversified her exports.

ii) State the advantages of diversifying exports.

iii) Mention two areas in Liberia where iron ore is mined.

c) i) Explain how mining of iron ore has benefited Liberia

ii) Name two other countries in Africa where iron ore is mined.

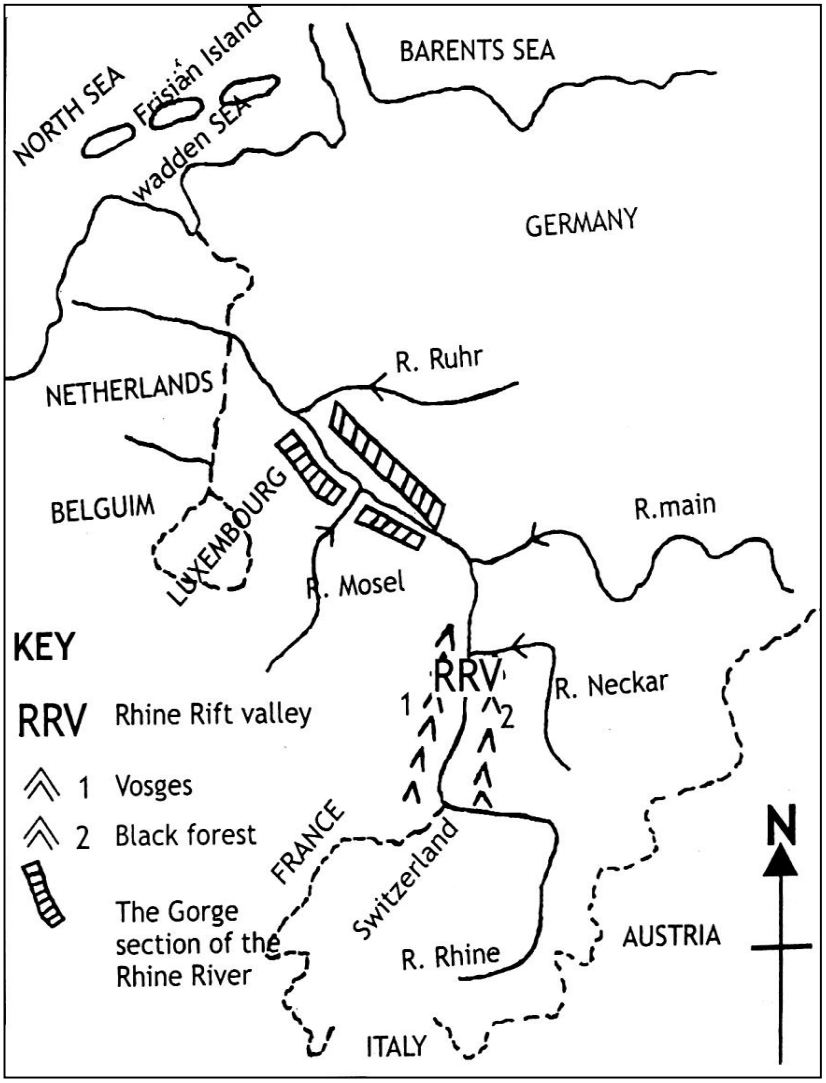
PART FIVE

RHINE LANDS

INTRODUCTION

The Rhine lands is the region in North western Europe which is drained by river Rhine and its tributaries. River Rhine has its head waters in Alps south of Switzerland. The Rhine river and its tributaries drains through five countries namely; Switzerland, Germany, Luxembourg, Belgium and Netherlands. Belgium, Netherlands and Luxembourg are known as the Benelux countries meaning countries of lower altitude on the Northern European plains.

SKETCH MAP TO SHOW THE RHINE BASIN



The position of the Rhine lands

The Rhine land countries are situated in North Western Europe. The Rhine lands extend approximately 42^{o}N – 54^{o}N latitudes and 3^{o}E – 13^{o}E longitudes. The region is neighboured by the following countries namely;

1. Poland, Czechoslovakia and Austria in the east.
2. Italy in the south
3. France in the west
4. Britain in the north east which is linked by the North sea.

The size and population of the Rhine land countries

RHINELANDS	AREA(approx)	POPULATION (approx)
WEST GERMANY	248, 000 sq km	62 million
SWITZERLAND	42, 000 sq km	64 million
NETHERLANDS	36, 000 sq km	14 million
BELGIUM	31, 000 sq km	10 million
LUXEMBOURG	3, 000 sq km	36 million

A comparative analysis of the Rhine lands and East Africa

Size

In terms of size, the Rhine lands are only a fifth of the area of East Africa and would take up less than half of Tanzania. On the other hand, East Africa is made up of three countries whereas Rhine lands constitute 5 countries.

Population

In terms of the number of people, the Rhine land population is higher than that of East Africa. The population of the Rhine lands is very high , over ninety million. Belgium and Netherlands for example are some of the most densely populated countries in the world. Belgium with about 320 persons per square km and Netherlands with over 380 people per square km. In contrast, East Africa has a population density of an average below 20 persons per sq km. It is only in cities and very productive areas that the population rises above 140 people per sq km.

Period of independence

The Rhine land countries have had a long period of independence for example the Swiss struggle for independence dates back in 1219. This has enabled the people in this region to come together as nations and think of themselves as Germans, Dutchmen, Swiss and the like.

On the other hand, the East African countries have just attained independence less than 100 years. This has prevented them from coming together as a nation and think of themselves as one people in the region. There is abundance of tribes found in East Africa and as such there are a number of regional languages.

Rocks

In terms of rocks, East Africa is made up of old basement rocks which were formed during tertiary, quaternary periods yet those of Rhine lands are geologically young rocks.

Relief

Much of East Africa is a plateau which punctuated by both volcanic peaks and block mountains. However, volcanism is a major contribution to many land surfaces and other physical features of East Africa. On the other hand, glaciation has been responsible for many of the land surfaces in the Rhine lands. The beauty of Switzerland owes much to its glaciated scenery. Like wise, the soils in Germany and Netherlands such as boulder clay, and loess are direct and indirect as a result of it. In East Africa, glaciation is only limited on few peaks which rises above the snow line. For example Kilimanjaro, Meru, Elgon and Rwenzori.

By way of coincidence, both East Africa and Rhine lands have a rift valley and related block highlands. The East African rift valleys are the biggest in the world. The rift valley in Germany extends 290 km from Basel to Mainz in Germany.

Climate

The quantity and distribution of rain is the major factor governing East Africa's climate. The dominant factor for climate in Rhine lands is temperature leading to seasons like winter, summer, autum and spring. The Rhine lands are entirely in the temperate region where as East Africa lies astride the equator and experience tropical climate.

Coal exploitation

Coal has been the back bone to the development of industry in Europe as a source of fuel. The Ruhr industrial region in particular. In East Africa there is a general lack of coal except in southern Tanzania.

Water ways

In terms of transport, water transport is the cheapest means of carrying bulky goods. In East Africa, major steamer services and trade are conducted on L. Victoria.

In Rhine lands, the Rhine water way together with the canals and tributaries of Rhine river account for heavy traffic water transport.

The rivers of western Europe have a fairly constant volume and do not present many difficulties to river traffic, such as water falls. The major river like Rhine, Danube, Mosel, Mainz, Ruhr, Meuse, Wesser and Elbe are all capable of carrying over 1000 tons of goods each. In addition, there is a network of kilometres of navigable water ways. Unfortunately, for East Africa, its rivers cataracts, rapids and the like. On the other hand, there are no canals to supplement rivers and lakes.

Source of power

To a large extent, most of East Africa's electricity is derived from hydro electric stations. In this respect, Switzerland shares a similar position. The many glaciated valleys and water falls in Switzerland make ideal conditions for generation of electricity.

Land lockedness

Both regions have land locked countries for example Uganda in East Africa and Switzerland in the Rhinelands.

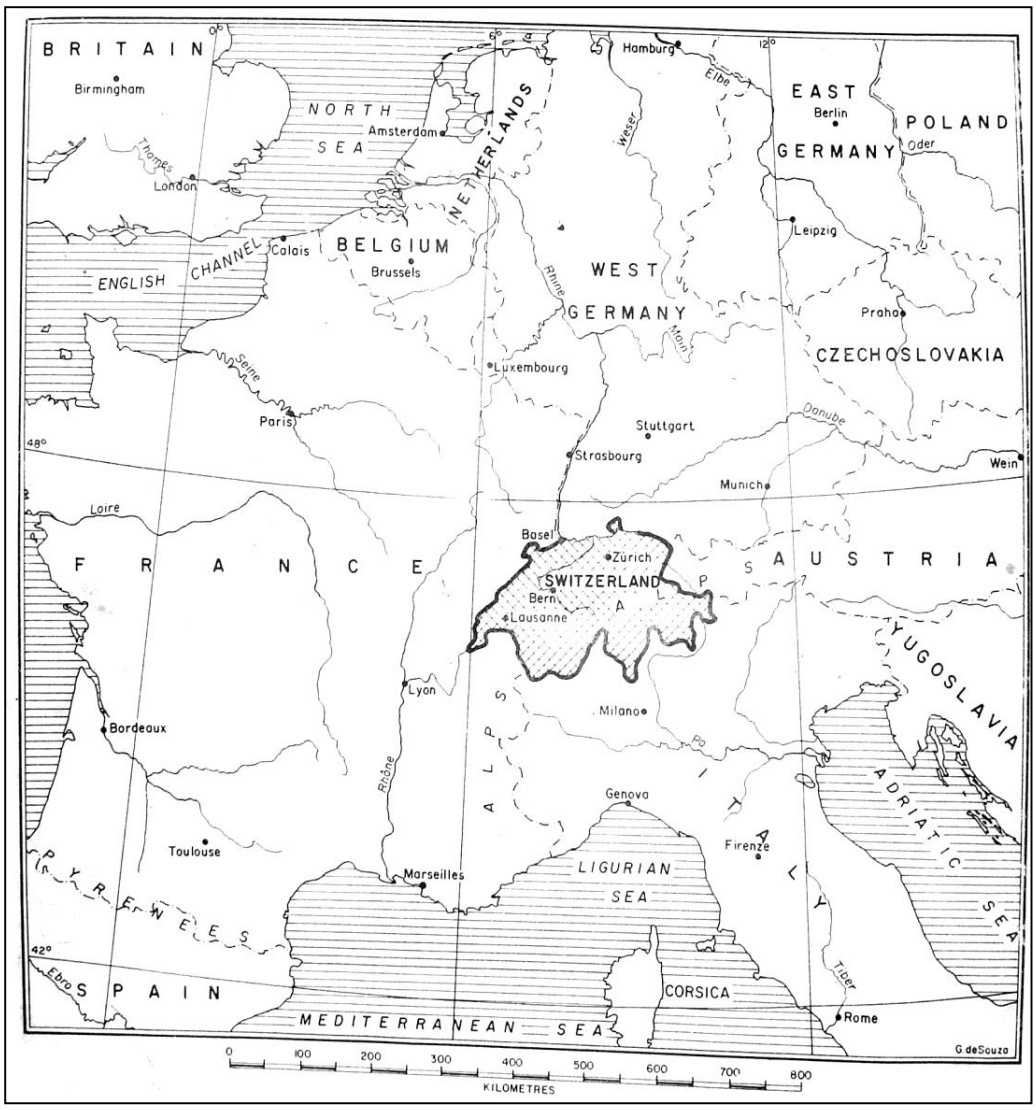
They rely on outlets of other countries for the export and import of their goods. In the case of Uganda, the railway lines through Kenya to Mombasa and through Tanzania to Dar-es-Salaam have remained its life time. Similarly, the Rhine through Germany and Netherlands, ending in Rotterdam is the artery for Switzerland.

Development

The Rhinelands are comprised of most industrialized countries of the world whereas East African countries are traditionally less developed countries.

SWITZERLAND

THE POSITION OF SWITZERLAND IN CENTRAL EUROPE

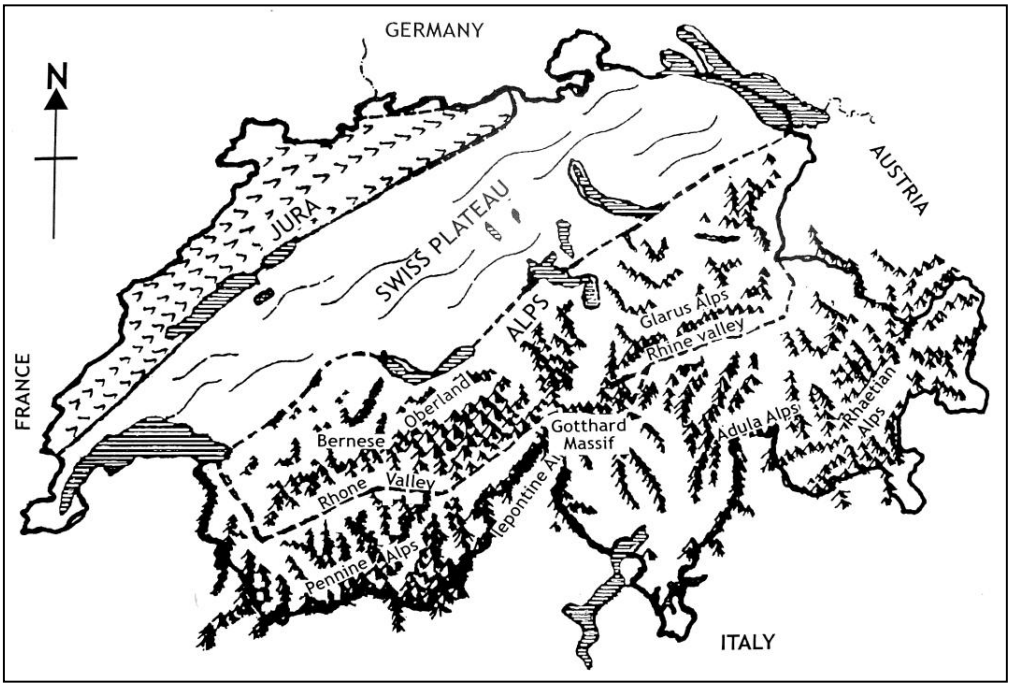


Switzerland is a land locked country situated in Central Europe. It is positioned in the central of Alpine mountain passes, such as Goft hard, Furka and Oberalp. Switzerland is the source of some of Europe's main rivers, such as Rhine, Rhone, Danube via Inn, and Po via Ticino. Switzerland's neighbours include Germany in the north, Austria in the east, Italy in the south and France in the west.

Topography of Switzerland

Switzerland's land surfaces can be simply classified into three main physical regions namely; the Alps, the Central plateau and the Jura.

SWITZERLAND PHYSICAL REGIONS



THE ALPS

The Swiss Alps occupy about 60% of the country. They form part of the upper Italian plateau. The Alps is a region of complex rugged mountains. The mountain mass of the Alps is transversed and divided up by the longitudinal valleys of the Rhone, upper Rhine, Reuss and Ticino into six sub regions. These are:-

1. Bernese Oberland
2. Lepontine mountains
3. Rhaetian Alps
4. Pennine Alps
5. Alps of Glarus
6. Adula Alps

The mean altitude is not much more than 5100ft (1700km). The highest peak is Darfur peak of Monte Rosa 15,217 ft (4,643m)

The ice age glaciers greatly affected the landscape and produced a variety of glaciated scenery including tiered valleys, terraces, passes, arêtes, U-shaped valleys, pyramidal peaks and Morraine blocked lakes.

Glaciers in the Alps

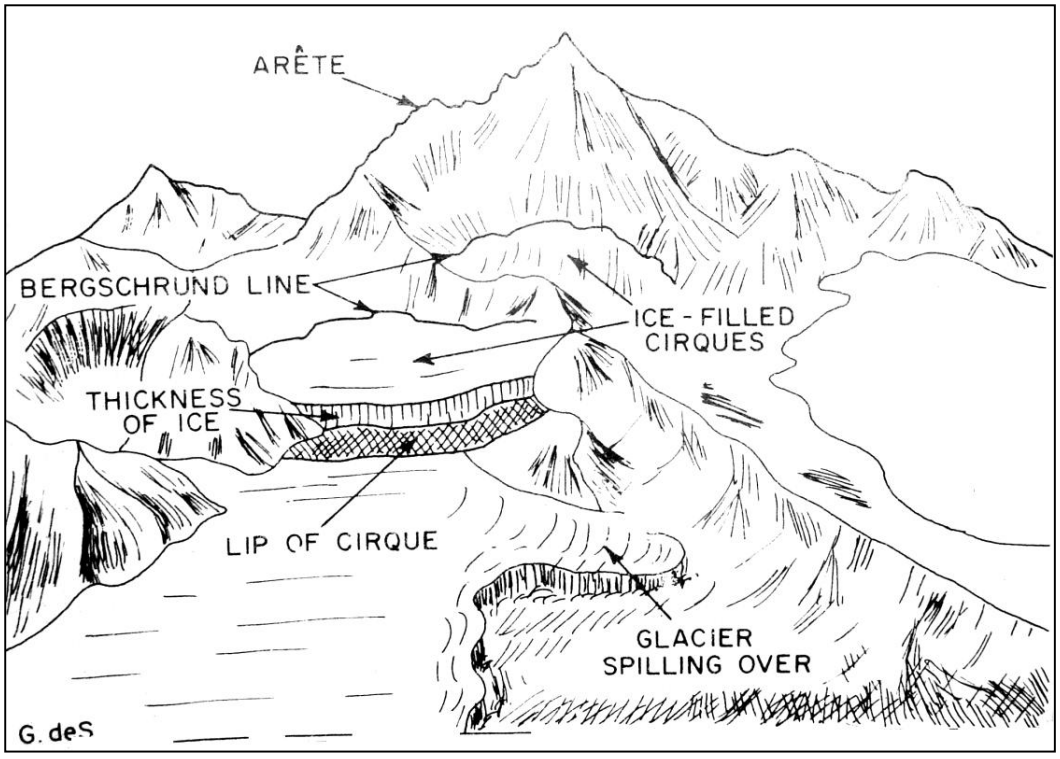
A glacier is a mass of moving ice from high peaks downhill. The precipitation which falls high up in the mountain peaks of the Alps forms ice and snow. This ice gradually flows away from the high peaks down hill. As it flows over the rocks, it cracks them and develops crevasse. Today in Switzerland there are much smaller glaciers as they were at the time of the European ice age, approximately 50,000 years ago. There are 140 glaciers remaining in Switzerland today. Some of these glaciers are receding, others are advancing whereas others are stationary.

MAJOR GLACIERS

Largest glaciers	**Area (km^2)**
Great Aletsch	169
Gorner	69
Fiescher	40
Lower Aar	40
Rhone	20
Morteratsch	20

Glacial erosional features

These include features such as arêtes, hanging valleys, cirques, pyramidal peaks, U-shaped valleys, Cascading water falls and many others.



i) Cirque or corrie

This is a semi-circular basin caused by glacial erosion in glaciated mountains. Its formation is as a result of repeated freezing and melting of frozen water in cracks on the mountain side. This exerts pressure and influences the breaking up of rock. Eventually, during the warm conditions, the frozen water melts and flows out of the cracks carrying away rock debris. If the process continues for many times, the crack will develop into a huge arm chair circular basin known as a cirque or a corrie. When a cirque is filled with water, it may form a lake known as a cirque.

ii) Arêtes

These are sharp knife like edged features found between two cirques. They are formed when two cirques form adjacent to each other and only a sharp ridge is separating them.

iii) Pyramidal peaks

This is also known as a horn. It is a sharp pointed mountain peak which appears like a pyramid, hence the name pyramidal peak. It is formed when three or more cirques form on a mountain.

iv) U –shaped valley

This is a broad flat bottomed steep sided valley with a U-shaped cross profile. It is formed when the interlocking spurs of a valley are eroded by a glacier into a straight sided valley with a U-shape.

The Lauterbrunnen valley an example of a U-shaped glaciated valley.



v) Hanging valleys

These are small valleys joining the main valley left high hanging above the main valley. They are formed when the main valley is over deepened by glacial erosion such that the tributary is left high above the main valley. Rivers flowing through these valleys form cascading water falls.

Value of glaciated regions

1. The cascading water falls from hanging valleys are suitable for the development of hydro-electric power. Switzerland has developed a number of hydro-electric power plants from such water falls. These water falls are also beautiful and very attractive to tourists.
2. The glaciated scenery is beautiful and attractive to tourists. Switzerland's tourist industry in the Alps is based on such glacial features.
3. The glacial troughs form natural route ways and passages in rugged highland regions.
4. The alps have good pastures during summer giving rise to animal rearing.

Disadvantages of glaciation

1. Some outwash plains contain infertile soils giving rise to waste land.
2. The glaciers erode the top soils making the areas of little agricultural value.
3. They lead to the formation of a rugged landscape which hinders the development of transport routes.

A glacier showing Medial moraine

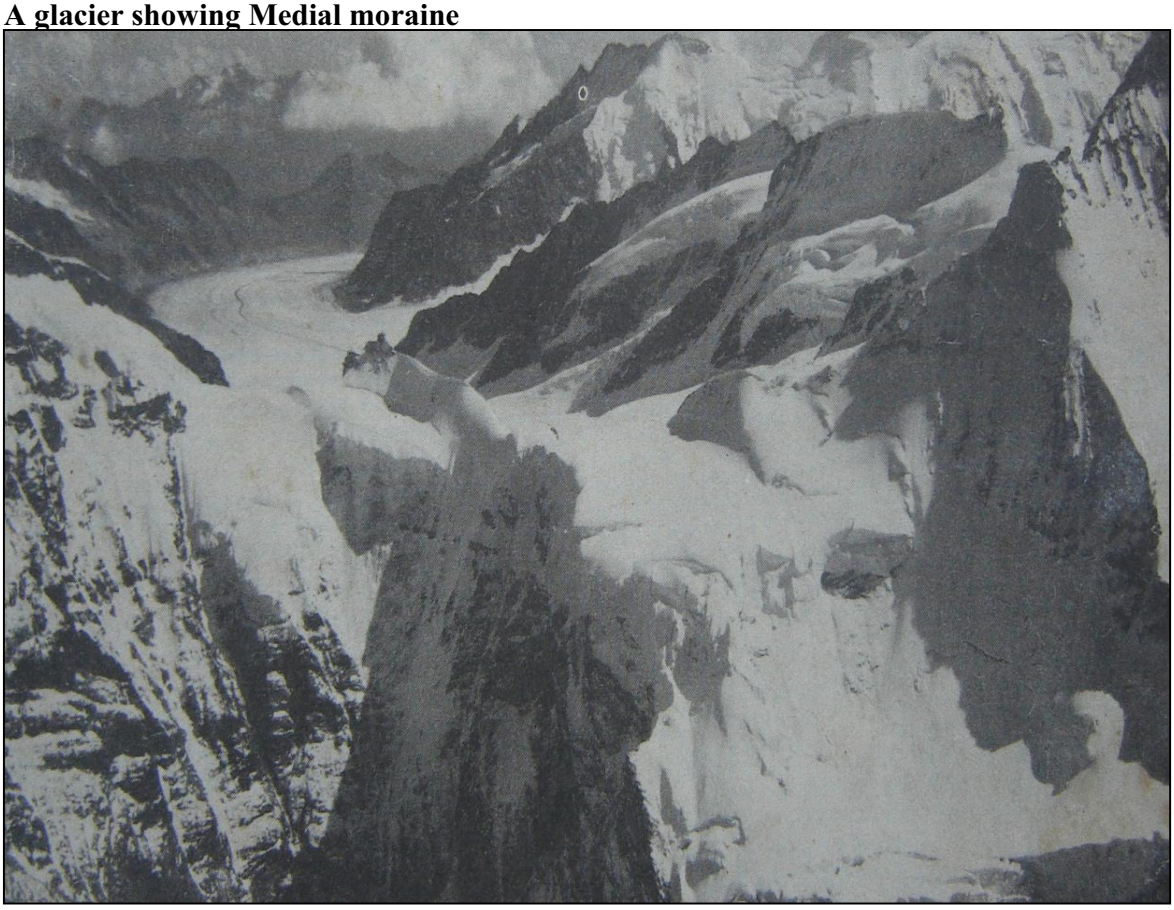
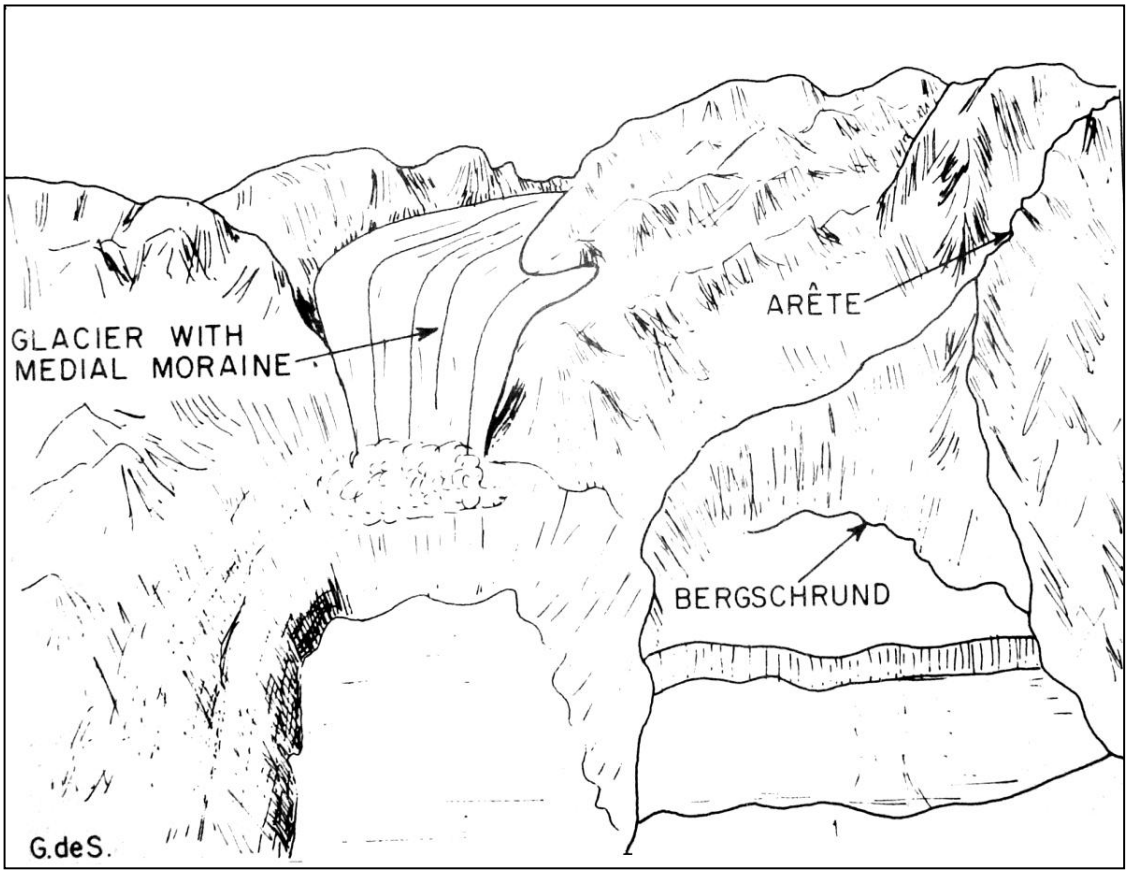


Diagram showing Medial moraine



The characteristics of the Alps

(i) The region is characterized with complex rugged mountains aligned North East and south West

(ii) The average height of the mountains is not much more than 1700m above sea level. Its highest peak is Dufour peak of Monte Rosa 4634m.

