

THE GEOGRAPHY OF UGANDA.

Chapter 1.

INTRODUCTION TO UGANDA.

Position, location and size.

Uganda, officially the Republic of Uganda, is a landlocked country in East Africa. Uganda is also known as the pearl of Africa. It is bordered by Kenya in the East, south Sudan in the NORTH, Democratic Republic of Congo in the west, and Rwanda in the south west and Tanzania in the south. The southern part of the country includes a substantial portion of Lake Victoria, which is also shared by Kenya and Tanzania.

Uganda is located between latitude $4^{\circ}12'N$ and longitude $29^{\circ}34'E$ to $35^{\circ}E$

Uganda lies astride the equator, which sub divides the country into two hemispheres i.e. $\frac{2}{3}$ lies in the northern hemisphere and $\frac{1}{3}$ in the southern hemisphere.

Uganda has an area of 241,550.7 square kilometers (sqkm), of which 41743.2sqkm is open water and swamps while 199,807.4sqkm is land.

A SKETCH MAP SHOWING THE LOCATION OF UGANDA

Relief

Most of Uganda forms part of the interior plateau of the African continent. It is characterized by flat topped hills in the central, western and eastern parts of the country. The rise of plateau in the eastern and western parts of the country is represented by spectacular mountainous topography found along the borders. These include the Block Mountains of Ruwenzori and the Mufumbiro volcanoes in the west and mt Elgon, mt Moroto, mt Morongole, mt Timu and mt Kadam in the east.

Geology and soils.

The geological formations of Uganda reveal rocks formed between 3000 and 6000 million years ago (pre-Cambrian era); hence they are very old.

The younger rocks are either sediments or of volcanic origin, formed from about 135 million years ago (cretaceous period) to the present.

The soils of Uganda are defined by a number of parameters including parent rock, age of soil climate. The most dominant soil type is ferralitic soil which accounts for about two-thirds of the soils found in the country.

Uganda's soils are divided into 6 categories based on productivity. Very high to high productivity, moderate productivity and nil productivity.

Drainage

Uganda drainage comprises lakes like Lake Victoria (the second large fresh water body in the world), Lake Albert, Lake Katwe, Lake Bisina, Lake George Lake Bunyonyi, Lake Kyoga, Lake Kwanja, Lake Edward and Lake Mutanda etc.

Rivers include ; Victoria Nile, Albert Nile, river Katanga, river Kafu, river Aswa, river Sezibwa, river Mubuku, river Nkusi, river Semuliki, river Sipi and river Mayanja etc.

Climate.

Uganda has 5 climatic zones, using rain fall received as the dependent variable. They are;

Zone 1- the lake Victoria zone, zone ii- the Karamoja region, zone iii- western Uganda, zone iv- the Acholi-kyoga, and zone v- the Ankole-southern area.

The temperature range between 16 -31⁰c and rain fall ranges between 700-3000mm per annum on average.

Uganda's climate is shape by the inter –tropical convergence zone (ITCZ) and prevailing winds such as the south east and north east trade winds. There are two main seasons: the rainy and dry seasons.

Mean temperatures show great variation depending on elevation and land scape. Temperatures in areas adjacent to water bodies are modified by the maritime conditions

Vegetation

There are 11 main vegetation categories: high montane moorland and heath, medium altitude forests /savannahmosaic, moist thicket, woodland, swamp (wetlands) and cultivation communities.

Economy

Uganda's economy is basically agriculture employing about 63% of the country's population and contributes about 22.2% to GDP at current market prices. The sector is also a major source of raw materials to the local industries and contributes about 40% of the total goods export earnings.

Population

The census conducted at the end of August and early September 2014, covered 7.3 million households with 34.8 million were females. The central region had the highest population of 9.6 million.

Eastern Uganda with 9.1 million. Western region with 8.9 million and northern region with 7.2 million people.

Chapter 2.

PHYSICAL REGIONS OF UGANDA

Uganda is located on the east African plateau and it is predominant feature. However, the relief of Uganda displays a great contrast. The lowest point is located in western Uganda at 620 meters above sea level along the Albert Nile and the highest point is found in the same area at mt. Rwenzori peak at 5100 meters above sea level.

The major relief regions in Uganda include;

1. Lowlands region for example in Kasese, Ntoroko and Bulisa.
2. Plateau lands region for example in Kampala, Mukono, Gulu and Lira.
3. Uplands region for example in Kabong, Moroto, Kabala and Kisoro.
4. Mountain region for example in Mbale, Kapchorwa and Bundibugyo

A SKETCH MAP OF UGANDA SHOWING THE PHYSICAL REGIONS

The lowland region.

This constitutes the land that lies below 900 meters above the sea level. It constitutes 9% of the total land area of Uganda, occupying most of the area between Lake Edward and Lake Albert and stretching up to Gulu and Madi areas (along the Nile valley). For example in Kasese, Ntoroko, Bulisa, Nebbi, Arua and Moyo.

The region is characterized by steep slopes like Butiaba escarpment on the Eastern side of Lake Albert, and contains rift valley lakes like Lake George, Lake Edward and Lake Albert.

