

## **NATURAL VEGETATION**

Natural vegetation is that vegetation (plant life) that grows naturally in particular physical environment as a result of physical factors like climate, soils and drainage

### **Areas of natural vegetation types in East Africa and the Rest of the world**

There are a number of natural vegetation types in the world which include:

- Forests.
- Grasslands
- Desert/Semi desert vegetation
- Alpine Vegetation

### **1. FORESTS**

The forest Vegetation is categorised into two ie tropical and temperate forests.

#### **1) TROPICAL FORESTS**

These forests located within the tropics and they are sub divided into four;

**a) EQUATORIAL RAINFORESTS** that are found between latitudes 5 degrees North and South of the Equator and they are well developed in the

- Amazon basin of South America
- Congo basin of Central Africa
- West African coast line (Nigeria, Ghana Ivory coast)
- Highlands of Malaysia, Burma, Indonesia etc

#### **b) TROPICAL MONSOON RAIN FORESTS**

These are located within the tropics between 5 degrees North and South of the Equator. They are well developed in areas like Burma, India, Thailand, Northern Vietnam, Philippines etc.

#### **c) TROPICAL MONTANE FORESTS**

These are confined on slopes of high mountains normally at a height of about 1800m above sea level. Common tree species include; camphor, cedar, podarcap etc.

In East Africa they are found on slopes of mountains like Rwenzori, Kenya, Kilimanjaro, Elgon etc.

#### **d) MANGROVE FORESTS**

These are also swamp vegetation because of growing in marshy areas. They grow along coastal margins between 5degrees North and South of the equator.

They are developed in the marshy river Deltas of the Amazon and the Niger in Nigeria.

#### **II) TEMPERATE FORESTS**

These are located in the temperate regions outside the tropics. They are grouped into two ie deciduous temperate forests and coniferous temperate forests. They grow between 30 degrees and 70 degrees North and South of the equator.

The deciduous temperate forests are further broken down into cool temperate and Mediterranean deciduous forests. The Mediterranean deciduous forests are mainly located on the Mediterranean shoreline of Algeria, Morrocco, Spain, Italy, France, Tunisia, South African coastline and Western coastline of Australia while the temperate deciduous forests are well developed in Central and Western Europe, Korea, China, Northern Japan, Chile, News land.

#### **2. GRASSLANDS**

These constitute the largest vegetation cover on the Earth and they are divided into two ie Tropical and Temperate grasslands.

Grasslands are known by different names in different parts of the world as shown in the table below;

AREA	NAME
North America	Prairies
South America	Pampas
South Africa	Highveld
Rest of Africa	Savannah
Australia	Downs

The Tropical grasslands are commonly referred to as Savannah grasslands and they located between 5 and 15 degrees North and South of the equator. They are well developed in India, Africa etc while the temperate grasslands are found in the interior of continents with temperate longitudes between 35 and 60 degrees North and South of the equator.

### **3. DESERT VEGETATION**

This type of vegetation is divided into two namely;

Tropical desert vegetation

Cold desert vegetation

The Tropical desert vegetation is found in various parts of the world ie North America, Northern Mexico, Sahara region of Africa, Namibia, etc

The cold desert vegetation (Tundra) is mainly found in Asia, Northern parts of Europe in the Scandinavian countries, Canada and Green land.

### **4. ALPINE VEGETATION**

This is divided into two ie

a) Tropical Alpine vegetation

b) Temperate Alpine vegetation

Tropical Alpine vegetation is sometimes referred to as montane vegetation, it consists of clearly demarcated vegetation zones from the foot hills to the summit while the temperate Alpine vegetation is found in the temperate regions like the Alps in Western Europe, Northern California, and British Columbia in the Appalachian Mountains etc.

## **NATURAL VEGETATION IN EASTAFRICA**

East Africa has a variety of natural vegetation types that include the following;

- **Tropical/Equatorial rain forests**
- **Savannah vegetation**
- **Semi- desert vegetation**
- **Montane vegetation**
- **Swamp vegetation**

## CHARACTERISTICS OF DIFFERENT VEGETATION TYPES

### TROPICAL RAIN FOREST

Areas: Mabira, Budongo, Bugoma, Itwara, Kalinzu, Imaramagambo, and outside East Africa Congo forest, Amazon forest, Cameroon, Gabon

#### CHARACTERISTICS

- Tall trees reaching a height of 50m because of competition for sunlight.
- Little or no undergrowth due to thick canopies that prevent sunlight from reaching the floor
- Trees form dense canopies of three layers 30-50m, 15-30m, 8-15m due to growth at intervals
- Trees are ever green shading leaves at different intervals due to rainfall throughout the year
- Trees are broad leaves that allow evapotranspiration to remove excess water
- Trees have thin barks to assist remove excess water due to heavy rainfall
- There are numerous climbing plants like lianas and epiphytes that get support from the huge trees and also climb looking for sunlight
- Trees have straight and big trunks due to ample supply of water
- Most trees have buttress roots that give support huge and tall trees
- Trees are hardwood trees like mahogany, mvule, musizi, redheart, ironwood etc due to long gestation period
- Trees are in mixed stands ie a variety of tree species eg mvule, mahogany, palms, musizi etc due to ample supply of water
- Trees take a long period to mature 50-100 years some over 100 years because they are hardwood

## **MANGROOVE FOREST**

Areas: found on the East African coastal lowlands , Mombasa, Lamu, Tanga, Dar-el-salaam and along the river valley like Rufigi and Ruvuma

### **CHARACTERISTICS**

- **Evergreen** trees because of rainfall throughout the year
- Trees have broad leaves to get rid of excess water due to heavy rainfall and alot of water
- Trees have aerial/stilt roots to support the stout trunks and keep them growing above the water levels and for respiration
- They have hard wood because they take long to mature
- Trees have short stumpy trunks in low tidal waters
- Trees have medium height due to ample supply of sunlight
- Trees have dense bushy stands because of hot conditions and ample supply of nutrients
- Trees shed off leaves at different intervals as they mature
- The trees are umbrella shaped and develop branches closer to the ground
- Have a belt of various speceis that grow parallel to the shore
- Have grey leathery foliage that appear to float on the water

## **TEMPERATE FOREST**

Areas: found on high mountains like Kilimanjaro, Rwezonri, Kenya,Elgon,Muhavura at the height of 2500-3200 metres

### **CHARACTERISTICS**

- Characterised by evergreeb trees because of moderate rainfall, fairly distributed and relatively cool temperature
- Trees are medium heighted of 10-20 metres because of modorate rainfall
- Trees grow in pure stands as few species grow under cool conditions
- There are few tree species like podocarp,camphor, and cedar because of cool conditions

- Trees have small pointed leaves
- Trees have leaves with wax

### **BAMBOO FOREST**

Areas: found on high mountains like Kilimanjaro, Rwezonri, Kenya, Elgon, Muhavura at the height of 3200-4000 metres

### **CHARACTERISTICS**

- Characterised by bamboo trees of height of 4-10 metres because moderate rainfall
- The Bamboo forest is in form of single layers of trees because of cool conditions
- Trees are reed-like in appearance
- Trees have hollow stems and are segmented
- Trees are evergreen because of rainfall fairly distributed through the year as well as because of cool temperature
- Trees have tough and pointed leaves to reduce on evapotranspiration
- Trees have prop roots
- There is little or no under growth because few plant species can survive
- Trees grow in clusters

### **HEATH AND MOORLAND**

Areas: found on upper slopes of mountains of Kilimanjaro, Kenya, Rwenzori, Elgon, Muhavura at 4000-4500 metres

### **CHARACTERISTICS**

- There are few plant species because of cold temperature
- There is growth of short plants and flowers like lobelia and giant groundsel because of cold temperatures
- There is growth of ferns because of cool conditions
- In some areas, there is growth of short grass because of low rainfall and infertile soils

- Grass and plants that grow are ever green because of cool conditions
- Apline and shrubs
- Growth of plants like mosses and lichens adopted to cool conditions

### **SAVANNA WOODLAND**

Areas: western and southern Tanzania(Miombo woodland), same parts in Northern Uganda, parts of the rift valley around lake George and Edward, some parts of Southern and Eastern Kenya

### **CHARACTERISTICS**

- Continous cover of trees because of moderate rainfall of 750-1000mm
- Trees are of moderate height due to moderate rainfall
- Trees have thick barks and swollen trunks meant to store the water due to hot temperature
- Trees have thin leaves meant to reduce on evapotranspiration
- Trees are umbrella shaped
- There is dense growth of grass , bushes and shrubs due to moderate rainfall
- The grass, bushes, and shrubs are drought and fire resistant, drought and fire is common
- The comon tree species are acacia and boabab that grow under moderate rainfall and hot temperatures
- Tres are intermingled with xerophytic thorny lianas , cactus and a few hardly shrubs
- Trees have tap root /long root

### **SAVANNA GRASSLAND**

Areas: Northern Uganda, rift valley floor in western Uganda(Queen Elizabeth NP)area, areas around Bukoba in Tanzania, Nyika plains of Kenya

### **CHARACTERISTICS**

- Dominated by tall grass of 1 metre because of moderate rainfall
- The dominant grass species are spear grass and elephant due to

moderate rainfall 500-750mm

- Grass is green during wet season but dries up and becomes brown during the dry season is prominent
- There are scattered trees that are short of 5-10 metres
- Trees are umbrella shaped
- Trees are deciduous shedding off leaves during dry season because it is prominent
- Trees have small leaves meant to reduce the rate of evapotranspiration
- The dominant tree species are acacia and baobab
- Trees and grass are drought and fire resistant
- Trees have tap /long roots

#### **DRY BUSH AND THICKET (DRY SAVANNA)**

Areas: Northern ,North Eastern andNorth Western Kenya, Karamoja, Ankole-Masaka dry coriidor and some areas of central Tanzania