(iii) The region is dissected by the longitudinal river valleys of the upper Rhine, Rhone, Reuss and Ticino, leading the region to be sub divided in six sub Alpine regions.

(iv) There are a number of mountain passes e.g. St. Gothourd, Simplon, Great and Little St. Bernard e.t.c

(v) There are a number of glacial erosional features and glacial depositional features.

The economic importance of the Alps

1. There is much developed tourism due to the magnificent mountain scenery.
2. There is generation of hydro electric power from the many waterfalls in the glaciated highland.
3. Lumbering from the coniferous forests on the mountain passes.

4. Arable farming is carried out on the lower slopes.
5. Vine growing is an important activity in the area. There are orchards and vine yards on the lower slopes of mountains.
6. There is mining and smelting of Aluminium.
7. The Alps is a source of many rivers from the melt waters of the glaciers.
8. Animal rearing particularly cattle keeping is another agricultural activity carried out on Alps.

Problems facing people living on the Alps.

1. The rugged landscape make transport and communication difficult.
2. The area is affected by soil erosion when ice melts.
3. Barren rocks and infertile soils which hinder agriculture.
4. The upper slopes discourage settlement due to steep slopes and very low temperature.

THE SWISS PLATEAU

The Swiss plateau extends 290km long and up to 48km wide. It was an arm of the sea and now forms a corridor between the Jura and the Alps. The Swiss plateau occupies 30% of the total area of Switzerland.

The region is composed of molasses (sediments) from the Alps, Jura and Black forest. There are large stones and sand stone nearer the Alps.

Much of the plateau is covered by morainic materials forming a landscape of low hills and numerous forests. Its average height above sea level is (580m). The plateau experiences milder climate suitable for settlement, therefore it is the most populated area with $^{2}/_{3}$ of Switzerland's population. The region is the most productive part of Switzerland and has become the economic heart of Switzerland.

The importance of the Swiss plateau

1. It is the economic heart of Switzerland with many towns, cities and industries. For example Basel an inland port, centre for chemical and textile industries. Zurich an important city for textiles, Beru the capital city and Geneva a centre for watch making and precision instruments.
2. It is a region with most fertile soil and mild climate suitable for agriculture. Therefore, crops such as wheat, maize, vines, fruits and flowers are grown.
3. There is animal rearing carried out because of rich pastures and fodder crops.
4. The undulating landscape has enabled mechanized agriculture, settlement, construction of good transport network and industrialization.

THE JURA

The Jura region comprises of about 10% of the total land area of Switzerland.

Characteristics of the region

1. The region consists of young North-East and South-West fold ranges with parallel synclines and anticlines.
2. The fold ranges are broken through by river erosion causing gaps called cluses.
3. The rocks in this region are mainly of limestone. These limestone rocks are permeable. They allow water to percolate and sink through them. Therefore, there are many Karst features such as shallow holes, sink holes, caves, dry valleys, gorges and cliffs with rocky faces.
4. The northern region has a flat topped plateau.
5. The average height of land is 750m above sea level.

Economic value of the Jura region

1. There is a wide spread undertaking of livestock keeping particularly cattle rearing for beef and diary products. Goats and sheep are also reared on the higher slopes.
2. The lower slopes are covered with forests particularly pines which have promoted lumbering.
3. The limestone landscape has supported tourism.
4. There is mining of salt and limestone n the region.
5. There is manufacturing of watches, textiles and other items.

SWITZERLAND'S POPULATION

The population of Switzerland is un evenly distributed. Over 70% of the population is found in the Swiss plateau which covers only 30% of the land area of Switzerland.

Reasons why the Swiss plateau is densely populated.

1. The presence of many industries in the region has attracted many people to come and stay in the region while seeking employment.
2. The nature of the land which is undulating and gently sloping makes settlement and construction of social and economic infrastructure easy.
3. The presence of fertile soils derived from glacial and river deposits have encouraged both settlement and farming.

4. The availability of conducive climate which is mild in winter and warm in summer. These have favoured settlement and farming.
5. The mountainous nature of the rest of the country makes settlement difficult thus settling on the Swiss plateau where the land is almost flat.
6. The availability of well developed transport and communication network of roads, railways and air transport.

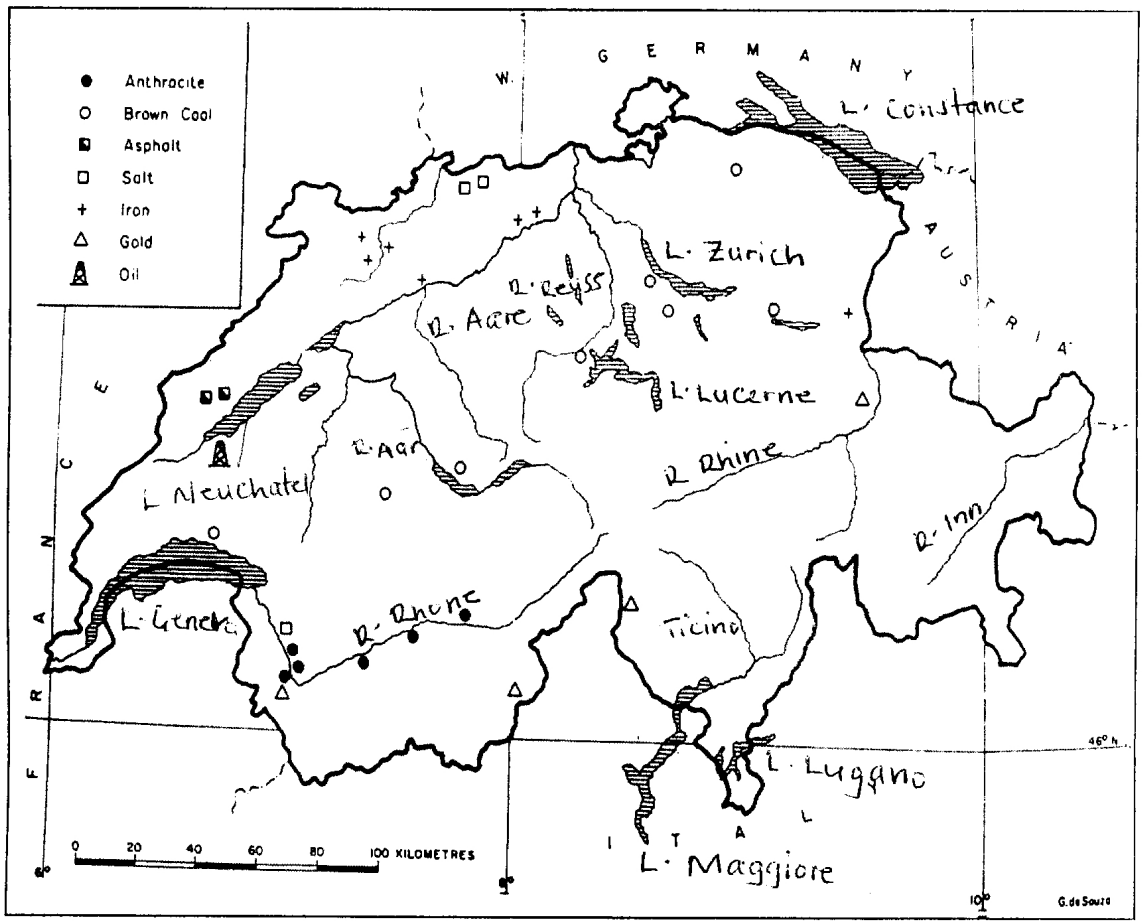
Reasons why Alps have a low population density

1. The presence of barren soils which are thin, stony and infertile. Such soils discourage both farming and settlement.
2. The region experiences wild and harsh climate especially in winter season when the temperatures fall below 0^{o} up to $-6^{o}C$. such climate is conducive for human survival therefore the people settle on the Swiss plateau where climate is favourable.
3. The presence of complex rugged mountains makes transport very complicated.

The mineral resources of Switzerland

Switzerland is poorly endowed with the most important minerals. The country is almost totally lacking minerals with of mention. The only reliable mineral resource is salt which is mined from the Rhine valley near Basel and in the Rhone valley near Bex. Other minerals but in small quantities include anthracite which is mined from the ancient lake bottoms and iron ore from Gonzen and Frick tail.

A SKETCH MAP OF SWITZERLAND SHOWING MINERAL DEPOSITS



Power resources in Switzerland

Switzerland is endowed with a number of power resources. These are:-

(a) Hydro Electric power

(b) Nuclear power

(c) Natural gas

Hydro electric power is the most important source of power. This has been due to the presence of a number of rivers that flow from the Alps and Jura that are harnessed to generate hydro electric power. There are over 432 major HEP stations in Switzerland.

How electricity is used in Switzerland

USER	QUANTITY IN %
Private homes, business, traders, agriculture	50.5
Railways	6.7
Industries	22.0
Electro chemical and metallurgical	14.7
Others	6.3

Reasons why there are more HEP stations in the south than in the North

1. Most of the major rivers have their headwaters from the melt waters of glaciers in the south.
2. Constant flow of waters
3. The presence of many cascading water falls.
4. The absence of water falls in the North.
5. The presence of limestone rocks in the Jura region which allows water to penetrate through thus discouraging surface drainage which could be used to generate HEP.

AGRICULTURE IN SWITZERLAND

Characteristics of Swiss agriculture

1. It is most developed in the Swiss plateau.
2. It is scientific and capital intensive. This means that it involves application of fertilizers and other scientific methods to yield high produce from small area of farmland.
3. Cattle rearing especially for diary products such as cheese, butter, condensed milk and the like are produced.
4. Fodder crops such as hay, oats and Luce are grown to feed the live stock.
5. On the lower slopes and flatter surface food crops and fruits are grown. For example maize, wheat, Barley. The growing of fruits such as cherries, apples, pears and vines is important around lakes such as Geneva and Constance.

Factors for the development of agriculture in the Swiss plateau

1. The soil. The Swiss plateau is the most fertile part of Switzerland.
2. Constitutes of glacial and river deposits which have made the soil fertile thus encouraging the growth of a variety of crops.

3. The presence of good climate characterized with mild winters, enough rainfall and sunshine is favourable for farming.
4. The nature of the land which is relatively flat especially on the Swiss plateau and the gently rolling lower slope of the Alps and Jura.
5. Availability of rich pasture and fodder crops especially on the lower slopes of the Jura and Alps which support livestock keep especially cattle for beef and diary products, sheep and goats
6. The presence of well developed transport routes such as roads and railway which enable easy and quick marketing of the agricultural produce.
7. The availability of a large market in the town centers.
8. The high level of education which enables provision of skilled man power.
9. The availability of capital to invest in the agricultural sector.

Reasons why agriculture is least developed in the Alps

1. The nature of relief which is mountainous and rugged discourages mechanization and farming in general.
2. The terrain of the Alps which is generally glaciated with very low temperatures. Such low temperatures cannot support plant growth.
3. The presence of poor soils which are generally thin, strong and infertile .
4. Difficulty in construction of transport and communication lines due to the rugged nature of landscape.

THE SWISS TRANSPORT.

Switzerland's transport constitutes of an integrated international and world wide transport and communication networks. There is also a well distributed internal network of roads and railways.

The Swiss railway system

The railway system network comprises 6550 kilometers of line which penetrate into the most distant valleys and even climb to 3500 metres. There also 400km of funicular railway and aerial cable ways enabling tourists to reach ski slope and the mountain tops with ease.
Switzerland's central position in Europe makes her an important country for international rail connections. There are 5 main lines crossing Switzerland. These are:

1. Basel chiasso north south line connecting Germany to Italy via St. Gotthard Tunnel.
2. Besel Bern-milan passing through the Lotschberg and Simplon tunnel

3. Vallor-lausanne-Brigue line which passes through the Rhone valley and Simplon tunnel ensuring traffic between France and Italy.
4. The Geneva-Bern –Zurian line connecting France to German and Austria.

THE RAILWAY NETWORK IN SWITZERLAND

Reasons why Switzerland has developed an efficient railway system

1. To convey imports and exports via Basel to the rest of Switzerland and from various parts of the country .Large quantities of imports arriving at port Basel are conveyed by rail into the interior of Switzerland, likewise large quantities of exports from various parts of the country reach Base l by rail.

2. To encourage the development of the tourist industry. Electrifying aerial cable ways and funiculars can reach higher altitudes of the rugged mountains in the Alps. They transport millions of visitors each year. They enable tourists to reach ski slopes and mountain tops with ease.

3. Switzerland lies in the central position of Europe. Naturally, this makes Switzerland a transitional and route way for international movements. Therefore, Switzerland has developed her railway system to promote international links and benefits from the international linkages.

4. The need to transport thousands of workers to their work places and back home daily.

5. The need to develop manufacturing industries based on imported raw materials thus using railway transporting bulky goods.

Road transport

Road transport is well developed in the Swiss plateau. This is due to the nature which is almost flat and undulating, presence of many industries , well developed agriculture and a large population. Switzerland has one of the desert roads networks in the world. There are important roads routes which have been developed northwards through the Jura Basel and Rhine valley to Lyon and Paris. There are also road routes west of Geneva and Rhone valley and south wards to Italy through the main passes.

Air transport

The Swiss air transport is dominated by international flights than local flights .The main airports are Kloten at Zurich, Cointrin at Geneva and Basel.

Reasons for the development of the air transport in Switzerland

1. To tap and harness the strategic location of the Switzerland in the central position of Europe.

2. To provide quick and efficient transport for the tourists to and from Switzerland.

3. To transport quickly her high value manufactured good to the international market.

Water transport

The Rhine river is a very important water way of Switzerland .Basel is an inland port which handles the whole of the international river traffic to and from Switzerland.

The volume of tonnes of goods imported through port Basel represents.

Among the main commodities imported include liquid and solid fuels, cereals, raw and semi-finished metals. There are over 440 vessels having a cargo capacity of 429,470 tons.

Problems facing the Swiss transport system

1. The mountainous terrain in the Alps and the Jura create problems in construction of roads and railway lines.

2. Many rivers are not navigable due to water falls and rapids.

3. Congestion on the transport routes especially roads.

4. Flooding of rivers especially in spring due to melt water of glaciers from the Alps.

5. Delays due to congestion.

6. Switzerland posses no coal and oil therefore depends on imported one whose costs are ever increasing.

7. High costs of constructing roads and railways especially in the mountainous regions.

8. Switzerland is landlocked and has to go through other countries to reach the sea therefore incurring custom taxes and high costs of transportation.

Solutions to the problems

1. Construction of roads and railways in mountainous regions applying high skills in engineering.

2. Electrifying the railway system to enable fast movement and climbing high altitudes.

3. Construction of the national road network and railway's adjacent to Rhine river and reduce on congestion on the Rhine river.

4. Use of locks to improve on the navigability over waterfalls and rapids on rivers.

THE SWISS TOURISM INDUSTRY

The development of the Swiss tourism industry dates back in the 18th century when travelers from a number of European countries admired the diversity of scenery and beauty of the Alps. The British were the early main tourists who visited and took delight in the discovering Switzerland as a holiday country. Many of the early tourists were mountain climbers.

From the beginning of the mid of 20th century, there has been a complete revolution in the Swiss tourist industry. German visitors also began to come in ever-increasing numbers. Swiss tourist nationals came to 25%, and electrification of accommodation facilities.

TOURIST ATTRACTIONS IN SWITZERLAND

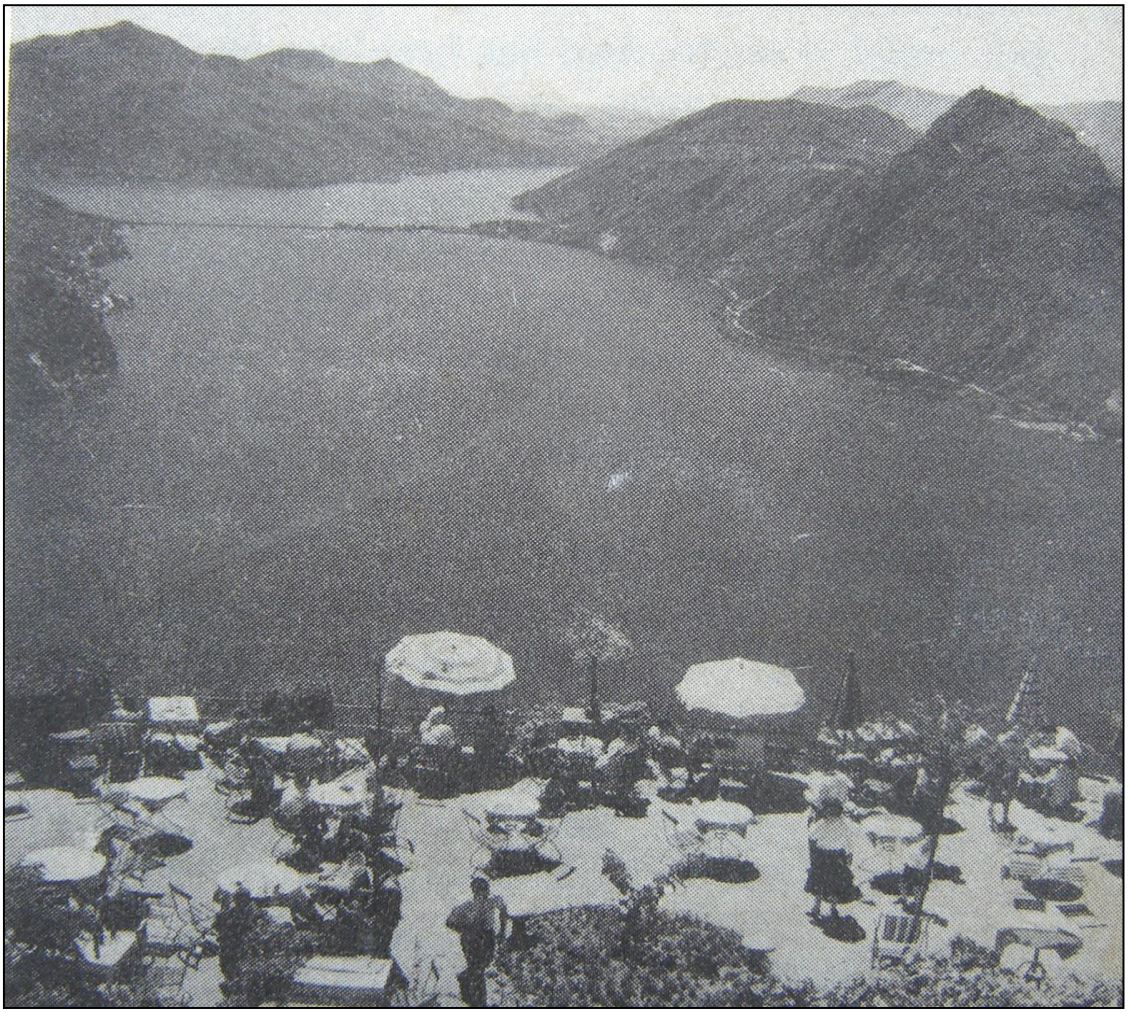
1. Beautiful scenery of snow capped peaks, pyramidal peaks, hanging valleys and cascading water falls.
2. The climate which provides both summer and winter attractions.

a. In summer, the sunny days encourage sun bathing, swimming and view the magnificent scenery of snow capped peaks, clear blue sky and cascading water falls.

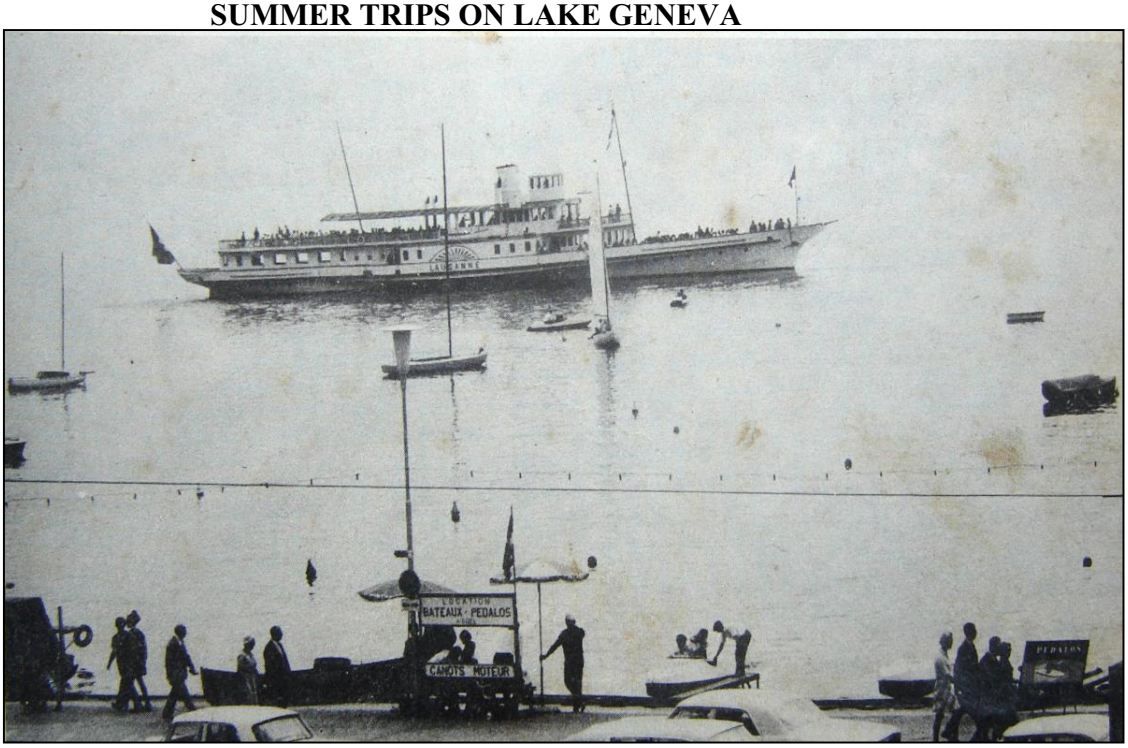
b. In winter, the big attraction is the abundance of snow on the mountainous slopes to which tourists take part in the ski-ing and ice skating.

3. The mountainous scenery in the Alps attract mountain climbers.
4. Lakes in the Swiss plateau and Jura which encourage fishing, sun bathing and swimming.
5. Forests on the slope of the mountains.
6. The Swiss culture.
7. Watch making industry.
8. Chalet villages of Alpine and tunnels.