The plateau lands region

This region constitutes the land that lies between 900-1500 meters above sea level. It covers the largest part of Uganda, about 84% of the total land area. It is generally high in the south for example in Kampala, Mukono, and Jinja and it is lower in the central and northern parts of the country for example in Soroti, Lira and Gulu. The area is gently sloping with isolated residual hills called inselbergs for example Nakasongola hills and Mubende hills.

The uplands region

This constitutes the land that lies between 1500-2000 meters above sea level and it covers 5% of the total land area of Uganda. Uplands are less uniform than the plateau lands and are found in south and western parts of Uganda for example in Mbarara, Bushenyi, Kisoro, Kabale and Rukungiri. They include Isingiro hills in Buhweju and Ibanda, Singo hills in Mubende, Buhweju highlands and Kigezi highlands in Kabale and Kosovo and Karamoja region in Moroto, Kotido and Kaabong.

The mountain region

This region constitutes the land that lies above 2000 meters above the sea level and covers about 2% of the total land area of Uganda. It is not good for agriculture and settlement because it is above 2000 meters above the sea level which is characterized by cold temperatures and thin stony soils due to the presence of steep slopes.

Most of the mountains in Uganda for example Elgon, Napak, Kadam, Moroto and Morongole are of volcanic origin except Mt. Ruwenzori which is a block mountain (horst).

Chapter 3

LANDFORM EVOLUTION IN UGANDA

The geomorphic processes responsible for land form development in Uganda are endogenic and exogenic. However, most landforms in Uganda were formed as a result of endogenic/internal/tectonic processes i.e. faulting, folding, warping and volcanicity. The three tectonic processes i.e. faulting, folding, and warping are referred to as earth movements.

Tectonism refers to all crustal disturbances of endogenic origin arising from geochemical reaction /radioactivity beneath the earth's crust.

The features formed were later modified by external /exogenic processes such as denudation/degradation i.e. weathering, mass wasting and erosion and deposition/aggradation by rivers, waves, wind and glaciers.

FAULTING.

Faulting refers to the breaking up or cracking or fracturing of the hard rocks of the earth crust followed by the displacement of the rocks relative to one another on either sides of the fault-line.

Faulting originates from geochemical reaction and radioactivity beneath the earth crust which generate convective currents. When convective currents reach the earth crust generate compressional and tensional forces which when strong enough result into faulting.

Faulting as an endogenic process has led to the formation of various landforms in Uganda and these include;

1. The escarpments like Butiaba.
2. Rift valley in western Uganda in Kasese and Bundibugyo.
3. The block mountain i.e. mountain Rwenzori.
4. Grabens like Grabens occupied by Lake Albert, George and Edward.
5. The fault guided valley i.e. Aswa valley.

A SKETCH MAP OF UGANDA SHOWING MAJOR LAND FORMS FROM FAULTING

FAULT SCARPS/ESCARPMENTS.

An escarpment is a steep (cliff) along a single fault line where land falls from a higher level to a lower level.

Escarpment were caused by geochemical reactions and radioactivity within the interior of the earth that resulted into convective currents leading to tensional forces and compressional forces.

Tensional theory.

According to the tensional theory, the tensional forces pulled the crustal blocks apart resulting into normal fault. This was followed by down ward displacement of one of one block that left a steep slope known as an escarpment. It was later modified by denudational forces of erosion and mass wasting to give the present shape.

For example Butiaba escarpment, Kyambura escarpment, Katojo escarpment, Kichwamba escarpment and Biso scarp in the rift valley region in the western Uganda.

Illustration

Compressional theory.

According to the compressional theory, the compressional forces pushed the crustal blocks towards each other resulting into reverse fault. This was followed by upward displacement of the block that left a steep slope known as an escarpment. It was later modified by denudational forces of erosion and mass wasting to give the present shape.

For example Butiaba escarpment, Kyambura escarpment, Katojo escarpment, Kichwamba escarpment and Biso scarp in the rift valley region in western Uganda.

Illustration.

THE RIFT VALLEY.

A rift valley is an elongated trough/ depression bordered by two in-facing fault scarps. The rift valley in Uganda constitutes the western arm of the Great Rift Valley in areas like Bundibugyo, Kasese, Bushenyi, and kisoro, Kanungu, Rukungiri, Kibale, Hoima and Bulisa

Formation of rift valley

A rift valley in Uganda was formed as a result of faulting either due to compressional or tensional forces.

Tensional theory.

According to the tensional theory by J.W Gregory, heating by geochemical reactions and radioactivity beneath the earth crust created convective currents which led to tensional forces.

These tensional forces pulled apart in the opposite directions from the central point forming normal faults, dividing the earth crust into several blocks.

As a result, side blocks were later pulled apart as the central blocks sunk under its own weight forming a rift valley with gentle slopes.

It was later modified by denudational forces such as river erosion, weathering and mass wasting to give the present shape for example the western arm of the rift valley in western Uganda in Kasese and Bundibugyo.

Illustration.