#### **CHARACTERISTICS**

- Dominated by short grass due to low rainfall
- Grass grows in tussocks
- Grass dries become porched and brown due to long dry season
- Bare patches are common especially in dry season
- There are scattered thorny bushes due to dry climate
- There are stunted with woody stems
- Trees have small leaves to reduce on evapotranspiration
- There are trees like cactus and baobab adopted to very dry conditions
- Trees have swollen trees trunks that can store water and bare leaves only for a short period of time
- Trees have long /tap roots that search for water deep underground
- Some trees are waxy to prevent water loss
- Bushy thorny drought resistant trees of about 5-10 metres tall which are normally short and scattered



- The trees have a short gestation period to fit with in the short wet season
- They have a thick fleshy appearance on the leaves and stems

## **SEMI DESERT**

Areas: Northern, North Western and North Eastern Kenya , Karamoja , lake Albert flats, Ankole-Masaka corridor etc

## **CHARACTERISTICS**

- Have bushy,thorny trees with scrubsgrowing in between
- Many plants have deep / tap penetrating roots that enable them to draw water from the undergrond resources as there is limited surface moisture
- Plants have tiny ,thorny leaves that reduce the rate of evapotranspiration eg acacia and prevent animals from eating them
- Some trees have swollen turnksin which they store water for use during long dry season eg boabob
- Many plants produce seeds which lie dormant for many years until little rainfall comes and germinates
- Seeds have thick cases that protect them from bush fires thusfire resistant
- Many plants complete their cycles within few weeks before soils dries up
- Plants are xerophytic ie drought resistant eg acacia, Euphobia,
- Have short scattered grass
- Have bushy thorny trees of height 5-10m
- Have thick fleshy appaerance on leaves and the stem
- Semi-desert plants have thick barks and to reduce on water loss
- Trees have hard barks
- There are thickets separated by bare patches or short grassses
- Plants are widely spaced due to reduced competition for water eg cactus

- Some plants are halophytic growing in areas of saline soils

## **MEDITERRANEAN VEGETATION**

Areas: found in west coast of continents in mid latitudes , mediterranean basin , california ,central dule,southwest Austria, western part of cape province of South Africa

## **CHARACTERISTICS**

- mediterannean forest of broad leaved evergreen trees eg oak , reduced eucalyptus
- some are short flat topped trees like cork oak
- there is limited under growth due reliable rainfall
- in wetter parts like mountain slopes, the coniferous trees are common due to limited rainfall
- some trees have thick rough barks to store water during the summer season
- some trees have compact woody stems , bush shrubs with dense thicket
- much of the woody vegetation is hard leaved (sclerophyll)
- vegetation has small dark leaves covered with wax to retain moisture in dry summer months
- there is growth of plants like grapes vines that have long tap roots which reach down the moist rock
- some plants have large fleshy bulbous roots which store water for use in summer
- there are sweet smelling herbs and shrubs like lavender , thyme and rose mary
- there is mixed type of vegetation with decidious trees ,coniferous , tough grasses ,dwarf trees
- short grasses are common like in the meditteranean central valley
- in some areas there is bunchy and wiry grasses

## SWAMP VEGETATION

Swamps are wetlands consisting of saturated soils or stagnant water. They are dominated by water loving/water tolerant woody plants such as shrubs, bushes, grasses and trees

Areas: around shores of lakes like Lake Victoria

along river banks, flood plains and deltas eg on rivers like River Nile, Katonga, Yala, Lwajali, Sezibwa

in broad valleys with stagnant water eg Awoja swamp in Soroti, Olwenya in Lira etc

It is consisting of papyrus swamps, grasslands and tree swamps

## CHARACTERISTICS

- There is a continuous cover of shrubs, bushes, grasses and papyrus
- Grass has sharp blades
- Papyrus has woody triangular shaped stems
- Papyrus are quite tall in height of 3m to 6-10 feet
- Thin, green threadlike filaments appear in a circular arrangement at end of each papyrus stem
- Papyrus swamp and grassland are prone to periodic fires in dry season
- Roots are anchored in mud under water
- Tree swamps are ever green throughout the year

## TROPICAL RAIN FOREST

### 1. CLIMATE

- Heavy rainfall over 1500mm well distributed throughout the year
- hot temperature of 23-29 degrees which increase humidity and rainfall for the growth of trees
- high humidity about 80% promoting luxuriant tree growth
- presence of adequate sunlight for trees to manufacture food through photosynthesis promoting tree growth

## **Note**

In explanation of the factors/conditions, please integrate the characteristics e.g

Heavy rainfall of over 1500mm well distributed throughout the year leads to/ encourages/ favours the growth of tropical rainforests with trees that are ever green shading leaves at different intervals in forests like Mabira, Imaramagambo, etc.

## **2. RELIEF**

- gentle slopes of mountains and plateaus
- lowlands along the coast and in river valleys where is growth of riverine forests

## **3. ALTITUDE**

- low altitude of 1000-25000 metres on slopes of highlands and in low lying areas leading to hot temperatures , high humidity ,heavy rainfall for tree growth

## **4. SOILS**

- deep fertile soils on gentle slopes of mountains , some which are fertile volcanic soils and alluvial soils that exist along river valleys promoting riverine forests and on lake shores like fertile soils of lake victoria basin leading to growth of Mabira forest

## **5. DRAINAGE**

- well distributed gentle slopes of mountains and well drained low lying areas

## **6. BOITIC FACTORS**

- government policy of conservation as national parks , game reserves , and forest reserves eg Mabira , Budongo, Bugoma , Kibale, Imaramagambo,Bwindi etc

## **Answer Guide**

### **FACTORS (CONDITIONS) THAT HAVE FAVOURED THE GROWTH AND DISTRIBUTION OF TROPICAL RAIN FORESTS IN EAST AFRICA**

#### **1. Climate**

-Heavy rainfall. Tropical rain forests require heavy rainfall of over 1500 mm which is well distributed throughout the year. The heavy rainfall facilitates the growth of tall, huge, and luxuriant trees like mvule, mahogany etc.

-Hot temperatures. The hot temperatures of between 22 – 28 degrees C increase humidity in the air /atmosphere hence formation of rainfall for tree growth. This accounts for the evergreen trees that are tall, huge, and luxuriant in forests like Mabira, Kibaale, Budongo etc.

- High humidity. Tropical rain forests also require high humidity levels of about 80%. This promotes growth of luxuriant trees that are huge, tall e.g musizi, mahogany, and Mvule in Mabira forest

Ample sunlight. Presence of adequate sunlight for plants to manufacture their own food promotes plant growth hence accounting for the existence of a variety of tree species that are luxuriant and tall like in Mabira, Budongo, Kakamega forests etc.

#### **2. Relief**

-Gentle slopes support the growth of tropical rain forests e.g the gentle slopes around Lake Victoria with Mabira forests. This is because such gentle slopes have well drained fertile soils for the growth of huge tall and luxuriant trees with buttress roots.

- Lowlands also favour the growth of tropical rain forests e.g at the East African coast and along valleys for riverine forests like along river Katonga. This is because such lowlands have deposited fertile alluvial soils for the growth of tall and luxuriant trees.

- Foothills of mountains have favoured the growth of tropical rain forests especially on the windward slopes of mountains e.g Elgon with mountain Elgon forests. This is because such foothills have fertile soils and receive heavy reliable rainfall for the growth of huge and luxuriant trees.

### **3. Deep fertile soils**

Tropical rain forests require deep fertile soils. These soils have favoured the growth of tropical rain forests e.g on the slopes of mountain Elgon, Rwenzori, Kilimanjaro etc.

Also deep fertile soils on gently sloping areas have led to the growth of tropical rain forests e.g Mabira forests.

The fertile alluvial soils existing along river courses and shores of lakes have favoured the growth of huge trees e.g in Mabira forest, around Lake Victoria and riverine forests along river Katonga and Kafu.

### **4. Drainage**

- The well drained areas especially along gentle slopes of mountains have tropical rain forests e.g Elgon slopes with mountain Elgon forests and also other lower altitude areas around Lake Victoria in Buikwe with Mabira forest etc. This is because such well drained conditions lead to the growth luxuriant tall and huge trees.

- Water logged areas especially the East African Coast have favoured the growth of riverline forests that are also evergreen.

### **5. Altitude**

Tropical rainforests grow in areas with altitudinal range of 1000- 2000 metres above sea level which have hot temperatures required for the growth of huge and tall trees e.g on the lower slopes of mountain Elgon, Rwenzori, around the shores of lake Victoria like at Mabira, Kiisi, Kakamega etc.

### **6. Favourable government policy**

The supportive government policy of gazettement/ conserving of forest reserves has led to growth and continued existence of tropical rain forests e.g Bwindi, Budongo, etc in Uganda; Kiisi, Kakamega forests in Kenya.

## **QUESTIONS**

1. (a) Describe the characteristics of Tropical Rain forests.

(b) Explain the conditions which have favoured the growth of Tropical Rain forests in East Africa.

2. To what extent is climate responsible for the growth/occurrence of Tropical Rain forests in East Africa?

## **APPROACH**

- Define Tropical rain forests
- Outline characteristics
- Show areas where they occur
- Give the extent (roles) of climate
- Give other factors

3. Explain the factors influencing the distribution of Tropical rain forests in East Africa.

NB Consider factors for the growth of tropical rain forests.