THE SUMMER TOURISTS ENJOY THE VIEWS



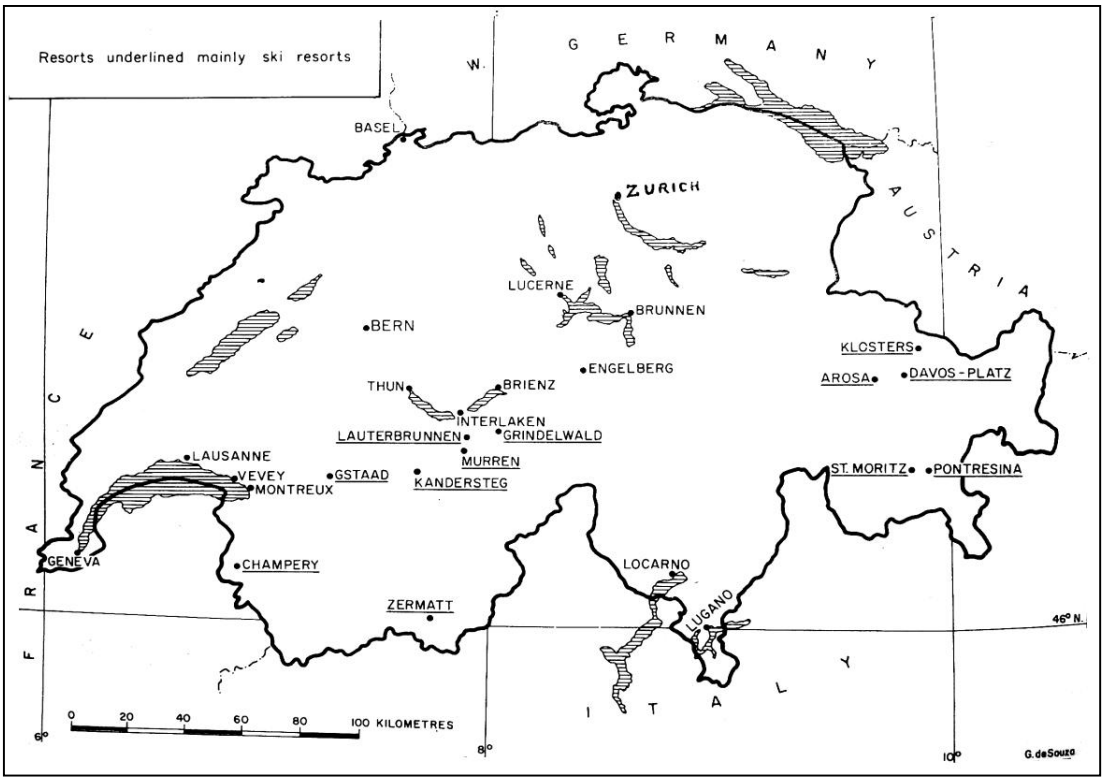
SUMMER TRIPS ON LAKE GENEVA



THE SWISS TOURIST RESORTS

Tourist resorts provide special facilities for tourists to enjoy their tour. There are both summer resorts situated in the towns of the plateau such as the Lausanne, Geneva, Bern Zurian and the showers of lake Licerne; In winter, the most well known resort are Grindelwald, Kandersteg , Zermatt, Vevey, St.Moritz and the like.

A MAP SHOWING THE SWISS TOURIST RESORTS



Factors which have favoured the growth of the tourist industry in Switzerland.

1. The strategic geographical location of Switzerland in the heart of Europe. Her position provides a large market for tourism from the rich and leisure looking people of France and Italy.
2. Well developed transport and communication network of roads, railways, water and air. For example, there are electrified trains and cable cars that en able transportation of millions of tourists each year.

COMMUNICATION BETWEEN RESORTS

Movement by cable cars



Electrified railway



3. The availability o f well developed and comfortable hotels and lodges. There are other types of accommodation including chalets (wooden huts), holiday apartments and caravan n sites. Today, there are over 7800 hotels which may overnight accommodate for 31.4 million tourists. The hotels in Switzerland are famous of high standard services.
4. St.Moritz has more accommodation for tourists than any other place in Switzerland. There are such as hotels with over 5500 beds.
5. The diversity of international languages that provide good and easy communication between the tourists and the Swiss people. For example English, French, German and Latin.
6. The presence of alternating winter and summer climate which attract various tourists activities enabling tourists trade nearly all the year round.
7. Switzerland is politically neutral and stable, a factor that has accounted for many tourists visiting the country since they are assured of safety and security.
8. Availability of capital from the well developed banking system
9. Increased advertisement through various ways such as brochures, internet, television, magazines and the like.
10. The presence of a well trained personnel in the management of the tourist industry. The development of the tour and travel agencies which organize tours for the tourists, provide air and Coach travel, and arrange accommodation.
11. The presence of many international organization such as world health organization (WHO), international Committee of Red Cross (ICRC) and others. These make Switzerland a central point of many guests.
12. The nature of the Swiss people of being friendly and hospitable.

The importance of the Swiss tourist industry

1. It is source of foreign exchange as tourists spend money in extensive hotels, lodges, shopping and the like.
2. The tourist industry has generated employment opportunities to the Swiss people in form of hotel attendants, drivers, guides and the like.
3. Tourism has contributed to the growth of the towns such as Zurich, Lucerne, St. Moritz, Zermatt, Geneva and many others.
4. The tourist industry has led to the development of infrastructure such as hotels, lodges and transport routes e.t.c.
5. Tourism has led to the economic use of regions which would have otherwise been useless e.g. the rugged mountains of Alps.

6. There has been development of well trained labour force in the hotel industry.
7. There has been promotion of good international relations with other countries where tourists come from.
8. Tourism has helped to create areas fro recreation and preservation of nature for future generations.

INDUSTRIALISATION IN SWITZERLAND

The growth of industries in Switzerland started with the manufacture of textiles and watches as cottage products. However, today the manufacture of machinery has taken the load.

TYPES OF INDUSTRIES IN SWITZERLAND.

1. Engineering industry

This accounts for more than a third of total exports. The products made include; locomotives and wagons, vehicles, tractors, machine tools, turbines, electrical appliances and the rest.

2. Watch making

Watch making is concentrated in the region of La Chaux-de- fonds and LeLocle. It started as a home product in winter.

3. Precision industry

This constitutes of high quality precision instruments particularly; optical instruments, for example surveying instruments, binoculars and microscopes. Navigation and meteorological instruments are also produced.

4. Textile industry

The Swiss textile industry has concentrated on the production of high quality goods rather than mass production. The Swiss textile industry emphasizes manufacturing latest fashions. The main textile manufacturing areas are Zurich, and ST. Galen. Most of the textile products are exported abroad.

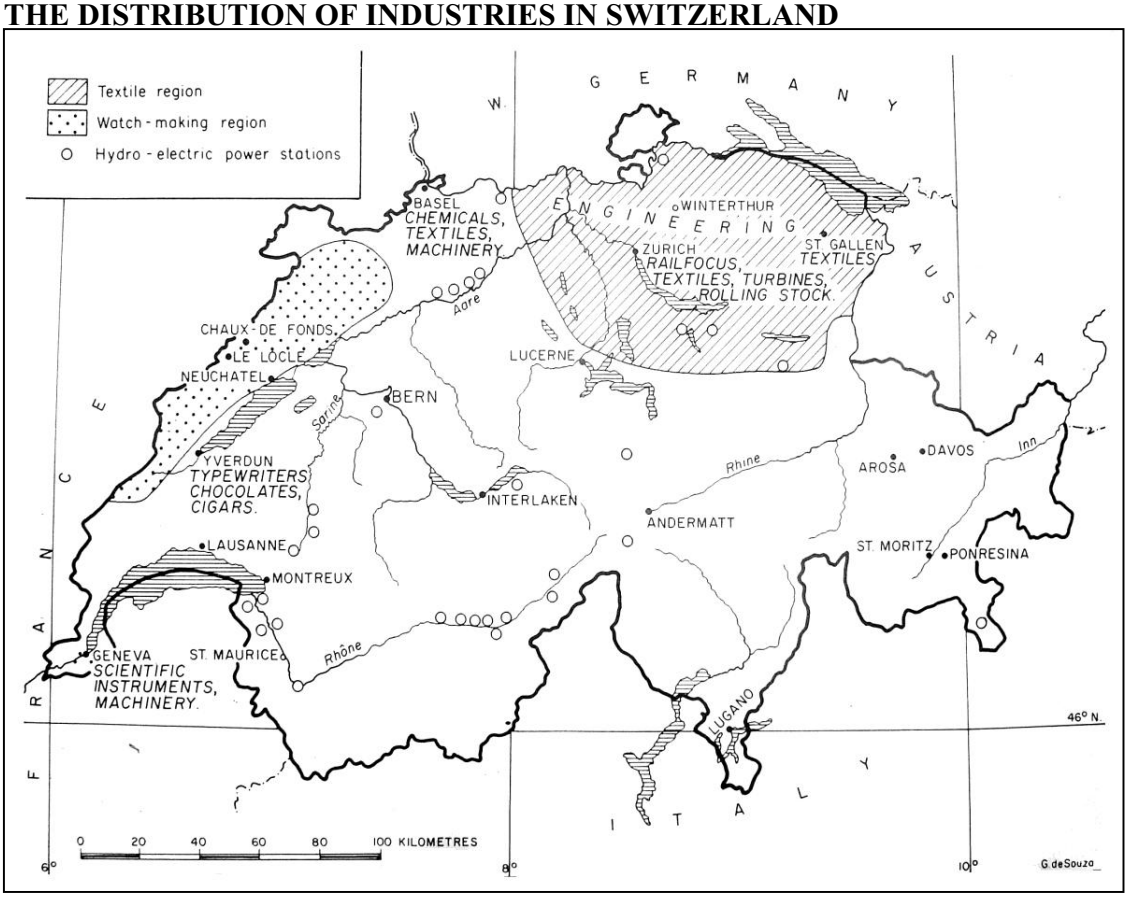
5. Foot wear

The foot wear industry employs over 130,000workers. Exports consist of mainly ladies shoes and high quality boots.

6. Chemical and pharmaceutical industry

This industry produces drugs, dyes, soaps, explosives, insecticides, plastics cosmetics and other items. Basel is the most important centre. Other centres include Bern and Zurich.

THE DISTRIBUTION OF INDUSTRIES IN SWITZERLAND



Factors for industrial development in Switzerland

1. Availability of capital to invest in industrial development. This money has been accessed from the international financial institution (World Bank) which has its headquarters in Switzerland.
2. The presence of a large market for the products both within the country and from neighbouring rich countries for example; France, Germany, Italy and the like.
3. Availability of power resources especially HEP generated from Alps.
4. The presence of skilled man power by the Swiss themselves.
5. The presence of well developed transport and communication routes such as railways, roads, air and water transport.
6. The presence of a good government policy which encourages industrialization.
7. The country is politically neutral. This has enabled industrial development to take place without any destruction.

8. The availability of raw materials especially from the agricultural sector such as vegetables, meat, milk, sugar beet and the like.
9. The gently sloping nature of land in the Swiss plateau which has made construction work of industries easy.

Problems facing industries in Switzerland

1. The production of high quality capital intensive goods is very costly.
2. Switzerland lacks most of the required raw materials for industrialization for example coal, iron ore, petroleum and the like.
3. Switzerland faces stiff competition with other countries producing similar goods, notably Japan and USA.
4. The country is land locked with no direct access to the sea.
5. Transport costs are high due to land lockedness.
6. Precision products are expensive and difficult to make.
7. There is small home market.
8. Heavy navigation traffic along the Rhine river which leads to congestion and frequent delays.

Solutions to the problems facing industries in Switzerland

1. Production for export to over come the problem of small home market.
2. Importation of raw materials from abroad for example cotton from Egypt and iron ore from France.
3. Production of commodities which require few raw materials but high skill and precision. The end process is very light in weight, small in volume but of high monetary value. This has enabled overcoming the problem of raw materials and high transport costs.
4. Neutrality is emphasized to discourage economic embargos.
5. Rhine river is used to link the country to the sea via Rotterdam. This has minimized the problem of land lockedness.
6. Automation of industries to reduce the problem of labour shortage.
7. Widening the market through market research and organizing annual international trade fairs.

The importance of industries to Switzerland

1. There has been capital accumulation for further economic development.
2. They have promoted improvement of standards of living among the Swiss people.
3. Industrialization has enabled the Swiss people to acquire more skills of manufacturing.

4. They have enabled the country to earn foreign exchange through exportation of the manufactured products to other countries.
5. There has been increased revenue to the government through taxes imposed on the industries.
6. Industrialization has led to wide spread urbanization particularly at Basel. Zurich, Bern and Geneva.
7. Industrial development has accelerated the development of the transport network of roads, railway, water and air.
8. There has been generation of employment opportunities to the Swiss people.

REVIEW EXERCISE

1. (a) Draw a sketch map of Switzerland to show the major physical regions

(b) Name the region where each one of the following is found

(i) Moraine dammed lakes

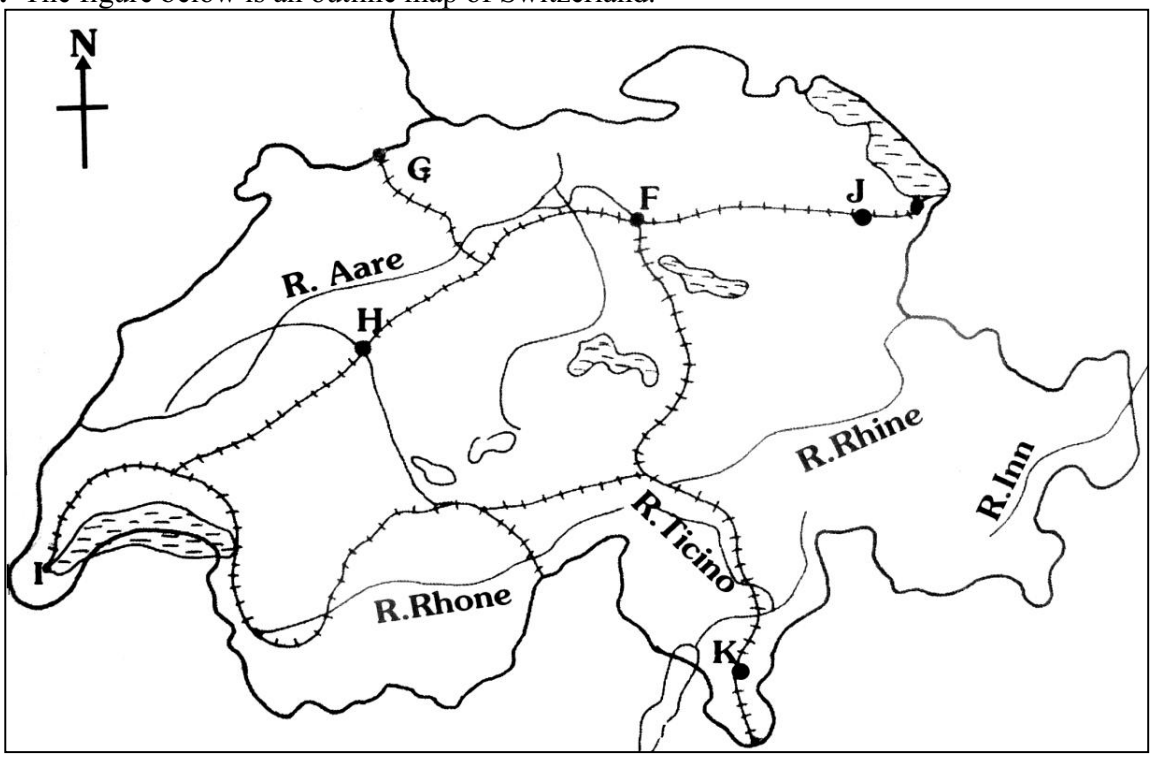
(ii) Hanging valleys

(iii) Sink holes

(c) Explain each of the features of (b) above is formed

(d) Describe the major economic activity carried out in each of the regions identified in a) above.

2. The figure below is an outline map of Switzerland.



(a) On it

i. Name the towns marked F, G, H, ,I ,J and K.

ii. Mark the main railway lines

(b) i. Why did Switzerland develop an efficient railway network.

ii. Name the other modes of transport used in Switzerland.

(c) i. Outline the problems facing the Swiss transport system

ii. How are the problems outlined in (c) above solved.

3. Read the passage below and answer the questions that follow

Switzerland is a land locked country with over 6 000 000 inhabitants. Only a quarter of the land is cultivable and there are few mineral resources of importance.

Adapted from: Hughes D and Randle. J. <u>The Rhine Basin, A study in Development</u>

(a) i. What is meant by the term "land locked country?"

ii. Explain how Switzerland has tried to solve the problem of land lockedness

(b) Giving specific examples, describe how physical factors have made it difficult to cultivate the remaining ¾ of Switzerland.

(c) State 3 ways in which the uncultivated land in Switzerland has been put to use.

(d) i. Explain how Switzerland in spite of having few mineral resources of importance has been able to develop her industries.

ii. Name two minerals mined in Switzerland

iii. Name three exports from Switzerland

4. (a) Identify four tourist attractions found in Switzerland

(b) Explain the factors which favoured the development of the tourist industry in Switzerland

(c) Outline two benefits of the tourist industry in Switzerland

(d) i. Identify three tourist attractions in Uganda which are not in Switzerland

ii. What measures has the government of Uganda taken to improve her tourist industry.

5. In East Africa, the highlands are the most densely populated while in Switzerland, the low lands have the biggest population densities.

(a) i. Account for the difference in population distribution between the two areas

ii. A part from the plateau lands, name two other areas which are densely populated in Switzerland.

(b) How are the highlands being developed? Name the activities taking place.

(c) How are mountain barriers a resource of agricultural and industrial development in their region?

(d) Despite the fact that East Africa has more resources than Switzerland, why is Switzerland more developed than East Africa?

6. (a) i. Regardless of her harsh environment, how has Switzerland managed to develop?

ii. What major activities are taking place in the Swiss Alps?

(b) i. With reference to the watch making industry, give the factors that have led to its development.

ii. What problems does this industry experience?

(c) i. Name three types of agriculture found in Switzerland

ii. What problems do the Swiss farmers experience?

7. Read the passage and answer the questions that follow:

"Switzerland, as in the other highland areas of North West Europe, has a landscape created by ice. Glaciers formed on mountains and flowed down hill, enlarging valleys and leaving jagged, spectacular scenery. When the ice melted, lakes were left on the valley floor. **Source: Waugh D. <u>The World</u> p. 11.8**

(a) i. State three glacial features mentioned in the passage

ii. Describe the formation of any one of the features stated in (a) (i) above.

(b) Name:

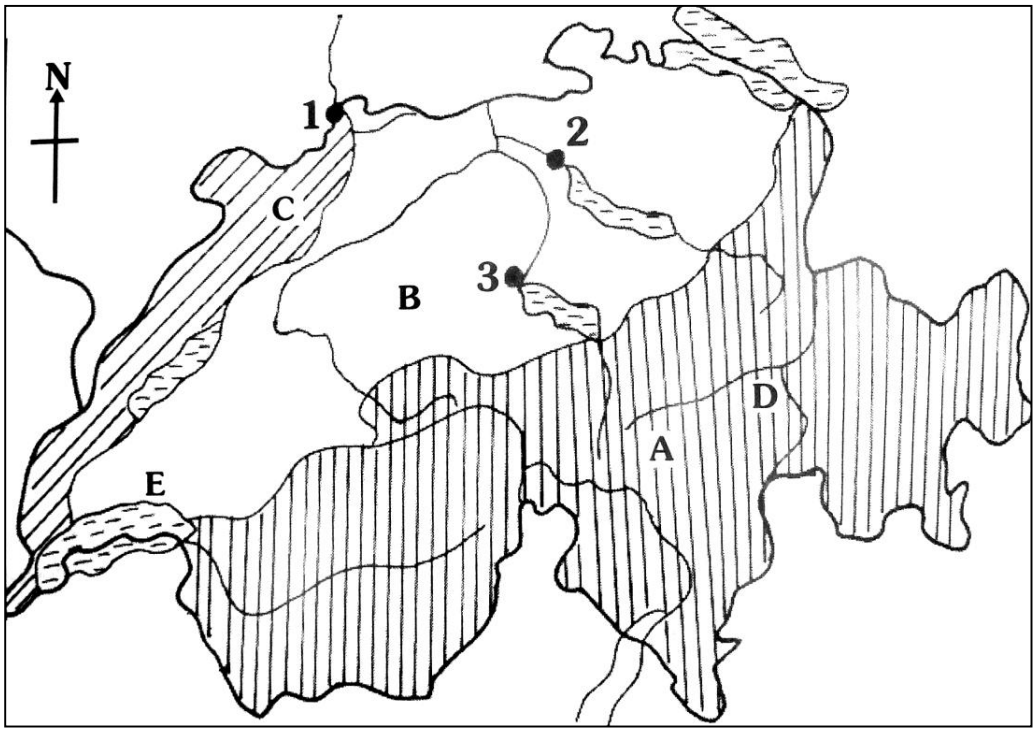
i. The region in Switzerland with a glaciated landscape

ii. Any three economic activities taking place in the region named in b (i) above.

(c)i. Outline the problems facing the economic activities named in b(i) above.

ii. Explain the steps taken to solve the problems outlined in c (ii) above.

8. Study the map of Switzerland provided and answer the questions which follow.



(a) Name the:-

i. regions marked A, B, C, and D

ii. towns marked 1, 2 and 3

iii. river marked D

iv. lake marked E

(b) Identify any two:

i. tourist attractions found in region marked A

ii. manufacturing industries found in town marked 1

(c) Explain the factors which have favoured the development of:

i. tourism region marked A

ii. manufacturing industries in the region marked B

(d) Outline the problems facing manufacturing industry in Switzerland

9. (a) Draw a sketch map of Switzerland and on it mark and label

i. the three relief regions

ii. a watch making district

iii. an engineering centre

iv. a textile making district

(b) State any two products obtained from the Swiss

i. engineering industries

ii. chemical processing industries

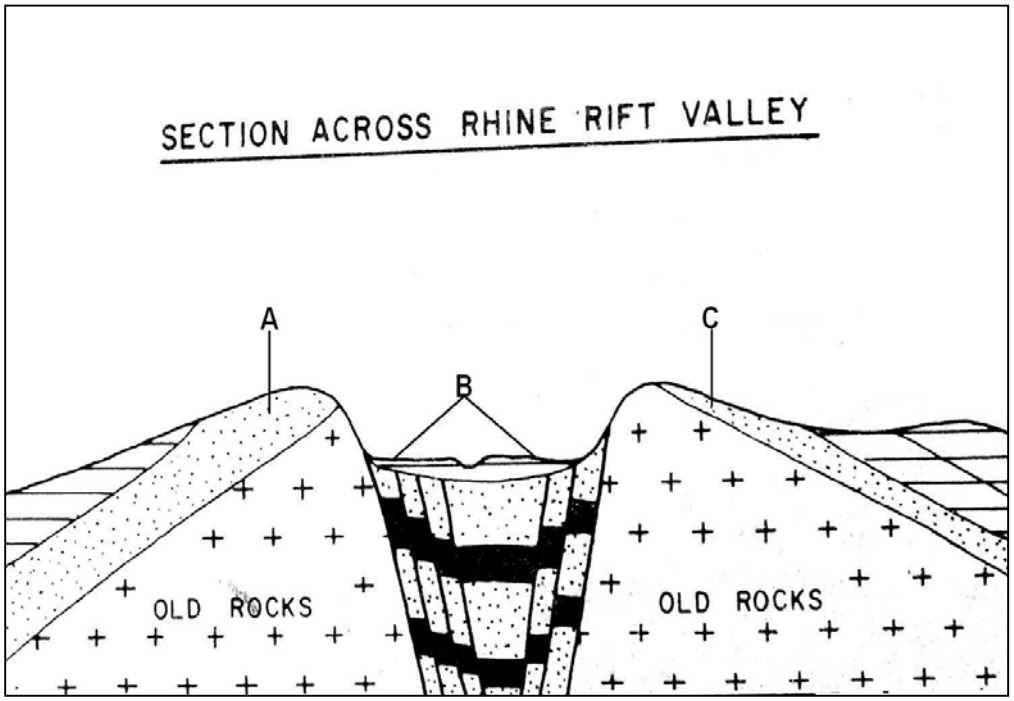
(c) Explain the:

i. problems faced by Switzerland in developing her industries

ii. steps taken to solve the problems in (c) ii) above.

(d) Outline Switzerland's benefits from her industrial sector.

10. Study the map of Switzerland provided below and answer the questions that follow.



(a) Name the:

i. industrial centres marked C, D, and E

ii. rivers marked 1 and 2

iii. lakes marked 3 and 4.

(b) State any two industries found in the centre marked

i. C ii. D

(c) Explain the conditions which have led to the development of the industrial sector in Switzerland

(d) Outline the problems facing the industrial sector in Switzerland.

GERMANY

Introduction

The Germany today is not the Germany before 1871 or after 1945. Germany has experienced tremendous changes politically, socially and economically. From the historical point of view, the German territory constituted of Teutonic tribes which numbered over 39 tribes including Saxons, Frisians, Franks, Thuringians,Alemanni, Swabians, Bavarians and many others which maintained their independence and government under a ruling family.