Compressional theory

According to the compressional theory by E.J Wayland, heating by geochemical reactions and radioactivity beneath the earth crust created convective currents which generated compressional forces.

Compressional forces pushed in the same direction towards each other forming reverse faults, dividing the earth crust into several blocks.

As a result, side block were forced to override the central block, hanging above the central block that remained stable at a relatively lower level forming a rift valley steep slopes.

The overhanging edges were later modified by denudational forces such as river erosion, weathering and mass wasting to give the present shape.

Illustration

The influence of the rift valley on human activities in Uganda.

Positive influence.

1. The rift valley has favored the development of tourist, education and research since it has magnificent features like Butiaba escarpment and Rift Valley Lake Albert hence generating foreign exchange from foreign tourist.
2. The rift valley lakes on the floor of the rift valley like Lake Albert, George and Edward have promoted fishing thus creating employment opportunities to the Ugandans.
3. The rift valley lakes on the rift valley floor have also encouraged water transport for example on Lake Albert from Wanseko in Bulisa to Punyamur in Nebbi.
4. The rift valley has encouraged the development of mining since its formation led to exposure of minerals for example salt mining from lake Katwe, limestone at Hima in Kasese and oil in Bulisa and Hoima on the lake Albert.
5. The rift valley has favored agriculture due to presence of fertile soils on the rift valley floor which encourage growth of crops like maize at Mubuku irrigation scheme and Mubuku prison farm.
6. The rift valley has promoted wild life conservation and the conservation of biodiversity due to the presence of range land vegetation on the wild animals feed for example in Queen Elizabeth National park in Kasese.
7. The rift valley floor has encouraged settlement because of its being relatively flat for example at Kasenye, Muhokya, Katwe and Kasese town in kasese district.

8. The rift valley region has promoted hunting and food gathering due to the presence of rangeland vegetation and wild animals for example harvesting of wild honey and hunting of antelopes among the Basongora of Kasese.
9. The rift valley has encouraged lumbering due to the presence of woodland vegetation in the some parts of the rift valley floor for example in Kasese.

Negative influence.

1. The rift valley region receives low rainfall amount since it is in the rain shadow discouraging agricultural activities especially the growth of crops like maize in Kasese.
2. The rift valley escarpments have discouraged the construction of transport network especially roads due to steep slopes like Butiaba escarpment and Kyambura escarpment.
3. The rift valley region is a region of crustal instability, susceptible to calamity, which discourage settlement such as earth quakes and landslides in Bundibugyo.
4. The rift valley region experiences flooding by rivers from mountain Rwenzori for example river Nyamwamba and Mubuku in Kasese which discourages settlement.
5. The rift valley inhabits dangerous wild animals, which discourage settlement lions and leopards in Queen Elizabeth National park in Kasese.
6. The rift valley is a hiding place for rebels and wrong doers leading to insecurity, which discourages settlement for example ADT in Bundibugyo and Kasese.

The influence of the rift valley on the climate of the surrounding areas.

1. The rift valley floor is sheltered from rain bearing winds and therefore it is in the rain shadow leading to low rain fall amount received on the rift valley floor for example at Katwe, Muhokya and Kikolongo in Kasese.
2. The windward sides of the rift valley shoulders receive heavy rainfall for example Kabarole and Bundibugyo while leeward sides of the rift valley shoulders receive low amounts of rain fall for example in Kasese.
3. Areas on the rift valley floor for example Katwe, Muhokya and Kikolongo in Kasese are hotter than the surrounding highlands that form the rift valley shoulders like Kabarole since they are low lying areas.
4. The rift valley areas like Bundibugyo experience temperature inversion. Temperature inversion is the atmospheric condition in the air temperature increases with altitude/height in the atmosphere. This result from rapid cooling of the highland slopes that form the rift valley shoulder at night resulting into cold dense air. The cold dense air then descends downslopes into the rift valley under the influence of gravity and collects in rift valley displacing warm light air upwards to the upper levels so that cool air is below warm air. This results into mist and fog especially in the morning for example in Kasese, Kabarole and Bundibugyo.
5. Atmospheric pressure is low on the rift valley floor due to hot temperature experienced for example at Kikolongo and Katwe in Kasese.
6. Relative humidity is generally low on the rift valley floor due to limited vegetation cover for example at Katwe in Kasese.
7. The climate of areas around rift valley lakes like Lake Albert, Edward and George is modified by the lake through evapotranspiration and sea breeze leading to warm temperatures, high relative humidity and heavier rain fall near lakes.
8. The rift valley areas experience strong eddies/stirring winds which normally cause erosion for Katwe in Kasese

BLOCK MOUNTAIN/HORST.

A block mountain /horst is an upland bordered by fault scarps on the two or more sides. Mountain Rwenzori is the only block mountain in Uganda.

Formation of mountain Rwenzori.

Two theories have been put forward to explain the formation of mountain Rwenzori i.e. the compressional and tensional theory.

Compressional theory

According to the compressional theory, heating by geochemical reactions and radioactivity beneath the earth crust created convective currents. When these convective currents reached the earth crust, they tended to converge creating compressional forces.