## **APPROACH**

- Define tropical rain forests
- Outline characteristics
- Show distribution
- Explain other factors

## **MANGROVE FORESTS**

### **CLIMATE**

- heavy rainfall of 1000-2000mm and well distributed throughout the year
- hot temperature of 24-30 degrees leading to high humidity and rainfall for mangrove tree growth
- high humidity of around 80% leading to heavy rainfall for proper growth

### **RELIEF**

- coastal lowlands, broad river valleys and creeks. These areas there is accumulation of silt, mud and alluvial soil that support mangrove forest

### **ALTITUDE**

- low altitude of 0-200 m leading to the hot temperatures, high humidity suitable for growth of mangrove forests

### **SOILS**

- impermeable clay soils, mud flats, alluvial soils, peat and deep saline

soils . These soils are impervious leading to poor drainage that encourages growth of the mangrove forests

#### **LATITUDE**

- they thrive in low altitudes of  $5^{\circ}\text{C}$  north or south of the Equator associated with hot temperatures and heavy rainfall

#### **DRAINAGE**

- poorly drained , soggy, water logged and salinewater conditions. in coastal low lands where there is presence of low tidal range of water that creates marshy conditions

#### **BIOTIC FACTOR**

- government policy of conservationas wet lands
- encroachments for building poles cultivation of water loving plants has reduced mangrove

#### **OTHER FACTOR**

- coral reefs on the coast prevent deposited alluvial soil from erosion by strong waves and tides leading to growth of mangroves swamps

#### **Activities carried out in the mangrove forest vegetation region**

- i. **they promote fishing activities ie lung fish are caught in muddy environments**
- ii. they provide timber for boat making and float making used for fishing
- iii. they act as homes of birds and wild animals hence promoting wild life conservation and tourism
- iv. **the shrubs and trees** are used for local art and craft raw materials in the local art industry
- v. act as a link between the land and marine eco system

#### **Problems faced when utilizing mangrove vegetation**

- i. they have poor soils due to leaching and salinity hence discouraging crop growing
- ii. they are remote due to inaccessibility
- iii. they impose difficulties in road and port construction since they are difficult to clear



- iv. the areas with mangrove forests and are water logged act as habitats to disease vectors
- v. they also act as breeding places for wild animals due to the dense and thick vegetation

## **TEMPERATE FORESTS**

### **CLIMATE**

- moderate rainfall of 80-1200mm
- warm, relatively cool temperature 15-21° c

### **RELIEF**

- fairly steep slopes

### **ALTITUDE**

- 2500-3200m above sea level leading to temperature of 15-21° and moderate rainfall suitable for their growth

### **SOILS**

- relatively shallow soils on fairly steep slopes as a result of soil erosion

### **DRAINAGE**

- well drained soils

### **BIOTIC FACTOR**

- government policy of conservation as national parks ,game reserves ,forest reserves eg Mahinga NP,Rwenzori NP, Mt Elgon NP and Echunga Forest reserve

## **BAMBOO FOREST**

### **CLIMATE**

- moderate rainfall of 600-800mm
- relatively cool temperature 8-14°

### **RELIEF**

- steep slopes of highlands and mountains

### **ALTITUDE**

- 3200-4000m a.s.l leading to temperature of 8-14°c and moderate

rainfall for their growth

## **SOILS**

- shallow soils as a result of soils erosion due to steep slopes

## **DRAINAGE**

- well drained soils

## **BOITIC FACTOR**

- government policy of conservation as national parks /game reserves /forest reserves eg Mahinga NP,Rwenzori NP, Mt Elgon NP and Echunga Forest reserve

## **HEATH AND MOORLAND**

## **CLIMATE**

- rainfall of less than 600mm
- cool/cold temperatures of 1-7°C

## **RELIEF**

- very steep slopes of highlands and mountains

## **ALTITUDE**

- 4000-4500mm a.s.l waeding to cold/cool temperautres of 1-7°C and low rainfall suitable for its growth

## **SOILS**

- shallow infertile soils as aresult of soil erosion due to very steep slopes

## **DRAINAGE**

- porly drained soils as aresult of melting of snow and ice at height of around 4500m

## **BIOTIC FACTOR**

- government policy of conservation as national parks /game reserves /forest reserves eg Mahinga NP,Rwenzori NP, Mt Elgon NP and Echunga Forest reserve

## **SAVANNA WOODLANDS**

### **CLIMATE**

- moderate rainfall of 750-1000mm
- humidity of 50-60%
- hot temperature of 24-29°C

### **RELIEF**

- lowlands of and gentle slopes like those western and southern Tanzania, some parts of Northern Uganda

### **ALTITUDE**

- 500-1500m a.s.l leading to hot temperature

### **SOILS**

- fertile and fairly fertile soils like those of western and southern Tanzania

### **DRAINAGE**

- well drained areas of East Africa

### **BIOTIC FACTOR**

- cutting trees by has reduced forests into woodlands
- destruction of forests by elephants and giraffes into woodlands eg in Queen Elizabeth national park
- government policy of conservation as national parks /game reserves /forest reserves eg Mahinga NP, Rwenzori NP, Mt Elgon NP and Echunga Forest reserve

## **SAVANNA GRASSLAND**

### **CLIMATE**

- moderate rainfall of 500-750mm
- humidity of 40-50%

- hot temperature of 24-29°C

#### **RELIEF**

- lowlands of western rift valley, Bukoba area, Nyika plains and Northern Uganda

#### **ALTITUDE**

- 500-1500m leading to hot temperature for growth of grass lands

#### **SOILS**

- fairly fertile soils like those around Bukoba area and Nyika plains

#### **DRAINAGE**

- well drained areas

#### **BIOTIC FACTOR**

- government policy of conservation as national parks /game reserves /forest reserves eg Mahinga NP, Rwenzori NP, Mt Elgon NP and Echunga Forest reserve
- cutting of trees by man for timber, fuel has turned forests and woodlands into grasslands
- wild animals like elephants turned forests and woodlands into grass lands
- destruction of forests and woodlands by termites etc turned forests and woodlands into grasslands

### **DRY BUSH AND THICKET (DRY SAVANNA)**

#### **CLIMATE**

- low rainfall of 300-500mm
- low humidity of less than 30%
- hot temperature of more than 27°C

#### **RELIEF**

- low land areas of east africa like those of Karamoja, Masaka-Ankole corridor and Central Tanzania

## **ALTITUDE**

- 500-1500mm a.s.l leading to growth of savana grasslands

## **SOILS**

- mostly in areas of infertile soils like Anole -Masaka corridor , Turkana land . some parts of central Tanzania where soils are not fully developed due to arid climate

## **DRAINAGE**

- well drained areas with limited surface water

## **BIOTIC FACTOR**

- cutting of trees for fuel , grazing ,sucking boreholes by man turned woodlands and grasslands into dry savanna
- over grazing by wild animals eg Kidepo valley national park and Lake Mburo national park
- government policy of conservation as national parks /game reserves /forest reserves eg Mahinga NP,Rwenzori NP, Mt Elgon NP and Echunga Forest reserve
- pests and diseases eg locusts and termites

## **Land use activities in the savanna vegetation regions**

- i. growing of seasonal crops due to alternating wet and dry seasons
- ii. animal rearing in the grasslands. this is due to a lot of pastures found in the grasslands
- iii. they are suitable for settlement compared to the tropical rainforests
- iv. lumbering occurs especially in savanna woodlands where valuable trees such as mvule and others can be located
- v. bee keeping and honey are seriously being carried out in the region since the region is characterised by many flowers that attract bees that make honey
- vi. it is also a source of roofing and building materials

## **Problems facing the land use in savanna vegetation regions**

- i. low and unreliable rainfall which limits the cultivation of crops and leads to scarcity of water and pasture for animal grazers

- ii. severe soil erosion due to poor farming methods such as over grazing
- iii. prevalence of vectors and diseases such as mosquitoes in the Miombo woodlands
- iv. pests such as the rodents and other dangerous wild animals like lions which are a threat to human life and property
- v. wild fires that are widely spread during the dry season especially among pastures communities eg the fire set by pastoralists in anticipation of fresh pastures

#### **Economic activities carried out in areas with montane vegetation**

- i. cattle rearing due to the presence of savanna vegetation on the lower slopes
- ii. cultivation of arabic coffee and other crops which can grow under savanna type of climate in the lower slopes
- iii. the rain forest zone favours tree crop cultivation eg coffee
- iv. the temperate favours the growth temperate crops eg citrus fruit
- v. the bamboo zone is used by man to obtain timber for construction through lumbering
- vi. there is always extraction of minerals at the foot of the mountains eg copper
- vii. quarrying for building materials can be done at the lower slopes of the mountain

### **SEMI-DESERT VEGETATION**

#### **CLIMATE**

low rainfall of 250-625mm which is unreliable leading to growth of plants with short cycle of growing

very low humidity of less than 30% due to absence of surface water

hot temperature of over 30°C with dry winds and high evaporation rates leading to short grass and scattered trees

#### **RELIEF**

low lying relief of ie leading to hot temperatures and low rainfall

leeward side of mountains leading to drought resistant plants eg Karamoja

## **ALTITUDE**

low altitude of less than 200mm a.s.l leading to hot temperatures and low rainfall

## **SOILS**

infertile sandy, skeletal soils with limited humus content

highly porous soils with a low moisture retention capacity hence scattered trees and grass

## **DRAINAGE**

limited surface water leading to dwarf , small little heath like plants

in salt depressions halophytic plants such as salt bushes

## **BIOTIC FACTOR**

government policy of conservation as national parks eg Kidepo valley national park

over grazing , burning , sucking of boreholes , deforestation leading to scattered trees and stunted grass

wild animals feed and destroy woodlands and grasslands leading to semi desert vegetation

locusts and termites destroy grasslands leading to dry scrub and semi desert vegetation

## **MEDITERRANEAN VEGETATION**

### **CLIMATE**

**moderate rainfall of 500-1000mm** on shore westerly winds that blow in winter bring cyclonic rainfall

warm/ hot dry summer with temperatures around 24°C -25°C and cool /mild winters with temperature of 11°C-12°C facilitate the growth of mediterranean vegetation

### **LATITUDE**

mid latitude 30°N-45°S here the summers are warm , winters cool to mild favouring the growth of this vegetation

## **ALTITUDE**

coastal areas at low altitude with exception of Atlas mountains ,in South Africa found in coastal low lands

at high altitude like on the slopes of Atlas mountains in North Africa, medium height trees like oak and pine grow while at low altitude along the coast in Morocco, Tunisia and South Africa small trees and bushes are dominant