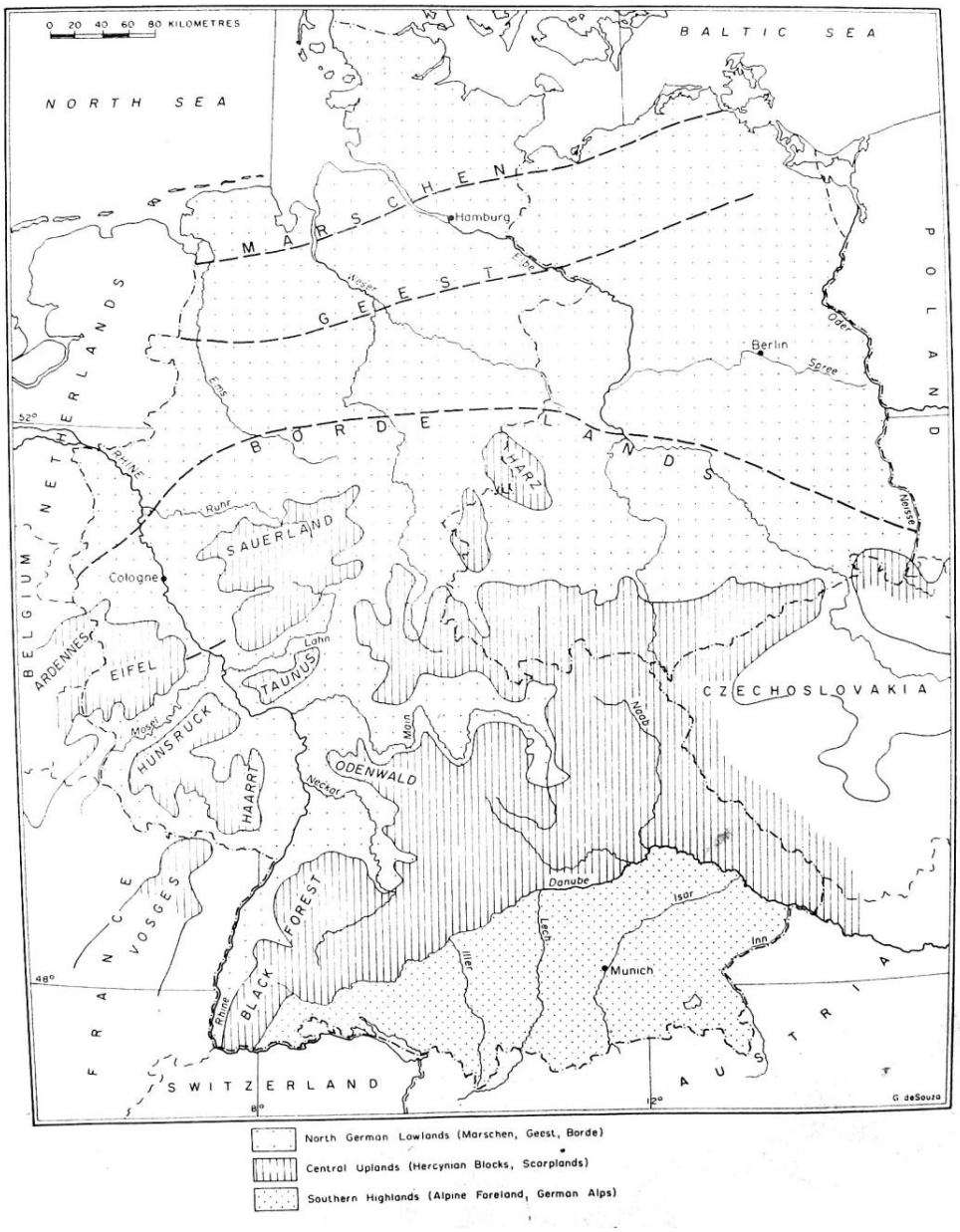
Prussia became the largest and the most powerful. Prussia succeeded in joining all the states together except those belonging to Aastic. Under the guidance of its chancellor, Otto Von Bismark, (1871 – 1914), Germany achieved great development especially in the field of industrialization.

After the end of second world war (1939 – 45) Germany was divided into West Germany (Federal Republic of Germany) and East Germany (German democratic Republic). The division was a political one, imposed by those countries who were at war with Germany and this resulted into important economic differences. However, today, the German states have been re-united to form one Germany.

The German topography

The physical structure of Germany may be simply divided into three main regions. These are
(i) the Northern low land
(ii) the central highland
(i) the Southern upland

THE GERMAN PHYSICAL REGIONS



The Northern lowland

This forms part of North Germany. The average height of this area above sea level rarely raises above 210 metres. There are no mountains and highlands in this region. It is an area covered almost entirely by sedimentary geologically young quaterrinary rocks. There are particularly large quantities of alluvium, morraininc debris such an boulder clay, sand and loess deposit. The distribution of these deposits creates further sub-division of the plain into three parts; namely

(a) Marschen

(b) The Geestlands

(c) The Bordeland

(a) The Marsche

The land originally was under the North Sea but has been reclaimed. It is mostly used as pasture land for beef and diary cattle, wheat, potato growing and market gardening near big towns.

(b) The Geestlands

These are characterized by having soils of a sandy nature, containing little organic materials which make up fertile soil. The Geestlands are the remnants of fluvial- glacial materials. The natural vegetation here was oak forests but these were cut down to give way for agriculture and settlement.

(c) The Bordeland

This region is the most important in economic terms. It contains loess and loamy fertile soils. It contains deposits of rock salt, potash, iron ore, brown coal and some bituminous coal. The zone specializes in the growing of wheat, sugar beet and dairying as well as having a variety of industries.

(d) The central highlands

This is commonly known as the Hercynian blocklands. The highland block has been dissected by river Rhine and its tributaries, namely Moselle, Lahn and Main. The continuous flow of river Rhine through the highland block has given to steep sided Rhine valley. The southern part of the central highlands includes the Rhine rift valley, the black forest, the Bohemain forest and the intervening scarps and vales.

The vales are intensively farmed whereas the scarps are used for pastoral farming in particular dairying. The forested areas are used for lumbering. There is wood carving especially during winter for example Cockoo clocks and musical boxes which are sold to tourists.

Southern upland or Alpine foreland

This region extends from the scarp and vale country, bounded by river Danube, south as far as Germany border with Switzerland and Austria, bounded by the Alps.

The landscape of this region is undulating plateau rising from 300m to 900m. it contains materials washed from morainine material; including boulder clay, drumlins, lakes and areas of poor drainage, together with outwash sands and gravels. The common crops grown here are Rye and Barley.

THE GERMANY AGRICULTURE

The Germany agriculture is mainly of the peasant farming type, with small and medium sized family holdings. Many of the farms are too small. There has been recent development in farming particularly the growth of farm size and mechanisation.

The main features of Germany agriculture

(i) Large areas are devoted to arable farming and mixed farming

(ii) Agriculture is predominantly on small scale

(iii) Large farms are only 38% of the total farms

(iv) Intensive farming is predominantly used

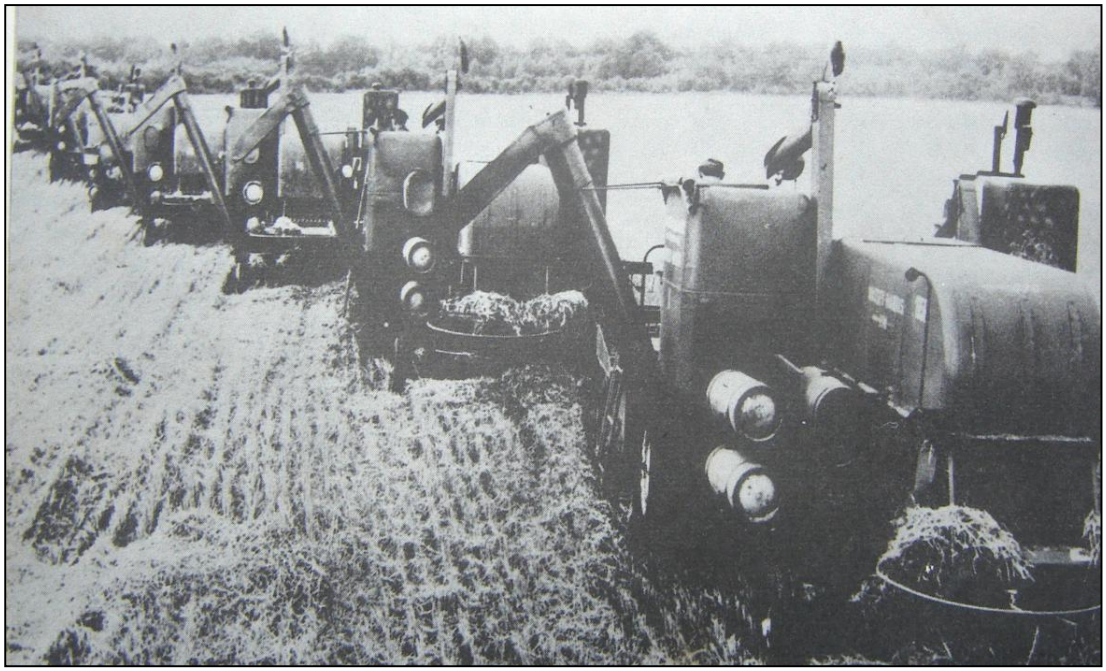
(v) Diary farming is emphasized

(vi) Labour intensive technique is applied in market gardening and vine growing

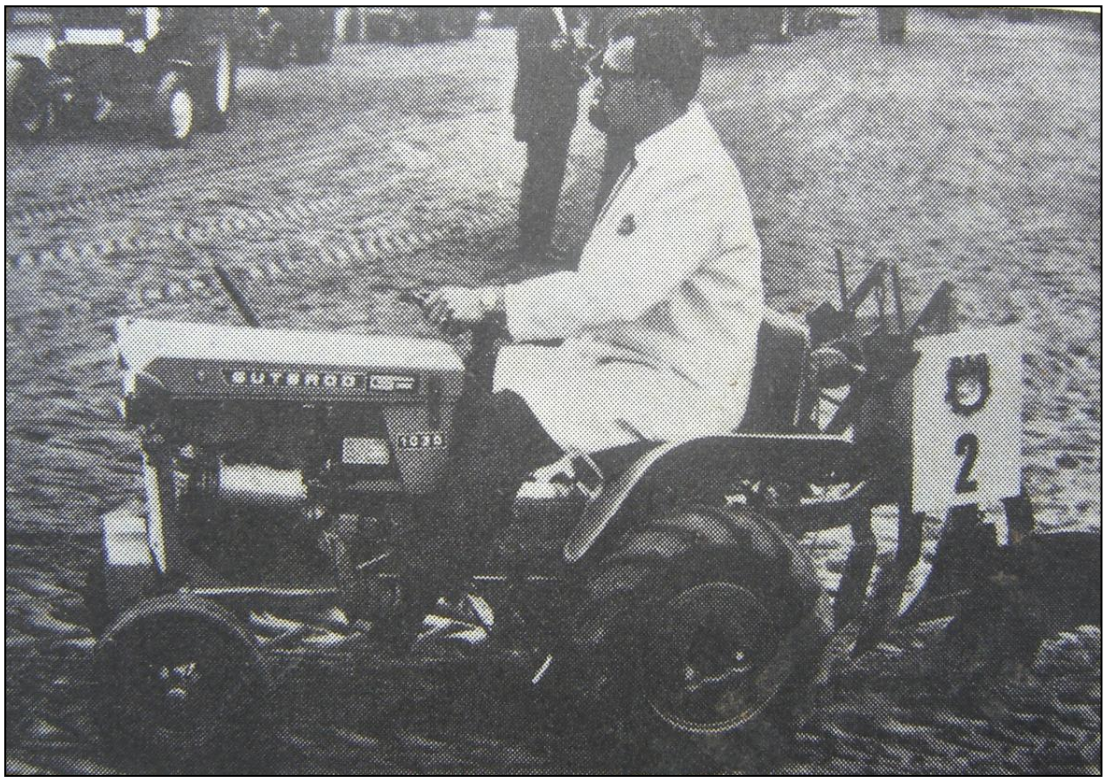
TYPES OF FARMING IN GERMANY

1. Arable farming: This involves cultivation of grains such as maize, wheat and rye, vegetables, potatoes, sugar beet, fodder, orchards and vines.

2. Livestock farming: Livestock farming is the main source of income to farmers in Germany. This involves rearing both animals and birds. The animals kept include cattle, pigs and sheep to a lesser level. The birds reared include chicken.



Combining harvesters at work harvesting rye crop in Emsland

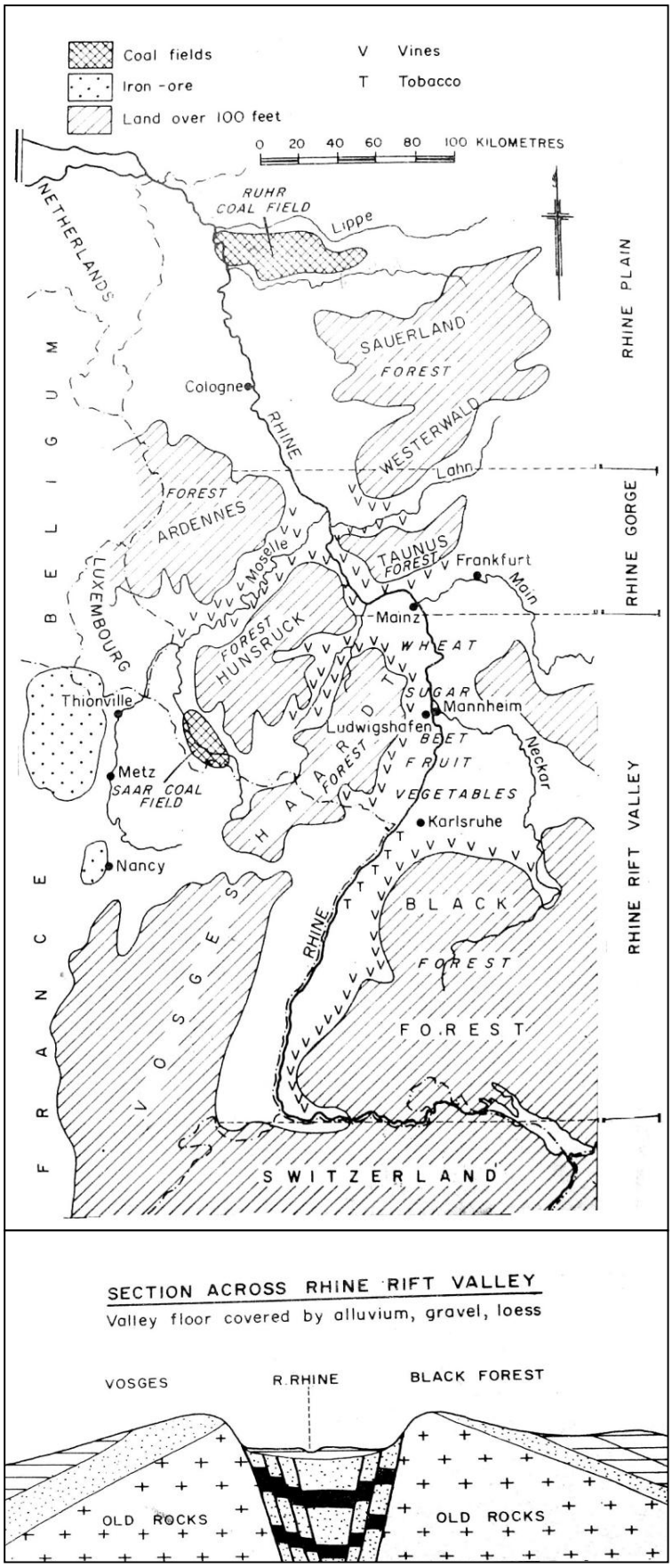


An ideal tractor for a small holding market gardener for vine yards

THE RHINE RIFT VALLEY

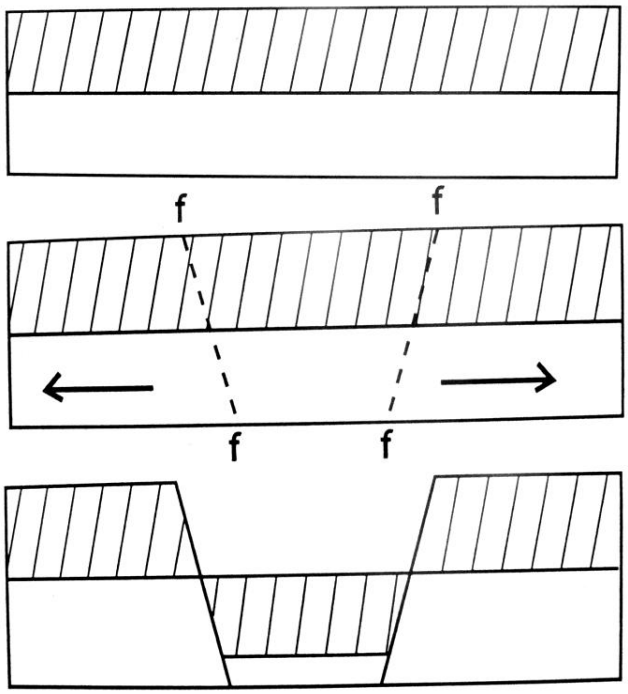
The Rhine rift valley extends approximately two hundred ninety kilometres up to Mainz from Basel. Its width is ranges between 32 and 42 kilometres with mountains and hills on each side; for example Vosages and Haasdt on the west bank and Black forest and Ordenwald on the eastern bank. The valley bottom is composed of soft rocks, clay, loam soil and considerable deposit of alluvium.

THE EXTENT OF THE RHINE RIFTVALLEY.



FORMATION OF THE RHINE RIFTVALLEY

The formation of the Rhine Rift valley is based on the theory of Tension. It is thought that the region was subjected to tension forces brought about by earth movements. This led to the development of lines of weakness with in the earth crust which facilitated letting the central portion to sink and form a rift valley.



Block of land before tension

Pressure known as tension tears the earth crust apart. Lines of weakness develop with in the earth crust which facilitates its breakdown.

The central block finally sink at a very slow speed to form a rift valley.

Economic activities in the Rhine rift valley

1. Farming on the steep sides of the rift valley.

2. Diary farming.

3. Arable farming; growing crops such as, sugar beet, maize, tobacco, vegetables and large quantities of fruits.

4. Industrialization, mainly agro-based industries of imports and exports along the Rhine river.

Conditions that have favoured crop farming in the Rhine rift valley.

1. The valley bottom is composed of fertile loam, clay and alluvial soils.

2. The undulating sides of the rift valley.

3. High temperature especially in summer which often go above 25^0c and short cold winters.

4. The presence of a ready market provided by the neighbouring towns and cities

5. Small forms that are easily managed.

6. Moderate rainfall which is also supported by irrigation.

VINE GROWING IN THE RHINE RIFT VALLEY

Vines are grown on the sides of rift valley. The sides of the rift valley are gently undulating making it ideal for cultivation of vines. The western flanks are particularly covered extensively with vine yards. Pfalz produces more vines than any other part of Germany.

Factors that have favoured vine growing in the rift valley

Physical factors

1. The presence of fertile alluvial soils brought down by the Rhine river in times of floods

2. Availability of water for irrigation from the Rhine river in the times of rain shortage.

3. The presence of adequate rainfall for the fruits to grow and mature.

4. The presence of rift valley which shelters the gardens from strong winds.

5. The availability of good conclusive climate with warm, sunny, summers which enable the ripening of the fruits.

6. The presence of river Rhine which is used as cheap means of transport

7. The effect of aspect, provides warmer conditions as vines are grown on the south facing slopes.

Other factors

1. Availability of a large market both in Germany and the surrounding rich European nations .

2. Availability of fertilizers.

3. High level of technology.

4. Availability of capital to invest in the farms.

5. High level of education

6. Availability of agricultural extension

PROCESSING OF VINES

1. The grapes are crushed and the juice is run off into wooden barrels or metal tanks.

2. The juice is left to ferment for about 3 months.

3. Filtering of the juice.

4. Bottling of the wine.

Industries associated with vine growing include those producing champagne, brondy and burgundy.

Marketing of wine

Most of the wine produced is consumed locally. However, much wine is exported to England, USA, Australia and Netherlands.

Problems facing the vine growing industry

1. Pests and diseases which include:-

(i) Peronospera diseases which attacks the leaves

(ii) Oidium- a fungus disease

(iii) Pests such as moths, red spider and worms which damage the plants.

2. Frost especially in winter.

3. Shortage of labour during the very busy period of harvesting.

4. The steep slopes that limit area for cultivation on and hinder easy transportation of grapes.

5. Drought which sometimes occur during the growing period.

6. The nature of relief which is ruffed thus restricting mechanization.

7. Soil erosion along the steep slopes.

8. Soil exhaustion due to intensive farming.

9. The flooding of River Rhine leading to the destruction of crops.

Solutions to the problems facing vine growing in the Rhine rift valley

1. Spraying with herbicides to control diseases and pests.

2. Recruitment of part time labour force especially women and holiday makers during busy harvesting periods.

3. Raising of wages for the workers in order to attract and keep them of the farm.

4. Application of mechanizations where possible.

5. Building of emberkments to control the flooding of river Rhine.

6. Construction of special paths to carry grapes down the steep slopes

7. Use of fertilizers and manure to maintains soil fertility

8. Practice irrigation farming to solve the problem of drought

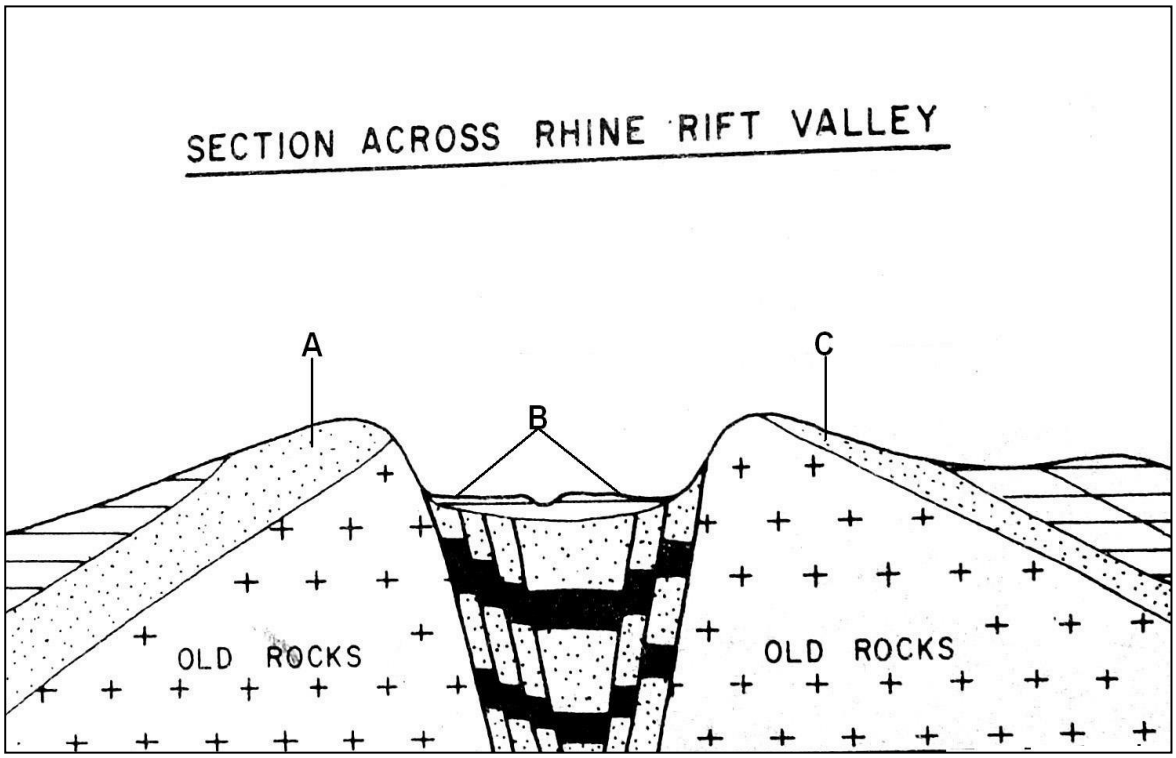
9. Terracing and contour ploughing to control soil erosion.

10. Spraying of warm air to raise the temperature during frost conditions.

REVIEW QUESTIONS

1. (a) Study the diagram below and answer the questions that follow

A CROSS SECTION OF THE RHINE RIFT VALLEY



Name the physical features marked

(i) A (ii) B (iii) C

(b) Describe the process which led to the formation of the Rhine rift valley.

(c) (i) Identify the economic activities taking place in the Rhine rift valley

(ii) Describe the factors which have led to the development of the economic activities in (c) (i) above.

(d) Explain the contribution of the Rhine rift valley to the economic development of Germany.

2. (a) With the help of diagrams, describe the formation of the Rhine rift valley.