Compressional forces pushed the crustal rocks from opposite direction resulting into development of reverse faults.

This was followed by differential uplift of crustal block mountain Rwenzori.

It was later modified by denudational forces such as river erosion, glaciations, weathering and mass wasting to give the present shape.

Illustration.

Tensional theory.

According to the tensional theory, heating by geochemical reactions and radioactivity beneath the earth crust created convective currents. When these convective currents reached the earth's crust, they tended to diverge crustal blocks apart resulting into development of normal faults. This was followed by relative sinking of the crustal block with the side blocks sinking faster than the central block forming a block mountain Rwenzori.

This was later modified by denudation forces such as river erosion, glaciation, weathering and mass wasting to give present shape.

Illustration.

The influence of mountain Rwenzori on human activities in Uganda

Positive influence.

1. Mt. Rwenzori has promoted tourism, education and reach due to the presence of magnificent features for example snowcapped Margherita peak, glacial features like Lac Du Speke, hence earning Uganda foreign exchange.
2. Mt. Rwenzori has encouraged the development of agriculture due to heavy rain fall received on the wind ward sides and fertile soils which encourage the growth of maize, rice, vegetables and tea in Bundibugyo and Kabarole.
3. Mt. Rwenzori has promoted mining because of the minerals on the lower slopes, hence providing employment opportunities to the people for example stone quarrying at Kasese and limestone mining at Hima.
4. Mt. Rwenzori has promoted wildlife conservation and conservation of biodiversity due to the presence of montane forests acting as habitats for wild animals for example in Semuliki national park and mt.Rwenzori wild animals for example in Semuliki National park and mt Rwenzori national park in Bundibugyo.
5. Mt. Rwenzori has boosted fishing because it is a source of rivers such asNyamwamba, Sebwe and Mubuku in Kasese, Mpanga in Kabarole.
6. Mt. Rwenzori has promoted lumbering due to the presence of montane forests for example in the mt Rwenzori forests found in Bundibugyo, Kabarole and Kasese.
7. Mt Rwenzori ha encourage the generation of hydroelectricity power from the rivers originated from mountain for example Mubuku power station on river Mubuku.
8. The lower slopes of mt.Rwenzori are used for settlement since they are gently sloping for example in the Kasese, Kilembe, Bwera and fort portal.

9. Mt. Rwenzori has encouraged hunting and food gathering for example collection of wild honey in the montane forests of Bundibugyo, Kasese and Kabarole.

Negative effects.

1. Mt. Rwenzori has caused a rain shadow effect leading to low rain fall amount and hot temperature, which has reduce agricultural activities for example in Kasese.
2. The steep slopes of mt Rwenzori have accelerated soil erosion, which discourages agriculture in Bundibugyo, Kasese and Kilembe.
3. The steep slopes of mt Rwenzori have acceleratedlandslides, leading to loss of life and property which discourages settlement in Bundibugyo and Kasese.
4. Mt. Rwenzori is a hiding place for wrong elements for example alliedDemocratic front (ADF) rebels, discouraging settlement in Bundibugyo, Kabarole and Kasese.
5. Mt. Rwenzori forests are habitats for dangerous wild animals and disease carrying vectors which pose a threat to settlement and agriculture for example lions, leopards and monkeys in montane forests of Kabarole, Kasese and Bundibugyo.
6. The steep slopes of mt Rwenzori have discouraged the construction of transport routes like roads for example in Bundibugyo and parts of Kasese.
7. The mountain leads to periodic flooding from excessive orographic rainfall and melt water from glaciers for example floods caused by river Semuliki in Bundibugyo and river Nyamwamba in Kasese, discouraging settlement.

Influence of mountain Rwenzori on climate.

1. Mountain Rwenzori receives heavy relief rain fall on the windward slopes for example in Kabarole and Bundibugyo. This occurs due to the rising of moist winds on the wind ward slopes which rise and cool down adiabatically at the rate of 1°C per 100metres. Upon reaching the condensation level it forms cumulonimbus clouds that give rise to orographic rainfall.
2. On the other hand, on the leeward side of the mountain, there are descending dry winds hence little or no rain fall is received for example in Kasese.
3. Generally, cooler temperature are experienced on the wind ward slopes as one climbs to the top of the mountain since temperatures decrease with altitude for example Kilembe hills, Bundibugyo and Kabarole.
4. The windward side is characterized by warm temperatures for example in kabarole and Bundibugyo while the lee ward side is characterized by very hot temperatures for Kasese.
5. The peaks of mtRwenzori for example Margherita are snowcapped through throughout the year due to very low temperatures below 0°C experienced.
6. The wind ward side is characterized by low pressure due to rising of warm winds for example in Bundibugyo, kabarole while the lee ward side are associated with high pressure due to descending cool dry winds for example in Kasese.
7. The relative humidity is high on the lee ward side for example in kabarole , Bundibugyo, due to high rate of evapotranspiration while the lee ward side has low humidity due to low rate of evapotranspiration for example in Kasese.