## **SOILS**

ashy mediterranean residual soils . some mediterranean areas have infertile soils leading to growth of scrub

in some areas there are limestone soils which are porous and drain easily hence deep rooted plants

## **MARINE INFLUENCE**

there is marine influence . as a result of marine there is a lot of moisture for growth of plants

the soils in the Mediterranean region drain so easily and the hot temperatures during summer cause excessive evaporation resulting into the growth of deep rooted plants with thick bark for storing water

the vegetation is adapted to windy salty air conditions

## **BIOTIC FACTOR**

cutting of trees for timber agriculture, grazing and introduction of exotic breeds led to loss of natural forests leading to scrub and artificial forests as well as growing fruits

forests due to conservation eg oak, cork oak, red wood etc

## **FIRE**

many plants are fire loving depending on fire for reproduction ,recycling nutrients and removing dead vegetation

## **Activities carried out in the mediterranean vegetation zone**

the vegetation has grasses suitable for animal grazing

some of the originally wild growing tree species have become domestic where people earn money for local agricultural economies

some vegetation are cultivated in large numbers like in Italy and South



africa

the vegetation also attracts tourists hence bringing in foreign exchange to the respective vegetation regions

## **SWAMP VEGETATION**

### **CLIMATE**

wet conditions with the rainfall amounts above 1000mm per annum favour growth of swampy vegetation

### **ALTITUDE**

they grow in areas with low altitude of below 1000m above sea level

### **RELIEF**

open valleys of low lying areas which become water logged hence attracting water loving plants such as papyrus thus swampy vegetation

### **DRAINAGE**

they grow in poorly drained areas / water logged areas with clay soils

### **SOILS**

they grow in fine alluvial soils while riverine and lacustrine swamps grow in the clay /peat soils

### **BIOTIC FACTORS**

government gazetted swamps and wetlands encourage the growth of swamp vegetation

afforestation practices ensure increased rainfall distribution which favours vegetation growth

### **Economic importance of swamp vegetation**

it provides raw materials for handcraft industry eg papyrus for making mats and baskets

it is also a source of fuel used for cooking and lighting ie dry papyrus

it is a tourist attraction since it harbours hippos , crocodiles and rare birds etc

it can be cleared for crop growing

it is used for roofing houses in local and rural communities

it is a basis of brick making and ceramics industry

### **Qn. Account for the decline of savanna vegetation in East Africa**

Savanna vegetation is the vegetation that lies between tropical forest zone and desert areas

A candidate should identify the three forms of savanna vegetation and characteristics in detail ie

- savanna woodland
- savanna grassland
- dry bush and thicket/scrub(dry savanna vegetation)

### **Human factors for decline of savanna vegetation**

cutting down for building materials turning woodlands into grasslands

increased demand for fuel wood ie firewood and charcoal has led to woodlands changing into grasslands common in Nakasongola

clearing of woodland savanna vegetation to create land for cultivation and settlement has changed woodland into grassland eg Kayunga district

industrialisation has led to destruction of savanna woodland vegetation due to increased demand of land and fuel eg Hima and Tororo cement factories changing woodlands into grasslands

borehole drilling that lowers the water table has transformed the grassland into dry savanna

uncontrolled bush burning to allow fresh pasture has changed dry grasslands into dry savanna eg Ankole-Masaka corridor

over stocking and over grazing has changed grasslands to dry bush and thicket eg Ankole-Masaka corridor

mining and quarrying has led to destruction of woodlands changing it into savanna grasslands eg Busia, Mubende

There are some savanna areas where shift cultivation is being practiced eg Miombo woodlands of Tanzania which has depleted savanna woodlands into bare grounds

Desertification/ aridity that turns the grasslands into dry savanna due to low rainfall amounts like in Kotido and Moroto.

construction of transport routes like roads, railway lines has led to clearing of woodlands turning into savanna grassland

lumbering in woodlands has turned them into savanna grasslands

### **PHYSICAL FACTORS**

prolonged drought conditions have led to desert conditions eg in Eastern Uganda, Eastern Kenya, North Western Kenya turning grasslands into dry bush and thicket

pests and diseases eg termites, caterpillar harvesters ants have destroyed savanna grasslands vegetation changing into dry bush and thicket as in Nakasongola ,Katakwi while locusts turned Northern and North western Kenya into dry bush and thicket

gazetting of savanna grasslands into national parks /game reserves has led to over grazing and browsing of trees by wild animals like Elephant Giraffe turning woodlands into grasslands and dry savanna eg Queen Elizabeth national park , Lake Mburo national park and Kidepo Valley national park

wild fires have turned savanna woodlands into grasslands and dry savanna

influence of dry prevailing winds which further intensify the drying effect has led to degeneration of grasslands into dry bush and thicket eg North Eastern and NorthWestern Kenya

### **Note**

#### **Other factors for decline of other vegetation types ;**

heavy rainfall leading to floods, accompanied by hail storms and lightning  
swamp reclamation

landslides on mountains can lead to destruction of forests

#### **Qn. To what extent has natural vegetation of East Africa been modified by human activities**

Candidates should define natural vegetation

Natural vegetation is that vegetation that grows naturally in particular physical environment as a result of physical factors like climate, soils and drainage

**Identify the major natural vegetation types and their characteristics in East Africa**

## **Africa**

Tropical rain forest

Mangrove forest

Temperate forest on mountains

Bamboo forests on mountains

Heath and moorland

Savanna grassland

Savanna woodland

Dry bush and thicket (Dry Savanna)

Papyrus swamps

**In discussion of factors candidates should identify original vegetation type and the modified resultant vegetation in East Africa**

### **Human Factors**

lumbering in Tropical rain forests has led to forest trees being replaced by woodland, grassland and scrub eg Imaramagambo, Bugoma, Kibale

Cutting down trees for fuel ie firewood/ charcoal eg Kibale where trees have been replaced by secondary forms of vegetation

Cutting trees for building materials, electric poles etc turned forests into grasslands

Destruction and clearing forests to create agricultural land either commercial or subsistence eg Lugazi where part of the Mabira has been cleared to grow sugarcane, central Tanzania, Kenya highlands, Kigezi highlands etc has led to original vegetation being replaced by planted crops

clearing forests /grasslands for settlement /urbanisation /industrialisation in areas like Lugazi, Kampala, Nairobi, Juba, Dodoma etc

Construction of communication networks has destroyed the natural vegetation types replacing them with grass or secondary vegetation growth on reserves

Animal grazing through nomadic pastoralism, ranching and dairy farming leads to disappearance of forests woodlands and grasslands to be replaced by dry savanna

Repeated burning in Karamoja, Turkana, Masai, Nakasongola etc has led to destruction of woodlands and grasslands turning them into dry savanna

Mining and Quarrying like Kilembe, Mwandui, Tororo , Bambui etc has led to destruction of forests and other vegetation types to be replaced by scrub

Swamp vegetation for Agriculture/ dairy farming has resulted into paprus swamps being replaced by crop vegetation and artificial pasture

Sucking boreholes in search of water has led to drying up of trees to be replaced by grasslands

Human interference through afforestation and reafforestation has led to introduction of exotic tree species eg pines, eucalyptus etc replacing former grasses and natural trees etc.

**Candidates are expected to point out and explain other factors that have modified natural vegetation**

Harsh climatic conditions of unreliable rainfall, long drought/desertification has changed the natural vegetation eg from grasslands to dry savanna and finally into semi desert and desert vegetation eg Chalbi desert

heavy rainfall resulting into flooding and continued deposition on floodplains leads to transformation of vegetation types/ lightning may strike trees which in return dry

Occurance of landslides has removed the initial vegetation cover exposing recli layers eg Bududa on Mountain Elgon slopes, Kigezi highlands, Rwenzori mountains slopes, Rwampara hills

Over grazing by wild animals, breusing, debaking and over tramping has changed the original natural vegetation type in National parks and Game reserves eg from woodland to grassland in Queen Elizabeth National Park and from savanna grasslands to dry savanna eg Masai Mara etc

Pests and diseases eg termites /ants eg in Nakasongola have destroyed savanna woodland and grasslands turning into scrub . Locusts in Northern Kenya turned the area into dry savanna and semi desert vegetation while tsetse flies at Masindi, Bunya, Mayuge, some parts of western Tanzania prompted man to clear forest

Wild fires

## **GENERAL CHARACTERISTICS OF SAVANNA**

Umbrella shaped trees

Trees are deciduous as they shed leaves during the dry season

The dominant trees species include acacia, baobab

Trees have tiny leaves to restrict transpiration

Trees tend to be drought resistant as they have thick barks, swollen trunks and long tap roots

Trees are fire resistant

Trees have waxy barks and leaves

Trees have gnarled (twisted) trunks with thick barks to reduce loss of water

## **SPECIFIC CHARACTERISTICS OF SAVANNA VEGETATION TYPES**

### **1. SAVANNA WOODLANDS**

Continuous cover of trees

Trees are moderate height 8-16 metres

Trees are intermingled with xyrophytic thorny lianas, cacti and few hardy shrubs

There is dense growth of grass, bushes and shrubs (dense underground)

### **2. SAVANNA VEGETATION**

Dominated by tall grass of up to 1 metre high due to moderate rainfall.