(b) Outline the physical factors that have favoured the vine growing in the rift valley

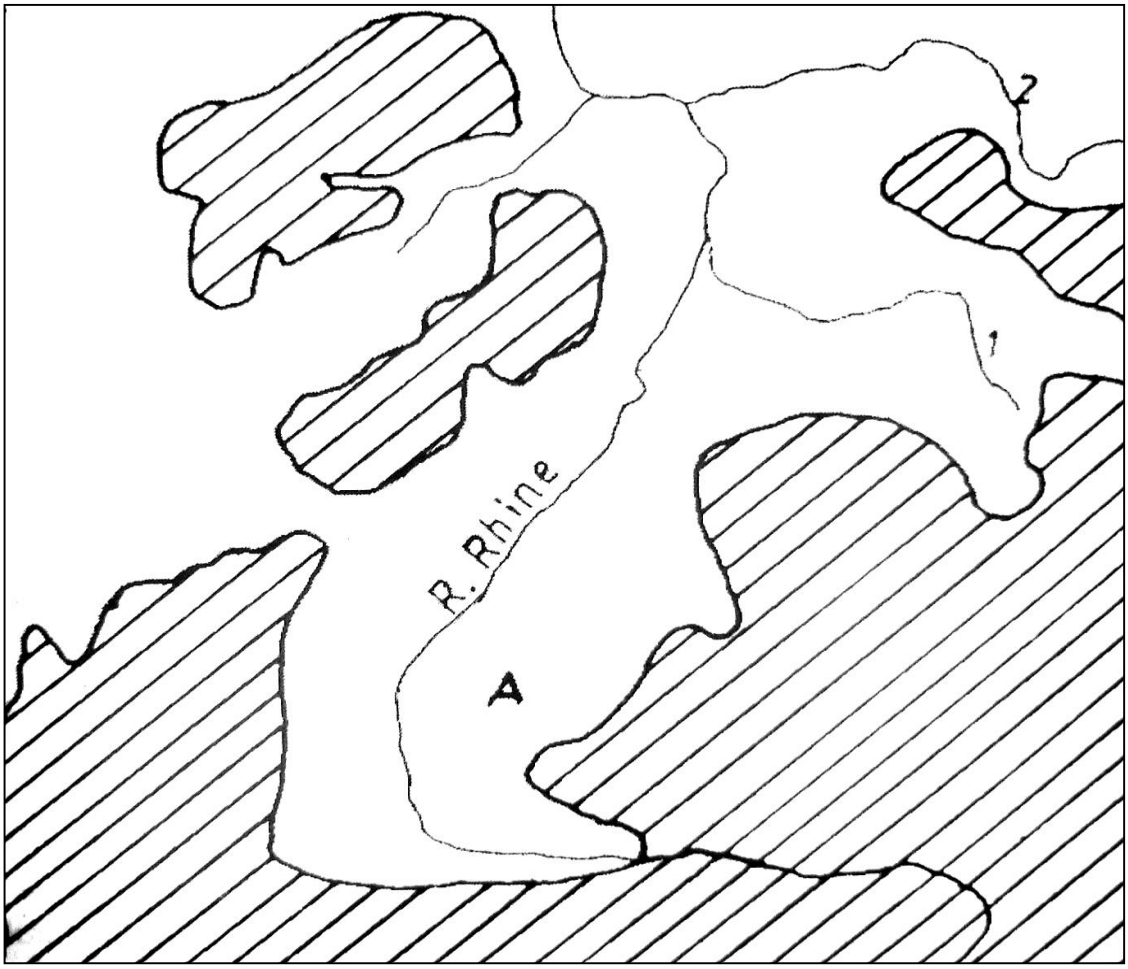
(c) Explain the

(i) problems facing vine growers in the rift valley

(ii) steps being taken to solve the problems in (c) (i) above

(d) State any two products which farmers in the Rhine rift valley obtain from their crops.

3. Study the sketch map showing the Rift valley section of the Rhine river and answer the questions that follow.



(a) (i) Name the rivers marked 1 and 2

(ii) Name the area marked A

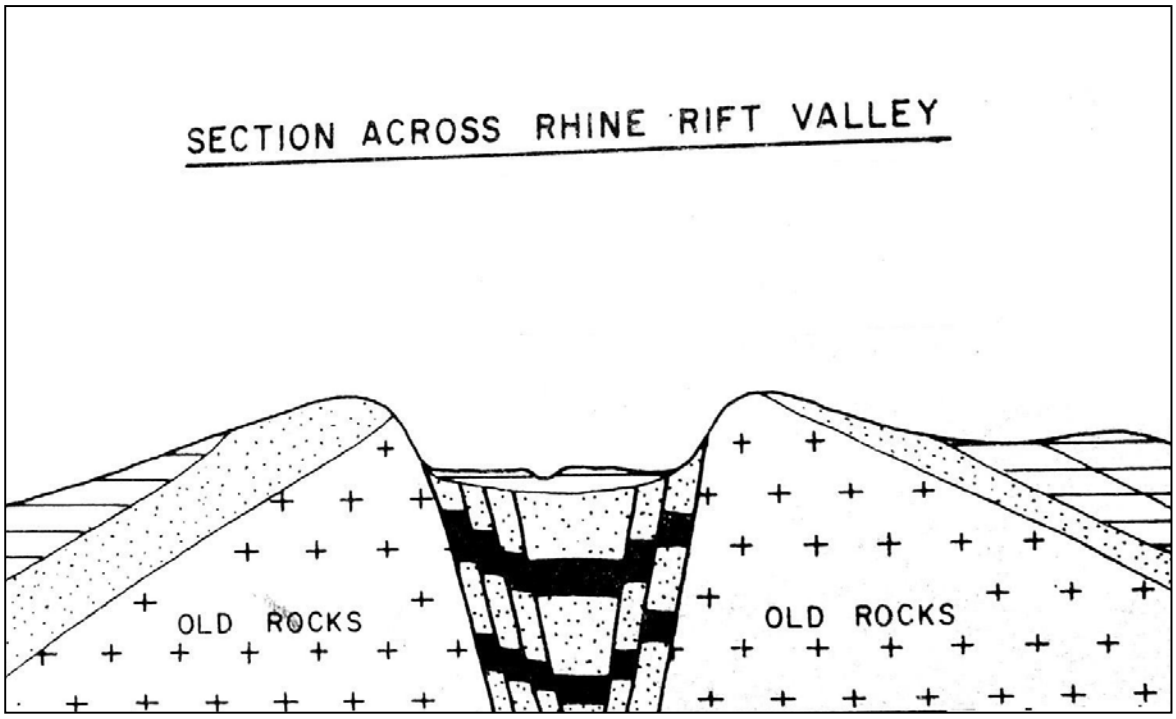
(b) With aid of diagrams, explain the formation of the Rhine rift valley.

(c) (i) Why is the Rhine rift valley an important vine growing area?

(ii) Name any two industries associated with vine growing in the Rhine rift valley.

(d) Outline the steps taken by the vine growers to improve on vine production in the Rhine rift valley.

4. Below is a cross – section of the Rhine rift valley. Study it and answer the questions that follow.



(a) Name

(i) Rhine river

(ii) Vosges mountains

(iii) Black forests

(b) (i) Explain how flooding an erosion are controlled on the Rhine river

(ii) State three physical factors which have made the Rhine valley agriculturally productive

(iii) Name two crops grown in the Rhine rift valley

(iv) Why is market gardening an important activity in this area?

(c) Giving examples. State the economic activities carried out in the East African rift valley.

5. (a) Give reasons why vines are grown on the south facing slopes in the Rhine rift valley.

(b) List four steps in processing of grapes to make wine.

(c) Name the countries that import wine from the Rhine rift valley

(d) What problems are faced by vine growers in the Rhine rift valley.

6. (a) Draw a sketch map of the Ruhr coal field and on it mark and name

(i) Concealed coal field

(ii) Exposed coal field

(iii) Towns; Dusiburg and Dortmund

(iv) Rivers; Rhine, Ruhr and Lippe

(b) Explain the difference between exposed and concealed coal field.

7. Study the table below and answer the questions that follow.

Year	Employment in coal industry	Production of coal (metric tones)
1955	400 000	125 000 000
1970	250 000	100 000 000

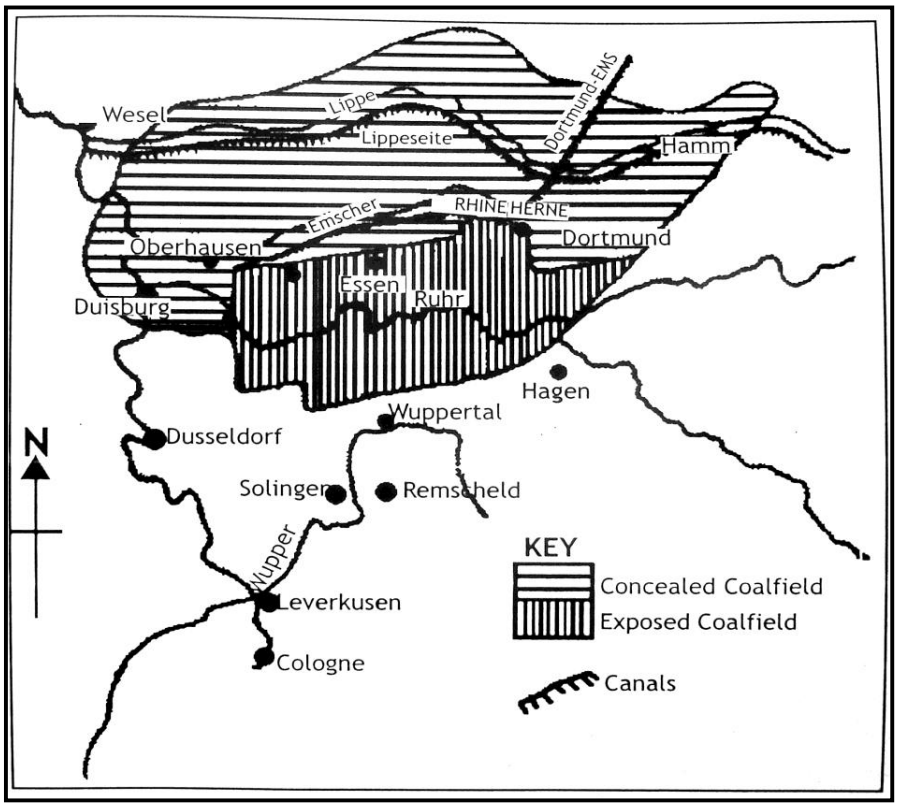
THE RUHR COAL FIELDS

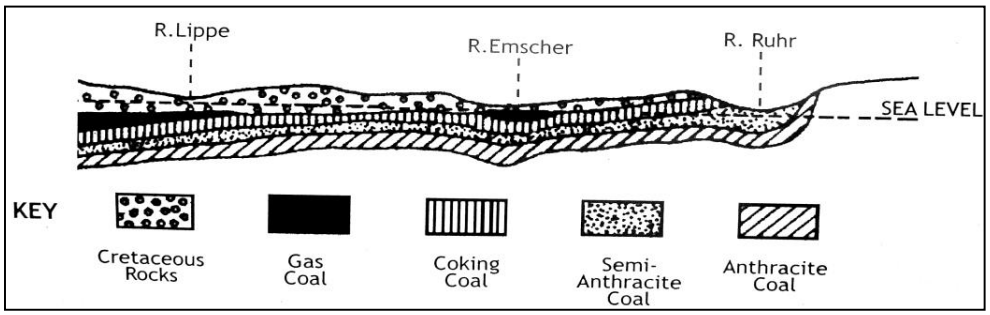
The Ruhr coal field is the largest and most economic mine in Europe. The coal is in large quantities and easy to mine. The coal is divided into two major parts:-

a. the condensed coal in the north

b. the exposed coal fields in the south

THE RUHR COAL FIELD





the exposed coal field has coal bearing rocks on the surface while concealed coal fields have coal bearing rocks buried underground.

Factors that have favoured the development of coal mining in the Ruhr region

1. The availability of large quantities of coal.

2. Availability of different types of coal e.g. bituminous

3. The coal is easy to mine since great depths are not involved especially in the exposed part.

4. Access to cheap water transport e.g. the Ruhr and Lippe rivers linking to the Rhine river. These enable large quantities of coal to be mined cheaply.

5. Availability of large market for coal especially from the established industries.

6. High level of technology used in the mining operations

7. Availability of skilled labour

8. Availability of capital from the well established banks and financial institutions.

Uses of coal

1. Bituminous coal is with much gas and is used as a source of energy for both domestic and industrial purposes

2. Anthracite coal burns with great heat and is used for heating boilers

3. Coking coal is used in the smelting of iron and steel.

Problems facing the Ruhr coal field

1. In many areas the coal has been mined for years and is now showing signs of exhaustion especially in the exposed part.

2. Increasing costs of mining with increasing depth especially in the concealed part.

3. Increasing competition from other sources of energy such as oil.

4. The closing of mines has resulted into unemployment and premature retirement.

5. Competition from other coal producers whose production costs are relatively lower e.g. USA

Changes in the Ruhr coal field

There has been a decline in the total output of coal over the recent years.

Factors responsible for the decline in coal production

1. The discovery of new forms of energy e.g. natural gas

2. The increasing use of nuclear power. This is a very powerful form of energy produced by the splitting if the nuclei of atoms.

3. Increasing use of crude oil as a form of energy.

4. The rising costs of mining in the deeper seams

5. Exhaustion of the easily worked exposed mines.

6. Improvement of technology which required less coal to be burnt especially in the iron and steel industry

7. A large number of miners have had to leave the industry for better paying jobs in the industrial sector.

8. Closing of some mines.

As a result of coal production, new industries have developed. These include:-

1. Oil refineries

2. Electronic industries

3. Engineering industries

4. Petro chemical industries

5. Textile industries

6. Food processing industries.

THE RUHR INDUSTRIAL REGION

The Ruhr region is the largest industrial complex not only in Germany but also in Europe. The region is enclosed by rivers Lippe, Rhine, Wupper and extends for 72km eastwards. There are twelve towns with over 5 million people.

Major industries in the Ruhr region

1. Iron and steel industry

This is the largest form of industry in the Ruhr region and main consumer of coal. The enterprises include steel mills, hot rolling, forging e.t.c. The iron ore necessary for the production of steel is imported from mainly France and Sweden.

Products from iron and steel industry include motor engines, turbines, and railway locomotives.

2. Engineering industry

The main centre for engineering are Essen, Dusseldorf, Dortmund, Duisburg and Solingen. Items produced include agricultural implements and machinery, blast furnaces, heavy vehicles manufacture e.t.c.

3. Chemical industry

The chemical industry produces dyes, plastics, fertilizers, synthetic fibres, detergents and other products. The main centers are cologne Essen, Stuttgart

4. Textile industry

Main center are found in the southern parts of the coal fields especially in the upper valley in the towns of Bemen and Elberfield. Others centres include Dusseldorf, Essen and Leverkusen products include silk, cotton and wool.

Differences between the Ruhr and East African industries

Ruhr	East Africa
1. Large scale	-Small scale
2. Capital intensive	-Labour intensive
3. Largely based on mineral raw materials	-Agro based
4. Heavy industries	-Mainly light industries
5. Coal is the main source of power	-Main source of power is HEP
6. High quality products are produced	- Low quality products are produced

Similarities between Ruhr and East Africa industries

1. Attracted to raw material source
2. Attracted to power
3. Manufacture of relatively similar items e.g. textiles

Factors that have favoured industrial development in Ruhr region

1. The spread of ideas of industrial revolution from the United Kingdom to Germany in the late 19^{th} century.
2. The presence of the largest and the most productive coal field in Europe which provided coal as a source of power or energy.

3. Availability of well developed transport system by road, railway and water. For example the Rhine river together with the several channels have facilitated the bringing in of bulky raw materials and taking away finished products.
4. Availability of large market for the industrial goods produced not only in Germany but also in the neighbouring rich European nations such as France, Italy and Switzerland.
5. Availability of raw materials e.g. iron ore which has led to the growth of iron and steel industries.
6. Availability of a large number of labour force which is skilled
7. The growth of banking and other financial institutions which provided money or capital for industrial development.
8. Government policy which encourages industrialization.

Problems facing the Ruhr industrial region

1. Pollution of the environment through gases pumped into the atmosphere from the industries.
2. There are also many people employed in the industry and this has resulted into a congestion of people.
3. Congestion of traffic which often leads to delays.
4. Industries are being highly mechanized and this has resulted into high rate of unemployment.
5. Exhaustion of coal which has resulted into the closure of some industries.
6. Competition from other producing countries notably Japan and USA which affects the demand for the products.
7. Shortage of raw materials e.g. iron
8. Excavation of coal has resulted into land degradation.

Solutions to the problems facing the Ruhr industrial region

1. Use of other energy resources which has less pollution effects on the environment e.g. natural gas and oil.
2. Due to exhaustion of coal, there has been another change to other sources of energy e.g. oil, natural gas and nuclear power.
3. Setting up strict laws against the pollution of land, water and air.
4. Recycling of wastes to reduce the importation of raw materials.
5. Importation of raw materials e.g. iron are from France and Sweden.
6. Creation of green belts through planting of trees to reduce environmental degradation.
7. Containerization along the Rhine river and use of barges which carry quantities of goods and raw materials.

REVIEW QUESTIONS

1. Study the passage below and answer the questions that follow.

"No other region in Europe has such a large concentrated industrial complex as the Ruhr." It has developed in the last one hundred years into Europe's biggest producer of a variety of industrial products like iron and steel. The Ruhr is enclosed by river Lippe, Rhine and Wupper and it extends seventy two kilometres eastwards. There are twelve towns with over 100 000 inhabitants and three other towns with over 500 000.

In all, the Ruhr conurbation contains over five million people i.e. 11 percent of Germany's total.

(Adapted from C.W. Gibbs "The Rhineland page (74)

a) i) Name the country in which the Ruhr complex is situated.

ii) Give three reasons to explain why the Ruhr is called a conurbation

iii) Name two towns found in the Ruhr conurbation

iv) What percentage of the population of the country named in (a) (i) above lie in the Ruhr conurbation?

b) i) State four factors which have led to the growth of the iron and steel industry in the Ruhr.

ii) Name three other industries which have developed in the Ruhr region.

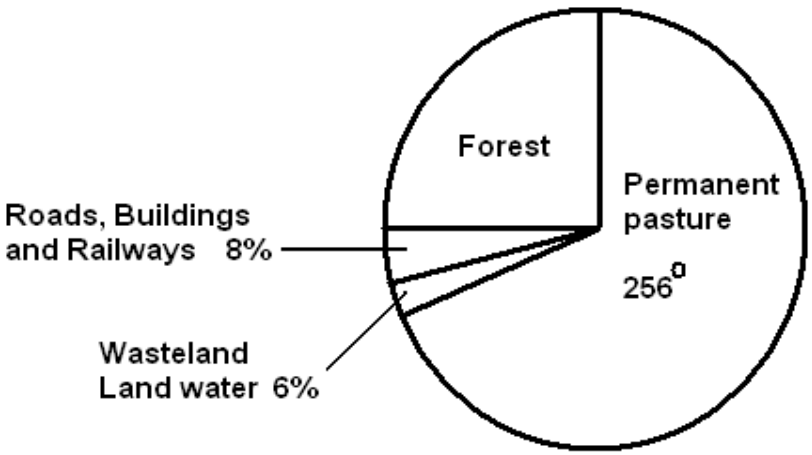
iii) List three products from the industries named in b (ii) above.

iv) State two differences between the industries on the Ruhr and industries in Switzerland.

c) i) Outline the problems facing the Ruhr industrial complex.

ii) Suggest two ways in which two of the problems named in c (i) above are being solved.

3. Study the pie chart below showing land use in Germany and answer the questions that follow.



a) i) What is 256^{o} of West Germany used for?

ii) Name two areas in West Germany where the land used in a(i) above is commonly found.

iii) What is the percentage if land under forest?

iv) Name two types of wasteland found in West Germany

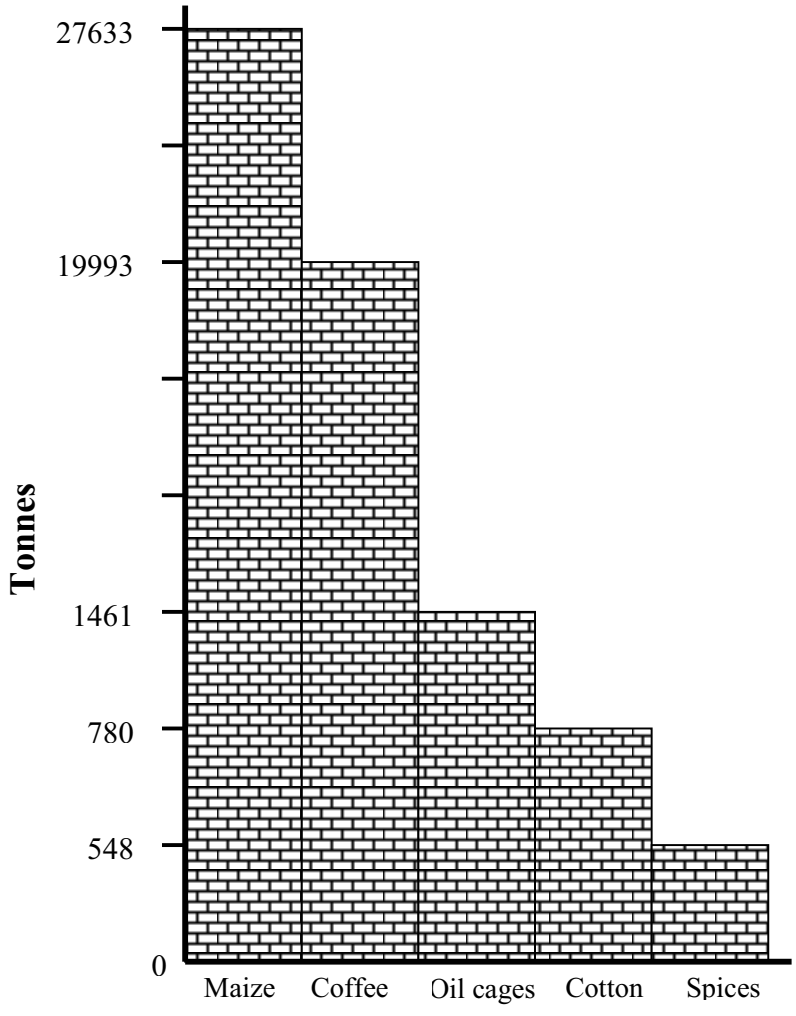
v) What two types of land use are represented by "Buildings" on the pie-chart?

b) i) Apart from providing timber, mention four other uses of forests in West Germany?

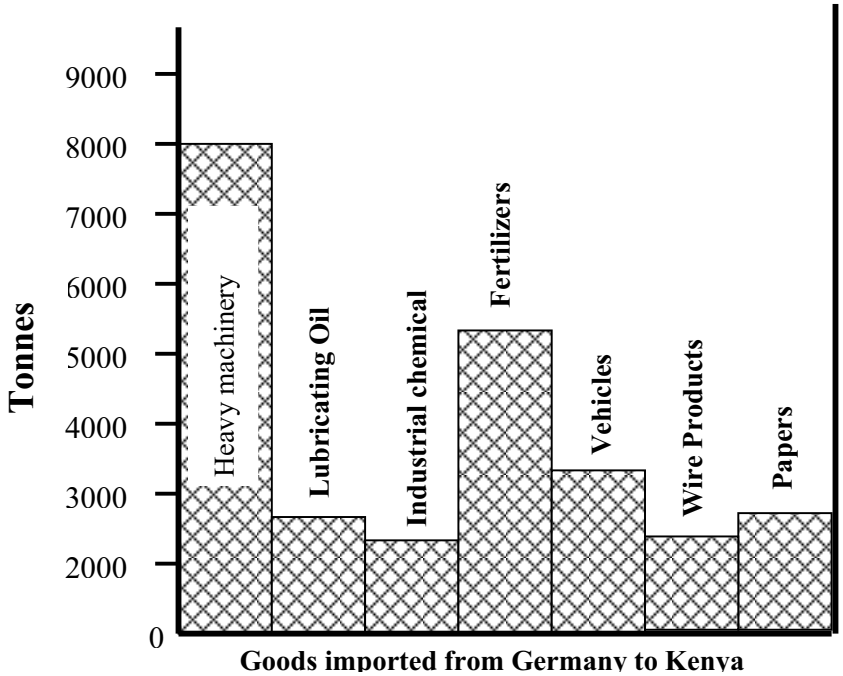
ii) Mention one way in which West Germany government is trying to conserve forests.

iii) Mention two problems which have led to the rapid disappearance of forests in Uganda.

4. The graphs on the next page are showing exports of Kenya to West Germany and from West Germany to Kenya. Study the charts and answer the questions that follow.



Goods exported to West Germany from Kenya



a) i) What is the difference between the type of goods exported from each country?

ii) In tonnage Kenya's exports to Germany are almost twice as much as Germany exports to Kenya. Yet by value Germany earns much more for her goods than Kenya. Why is this so?

b) i) Give two physical factors to explain why Germany does not grow maize and coffee.

ii) In which two ways has the Rhine water way facilitated the development of the Ruhr industrial region.

c) i) Name two river ports in Germany through which the products shown on the graph are exported.

ii) Suggest three factors which have contributed to the growth of any one river ports named in (c) (i) above.

iii) Name two towns in the Ruhr industrial region which manufacture heavy machinery.

iv) State two problems facing the transportation of the products in c) (iii) above.

5. a) i) Name the countries through which the Rhine river flows

ii) Name one port along river Rhine in each of the countries named in (a) (i) above.

b) i) Draw a sketch map of the Ruhr industrial region and on it mark any one industrial area found along river Rhine.

ii) What role has the Rhine played in the development of the industrial area located in (b) (i) above.

c) State the:

i) differences

ii) similarities between river Rhine and river Congo,

BELGIUM

Of the five Rhineland countries, Belgium is the second smallest having a total area of only 30,200 square km equivalent to 1/8 of Uganda. It is bordered by Netherlands, Germany and Luxemburg.