8. The wind ward side for example in Bundibugyo and kabarole have dense cloud cover throughout the year due to condensation of warm rising winds while the lee ward side for example Kasese has clear skies almost throughout the year due to limited evapotranspiration.
9. There is high humidity at low attitude because of being near the sources of water vapour like vegetation and water bodies for example in fort portal and low humidity at high altitude since water vapour molecules are pulled down wards by gravity for example in parts of Bundibugyo.
10. The foot hills of mountain Rwenzori experience temperature inversion through katabatic effect. This results from rapid cooling of the mountain slopes at night resulting into cold dense air. The cool dense air then descends downslope into the valley under the influence of gravity and collects in the valley displacing warm light air up[wards to the upper levels so that cool air is below warm air resulting into mist and fog especially in the morning for example in Kasese, kabarole and Bundibugyo.

Glaciation on mountain Rwenzori.

Glaciation refers to the work and overall effects of Glaciers on the land scape resulting into both erosional and depositional features. Or Glaciation is the process by which the land scape is modified by glacial erosion and deposition.

In Uganda glaciation occurs on Mt Rwenzori 4800 metres (15700) feet above the sea level.

Glaciers are formed when the temperature of the air cools bellow 0. Some of the water vapour condenses and freezes into ice crystals which fall on the earth's crust as snow, This later accumulates to form ice As the thickness of the ice increases, it moves down slope on the side of the mountain as a glacier.

As the glacier moves down slope, it erodes the mountain sides and deposits the eroded materials in the valleys, leading to the formation of glacial erosion and depositional features.

Example of glacial erosional features on mount Rwenzori include.

- Cirques/corries like lac du Speke basin and lac du Catherine basin.
- Tarns/Cirque lakes lac du Speke and lac du Catherine.
- Arêtes like one which extends from Mt Baker to Bujuku valley.
- Pyramidal peaks/horns like Margherita, Stanley, Speke, Albert, Alexandra and baker.
- U-shaped valleys/ glacial troughs like bujuku valley Mubuku, Mugusu, Kamusoso and Luzilumbe valley.
- Hanging valleys like lac vart valley, that joins Kamusoso valley and Speke valley that joins Kamusoso valley.

Examples of glacial depositional features include.

- Moraines found in Bujuku, Kamusoso, and Luzilumbe valleys.
- Till plains like on the floor of Mobuku and bujuku valleys.
- Erratics like in Kamusoso and Bujuku valleys.
- Out wash plains like in the Mobuku valley.

Importance of glaciation in Uganda.

Positive importances.

1. Glacial land forms have promoted tourism, education and research due to the presence of magnificent features like ice capped peaks like Margherita.
2. The boulder clay resulting from moraine deposits are fertile hence promoting crop cultivation for example Nyamwamba valley and bujuku valley.
3. The hanging valley are potential sites for the generation of Hydroelectricity power for example lac du vart Valley that joins Kamusoso valley.
4. Glaciers and glacial lakes are sources of rivers that provide water for irrigation hence promoting irrigation farming for example river Sebwe which provides water for Mubuku irrigation scheme.
5. The glacial lakes and rivers that flow from the glaciers provide water for domestic and industrial use for example river Mubuku.
6. The boulders, sand and gravel deposited by glaciers provide building materials for example in Nyamwamba valley.
7. Glaciers modify the climate by providing a cooling effect on the surrounding areas. This has supported the growth of alpine vegetation on the slopes of Margherita, Stanley and Speke, thus supporting forestry.
8. The u-shaped valleys also act as natural route ways since they are relatively flat encouraged transport in highland areas for example the Bujuku valley, Mubuku, Mugusu, Kamusoso and Luzilumbe.
9. The u-shaped valleys have encouraged crop growing and animal grazing for example in bujuku valley.
10. The broad glacial troughs have provided sites for settlement due to being relatively flat for example Bujuku valley and Mubuku valleys.

Negative importance of glaciation.

1. Glaciation has encouraged landslides resulting into destruction of lives, property and vegetation for example Nyamwamba valley, Nyamugasani valley and Mubuku valley.
2. The rugged relief created by glaciation hinders the development of transport and communication networks for example in Kamusoso valley.
3. Boulder clay deposits in some areas have produced a marshy landscape which discourages agriculture and construction of transport routes for example some parts of Nyamwamba valley and Kamusoso valley.
4. Many out wash plains contain infertile sands, hence discouraging agriculture for example in Mubuku valley.
5. Melt waters from glaciation cause flooding of rivers leading to loss of lives and property for example along river Nyamwamba.
6. Glaciers lead to extremely cold temperatures that discourage settlement for example on Margherita, Stanley and Speke peaks.
7. Glaciers encourage soil erosion once they melt which removes the top soil making the soils infertile for example in Kamusoso valley.

GRABENS.

A Graben is an elongated depression found on the rift valley floor formed as a result of secondary faulting either due to compressional forces or tensional forces acting on the rift valley floor. For example Lake Albert Graben .Edward and George Grabens.

Tensional theory.

According to the tensional theory heating by geochemical reactions and radioactivity beneath the earth's crust created convective currents that led to tensional forces. The tensional forces pulled the earth's crust apart leading to normal faults dividing it into sinking of the central block forming a rift valley.