The dominant grass species are elephant grass and spear grass

Grass is green during the rainy season and turns brown during dry season which is foreminent

There are scattered short trees of height of 4-10 metres

### **3. DRY BUSH AND THICKET/SCRUB (DRY SAVANNA)**

Have thorny-bushy trees with scrub growing in between

Very short grass

Bare patches are common

There are scattered thorny bushes to avoid competition for water

The trees are short less than 8 metres in height

There are stunted trees with woody stems

**Qn. Examine the influence of altitude on vegetation zonation in highlands of East Africa**

Candidates are expected to define vegetation/ vegetation zonation

Identify the highlands of East Africa then illustrate the vegetation zones on the highland of East Africa

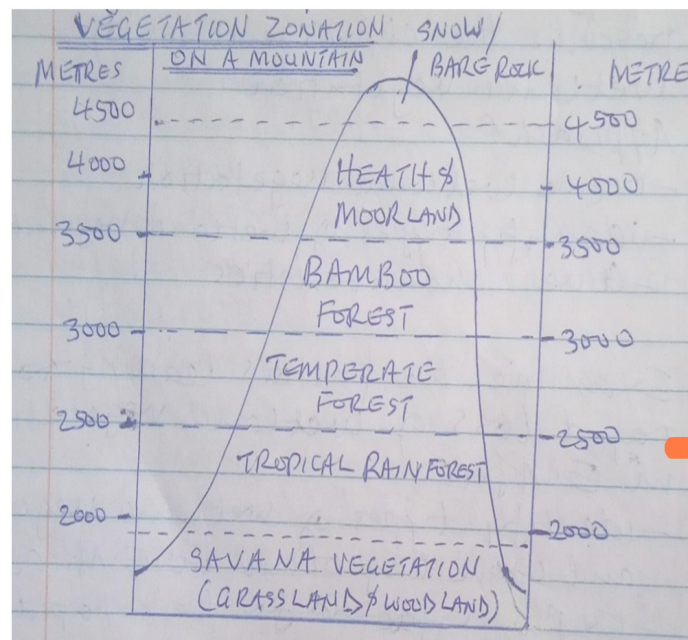
Candidates should identify the vegetation types describe their characteristics and explain the conditions for their existence at a given altitude

Vegetation is a continuous plant cover on the earth's surface.

Vegetation changes from the bottom of the mountain to the top of the highland in such way that the vegetation types can be identified

Highland areas of East Africa include Mountain Kenya, Mountain Kilimanjaro, Mountain Meru, Mountain Rwenzori etc

Vegetation zones on the above highlands is as follows



## **SAVANNAH VEGETATION ZONE**

This found at an altitude of 1000-1500m above sea level. It is characterised by;

Grasses such as elephant grass, umbrella shaped trees, shirt scattered trees, trees shade off their leaves during dry seasons etc on the Lee Ward side and Savannah vegetation turns into thicket with stunted trees, scrubs and bushes.

## **EQUATORIAL FOREST ZONE**

These come after Savannah vegetation at an altitude of between 1500 and 2500metres above sea level. The trees in this zone tend to;

- Grow broad leaves.

- Trees have buttress roots.

- There is little or no under growth.

- A variety of tree species exist.

- There is existence of climbing plants such as lianas etc.

## **CONDITIONS FAVOURING THE GROWTH OF TROPICAL MONTANE FORESTS**

Heavy and well distributed rain fall of over 1500mm that favour the growth of luxuriant trees.

Hot temperatures of over 20 degrees to support the growth of rain forests.

Relatively low altitude between 1500-2500 metres above sea level attracts the growth of rain forests since at such an altitude temperatures are conducive for the growth of thick forests.

Mountainous areas are drained by numerous rivers eg Mt Ruwenzori has rivers like Mpanga, Mobuku etc which continuously provide water and silt materials necessary for tree growth.

Presence of fertile soils that support the growth of rain forests.



## **TEMPERATE FOREST ZONE**

This is found at an altitude of between 2500 and 3500metres above sea level. The vegetation in this zone is characterised by;

Tall trees with small straight branches.

Ever green trees like spruce, pine.

Trees are cone shaped as an adoption to snow conditions.

The trees have small pointed leaves.

The trees have a short gestation period.

There are soft wood tree species e.g. pine, podarcap etc

Trees appear in pure stands.

## **CONDITIONS FAVOURING THE GROWTH OF TEMPERATE FORESTS**

Moderate rain fall above 1000 mm encourages the growth of trees like podacarp.

Cold temperatures ranging between 10-19 degrees encourage the growth of temperate tree species like pine.

Presence of thin and relatively fertile soils which encourage the growth of small straight tree species like camphor, pod carp etc.

Steep slopes along mountains which encourage the growth of Temperate tree species.

## **BAMBOO FOREST ZONE**

This vegetation zone lies at an altitude of between 3500 and 4000 metres above sea level.

## **CHARACTERISTICS OF BAMBOO FORESTS**

They tend to grow in a single layer.

They grow in pure stands.

They tend to be yellow (have yellowish stems)

- Their stems are segmented
- They have prop roots for support
- They have small rough / tough leaves
- There is limited or hardly any under growth

### **CONDITIONS FAVOURING THE GROWTH OF BAMBOO FORESTS**

Plentiful supply of precipitation in form of fog, Dew, mist, little rain fall which supports the growth of bamboo trees.

Cold temperatures of about 10 degrees encourage the growth of cold resistant tree species like bamboo.

Thin skeletal soils to support the growth of light trees such as bamboo.

Low humidity resulting into the growth of the bamboo trees.

Limited human activities such as crop cultivation, settlement hence the existence of bamboo trees.

### **HEATH AND MOORLAND ZONE**

This vegetation zone is found at an altitude of between 4000 -4500 metres above sea level. It is characterised by;

- A variety of beautiful plants in form of grasses and flowers e.g. mosses, ferns, berries etc.

- Grasses such as sedges have small leaves.

- Plants grow short.

### **CONDITIONS FAVOURING THE GROWTH OF HEATH AND MOORLAND VEGETATION**

Presence of thin soils that support the growth of short plants such as sedges.

Occurrence of little rain fall coupled with other forms of precipitation like snow, fog, mist which encourage the growth of heath and moorland vegetation.

Moorland vegetation is adapted to cold conditions of 10 degrees c hence it's growth.

High altitude of over 4000 meters above sea level that is associated with low temperatures that are essential for the growth of the Heath and moorland vegetation.

Limited human activities such as cultivation, settlement etc thus creating room for Heath and moorland vegetation.

Government policy of forest conservation in mountainous areas resulting into survival of the Heath and moorland vegetation.

### **LAND USE ACTIVITIES ASSOCIATED WITH NATURAL VEGETATION IN EASTAFRICA.**

A number of economic activities and uses can be associated with natural vegetation and these include

Pastoralist / grazing, it involves the keeping of live stock such as goats, sheep etc in the Savannah grass lands and semi-desert pastures due to presence of pastures.

Equatorial rain forests exist in areas where there is abundant and we'll distributed rain fall coupled with hot temperatures such conditions are conducive for the growth of crops such as coffee, cocoa, banana, tea etc which require similar conditions.

Varied vegetation types such as equatorial rain forests, semi-desert vegetation provide potential sites for film shooting.

Extensive Savannah grass lands serve as habitants for wild animals like Antelopes, water bucks, giraffes etc that attract hunting activities.

Lumbering especially in regions of tropical rain forests and savannah woodland to provide timber and fuel wood that is to say charcoal and fire wood.

Tourism / wild life conservation, this has been practiced in national parks, game reserves and game centuries for example the Tsavo national park, Kidepo national park, the Selous reserves in southern Tanzania.

Bee keeping, this is very common in savannah wood lands and the steppe savannah region in northern parts of masindi, very common in Nakasongola, Masai steppe region and the Miombo wood land I Tanzania.

Charcoal burning to produce fuel for use or sell to the urban dwellers. It has led to the depletion of trees, pollution of the environment and desertification.

## **NATURAL VEGETATION AS A BASIS FOR LAND USE PLANNING**

The distribution of natural vegetation provides a basis for land use planning in that the existence of rain forests can be a basis for gazzeting of forest reserves, game reserves and natural parks e.g. the Rwenzori, Elgon national parks were established in the rain forest region. Crops which require high rainfall and temperatures can be grown e.g. sugarcane at Jinja were grown just near the Mabira forests. Some parts of the forest have been cut down to plant sugarcane, tea, coffee, cocoa, etc. Furthermore lumbering can be undertaken to provide wood.

Savannah vegetation has a potential for a variety of economic activities. Grass can enhance rearing of animals, therefore modern ranches like Kisozi, Ankole-Masaka ranching scheme, Njeru stock firm, Maruzi, Batiima (Kabale firm) have been put in place due to presence of inexhaustible pastures. The seasonal rainfall within the Savannah vegetation zone has influenced the growing of seasonal crops like millet, Groundnuts, beans, maize, in Busoga, Buganda and commercial crops like tobacco cotton are grown especially in the North.

The extensive savannah grasslands and the wild game within are generally attractive to tourists. Therefore the land use planners have used this as a basis to gazette some area as game parks and reserves e.g. the Queen Elizabeth, L.Mburo, Murchison falls National parks were located in Savannah grass lands to promote tourism.

Desert and semi desert vegetation is used as another potential to develop the film and tourism industry. The rare plant species like Acacia and a variety of wild animals and landforms that exists there have led to demarcation of some areas as game parks e.g. the Kidepo valley national park within Kotido district. Drought resistant and quick maturing plants like millet and sorghum have been introduced in these areas of human consumption.

The montane vegetation indicates the existence of cool climate and this has been a basis for land use planners to introduce the growing of crops like wheat, barley and pyrethrum on highland areas of mt. Elgon and Ruwenzori where temperatures are low.

The existence of natural soft wood trees in the temperate forests has been used as a basis to plant softwood trees /forests along the Kabale, Bwindi and near Maramagambo forest in South Western Uganda. These provide soft wood to manufacturers of matchsticks, soft boards, papers, etc.

The existence of health and moorland has been used as a basis to encourage Alpine grazing, exotic breeds which require cool temperatures as kept on the highlands of Kabale and besides the vegetation is rare and is reserved as a tourist asset.

Swamp vegetation has provided a basis for the establishment and location of the arts and craft industry. The brick and tiles manufacturing industry was located at Kajjansi due to presence of clay from the swamps around. This is because from swamps there is clay which can be used for pottery arts and brick making. The papyrus grass is also a potential to process biogas energy to supplement on the Hydro-electricity.