Relief

The relief of Belgium falls into two main parts each of which consists of roughly east-west belts. The divisions are summarized below:-

1. The plain: This consists of:-

(a) The coastal belt of dune and polder.

(b) The sandy region of Flanders and the Copeland.

(c) The low loam plateaux of Hainaut and Brabont.

(d) The Sambre –Meuse valley.

2. The plateau: This consists of:

(a) The broken hill country of the Condroz.

(b) The Femenne depression.

(c) The high Ardenne plateau.

(d) The Scarplands of Belgium Lorraine.

DRAINAGE

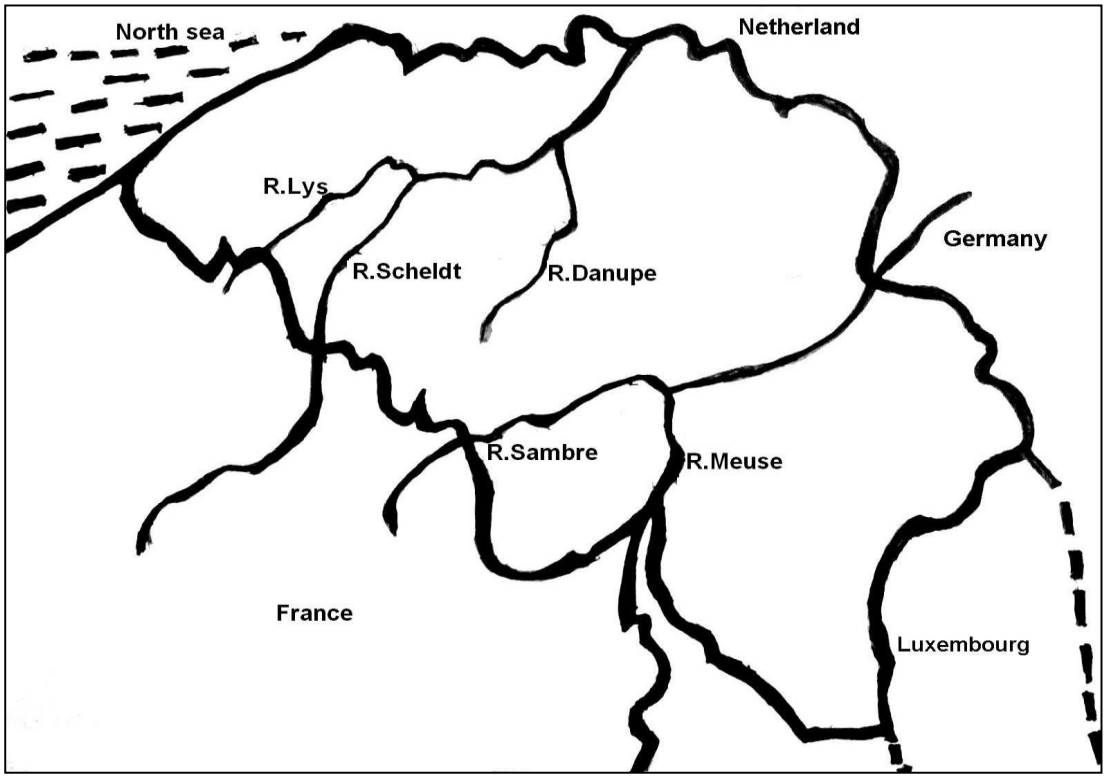
The Scheldt and the Meuse are the two great rivers of Belgium. Both rivers have their origin in France, traverse Belgium and enter the sea of Holland. These rivers are of importance to Belgium in that:-

1. Both are navigable throughout the entire length of their course in Belgium and form valuable water ways.

2. Source of water for both domestic and industrial purposes.

3. Recreational purposes.

BELGIUM:DRAINAGE AND NEIBOURING COUNTRIES



Climate:

Belgium experiences a cool temperature maritime type of climate. Summers are warm with an average temperature of 17^0 c while winters are cool with average temperature of -1^0c. The rainfall from east to west but generally moderate. Exceptions occur in the Ardennes being much cooler all the year and having heavy rainfall of about 1,200mm.

Agriculture

Although the total land area of farmland is small, Belgian agriculture produces 80% of the population's food requirements.

Types of agriculture in Belgium

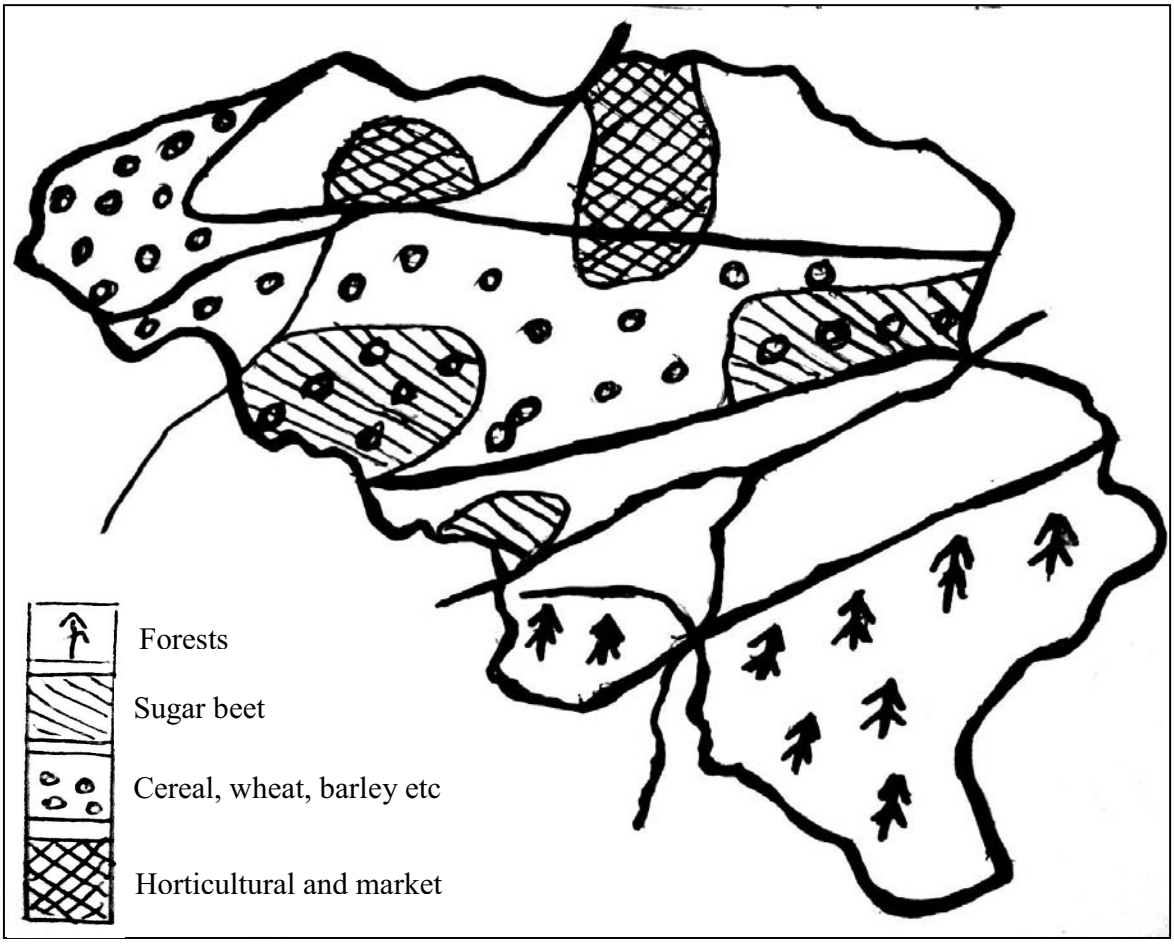
1. Horticulture

2. Growing of cereals

3. Sugar beet growing.

4. Animal rearing

BELGIUM AGRICULTURE



HORTICULTURE

This refers to the growing of fruits, vegetables and flowers for commercial purposes. Crops grown include tomatoes, lettuce, grapes, strawberries and orchards.

Factors that have favoured horticulture and Market gardening in Belgium.

1. Presence of deep, loamy soils of great fertility.

2. Presence of large market for the products from large market for the products from large towns such as Brussels.

3. High levels of technology as some crops are grown in glasshouses.

4. The relief is generally undulating easy for cultivation land mechanisation.

5. Presence of rivers such as Dandre, Senne, Dyle and Dener which act as a source of water as well as transport routes.

6. Well developed transport routes such that produce can reach the market easily.

GROWING OF CEREALS

The central plateau is an important cereal growing region. Important cereals grown are wheat, barley, rye and sugar beet. The growing of cereals has been favoured by:-

1. The high population in the country which provides ready market.

2. Presence of large open fields.

3. The relatively flat landscape which favours mechanization.

4. Presence of highly skilled labour force.

5. The presence of fertile soils.

Problems faced by farmers growing cereals.

1. Intensive cultivation is practiced which necessitates constant application of fertilizers and manures.

2. Shortage of land for cultivation.

3. Flooding of water from rivers which destroy farmlands.

4. Salination of the soils from the sea waters especially in coastal areas.

5. Shortage of labour during the busy periods.

ANIMAL REARING

The clay polder lands, the sandy plains of Flanders and the Northern Flauks of the Ardennes are the important cattle rearing regions. Dairy farming is practiced to produce milk and other milk products. One of the most recent developments in Belgium agriculture has been in response to the increased demand for pork among the EEC countries. Today pig breeding yields the highest value of the whole livestock industries. This has been mainly due to selective breeding.

Pork is exported in large quantities to Germany, France, Italy, Netherlands and Britain.

MINING

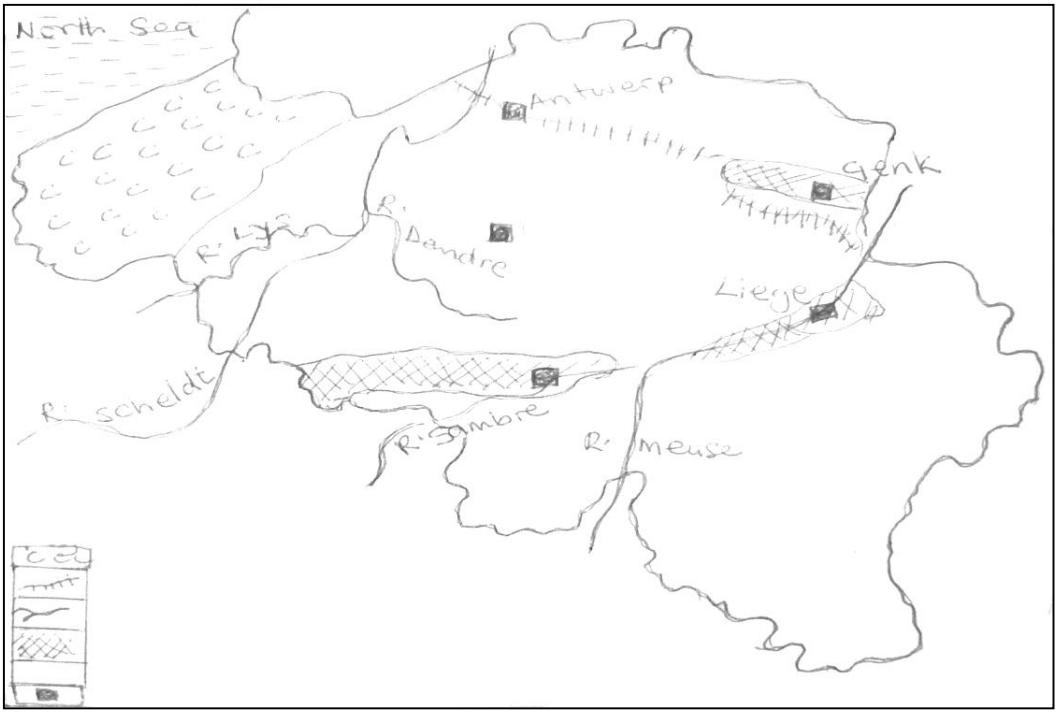
The chief minerals of Belgium are coal, stone for building purposes, limestone for cement making, and sand for glass manufacture. The metallic minerals; iron ore, lead and zinc which formerly were of great importance, are now nearly exhausted. Belgium shares with France and Luxembourg the large quantities of Lorraine, through her share is, unfortunately, very small.

The Belgium coal deposits occur in two main basins:-

i. the southern basin which lies in the sambre –meuse trough and

ii. the Northern basin in the province of Limburg which is commonly known as Campine field.

MAP OF BELGIUM SHOWING RIVERS, TOWNS, POLDERS AND THE ALBERT CANAL



INDUSTRIAL DEVELOPMENT IN BELGIUM.

This is the most important economic activity employing about 90% of the population.

FACTORS FAVOURING INDUSTRY IN BELGIUM

1. Large market provided by the dense population in Belgium and in the neighboring countries.
2. Presence of minerals like coal, limestone, for cement making, sand for glass manufacture, zinc, copper, cobalt, radium and iron ore.
3. Development of cheap water transport with the port at Antwerp having direct access to the North Sea.
4. Presence of skilled man power to run the industry.
5. Availability of enough capital to start and maintain the industry.
6. Construction of the Albert canal to ease transportation imported raw materials.
7. Presence of water bodies especially river Meuze which provides water for industrial use like cooling heavy machinery.

PROBLEMS FACING INDUSTRIES IN BELGIUM

1. They improved port facilities at Antwerp.
2. Construction of the Albert canal to ease access to the North Sea, and perhaps reduce transportation costs.
3. Iron and steel industries shifted to the coastal towns to increase access to the cheap imported iron.
4. Production of high quality steel products to favorably compete with other steel producing countries.
5. Importation of cheap raw materials especially iron.

TYPES OF INDUSTRIES IN BELGIUM.

1. **Engineering**:
   Vehicle industries located in the Sambre-meuze valley is the most important.
2. **Chemical industry**:
   Mons, Liege and Compine basin are the major chemical centres. Important products include plastics, man-made fibres, synthetic rubber and synthetic detergents.
3. **Textile industry:**
   Major products include cotton, linen, jute and synthetic fibres. Most raw materials are imported for example flax. Important producing centres include courtrai, Ghent and Antwerp.
4. **Metal and Steel industry**.
   The major steel mills are located in the Sambre-meuze basin and in Arlon. The non-ferous metal use Zinc, Cobalt and Radium and the most important centre is Liege. The products produced include electronic, space and aeronautical products.

RAW MATERIALS USED IN THE CHEMICAL INDUSTRY

(i) Coal (ii) Oil (iii) Carbon products

IMPORTANT ENGINEERING TOWNS

(i) Charlerio (ii) Namur (iii) Liege
(iv) Antwerp (v) Brussels

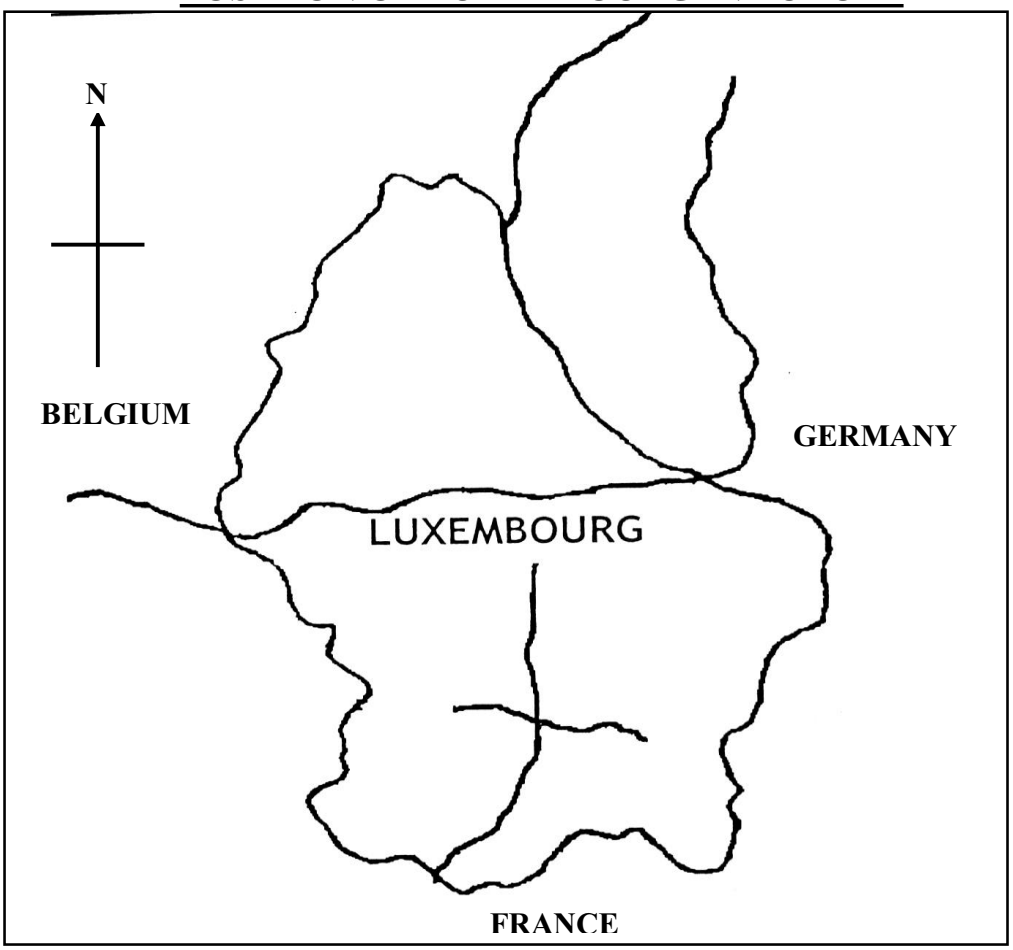
VEHICLE COMPANIES IN BELGIUM

(i) Volvo (ii) Ford (iii) General Motors

LUXEMBOURG

Luxembourg is the smallest country of the five Rhineland countries. Its size is comparable to that of Zanzibar and Pemba combined. It is bordered by Germany, Belgium and France.

POSITION OF LUXEMBOURG IN EUROPE



Relief:

Basically there are two distinctive and quite dissimilar regions in the country.

1. The northern third, known as Oesling is a portion of the Ardennes uplands.

2. The larger Southern portion, ten Gutland, is part of the Scarpland of the Lorraine and lowland.

Population:

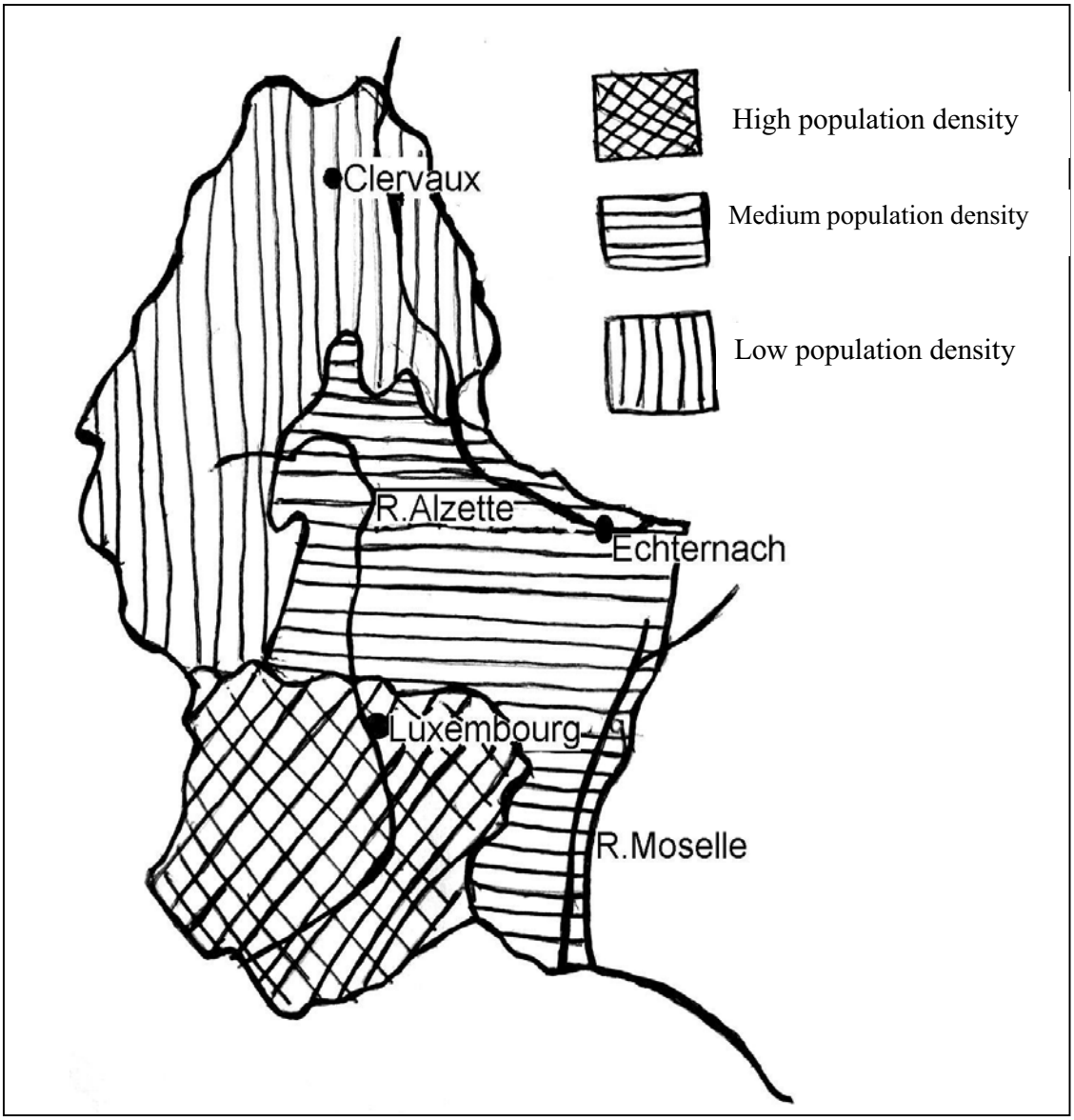
Although Luxembourg is one of the most densely populated nations in Western Europe, its population density varies from region to region. There are three distinctive areas with varying population densities:

1. Areas with high population density.

2. Areas with medium population density

3. Areas with low population density.

POPULATION DENSITY IN LUXEMBOURGE

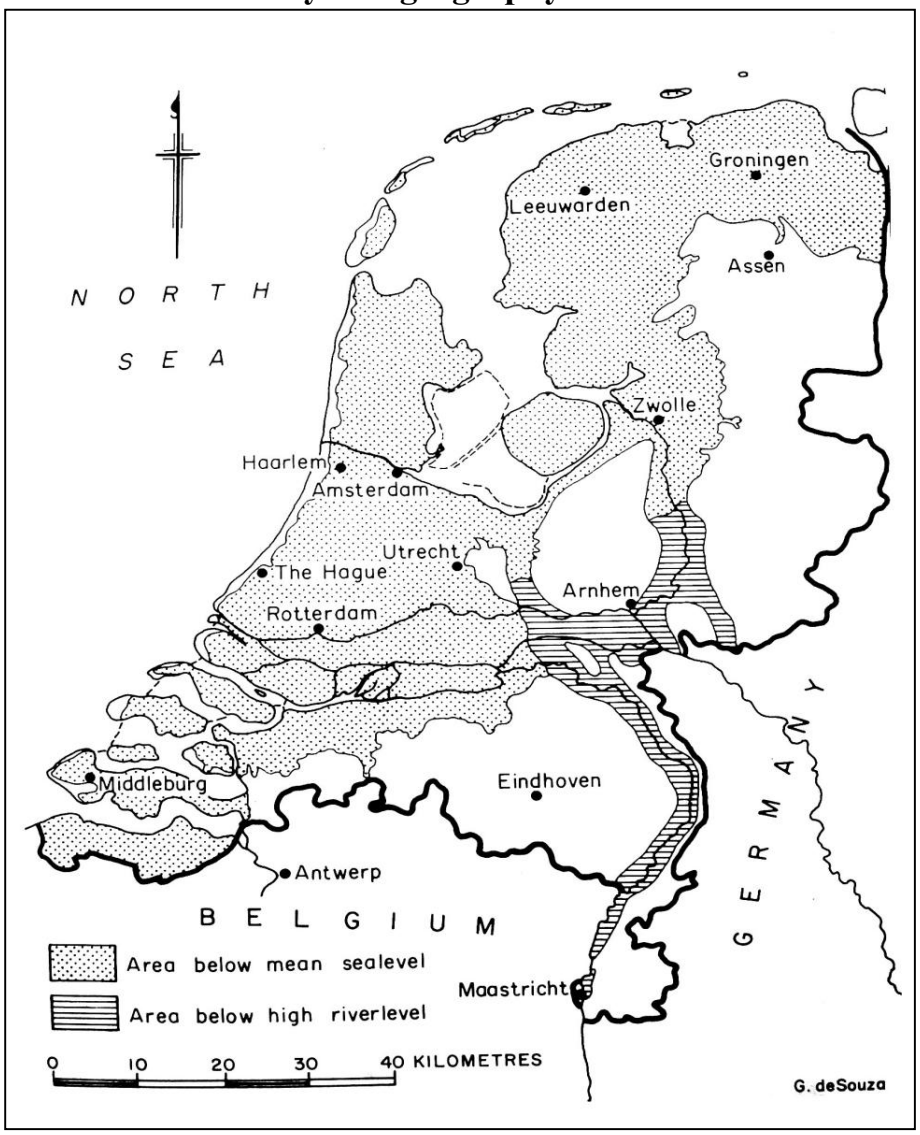


NETHERLANDS

Introduction

The Rhine river completes its work in Netherlands. Netherlands is more popularly known as Holland, meaning a hollow land.