The rift valley was subjected to further tensional forces resulting into secondary faulting that led to the formation of a smaller depression called Graben within the main rift valley. For example Lake Albert, Lake Edward and George Grabens

Illustration.

Compressional theory.

According to the compressional theory, heating by geochemical reactions and radioactivity beneath the earth crust created convective currents. When the convective currents reached the earth's crust they tended to converge leading to compressional forces that led to reversed faulting. The side blocks were forced to override the central block creating a rift valley.

Continuous compressional forces led to secondary reversed faulting which created a smaller depression called Graben on the rift valley floor. For example Lake Albert graben, George graben and Edward Graben.

Illustration.

FAULT GUIDED VALLEY.

A fault guided valley is a narrow or wide valley that developed along a fault line. Fault guided valleys originate from geochemical reactions and radioactivity within the interior of the earth's crust that lead to convective currents leading to tensional and compressional forces that lead to faulting.

During faulting that resulted from either tensional or compressional forces, the crustal rocks along the fault line got shattered and the weakened rocks were easily removed by denudation forces which lead to the valley along the fault line. For example the Aswa valley in northern Uganda.

Illustration.

WARPING.

Warping refers to the deformation of the earth's surface by an even downward and upward movement of the rocks of the earth's crust leading to the formation of wide depressions/basins and uplands.

Warping originates from convective currents generated by radioactivity and geochemical reactions beneath the earth's crust. The convective currents lead to up lift/up warping and down warping/ sagging of the earth's crust as a result of the force exerted by the compressional forces. In Uganda, warping is associated with the formation of the Victoria and Kyoga basins. As a result of compressional forces, Western Uganda for example, Kabale, Kisoro, Mbarara, Bushenyi and Kasese experienced up warping while central and south eastern Uganda experienced down warping, hence sagging of the earth's crust. This later led to river reversal of river Kagera and river Katonga hence pouring their waters in the developed Victoria and Kyoga basin hence forming the lake Kyoga and Victoria.

Illustration.

Contributions of warping to the development of Uganda.

Positive contributions.

1. Warping led to the formation of down warped basins like Victoria basin, Kyoga basin which were filled with water, hence promoting fishing which has provided employment opportunities.
2. Warping has promoted tourism, education and research due to the formation of down warped basins like Victoria and Kyoga which were filled with water with their impressive features hence earning Uganda foreign exchange.
3. Warping has promoted agriculture because down warped basins like Victoria and Kyoga basins have fertile soils which encourage the growth of crops.
4. Warping has favoured climatic modification since crustal warped lakes like Kyoga and Victoria lead to rainfall formation through evaporation.

5. Warping has promoted water transport on the crustal warped lakes like Lake Victoria and Lake Kyoga hence promoting trade.
6. Warping has encouraged mining especially sand and clay mining in the crustal warped basins for example sand at Kasenyi and clay at Kajansi in the Victoria basin.
7. Warping has encouraged wild life conservation since down warped basins like Kyoga and Victoria basins which were filled with water act as habitats for wild animals such as crocodile.
8. Warping has encouraged hunting and food gathering around crustal warped basins in the thick tropical rain forests for example in Mabira forest in the Victoria basin.
9. Warping has encouraged settlement and urbanization in the down warped basins which were filled with water since they modify the climate for example Kampala and Entebbe in the Victoria basin.
10. Warping has encouraged forestry and lumbering because the down warped basins have fertile soils which favour the growth of forests example Ssesse islands forests in the Lake Victoria basin.
11. Down warped basins have encouraged the generation of hydroelectric power since they provide water to rivers for example the Victoria basin provides water for Victoria Nile on which dams like Kiira dam and Bujagali power station are established.

Negative effects of warping.

1. Down warped basins have led to seasonal flooding especially during rainy seasons to the adjacent areas for example Lwampanga in the Kyoga basin and Masese in Victoria basin.
2. Down warped basins provide habitat for dangerous aquatic animals which attack and some times kill people for example crocodiles and hippopotamuses in the Victoria and Kyoga basins.
3. Down warped basins have encouraged smuggling of goods across borders since it is difficult to monitor movement for example goods smuggled to Kenya across the Victoria basin.
4. Down warped lakes are hiding places for wrong doers/elements leading to insecurity in the Victoria and Kyoga basins.
5. Down warped basins are breeding grounds for pests and disease carrying vectors for example tsetse flies that spread sleeping sickness to people and nagana to cattle in Mayuge in the Victoria basin, Water snails that cause bilharzia in the Kyoga basin.
6. Down warped basins have encouraged interstate conflicts due to struggle for water resource ownership for example Mijingo island struggle in the Victoria basin between Uganda and Kenya.
7. Down warped lakes are a hindrance to the construction of transport network especially roads and railway since they are filled with water for example the Victoria and Kyoga basins.
8. Down warped basins have led to urbanization with its associated problems such as high rates of crime at Kasenyi on Lake Victoria in the Victoria basin.

VULCANICITY.