Fishing is also recommended in areas with swamp vegetation e.g. along R. Mayanja, Katonga another shores, Katonga, another shores of L.Victoria and Kyoga. The most common type of fish caught is the mudfish and Tilapia.

However, the distribution of natural vegetation does not always provide a basis for land use planning. There is no clear and accurate demarcation between the vegetation type and in some cases different vegetation types co-exist in one area. This makes it difficult for planners to identify a specific vegetation type on which to base their policy planning and besides, today natural vegetation has greatly been modified by man and is no longer truly natural therefore depending on it for planning maybe fruitless.

Secondly, the distribution of natural vegetation occurs naturally without man's interference, wherever land use planners come in, it implies the involvement of man and therefore other factors have to be considered when planning land use projects. These factors include economic viability, population, minerals, climate, soils, physical landscape, accessibility and others e.g. the presence of rainforests with a good timber not entirely responsible for lumbering which takes place there. There should be market for timber technology to exploit the timber, accessibility to the forest and capital to pay the workers before lumbering can take place.

In conclusion, the distribution of natural vegetation may be the first consideration for land use planning, but it's not independent of other factors. It may also have its limitation and therefore other factors are considered as well.

## **FACTORS INFLUENCING THE NATURAL VEGETATION (DISTRIBUTION)**

Climate, it is an important factor affecting the distribution of natural vegetation and more so elements of rainfall and temperature as well as sunshine all of which affect the plant growth.

Heavy rainfall of 1800mm is responsible for the growth of tropical rain forests as well as other luxuriant types. Such forests may include Mabira forest in Buikwe district, Budongo forest in Masindi district, and Bugoma forest in Hoima district.

Moderate rainfall ranging between 700 – 1000mm is responsible for the growth of savannah more especially savannah grass land and wood land. This is very common in Miombo wood lands in Tanzania, savannah grass land in Serengeti, wooded savannah in the plains of Kasese.

In addition, climatic conditions characterized by cold temperatures is responsible for montane forests that is to say Alpine / temperate forests, heath and moorland as its common in mountains like Elgon, Ruwenzori, and highland areas like Kigezi highland.

It should be noted that the cool temperatures are responsible for the Bamboo forests as it is the case with Ecuja forests towards kisoro.

Limited rainfall less than 500mm is responsible for the steppe, scrubs and thickets especially in arid areas like Ankole Masaska corridor, Karamoja.

The strength and duration of sunlight affects the growth of plants and that's why places with sufficient sunlight tend to have equatorial / luxuriant forests that include equatorial forests.

While places of limited sunlight, plant growth is retarded resulting into stunted scattered trees as it is the case on the lee ward sides of some mountains.

Soils, soil types are responsible for the different vegetation types. The soil mineral compositions, neutrality, depth, and PH determine the type that is likely to exist in a given area. Soils that are very fertile, deep and mature encourage the growth of luxuriant forests as it is the case with Mabira forest in Buikwe district, Budongo forest in Masindi district, Bugoma forest in Hoima district, and Maramagambo in Kanungu district.

Areas that have fairly fertile soils favor the existence of the woodland and grass land and this is evidenced in some parts of Kasese, Serengeti plains, Ankole Masaka corridor among others.

Soils that tend to be skeletal and immature tend to support stunted trees such as thickets and scrubs as it is seen in Miombo woodland in Tanzania.

Drainage, the nature of drainage influences the vegetation type. Well drained areas will lead to the growth of tropical rain forests, wooded land and grass land.

Poorly drained soils or water logged soils are responsible for the growth of swamp forests or mangrove forests.

Moist or water logged conditions are responsible for the growth of Hydrophytes (water loving plants).

On the hand, places of dry conditions or where soils have limited moisture give rise to the growth of Xerophytes ( dry resistant plant species ).

Relief / Topography, it has influenced the distribution of vegetation in that it affects rainfall, temperatures as well as the nature of the soils which also in turn affect the mature of vegetation in a given area, that is to say, the steep slopes there is soil erosion and rain water drains away soil particles very fast as run off leading to development of scattered or short trees (stunted trees) because of the thin skeletal soils.

On the other hand, on the gentle slopes the soils are well drained and the infiltration of water is sufficiently enough to accelerate the formation of fertile soils boosting the growth of tropical forests.

On the lee ward side there is less rainfall because of the descending winds resulting into semi desert types like wood land, grassland, thickets, and scrubs.

The PH condition, the alkalinity or acidity of an area also determines the growth of plant types. Areas that have a lot of salt (saline conditions) are responsible for the growth of mangrove forests at the coast.

Biotic factor, this involves the role of animals and man. Animals such as buffalos, elephants have to some extent affected the nature of the vegetation cover. These animals are so destructive to the extent that they uproot trees leading to change of the existing natural vegetation that is to say wood land changed to grass land.

On the other hand, man's activities like deforestation for settlement, agriculture among others, there is over grazing, over stocking all have led to the depletion of some types of vegetation meaning that mans activities also account for the distribution of vegetation in East Africa.

Altitude, it has determined the natural vegetation zone especially in Highland areas of East Africa. Changes in altitude or height above the sea level have been responsible for the changes in vegetation types. In highland areas like Elgon, Kenya, Kilimanjaro, Kigezi among others, differences in height have created differences in the environmental conditions.

Conditions like rainfall, temperature, soil types all of which have affected the different vegetation types that is to say

A height above 1000m there is savannah wood land and grass land. This is because of the hot temperatures and limited rainfall as evidenced in Miombo wood land, Serengeti grass land.

At a height of about 2000m above the sea level, there are the tropical rain forests. This is because of the heavy rainfall about 1500mm as well as the moderate temperatures of  $25^{\circ} - 27^{\circ}\text{C}$ , in addition, soils are fairly deep and fertile to support the trees.

In the region about 3000m above the sea level, there are the montane or temperate forests and this is because of the reduced temperatures. The cold temperatures favor the growth of coniferous species and in such areas the trees are somehow luxuriant but as one goes higher, the trees become shorter or fairly stunted. At a height above 4000m above the sea level, bamboo forests exist and this is because of the cold temperatures and reduced rainfall.

Above the bamboo that is to say above 4000m above the sea level, there exists mountain Heath and moorland. This type is characterized by very cold temperature types. The plants are mainly adapted to cold conditions and they tend to disappear as one goes higher.

### **Measures for natural vegetation conservation and depletion control**

### **Economic importance of natural vegetation types in East Africa**

### **Qn. To what extent has the natural vegetation of East Africa been modified by human activities**

Candidates should describe the natural vegetation and modified vegn of East Africa.

### **Identify the major natural vegetation types and their characteristic in East Africa**

**The role of man in modifying vegn should be pointed out.**

Natural vegn is that type of plant life that grows naturally in a particular physical environment. It can either be a forest, grassland or scrub.

Natural forests include tropical rain forests, mangrove and montane forest, E. Africa coast, Kilimanjaro, Rwenzori, mt. Kenya.

Savannah woodland and grasslands cover areas of Northern Uganda, western Tanzania, Southern Tanzania etc. they are characterized by medium height trees, thorny trees, drought resistant trees, shading leaves during the dry season etc.

Scrubs occur in northern, N. En Uganda, Nn Tanzania etc due to rainfall below 500mm.

The foregoing natural vegn types have been modified by man's activities mainly in areas of Kenya Highlands, Kigezi Highlands, lake



Victoria basin, N.En Uganda. Etc

**Roles of man include the following.**

Clearing forests/ grasslands for / urbanization /industrialization in areas of lugazi, kampala, Nairobi jinja, Dodoma etc

Lumbering in tropical rainforests :- natural forests/ Trees have been replaced by woodlands and scrubs e.g parts of marabogambo, Bugoma, kibaale etc

Cutting down trees for fuel or fire wood, charcoal eg kibaale:- Trees have been replaced by secondary forms of vegetation

Construction of communication network has destroyed the natural vegetation types replacing them with tarred surface and dirty roads.

Animal grazing through nomadism, ranching dairying leads to the disappearance of forests, wood lands and grass land and swamps.

Wildlife conservation in national parks, forest reserves etc has led to continued existence of forests and grasslands.

Repeated burning in karamoja, Turkana, masai Nakasongola etc. has led to destruction of original vegetation types which are replaced with scrubs or other poor forms.

Mining and quarrying in mwadui, kilembe, Tororo, Bamburi etc. destroys the original forests or grass land replacing them with rock waste heaps and open pits or mines.

Swamps reclamation for agriculture, settlement, dairying etc

Human interference through afforestation and re-afforestation has led to the introduction of exotic tree species eg pines, Grevillea, robusta, Eucalyptus etc replacing the former grasses and natural trees etc.

**Candidates are expected to point out other factors that have modified the natural vegetation.**

Harsh climatic conditions or the desertification etc has changed the natural vegetation e.g karamoja

Occurrences of landslides has removed the initial vegetation cover exposing rock layers eg on mt. Elgon slopes, Kigezi Highlands, Rwenzori slopes, Rwampara Hills etc

Overgrazing by wild game, browsing, debarking and over trampling have changed the original natural vegn in National parks e.g Queen Elizabeth, masai- mara etc

**Qn. Account for the distribution of natural forest vegetation in East Africa.**

**Approach**

Define natural forest vegetation.

Identify the types of natural forests in East Africa

State the characteristics of each type of forest and where it is found descriptively or by drawing a sketch map.

Explain the factors influencing the growth of each type of forest

**Answer guide**

Natural forest vegetation refers to the community of a dense cover of trees growing naturally in a particular physical environment

Natural forests in East Africa are grouped into three types. Namely; equatorial forests/ tropical rain forests, montane forests, mangrove and riverine forests

Equatorial tropical rain forests are common in areas of mabira, kalangala, Budongo, Kibaale, Imaramagambo and on the foot hills of Mount Elgon, Rwenzori, Kenya, Kilimanjaro and Meru.