The Physical geography of Netherlands.



Geologically, the Netherlands is still a very young country. The terrain of Netherlands has been influenced by three major factors namely;

(i) The great ice age

(ii) the combined depositional effects of the Rhine Meuse and Sheldt.

(iii) the North sea and its incursions.

The retreating ice sheets which covered northern Europe during the Pleistocene period (the last million years) left behind huge quantities of morrainic materials, sand and boulder clay which were spread out fairly evenly, giving the Dutch landscape distinctly flat appearance. There has been formation of a delta from the deposits of the rivers Scheldt, Meuse and Rhine in the southern Holland. The relief of southern Holland is fairly flat and featureless. The most interesting feature of Holland's relief is the large western part which lies below sea level. The reason for so much of Holland lying below sea-level is that most of the land has been reclaimed from the sea.

Netherlands and the sea

The history of the Netherlands and the sea dates back between 11th and 16th when the Dutch struggled to force back high tides and storms which breached the sand bars and sand dunes. There was a catastrophe on the night of 18th November 1421, when Dordrecht the most fertile land was swallowed up by water and 100 000 people were drowned.

Land reclamation

Land reclamation is the process of turning waste land into useful productive land. Most of the land to the North and West of the land lies below sea level.

From the first half of the 13th century, the Dutch have made attempts to drain the land and make it habitable. They have created 'land from the sea.' The reclaimed land is called 'polder.'

Sea land has been reclaimed by building dykes to protect the coastline from attack and erosion. Due to improved skills and knowledge to combat the threat of the sea, the Dutch have managed to reclaim over 570 000 hectares, about 1 400 000 acres and this is approximately $^{1}/_{6}$ of the total land area. A French man so impressed by this achievement once wrote: 'God made the world, but the Dutch made Holland.' The Dutch and the sea portrays a good example of how man can fight nature and control it to use it for his benefit and for the development of his country.

Reasons why land was reclaimed

(i) To protect people's lives and property.

(ii) To provide suitable land for agriculture.

(iii) To provide suitable land for settlement.

(iv) To provide fresh water.

(v) To improve communication between the North and South.

(vi) There was need for recreation grounds.

(vii) To develop coastal towns.

(viii) To put to use fertile alluvial soil and increase agricultural production.

How land is reclaimed (creation of a polder)

(a) A strong protective wall known as a dyke is constructed around the area to be reclaimed. Dykes are constructed using concrete and bricks.

(b) The enclosed lowland is then divided in to polder ditches.

(c) Canals are then constructed to drain water from land.

(d) A collector reservoir is built.

(e) Water pumps are put in place to push water and also to regulate water flow.

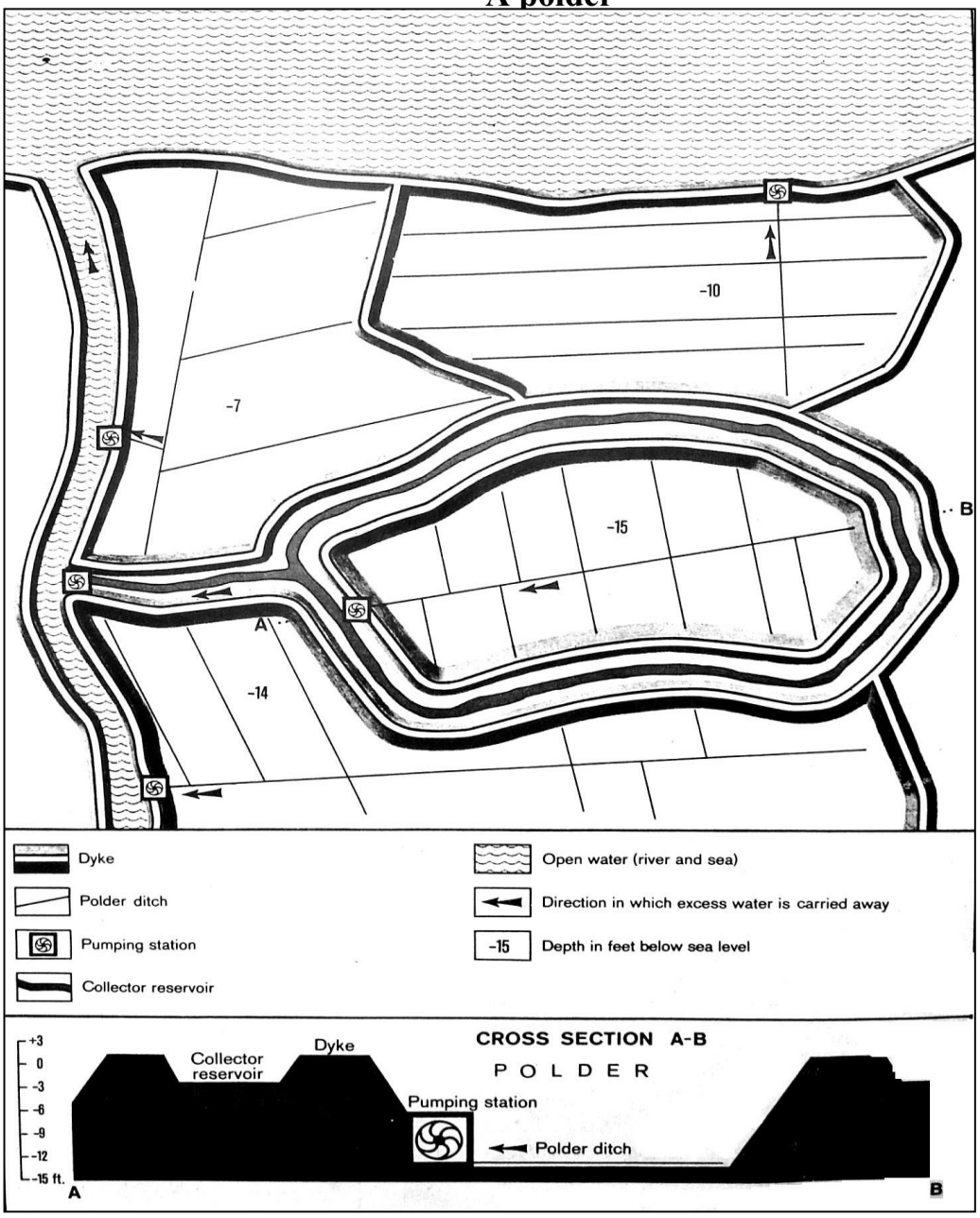
(f) Grass and reeds are planted to remove salinity.

(g) Fresh water is pumped into the polder to neutralize the soil and afterwards it is also drained out.

(h) The soil is tested to find out what type it is and what it can be used for.

Diagram showing how land is reclaimed

A polder



The Zuider Zee project

The Zuider Zee project is the largest reclaimed area. It is divided in 4 major polders which includes the following.

i. Markeward
ii. North-East polder
iii. Eastern Flevoland
iv. Southern Flevoland

Factors which led to creation of polders in Netherlands.

1. The Dutch government initiative to support and save her people from dangers of floods.
2. The existence of rich merchants who financed the projects of reclaiming the sea.
3. Existence of good engineers who constructed protective walls in the eastern part of the country to save people from floods.

Benefits of Zuider Zee project to Nertherlands.

1. There has been control on unnecessary flow of saline water into the land.
2. There has been creation of a fresh water lake which supplies water for domestic use and irrigation.
3. More arable land has been created to support the dense population of Netherlands.
4. The construction of the barrier dam has helped to shorten the road distance between North and South Holland by about 320km.
5. The increase in agricultural land has led to the creation of more employment opportunities.
6. The prosperity in agricultural sector has promoted industrial expansion in the polder areas.
7. The polders act as tourist attraction thus earning large amounts of foreign currency.
8. North Holland and Friesland are now connected by a short road.
9. There has been improvement on drainage in areas near Zuider Zee project.
10. People's lives and property have been protected from sea floods by strong protective walls (dykes).
11. Polder creation has protected the city of Amsterdam's reclaimed land and original land from sea submergence.

Ways how reclaimed land is used

1. They are used as settlement grounds for Dutch people.
2. They are used for arable farming hence leading to increased food production.

3. Polders have been used for construction of industries.
4. Employment opportunities have been availed through polder construction, agriculture, engineering e.t.c.
5. For construction of infrastructure such as roads, railways, hospitals, schools, e.t.c.
6. As a result of polder creation, a fresh lake, Lake Yssel has been formed which supplies water for irrigation and industrial use.
7. Polders are tourist attractions, therefore, they are attracting thousands of tourists to Netherlands hence earning foreign exchange.
8. Polders are acting as areas of recreation.

Problems facing the people in reclaimed areas

1. High costs of maintaining canals and dykes.
2. Sometimes sea storms and high tides overcome the existing dykes thus leading to serious floods which may cause loss of life, destruction of property and crops.
3. Mechanisation is limited due to the small size of farms.
4. There is pollution due to many industries built in the country.
5. Constant removing of weeds that overgrow the ditches and canals.
6. Canals and ditches are choked by silt thus reducing the volume of water flowing in them.
7. Sometimes the sea water seeps into the polders and make it saline.
8. Diseases and pests attack the crops.
9. Higher land rents to the farmers.
10. Soil exhaustion due to intensive farming.

Steps taken to solve the problems facing people living on the Polders

1. careful and safe disposal of wastes to avoid pollution.
2. Constant dredging of canals to control silting.
3. Continuous spraying of pesticides to control pests and diseases.
4. Application of fertilizers and practicing mixed farming to control soil exhaustion.
5. Government should subsidise land rents to reduce high costs.
6. Innovate appropriate agricultural machinery which are small in nature to work on the small Dutch farms.

THE DELTA PLAN

The delta plan project started after the completion of the Zuyder Zee project in the North. These projects intended to control and halt the sea menace to the South West, where broad estuaries reach far inland. Serious work on the project started after the country was struck by the most floods on 1st February 1953. In this disaster, over 152 000 hectares of land, about $4^{1}/_{2}$% of Netherlands was flooded and nearly 1800 people lost their lives together with thousands of livestock.

The Delta project was conceived to produce closure of four broad sea in lets; these are the Haringvliet, the Brouwershavensche Gat, the eastern Scheldt, and the Veersche. Other two inlets, the Rotterdam waterway and the Western Scheldt were not closed in order to give access to the ports of Rotterdam and Antwerp.

Aims of the Delta plan Project.

1. To stop North sea floods in the South West
2. To provide fresh water in the South and South West of Netherlands.
3. To improve communication in the area.
4. To provide land for settlement and agriculture.
5. To increase the area of recreational grounds.

Benefits of the Delta plan project

1. There has been improved distribution and control of fresh water supplies on the south west region of Netherlands.
2. Large reservoirs of fresh water have been created for domestic, industrial and irrigation purpose.
3. There as been reduction of road distance by 7km on top of the dam.
4. Suitable land for agriculture has been created.
5. Fresh water has reduced the effect of salination in the area near the dam.
6. There are no more floods in areas to the southwest.
7. trade and industry has been promoted in this region.

AGRICULTURE IN NETHERLANDS

The formation of a great variety of agricultural produce in the Netherlands is based on the mild climate, the fairly fertile soils, well controlled water supply, a well trained agricultural population, ready market from the industrial neighbouring countries, the strong co-operative societies, the enterprising spirit of forming community and the quick means of transport.
Of the country's total area of 3 500 000 hectares, 77 percent is used for agriculture and horticulture. Of this, 46 percent is grassland, 26 percent is arable farming and 5 percent is horticulture. The Netherlands does not produce sufficient bread grain to coarse grain to meat the requirements of its dense population. Thus, importation of large quantities of bread and coarse grain.
Great attention has been paid to the agricultural sector by establishing a good number pf agricultural schools aiming to provide advisory services to farmers.The farmers are organised in co-operative societies, particularly in the sphere of dairying and the buying and selling of agricultural requisites and products such as fertilizers and food stuffs. The co-operatives have contributed a great deal to the farmer's prosperity. Farmer's credit banks have been established on the co-operative principle to render financial services to the farmers.

Dairy farming in the Netherlands

(a) Type of cattle breeds kept

(i) Black and white Friesian Holland breed

(ii) Red and White Meuse-Rhine-Yssel breed.

(b) The main breeding districts

(i) Friesland

(ii) North Holland

(iii) South Holland

(iv) Overyssel

(v) Drenthe

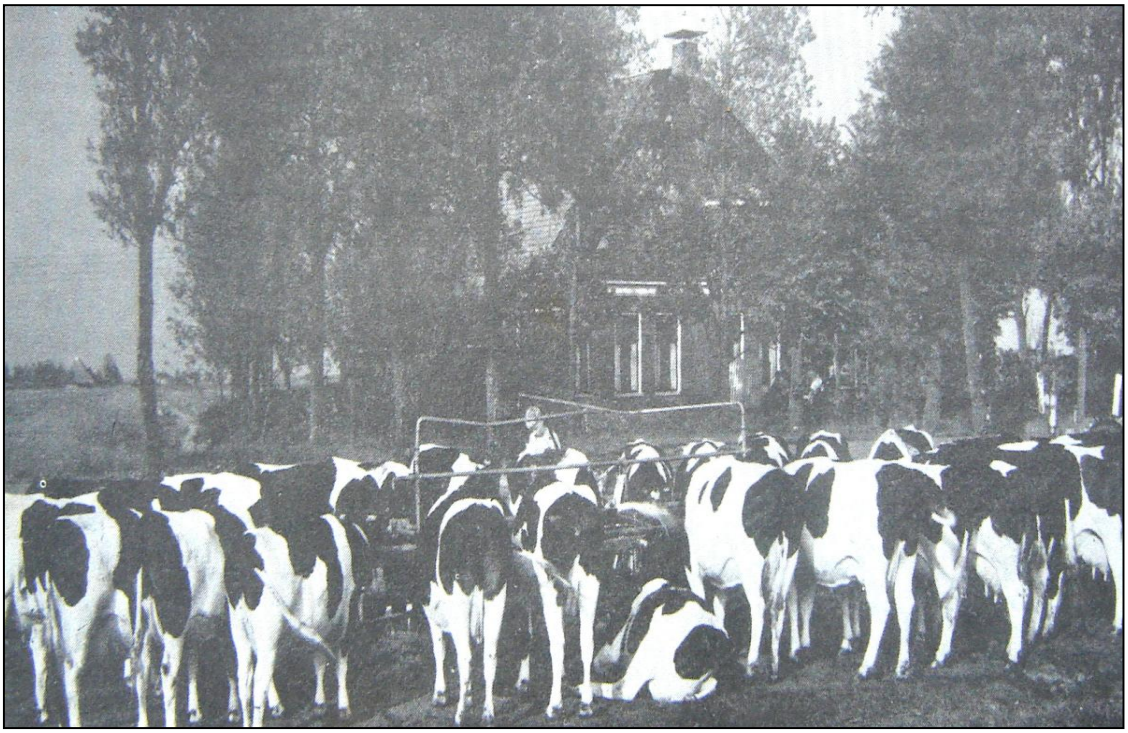
The Dairy industry

This is a very important agricultural industry in the Netherlands. A considerable portion of the production is exported in form of milk, butter and cheese.

Milk production, processing and exports of dairy products

About 90 percent of all milk produced in the country is delivered to the dairy factories and 85 percent of the deliveries is received by the co-operatives. The consumption of liquid milk is not much. Much of the milk is standardized and processed into butter, cheese and other products. Approximately 60 percent of this quantity is exported.

Among the butter exporting countries of the world, the Netherlands is the fourth, being preceded by New Zealand, Denmark and Australia. The Netherlands ranks first among the cheese exporting countries in the world. It is also the biggest condensed milk exporting country in the world. Exports of dairy products are shipped to the tropical and subtropical countries and the rich industrialized countries such as Great Britain, Germany and Belgium.



Friesian Holland breed for milking

Physical conditions favouring cattle rearing in the Netherlands.

(i) The soils are low lying such as clay and peat which are not suitable for any other agricultural produce.

(ii) The presence of moist weather conditions which favour cattle keeping.

Characteristics of Dutch cattle rearing

(i) Production of mainly milk, butter and cheese.

(ii) High exportation of processed and standardized milk.

(iii) Presence of processing and standardized plants.
(iv) High improved and yielding breeds such as Friesians.
(v) Accounts for 40% of the goods value agricultural production.

The importation of the dairy industry to the Netherlands
(i) It earns foreign exchange through exportation of dairy products.
(ii) Products like milk and provide protein giving food to the Dutch people.
(iii) It provides employment opportunity to the Dutch hence improved standards of living.
(iv)Animal wastes provide manure and fertilizers to the Dutch gardens hence improved soil fertility.
(v) The Dutch butter and cheese have built a reputation abroad for the country.

Arable farming

Crops grown

(i) Cereals: These include rye, oats, wheat and barley. Rye and oats are grown in the south and east of the country. Wheat and barley are grown mainly ins the north and west on the clay soils. With the exception of wheat, over 60 percent of the other cereals are used for stock feed.

(ii) Potatoes: Potatoes are spread all over the country and grown for a variety of uses; namely industrial potatoes for production of starch and potatoes grown for human consumption. Industrial potatoes are grown on the reclaimed peat soils. Large quantities of human consumption are exported as seed potatoes.

(iii) Sugar beet: Sugar beet is processed into sugar and the vegetative cover is crushed into cattle cake.

HORTICULTURE

Horticulture is a very intensive form of farming involving the growing of vegetables, flowers and fruits. It requires large sums of capital. Among the most important vegetables grown include tomatoes, cucumber and lettuce. The Dutch farmers concentrate their efforts mainly on the western European market.



Intensive Floriculture

VEGETABLE GROWING

The most important region for vegetable growing is in the South Holland glass districts, which is divided into two production centres, namely the Westland and the Kring. Complex glass houses for tomato, lettuce and cucumber are typical features of this district.



Intensive cultivation of lettuce inside a glass house

Factors which have influenced the development of agriculture in Netherlands.

1. Availability of alluvial fertile soils which support plant growth.
2. The presence of generally flat land which enables mechanisation.
3. Availability of ready market from the industrialized neighbouring countries.
4. The presence of good transport network which enables quick transportation of both agricultural produce and farm inputs.
5. The presence of good favourable climate whose temperatures are mild and enable plant growth.
6. Availability of an active and well trained agricultural population which has modern scientific methods of farming.
7. Good education system which recognizes agriculture by building a number of agricultural schools to produce a vigilant agricultural population.
8. Good government policy which supports farmers through loan provision and agricultural advisory services.
9. The availability of an active agricultural research which has enabled improvement in the quality of seeds and animals breeds.
10. Proximity to the highly industrialized nations for the dairy and horticultural products.
11. The enterprising and hard working spirit of the Dutch farmers thus enabling them to control their difficult environment.
12. The establishment of co-operative societies which ease the marketing and processing of agricultural products.
13. The strategic favourable trading position and advantage of quick means of communication with foreign countries have favoured agricultural development in Netherlands.

Problems facing agricultural sector in Netherlands

1. Unfavourable climate especially where conditions are too cold to enable plant growth.
2. There is still shortage of land despite land reclamation.
3. There is competition for market and factors of production with other agricultural producing countries.
4. High costs of reclaiming and maintaining of the reclaimed land thus leading to high rental costs.
5. Salination is still a problem.
6. Sometimes there is periodic flooding where the sea breaks the dykes and reclaimed areas are submerged.

Solutions to the problems facing the agricultural sector

1. Construction of glass houses to overcome the unfavourable winter conditions.
2. There is constant application of fertilizers to overcome soil exhaustion.
3. There has been construction of stronger dykes to control floods and sea waves.
4. More land has been reclaimed to overcome shortage of land.
5. Crops are sprayed by pesticides to control pests and diseases.
6. A market research is conducted to access a wider international market for their produce.
7. Mixed farming has been encouraged to reduce competition from other countries.

REVIEW QUESTIONS

1. Figure (a) shows agricultural exports and figure (b) shows all exports from the Netherlands.

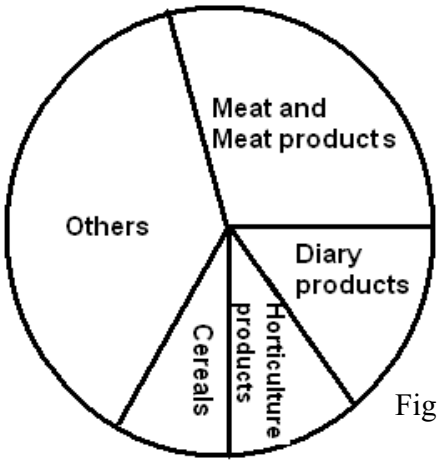


Fig (a)

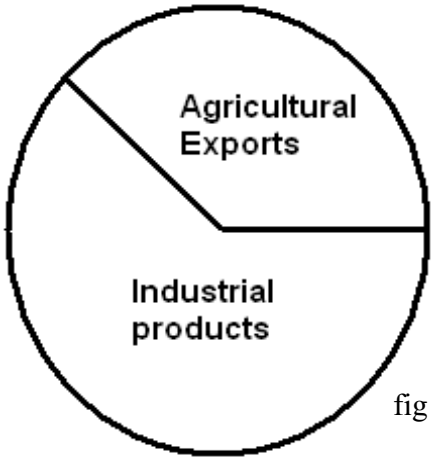


fig (b)

a) Basing your observation on fig (a)

(i) List three animal products exported by Netherlands

(ii) Calculate the percentage which is contributed by animal products.

(iii) Describe the main characteristics of the exports

(iv) Explain why the dairy industry has become so important in Netherlands

b) using fig (b)

(i) Explain why Netherlands exports more industrial products than agricultural commodities

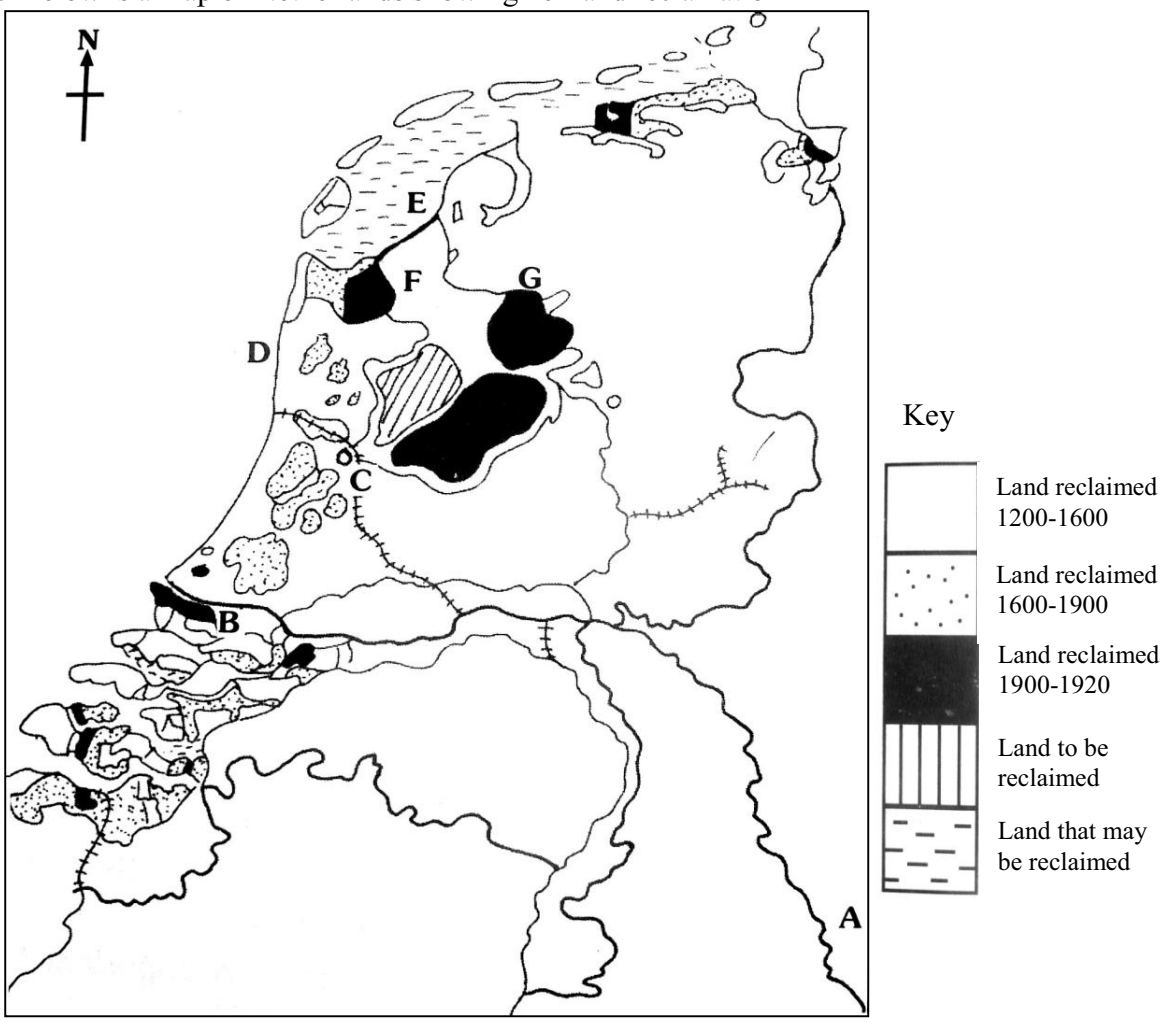
(ii) What are the advantages of depending on this pattern of exports.