Vulcanicity is the process through which molten rocks/ magma from the interior of the earths are either intruded underneath the earth's crust or extruded on the earth's surface through fault lines/fissures.

On the other hand, extrusive Vulcanicity is the process through which molten rocks/magma from the interior of the earths are extruded/ ejected and deposited on the earth's surface through faultiness and fissures.

Vulcanicity originates from geochemical reactions and radioactivity, generating intense heat and pressure hence melting mantle rocks into molten magma creating giant convective currents. The moving

convective currents lead to creation of lines of weaknesses known as fissures along which magma is either extruded or intruded.

When the magma is injected into the earth's crust, it results into intrusive features such as batholiths in Nakasongola and Mubende, dykes in Busia and osukuru hills in Tororo, sills for example at kakinzi in Luweero and on Karuma falls and lapolith for example Rubanda in kisoro.

When magma is extruded on the earth's surface, it results into extrusive/volcanic features like volcanic mountains such as mt Elgon and mt Moroto, craters on mt elgon and on mt Muhavura, explosive craters like Nyamununka, Katwe and munyanyange, calderas on mt Napak, lava plateau for example kisoro, Ntungamo and Bunyonyi areas, hot springs for example Sempaya hot springs in Bundibugyo and Kitagata hot springs in Bushenyi, lava-dammed lakes like lake Bunyonyi and lake Mutanda.

ASKETCH MAP OF UGANDA SHOWING VULCANIC FEATURES.

1. COMPOSITE CONE/STRATO VOLCANO.

Composite volcanoes are large cones with fairly steep slopes, made up of alternative layers of ash and lava ejected through a central vent over a long period of time. The composite cones were formed from viscous acidic magma which passed through the vent and built up near the vent in form of a cone shaped mountain with convex slopes. Blockage of the main vent and the mountain led to the development of secondary parasitic cones on the mountain side.

Sometimes latter explosion could blow off the top to form a large crater for example. mt Muhavura and Sabinyo in south western Uganda, mt elgon in eastern Uganda.

Illustration.

2. ASH AND CINDER CONES.

Ash and cinder cones are steep sided volcanoes with successive layers of lava ash and cinder. They were formed when the material (lava) is ejected in a violent eruption which breaks it into very many fragments of various sizes ash being smaller in size to cinder.

The fragments were later laid in layers of ash and cinder, each layer representing a phase in eruption. They are usually small usually less than 3000m/100000 feet in height and frequently occur in groups for example at saramble in Kisoro.

Illustration.

3. **SHEILD VOLCANIES/LAVA CONE/BASALT DOME.**

A shield volcano is a volcano with gently sloping slopes and broad base. It is formed when fluid lava flows over a wide area before cooling down. Consequent solidification leads to the formation of a much stretched lava cone. The magma forming such a volcano comes out through several fissures. Rapid loss of gasses occurs and because lava is less viscous. It flows for a while before it solidifies. For example Virunga and Muhavura ranges in south western Uganda.

Illustration.

4. **LAVA PLATEAU.**

A lava plateau is an upland made of different layers of lava. It is formed when basic lava oozes out from several fissures in the earth's crust and spreads out over the surrounding country side before solidifying as a sheet of basalt. Repeated fissure eruption leads to the building up of a thick and high plateau which may reach 6000 feet high. For example Ntungamo, Kisoro, and Hima plains.

Illustration.

5. EXPLOSION/RING CRATERS.

An explosion crater is a circular flat-floored depression resulting from explosive volcanic eruption on the ground. Explosive craters were formed due to gaseous material ejected in a violent eruption. Violent gaseous eruption removed the overlying crystalline rocks to form a wide circular depression on the earth's surface. The fragments such as ash and dust thrown up in the air by gases later fell back down and built up a rim around a depression. For example Katwe, Nyamununka, Munyanyange, Munyampaka craters in Kasese.
Illustration.

6. MOUNTAIN CRATER.

A mountain crater is a small circular depression found on top of a volcanic mountain. They were formed during the first eruption, which made the top of the mountain to be blown off during violent eruption forming a crater. For example on mt Muhavura and mt Elgon.
Illustration.

7. CALDERA.

A caldera is a large/ wide circular depression found on top of a volcanic mountain.

A caldera on mt Napak was formed when the top of the volcano was blown off in an explosive/violent eruption leaving behind a large circular depression known as a caldera.

Illustration.

8. VOLCANIC PLUG.

A volcanic plug is a volcanic rock spine with steep sides. It is formed when very viscous lava extrudes into the earth's crust and solidifies in the vent and as a result of violent eruption it is forced to erupt onto the earth's crust to form a solid rock. E.g. Tororo rock.

Illustration.

The influence of Vulcanicity on human activities in Uganda.

Positive influence.