Tropical rainforests are characterized by;

- ever green trees
- trees are tall
- trees have broad leaves,
- trees have huge and straight trunks

trees have buttress roots to support the huge trunks,

- trees appear in mixed stand for example mahogany, iron wood, ebony e.t.c

- trees form 3 canopy layers. That is, upper layer of very tall trees, middle and lower layer.

- trees have thick bark and provide hard wood for example, mahogany, iron wood, rose wood, green heart and ebony.

- Limited or no under growth because of the canopies which block sunlight from reaching the ground

**Montane forests-** sub divided into temperate and Bamboo.

Temperate forests exist at an altitude of about 2500m-3000meters above sea –level and characterized by;

- dominance of coniferous soft wood trees species like cedar, podocarp and camphor.

- trees are tall near the tropical rain forests due to heavy rain fall

- trees are ever green,

- trees have straight trunks,

- trees have thick barks,

- trees have needle shaped leaves and no under growth.

- Trees are shorter towards the bamboo forest.

**Bamboo forests** exist at an altitude of about 3000m – 3500m above sea. Bamboo plants have the following characteristics;

- they appear in single layer,

- grow in pure stand

- have segmented or reed like stems with hollows inside to minimize water consumption which is relatively scarce at this altitude,

- have small, tough pointed leaves,
- they are ever green,
- have prop roots to anchor in the swallow soil.

**Mangrove forests** in the salty waters along the coast of East Africa between 50 north and 50south of the equator for example Rufiji delta, areas near Mombasa, Lamu e.t.c

- Mangrove contain Medium height trees of about 12 meters,
  - trees have aerial roots for breathing in mud,
- Have tap roots for filtering salts from the blackish water
- Have buttress roots to anchor firmly in the unstable mud meters
  - trees have short and twisted trunks,
  - trees have ever green broad leaves
  - trees are of tropical hard wood.
  - trees form a dense cover due to water logging conditions,

### **Factors favoring the growth and distribution of natural forests**

The growth and distribution of natural forests in East Africa is influenced by; climate, type of soil, drainage, altitude, relief and biotic factors as explained below.

**Climate-** has influenced the growth and distribution of forests through its elements of rainfall, temperature and humidity. That is;

- hot and wet/ humid conditions have encouraged the growth of tropical rain forests.
- cool and wet conditions in highland areas have encouraged the growth of montane forests.
- hot and moist conditions in the coastal areas of East Africa

have encouraged the growth of mangrove forests.

**Altitude:** refers to the height above sea level and affects temperate and rainfall.

- Low and high altitude about 1000m-2500m above sea level encourages tropical rain forest
- High altitude of about 2500m-3500m above sea level has encourage growth of montane forest vegetation
- Coastal areas of about 0-200m above sea level have encouraged the growth of mangrove forests

**Nature of the soil.** The Type of soil in terms of; fertility, depth and texture has influenced the growth of forests in the following ways;

- deep and fertile soils such as volcanic on gentle slopes of volcanic highlands, loamy and alluvial soils in low lying areas such as lake shores and valleys have encouraged growth of rain forests.
- shallow and fairly fertile soils on mountain slope have encouraged the growth of montane forests
- deep, muddy and saline soils have encouraged the growth of mangrove forests.

**Drainage of the area** influences the moisture in the soil. That is;

- Well drained areas such as gentle slopes and steep slopes have encouraged the growth of both rain and montane forests.
- poorly drained or water logged areas such as salty marshes in the coastal areas and deltas have encouraged the growth of mangrove forests.

**Influence of relief.** That is;

- lowlands and gentle slopes have encouraged growth of rain forests

- fairly steep slopes or hilly areas have encouraged the growth of montane forests
- low lying coastal plains have encouraged the growth of Mangrove forests.

**Influence of relief biotic factors** for example;

- Bird have helped in dispersing seeds from which trees thrive
- Human intervention through afforestation, re-afforestation and agro forestry has facilitated the existence of natural forests,
- Favorable Government policy of conserving natural forests in form of forest reserves and national parks has facilitated the existence of natural forests for example Mabira, Budongo, Bugoma, IMaramagambo, Bwindi impenetrable forests, Elgon forests, Tsavo National parks e.t.c
- Absence of serious diseases and pests such as elephants and giraffes which would have otherwise destroyed and change the quality and quantity of forest vegetation. For example Mabira and Bwindi forests.

**Qn. To what extent has man influenced the distribution of natural vegetation of East Africa?**

**Approach**

- define natural vegetation
- Identify and describe the characteristics of natural vegetation types in East Africa.
- State areas where human activities have influenced/ modified natural vegetation in East Africa
- Give the 1st evaluation (to a large extent) and explain the activities that have influenced natural vegetation
- Give the 2nd evaluation (physical factors)

**Answer guide**

Refer above for Xtics of various vegetation types

**Human activities that have influenced vegetation distribution in East Africa include;**

- steady destruction and clearing of forests and swamps to expand cultivable land either for commercial or subsistence
- He burns vegetation to provide new pastures for nomadic pastoralism, dairying and ranching
- clearing of forests and grasslands and swamps for settlement/ urbanization in areas of Kampala, Lugazi
- lumbering in tropical rain forests have been replaced by woodland and scrubs
- cutting down of trees for fuel (fire wood and charcoal) for industrial and domestic use
- Swamp reclamation for agriculture, dairying, settlement, industrial development
- mining and quarrying in Mwandui (Diamond), Tororo (limestone and vermiculite), Kilembe (Cobalt), Bamburi
- Human interference through afforestation, re-afforestation and agro forestry has led to the introduction of exotic tree
- repeated bush burning in Karamoja, Mbarara, Turkana land, Masai, Nakasongola, Miombo in Tanzania
- Man also clears natural vegetation for setting up and expanding industries for example Namanve industrial park
- Cutting down of trees for timber and building materials have modified forest, grasslands and swamps;
- animal grazing through nomadism, ranching, and dairying leads to disappearance of original forests, grasslands

**To a least extent, man has influenced vegetation distribution through;**

- afforestation, re- afforestation and agro forestry for example planting pine, eucalyptus, Robusta, Grevillea
- Favorable Government policy of conserving natural vegetation in form of forest reserves and national parks has led to the

existence of natural forests, savanna and swamps for example Mabira, Budongo, Bugoma, IMaramagambo, Bwindi impenetrable forests, Elgon forests, Tsavo National parks e.t.c

On the other hand, vegetation distribution is influenced by physical factors like;

**Climate, altitude, type of soil, nature of relief, biotic factors and Drainage**

★ Remember to explain these factors.

**Qn. To what extent has climate influenced vegetation distribution in East Africa? Approach**

- Define natural vegetation,
- Identify vegetation types in East Africa descriptively or drawing a sketch map,
- Give the 1st evaluation and explain the role of climate
- Give the 2nd evaluation and explain other factors that influence vegetation distribution in East Africa. That is; altitude, type of soil, relief, biotic factors and drainage

### **Answer guide**

Natural vegetation refers to that type of plant life that grows naturally in a particular physical environment without man's influence or interference. It can be a forest, grassland or scrub.

East Africa has different types of natural vegetation grouped into; natural forests, savanna wood land and grass land, scrub (semi desert) and swamp vegetation.

**Natural forest vegetation** Includes the tropical rain forests, mangroves and montane forests.

They are common in areas of mabira, kalangala, Budongo, East African coast, Kakamega, slopes of mountain Kilimanjaro, Rwenzori, Kenya and other major mountains.

**Savanna vegetation** is subdivided into savanna wood land



and grassland depending on the annual rainfall received and the duration of the dry season.

Savanna woodlands and grasslands cover areas of Northern Uganda, western and southern Tanzania e.t.c

**Scrub or semi desert vegetation** in northern, north western and north eastern Kenya, north eastern Uganda (Karamoja), Ankole – Masaka corridor, northern Tanzania and some parts of Rift valley due to low annual rainfall between 250mm-500mm.

**Swamp vegetation** found in poorly drained areas and includes

- Mangrove swamps in the salty waters along the coastal plains for example Lamu and Rufijj delta.
- Papyrus swamps in water logged areas such as shores of Lake Kyoga and Victoria; valleys in central and western Uganda and river valleys such as katonga, kagera and Rwizi.

**Climate has to a largest extent** Influenced vegetation growth and distribution through its elements of rainfall, temperature and humidity as explained below;

**Heavy, reliable and well distributed rainfall** over 1500 mm per annum and hot temperatures of about 220 C-270 C encourage the growth of natural forests characterized by;

- ever green trees with broad leaves
- tall trees of up to 50 meters high
- trees have buttress roots to support the huge and straight trunks
- trees appear in mixed stand for example mahogany, iron wood, ebony
- trees form 2-3 canopy layers
- there many climbing plants for example lianas

**Moderate to heavy rainfall** of about 760 mm -1200 mm annually and distributed in one season and hot temperatures of about 240c

- 300 c has encouraged growth of savanna woodland while moderate annual rain fall of about 500mm-760mm and hot temperatures over 300 c encourage grass lands. Savanna vegetation is generally characterized by;

- dominance of medium height trees in the woodland and tall grass in the grassland
- trees have small waxy needle like leaves,
- trees are drought and fire resistant,
- trees are deciduous
- trees are umbrella shaped at the top to reduce water loss,
- dominant tree species are acacia and baobab,
- grass dries during the dry season and become brown or yellow, and green during the wet season.

**Low and seasonal rain fall** of about 250mm- 500 mm per annum and very hot temperatures over 300 C have encouraged the growth of scrub vegetation characterized by;

- bushy thorny trees of 5- 10 meters tall with shrub growing between them
- trees are drought and fire resistant for example acacia,
- very poor and short tuft grasses with bare ground between the scattered thorny bushes,
- grass dries up and turns yellow / brown during the drought period and roots become dormant in soil
- some plant species have twisting leaf system to prevent direct sunshine and high transpiration
- Trees have small waxy needle like leaves to reduce transpiration

**High humidity** over 80 % has encouraged growth of natural forest and swampy vegetation; moderate humidity savanna and low humidity for scrub vegetation.