(iii) List three industrial products exported by the Netherlands.

c) Mention five factors which have favoured the development of industries in the Netherlands.

d) Compare the exports of the Netherlands with those of your own country.

2. Below is a map of Netherlands showing her land reclamation



Study the map of Netherlands above and answer the questions that follow

a) Name

i) River A ii) Port B iii) Town C iv) Sea D

v) The feature E vi) Lake F vii) Polder G

b) i) State four conditions which make the polder land suitable for farming

ii) What four types of farming are practiced in Netherlands?

iii) For any one of the problems in c(ii) above, explain how it is being overcome.

3. Study the passage below and answer the questions which follow:

Netherlands is one of the world's most densely populated countries. The country adjoins other densely populated areas in North West Europe. At the same time the favourable situation of the country, lying as it does on the North Sea and at the estuaries of important rivers, is at once evident. The means of subsistence are very inadequate for the number of inhabitants, there can be no questions of Netherlands being over populated. However, there is some

justification for speaking of over population in the physical sense, as evidenced by housing shortage, the scarcity of space for recreation, traffic congestion and environmental pollution e.t.c.

As the population increased and effects of mechanisation made themselves felt in agriculture, an increasing drift to cities took place. No less than 81% of the population live in towns with over 10 000 inhabitants. Forty six percent of the entire population live in the provinces of North Holland, South Holland, and Utrecht, which together account for more than 21% of the area of the Netherlands. In recent years, however, there have been signs of reversal of this urbanization trend. With the large cities in the west now full to overflowing, there are more people living than settling there.

(Adapted from CW Gibbs: The Rhinelands Pg. 104)

a) i) Give two reasons to explain why Netherlands is one of the world's most densely populated countries.

ii) Name any two countries bordering Netherlands which are densely populated.

b) What evidence is there to show that;

i) Netherlands is over populated?

ii) the majority of people live in towns

c) Name three densely populated areas in Netherlands

d) Which three cities form Cornubation in the areas named in (b) (ii) above?

e) Describe four ways in which the government is trying to overcome the problems of over population in the Netherlands.

f) List four factors explaining why some of the polders in the North have a low population density.

4. a) i) What is land reclamation?

ii) With the aid of a sketch diagram, describe how land is reclaimed in Netherlands.

iii) Why is land reclamation carried out in the Netherlands?

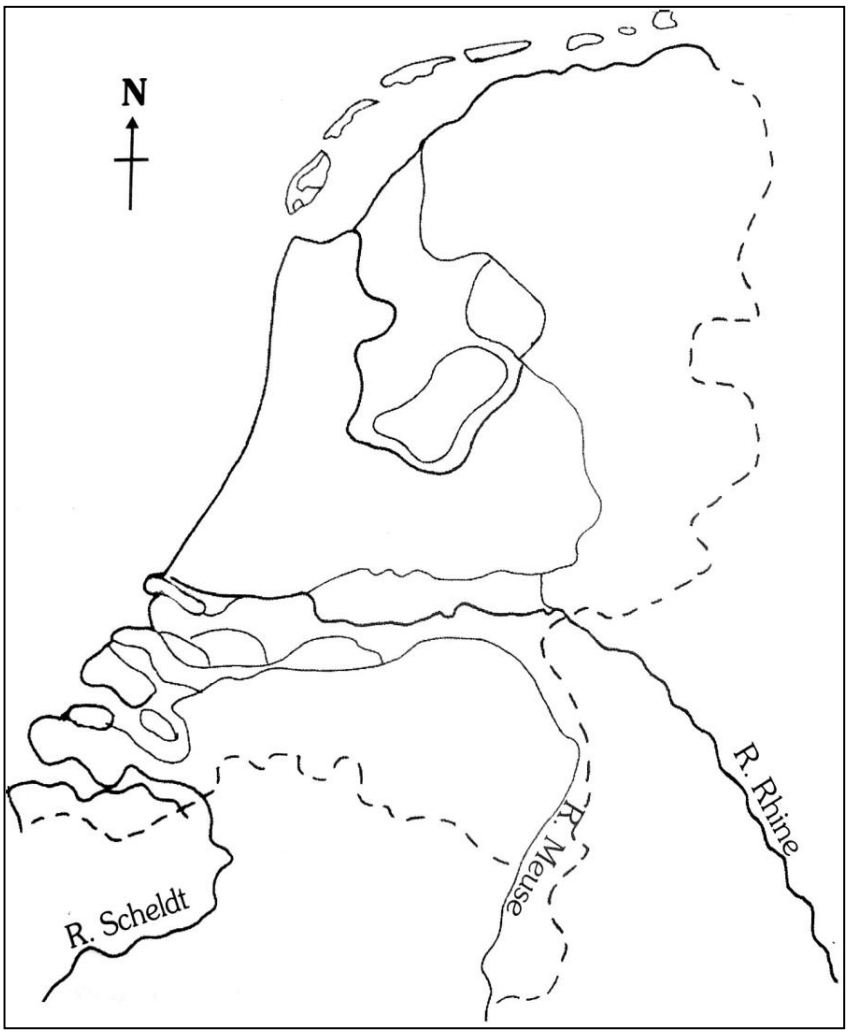
b) i) Using a sketch map show reclaimed land areas in the Netherlands.

ii) In which ways have the reclaimed lands been put to use/

iii) Write two problems faced by farmers in using the reclaimed land.

c) Name three agricultural projects being carried out on reclaimed lands in Uganda.

5



The figure above is an outline map of Netherlands.

a) On it; Mark and label the following land use

i) Arable farming ii) Cattle farming iii) Mixed farming

iv) Horticulture v) Woodland, heat and sand dunes

b) What are the physical conditions favouring cattle farming in Netherlands?

c) Outline the characteristics of the Dutch cattle farming.

d) What is the importance of the Dutch dairy industry to the Netherlands?

6. Read the passage below and answer the questions that follow:

"Rotterdam is the largest Port in Europe. It has existed for more than 600 years but became a major Port during the 19th century. Its rapid growth and prosperity in modern times have gone hand in hand with increase in population, industries, trade and its hinterland.

Thus, in addition to becoming the largest commercial Port of the Netherlands, Rotterdam has become an entreport for a large part of western Europe.

Adapted from Young and Lowry; "A Course in World Geography: Europe and the Soviet Union 3rd Edition Page 115)

a) i) What is a hinterland?

ii) Name the countries of Western Europe which make the Rotterdam hinterland?

b) Explain why Rotterdam has grown into the largest port in western Europe.

c) i) State some of the main problems facing Rotterdam port

ii) Outline the steps taken to solve the problems identified in (c) (i) above.

7. The table below shows land use in South Flevoland polder in Netherlands91968). Study it and answer the questions that follow.

Land use	Area occupied (Hectares)	Percentage pf land area covered
Farm land	21 500	……
Residential	7 740	……
Woodland, reserves and recreation	10 750	……
canals, dykes and recreation	301	0.75
Total land use	**40 291**	

a) i) Calculate the percentage of the area occupied by each of the land use on the table.

ii) Draw a pie chart to show the land uses in the South Flevoland polder.

iii) Using evidence from the pie chart , state the dominant land use in the South Flevoland polder.

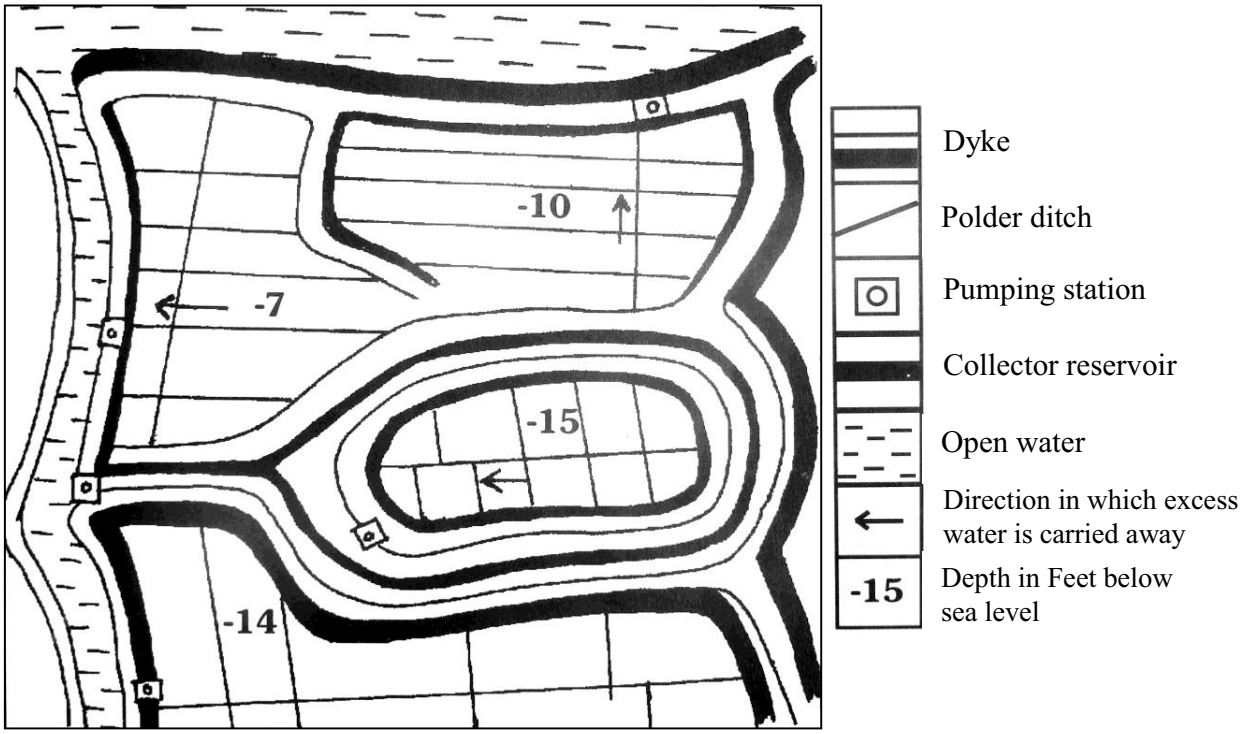
b) i) Explain what is meant by the term "POLDER"

ii) name any other two problems in the Netherlands.

iii) Outline the factors that led to the creation of polders in Netherlands.

c) How has Netherlands benefited from the polders?

9. Study the sketch map of a polder and answer the questions that follow:



a) i) Describe the relief of the land covered by the polder

ii) Explain why it was necessary to create polders in this area

b) Describe how a polder is made

c) Outline the various types of land use on the polder

d) i) Outline the problems facing people using the polders

ii) State the ways in which the problems in d (i) above are being solved.

10. Study the table showing land use in the Netherlands and answer the questions that follow.

Land use type	Total land area
Arable farming	770
Horticulture	140
Pastures	1 505
Wood and Waste land	525
Others	560
Total	**3 500**

Adapted from Gibbs C.W. The Rhinelands pg 111- 113

a) Draw a bar graph to show land use types in the Netherlands

b) State the land use type which occupies the;

i) largest area ii) smallest area

c) i) Calculate the percentage under farmland

ii) Describe the conditions which have made it necessary to leave a large portion of land in the Netherlands under permanent pasture in the Netherlands.

- Arable farming
- Permanent pasture

PART SIX

TRIAL PAPERS

TRIAL PAPER 01

INSTRUCTIONS

Answer four questions in all

Choose two questions from part one and two from part two

In part two not more than question may be chosen from one region Time: 2:30 MINS

PART I: THE REST OF AFRICA

1. a) State the characteristics of the following types of vegetation

(i) Desert vegetation

(ii) Equatorial vegetation

(iii) Mediterranean vegetation

b) For each of the vegetation types above, name the country where it is found.

c) What are the differences between Equatorial forests and Savannah vegetation?

d) What factors favour the growth of Equatorial forests in Africa?

2. a) Draw the map of Ghana and on it show and label the following

1. the white and black voltas.
2. Dams; Bui, Akasombo and Kpong
3. Lake Volta
4. Railway line
5. Power line
6. Ports

b) What were the aims of establishing the Volta project?

c) Explain the benefits of the scheme to Ghana

d) Outline the problems resulting from the establishment of the scheme.

3. Study the table below showing Africa's population growth and answer the questions which follow

Africa's population growth 1950 – 2000

YEAR	POPULATION IN MILLIONS
1950	2 767
1960	4 178
1970	5 432
1980	1 070
1990	2 093
2000 (projected)	818

Source: Adapted from white ***R.G Africa Studies for East Africa Students. P.7.***

a) Calculate the percentage change in population between

(i) 1950 and 1960

(ii) 1980 and 1990

b) Draw a line graph to show the trend of population growth in Africa between 1950 and 2000 projected.

c) Describe the factors which contributed to the population growth shown in b) above.

d) Explain

(i) the problems resulting from high population growth rates in Africa

(ii) State the steps being taken to solve the problems

4.a) Draw a sketch map of Africa and on it mark and name

(i) Any three ocean fishing grounds

(ii) Ocean currents; Canary and Benguela

(iii) Ports: Lagos and cape Town

b) Describe the conditions which have favoured the development of commercial fishing in any one fishing grounds named in (i) above

c) Describe the problems facing fishing in African countries.

5. a) With reference to Malawi

(i) State one way in which traditional farming systems in Africa have been changed.

(ii) Draw the map of Malawi showing the area where that system has been practiced and on it mark and name;

1. The area where the system is practiced.
2. Lake Malawi.
3. Forested area.

4. two rivers
5. low lying land
6. neighbouring countries

b) Describe the factors that favoured its location in this place?

c) What were the aims of introducing this way of modern farming?

d) Explain the benefits that have been realized from this system of modern farming

6. a) Draw the map of Egypt and on it indicate and name;

1. major mineral deposits
2. major industries
3. Red sea
4. ports
5. sugar growing areas

b) What factors favoured the development of industries in Egypt?

c) Why are most industries in Egypt located in the delta region?

d) What are the benefits of industries to Egypt?

PART II: STUDIES IN DEVELOPMENT

Answer two questions from this part; one from each region

NORTH AMERICA

7. a) Draw a sketch map of the great lakes and St. Lawrence river and on it mark and name;

(i) River St. Lawrence

(ii) The great lakes

(iii) The ports of Duluth, Montreal

b) Describe the steps taken to improve navigation on the Great lakes and the St. Lawrence river.

c) Explain the problems which are still existing on the St. Lawrence sea way.

8.a) (i) Describe the factors which have favoured farming in the Central valley

(ii) Explain the contribution of farming activities to the development of California

b) (i) Describe the problems faced by farmers in California

(ii) Explain the steps that were taken to solve these problems?

c) Outline the factors which have favoured the growth of the film industry in California?

9. a) Name any (i) three industries under the Tennessee Valley Authority (T.V.A)

(ii) two rivers draining the area under the T.V.A

b) Describe the conditions which led to the establishment of the T.V.A

c) Outline the activities which were undertaken by the T.V.A

d) Explain the benefits of the T.V.A to USA

RHINELANDS

10. Study the figures below and answer the questions which follow

Coal production in the Ruhr in selected years

YEAR	000's of tones
1968	4 000
1971	5 000
1974	6 500
1977	7 600
1980	4 700
1983	3 300
1986	2 000
1989	1 500

a) i) Choose a suitable statistical method to show the information given above

ii) Give two advantages of using this method you have chosen above.

b) Explain why the production of coal in the Ruhr has steadily been declining

c) Describe the problems which are faced in the Ruhr industrial areas

d) Explain the steps taken to solve the above problems.

11. Study the two tables below and answer the questions which follow:

Agricultural exports from Netherlands

Products	Percentage (%)
Meat and meat products	18
Dairy products	16
Horticultural products	14
Cereals	40
Others	12

All exports from Netherlands

Product type	Percentage (%)
Agricultural	36
Industrial	64

a) Draw two clearly labeled pie charts to show the above information

b) (i) List three animal products exported by Netherlands

(ii) What is horticulture?

(iii) Give three examples of horticultural crops

c) Describe three advantages of glass houses in horticultural farming

d) (i) Explain why Netherland's exports are more industrial products as compared to agricultural ones.

(ii) List three industrial products exported by Netherlands.

(iii) Describe any three characteristics of the exports of Uganda.

12. a) Describe the formation of the Swiss Alps

b) Clearly explain the influence of the Fohn wind in the climate of the Swiss Alps.

c) What problems does nature impose on the development of Switzerland?

d) How has Switzerland tried to solve the above mentioned problems.

TRIAL PAPER 02

INSTRUCTIONS

Answer four questions in all

Choose two questions from part one and two from part two

In part two not more than question may be chosen from one region

Time: 2:30 MINS

AFRICA

1. With reference from southern Nigeria,

(a) Draw a map showing

1. Oil palm growing areas,
2. Towns: Enugu and port Harcourt
3. Rivers: Niger and Benue.

(b) (i) Give any three physical conditions favouring palm oil production in Nigeria

(ii) Explain two methods of processing palm oil in Nigeria

(c) What problems are involved in palm oil production?

(d) Explain the contributions of the agricultural sector to the development of Nigeria.

2. (a) Draw a map of Swaziland and on it indicate:

1. Three forest areas
2. Rivers: Usutu and Komati
3. Towns

(b) What conditions favoured the growth of forestry in Swaziland?

(c) (i) Describe the problems experienced in the exploitation of forests in Swaziland

(ii) What steps have been taken to solve these problems?

3. (a) Draw a map of the Rand and on it mark and name

1. The major industrial centers,
2. The coal fields,
3. The railway network
4. The towns; Pretoria, Johannesburg, Verreninging, Witbank, Springs and Germiston.

(b) List at least four (4) minerals found in Rand.

(c) What factors have favoured the industrial development of the Rand?

(d)What problems does the Rand face?

(e)What are the benefits of mining to south Africa?

4. (a) Draw a map showing Natal-sugar growing areas and:

(i) A lake,

(ii) Rivers,

(iii)Railway,

(iv)Towns,

(b) What are the importances of growing to Natal?

(c) What problem face sugar growing in Natal?

5. (a) Draw a map of Africa and on it mark and label;

(i) three major latitudes

(ii) - Equatorial climate

- Mediterranean climate and savannah climate.

(b) Study the table below and answer the questions which follow:

Climate data for station D

Month	J	F	M	A	M	J	J	A	S	O	N	D
Temperature(^{0}C)	21	24	28	31	31	26	26	25	26	27	24	23
Rainfall (mm)	0	0	3	10	69	117	206	310	142	13	0	0

(i) Define annual temperature range

(ii) calculate annual temperature range

(iii) What type rainfall pattern is experienced at the above station?

(c) (i) What are the climatic problems experienced at the above station?

(ii) Describe the climate experienced at station D

(d) (i) Represent the above climatic statistics using a graph

(ii) State two countries which experience the above statistics.

6. Study the data given below:

ANNUAL AVERAGE NUMBER OF CATTLE.

Country	**Number in 000's**
Botswana	2,767
Burkina Faso	4,178
Mali	5,432
Mauritania	1,070
Namibia	2,093

(a) Draw a bar graph to show the information in the table.

(b) State (i) two countries where transhumance is practiced

(ii) one country where cattle ranching is dominant.

(c) Describe the conditions which have led to the practice of either transhumance or ranching in any country named above.

(d) Outline

(i) Problems faced by traditional livestock farmers in any country in Africa.

(ii) Measures being taken by the government to solve the problem in (d) (i) above

PART II: STUDIES IN DEVELOPMENT

Answer two questions from this part.

REGION 1: NORTH AMERICA

7. (a) Draw a map of Canada and on it mark and name the following:

(i) The three prairie provinces

(ii) Wheat export routes to farming in East Africa

(b) Compare farming in Canada to farming in East Africa

(c) Describe the general condition which favoured extensive farming on the prairies.

(d) Examine the benefits of farming to Canada.

8. Study the figure below and answer the questions which follow.

Land use in British Columbia

Cultivated land	1%
Other land available for agriculture	4%
Forest	39%
Barren land – rocky + mountain glaciers	56%
Total	100%

(a) Draw a pie chart to represent the information shown by the figure above.

(b) (i) Suggest ways in which the barren land and mountain glaciers can be utilized by man.

(ii) What problems have hindered agriculture from being an important economic activity in British Columbia?

(iii) According to the pie chart you have drawn in (i) above, what is the most important economic activity?

(iv) What factors have favoured the economic activity you have mentioned in (a) above.

9. Study the table below and answer the questions which follow.

Table: Land use on the Howard and Blythe cotton plantation

Land use	**Area in Hectares**
Cotton	304
Soya beans	638
Wheat	111
Fallow	162
Others	101
Total	1316

(a) Draw a pie chart to show the statistics above.

(b) Why has more land been used for the growing of Soya beans than cotton?

(c) (i) Mention any two states in the south where cotton is grown.

(ii) Describe the conditions which have favoured the growing of cotton in the south.

(d) Explain the contributions of cotton growing to the south.

10. (a) Draw a map of new york and on it mark and name:

(i) Islands: staten, coney, long island

(ii) Rivers: Hudson, harlem, east river

(iii)Airports: Newark, john F.kennedy, la Guardia

(iv)Bays: lower bay, upper bay, Newark bay

(b) Describe the factors which led to the development of New York.

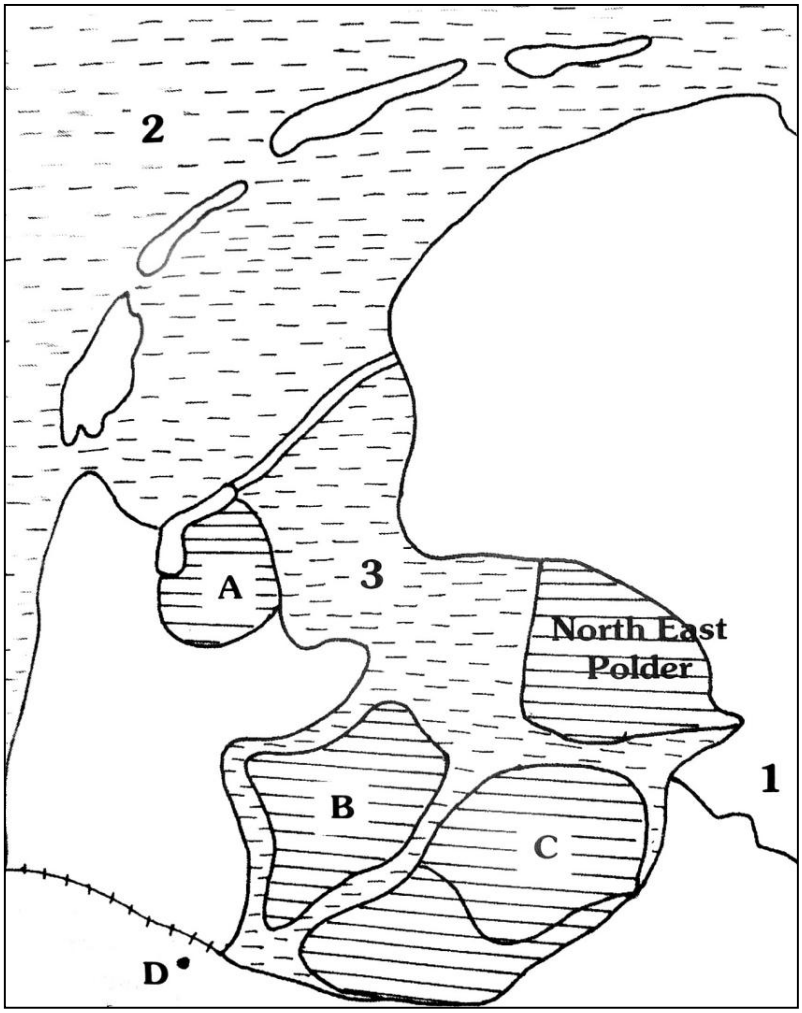
(c) (i) Name four industries found in New York.

(ii) What are the benefits of the industries to New York?

(iii) Outline the problems created by industries in New York.

(d) What steps are taken to solve these problems?

12. Study the map below showing the Zuider Zee reclamation scheme in Netherlands and answer the questions which follow.



(a) Name the (i) polders marked A, B and C

(ii) River marked 1

(iii) Water bodies marked 2 and 3

(b) Describe the process of polder formation.

(c) Explain the importance of the polders to the people of the Netherlands.

(d) Outline the problems facing the people living on the polders.

(e) Of what importance are cooperative societies in Netherlands?

13. (a) Draw a map of Belgium. On it mark and name the following:

(i) Rivers: Sambre and Meuse

(ii) Polders

(iii) Towns: Genk, Antwerp, Brussels, Charleroi

(iv) Three coal fields

(v) The Albert canal

(b) Mention any four products from the non-ferrous metal industry.

(c) What factors have favoured the industrial development in Belgium.

(d) (i) What problems are faced by industries in Belgium?

(ii) What steps have been taken to solve the above mentioned problems?