Other factors that have influenced the growth and distribution to a large extent apart from climate include type of soil, drainage, altitude, relief and biotic factors.

**Explain these factors in detail**

**Qn. To what extent has altitude influenced the distribution of natural vegetation in the highland areas of East Africa?**

**Approach**

- Define natural vegetation
- Identify the highland areas of East Africa where altitude controls or influences vegetation distribution.
- Explain the vegetation zonation with a clear diagram
- Explain the characteristics of each vegetation zone
- Give the first evaluation (to a large extent) and explain how altitude influences natural vegetation.
- Give the second evaluation (other factors) that is; Climate, type of soil, nature of relief, biotic factors, drainage and human activities.

**Qn. Account for the distribution of Savannah Vegetation in East Africa**

Candidates should identify the different types of Savannah Vegetation i.e. Savannah woodland, Savannah grassland and dry Savannah (bush and thicket)

And show where they are found, give the characteristics of each type and then give the conditions for the growth and distribution of each type of Savannah Vegetation in East Africa.

**Answer guide**

Savannah woodland lies near the tropical rainforests. It is found in western Tanzania, south western Tanzania (moimbo woodland), in northern Uganda e.tc.

It is characterized by.

- Continuous cover of trees
- Trees are of hardwood and of mixed stand
- Trees have a medium height of about 8 - 16 meters high
- Trees are umbrella shaped

- Trees have twisted trunks with thick and rough barks
- Some of the trees have swollen trunks to store water to be used in dry season
- Trees are drought and fire resistant
- Trees are deciduous in nature i.e. shed off their leaves to reduce moisture loss
- Dominant tree species are acacia, baobab, cacti
- Trees have tiny leaves to reduce on transpiration
- Most trees develop branches close to the ground
- Trees have waxy leaves
- There is dense growth of grass, bushes and shrubs

Another type is savanna grassland which lies between woodland and dry Savannah found in nyika plains of Kenya, northern Uganda, rift valley areas of western Uganda, and areas around Bukoba in Tanzania.

It is characterized by

- Tall grass like elephant and spear grass of about 1 - 4 meters high
- Grass turns yellow or brown during the dry season and green during the wet season
- It has short scattered trees and bushes grow within the grass and the trees
- Trees are deciduous in nature
- Trees have tiny or small leaves to restrict transpiration
- Trees are fire and drought resistant

Another type is the dry bush and thicket or dry Savannah common in northern, north western, and north Eastern Kenya, central Tanzania, north Eastern Uganda, ankole masaka corridor, e.t.c.

It is characterized by

- Stunted trees with woody stems
- Have thorny bush trees with shrubs growing in between
- The trees are short with small waxy needle like leaves
- The grasses are poor, very short and grow in bunches or tufts with bare land between the scattered thorny bushes

- Common tree species include acacia, cacti, euphorbia
- The trees are fire resistant
- Trees are less than 8 meters in height

The following are the general characteristics of Savannah Vegetation

- ✓ The trees are umbrella shaped
- ✓ The trees are deciduous shedding off leaves during the dry season
- ✓ Dominant tree species include acacia, baobab, cacti, euphorbia
- ✓ Trees have thick barks
- ✓ Trees have small leaves to reduce transpiration
- ✓ Trees are fire and drought resistant
- ✓ Trees have swollen trunks and long tap roots
- ✓ They have waxy barks and leaves

The following are the conditions that have led to the distribution of Savannah Vegetation in East Africa.

**Climate** in terms of rainfall has led to distribution of Savannah Vegetation as follows.

- ★ Moderate rainfall of 760mm to 1000mm has led to growth of Savannah woodland with medium height trees.
- ★ Moderate rainfall of between 600mm to 750mm lead to growth of Savannah grassland with tall grasses
- ★ Low rainfall of between 300mm to 500 lead to growth dry bush and thickets with poor grasses and thorny bushes
- ★ Hot temperatures of 25 degrees Celsius to 27degrees lead to the growth of Savannah woodland and Savannah grassland with drought resistant trees that have long tap roots
- ★ Very hot temperatures of over 27degrees Celsius lead to growth of dry Savannah with stunted trees and poor grasses
- ★ Moderate humidity of 50% to 60% lead to growth of Savannah woodland with medium height trees
- ★ Humidity of 40% to 50% lead to growth of Savannah grassland with tall grasses
- ★ Low humidity of less than 30% lead to growth of dry Savannah with stunted trees and poor grasses

**Soils** where by savanna woodland and Savannah grassland grow in areas with

fairy fertile e.g northern Uganda and dry Savannah grows in areas with skeletal infertile soils like in ankole masaka corridor

**Relief** where by Lowland areas of northern Uganda, rift valley areas, nyika plains experience hot temperatures and low rainfall hence leading to growth of dry Savannah Vegetation

**Low altitude** of less than 1500m a.s.l lead to hot temperatures and Moderate rainfall that supports the growth of Savannah woodland and Savannah grassland

**Drainage** that's to say well drained areas lead to growth of all types of Savannah Vegetation

**Man's activities** like cutting down of trees for timber, wood fuel, building materials, have turned forests into savanna woodland and Savannah grasslands. Sinking boreholes, Overgrazing and bush burning have turned savanna grassland to dry bush.

**Government policy** of gazzeting national parks and game reserves like Queens Elizabeth National Park, Kidepo valley national park etc have led to conservation of different types of Savannah Vegetation

**Pests and diseases** like locusts, termites, grass hoppers, have eaten trees turning savanna woodland into grasslands and dry Savannah e.g in nakasonga and in north Eastern Uganda

**Overgrazing by wild animals** in national parks have turned forests into woodlands, grasslands into dry Savannah e.g in Queen Elizabeth National Park lake Mburo national park, etc.

#### **Note**

- A candidate may come up with a different approach where he/she explains the conditions for each Type of Savannah Vegetation separately
- In explaining the characteristics of each type of Savannah Vegetation, please attach reasons/accountability for the characteristics
- In discussion of the conditions for growth and distribution of various vegetation types of Savannah, please integrate Factors/conditions with Characteristics

## **NATURAL VEGETATION IN AFRICA (OUTSIDE EAST AFRICA)**

Vegetation types in Africa include those found in East Africa plus Mediterranean vegetation.

### **MEDITERRANEAN VEGETATION**

This is a unique type of vegetation which grows on the west coasts of continents in the mid-latitudes between 30 - 40 degrees North and South of the equator. In Africa it is found in South-West Africa (Cape Province) and the extreme North-western parts of Africa (Algeria, Tunisia, Morocco and some parts of Libya). Outside Africa it is found in California, central Chile and South West Australia.

### **CHARACTERISTICS OF MEDITERRANEAN VEGETATION**

1. Mediterranean forests have trees with broad leaves which are evergreen e.g. oak, redwood, cork etc. due to wetter winter and resist dry summer conditions.
2. Much of the woody Mediterranean vegetation is hard leaved vegetation. It generally has small dark leaves covered with waxy outer layer to retain moisture in the dry summer months.
3. Plants like grape vine have long tap roots which can reach down the moist rocks to search for water.
4. Some plants have large fleshy bulbous roots which store water
5. There are sweet smelling herbs and shrubs e.g. lavender, rosemary, thyme etc.
6. Some trees have thick barks to store water during summer.
7. It has cone-shaped trees especially pine.
8. It has short-flat topped trees e.g. cork, oak etc.
9. It has mixed type of vegetation with deciduous trees, coniferous trees, rough grasses etc.
10. Some trees have compact woody stems, bush shrubs with dense thickets.
11. Short grass is common especially in the Mediterranean grassland of Californian central valley.

### **CONDITIONS/FACTORS FOR THE GROWTH AND DISTRIBUTION OF MEDITERRANEAN VEGETATION**

#### **1. Climate**

Mediterranean vegetation grows in Mediterranean climate with

- Hot dry summers with temperatures of about 25 degrees C.

- Cool, moist, rainy winters with temperature of about 12°C allowing the growth of huge trees like oaks.
- Annual rainfall of between 500-700 mm which supports the growth of scattered trees with long tap roots.
- The on-shore westerly winds blow in winter bringing cyclonic rainfall.

## **2. Soils**

- The ashy Mediterranean soils support the growth of Mediterranean vegetation e.g. oak, cork trees etc.
- The limestone soils which are porous and drain easily lead to the growth of the deep rooted plants in order to search for water.
- The Mediterranean regions are semi-arid and often with poor soils which lead to growth of scrubs and poor grasses.

## **3. Altitude**

Mediterranean vegetation is mainly found along the coastal areas with low altitude except for the Atlas Mountains e.g. scrubs near the sea coast.

## **4. Latitude**

- Mediterranean vegetation is found between 30 - 45 degrees North, and 30 - 40 degrees South of the equator.
- Also areas with Mediterranean vegetation are located mainly on the western side of continents because of marine conditions.

**5. Human activities** e.g. cutting down of trees (logging), overgrazing, agriculture, urbanization and introduction of exotic breeds of trees have led to extensive loss of forests and extinction of many native plants (Mediterranean plants.).

However, conservation of forest lands like in South Africa, Libya etc. has led to existence of Mediterranean vegetation.

**6. Drainage** factors e.g. poorly drained soils due to excessive evaporation during summer season makes plants develop long tap roots to search for water. While the plants that develop into forests e.g. pines grow in well drained soils.

**7. Biotic factors** e.g. caterpillars have affected the growth of Mediterranean vegetation for example it is estimated that one oak tree can attract over 5000 caterpillars and this has reduced their growth.



### **Questions**

- a. Describe the characteristics of Mediterranean type of vegetation
- b. Account for growth of Mediterranean type of vegetation in Africa.

### **Approach**

- Define Mediterranean vegetation and state where it is found
- Describe the characteristics

Explain the factors/conditions for growth of Mediterranean vegetation

**N.B All questions about vegetation require the characteristics of each vegetation type identified in the question**

**END**