1. It has promoted tourism, education and research which earns Uganda foreign exchange due to the formation of beautiful features for example mt elgon and hot springs like Sempaya in Bundibugyo.
2. It encourages agriculture due to the formation of fertile volcanic soils and heavy relief rain fall received on the slopes of volcanic mountains for example the growth of Arabic coffee on the slopes of mt Elgon in Mbale, Sironko and Manafwa.
3. It has boosted fishing on the lava dammed lakes like Mutanda in kisoro and Bunyonyi in Kabale hence providing employment opportunities.
4. Vulcanicity has promoted mining since it led to exposure of precious mineral salts for example salt from Lake Katwe and lime stone from the Tororo rock.
5. It has promoted wild life conservation of biodiversity due to the presence of forests which are habitats for wild animals for example in Mgahinga national park and mt Elgon national park.
6. It has promoted the development of water transport on the lava dammed lakes like Mutanda in kisoro and Bunyonyi in Kabale.
7. It has created potential sites for the generation of hydroelectric power for domestic and industrial use like Karuma falls (sill) on River Nile and geothermal electricity at hot springs like Sempaya in Bundibugyo and Kitagata in Bushenyi.
8. It has promoted lumbering due to the presence of forests resulting from fertile volcanic soils and heavy rainfall for example Mt elgon forests and Mgahinga forests.
9. It has promoted hunting and food gathering for example wild honey for people living near volcanic mountains like Mbale on mt Elgon, Mgahinga forests, Mt Kadam forests

Negative influence.

1. The steep slopes of volcanic mountains have encouraged soil erosion which leads to loss of fertile soils hence discouraging agriculture for example in Bududa, Mbale and bulamburi on mt Elgon.
2. The steep slopes of volcanic mountains have encouraged landslides which have led to loss of lives and property discouraging settlement and agriculture for example in Bududa and bulamburi on mt elgon.
3. Some volcanic features have discouraged the construction of transport and communication networks especially roads due to steep slopes for example Mbale and Kapchorwa on the slopes of mt Elgon.
4. Volcanic mountains have created a rain shadow effect characterized by low rain fall amounts and hot temperatures which has discouraged agriculture for example Nakapiripirit on mt Elgon.
5. Volcanic areas are susceptible to flooding during rainy seasons resulting from heavy relief rainfall discouraging settlement and agriculture for example in Mbale, Kapchorwa, Sironko and Bududa on mt Elgon.
6. The young volcanic soils are very porous and easily eroded, and sometimes soils are thin discouraging agriculture in some volcanic areas like kisoro, Kabale and Mbale.
7. Volcanic land forms are hiding places for wrong elements due to the presence of thick montane forests, thus discouraging settlement for example Mt Elgon forest in Mbale.
8. Volcanic features harbours dangerous wild animals like lions and leopards in montane forests like Mgahinga forests on mt Muhavura and mt Elgon.
9. The upper slopes of volcanic mountains are cold which discourages settlement and the growth of crops for example in Mbale, Kapchorwa and on Mt Elgon.

REVISION QUESTIONS.

1. Assess the contribution of faulting to the development of Uganda.

Define faulting, give the origin of faulting, identify the features from faulting and draw a sketch map of Uganda showing the features resulting from faulting.

Give positive and negative effects of faulting giving an example of a fault land form/feature on every point.

2. (a) Describe the processes responsible for the formation of the rift valley in Uganda.

Define a rift valley, give the origin of faulting and explain the tensional and compressional theory.

Draw a diagram for each theory to show the direction of forces, rift valley and escarpment.

(b) Explain the influence of the rift valley on the climate in the surrounding areas.

Explain the influence of the rift valley on elements of climate like rainfall, temperature, atmospheric pressure, winds and humidity. Give examples of areas within the rift valley on every point.

3. (a) Examine the processes responsible for the formation of mount Rwenzori.

Identify mountain Rwenzori as a block mountain. Define a block mountain, give the origin of formation and explain the compressional and tensional theory of formation of block mountains. Draw a diagram showing direction of force, block mountain, fast and slow sinking blocks.

(b) Examine the influence of mountain Rwenzori to the development of Uganda.

Explain both positive and negative influence giving human activities and examples around mountain Rwenzori on every point.

4. Examine the importance of Vulcanicity to the development of Uganda.

Define Vulcanicity and give the origin of Vulcanicity, identify land forms resulting from Vulcanicity and draw a sketch map of Uganda showing volcanic landforms.

Explain the positive and negative importance of Vulcanicity giving an example of Vulcanicity landforms/features on every point.

5. (a) Explain the process responsible for the formation of either Mt Elgon or mt Rwenzori.

Choose a mountain and identify the type of mountain, mt elgon is a volcanic mountain, mt Rwenzori is a block mountain. DEFINE the type of mountain chosen, give the origin and explain as above in number 3(a). Don't forget to draw a diagram.

(b). Examine the influence of the mountain chosen above on the climate in the surrounding areas.

Explain the influence of the mountain on rainfall, temperature, humidity, winds and atmospheric pressure etc. giving examples of areas around the mountain chosen on every point.

6. Assess the contribution of warping to the development of Uganda.

Define warping, give the origin of warping and identify areas affected by up warping and down warping. Draw sketch map of Uganda showing down warping basins and areas affected by up warping.

Explain the positive and negative contributions of warping bringing out examples of areas affected by up warping and down warping on every point.

7. Explain the impact of faulting on the development of relief landforms in Uganda.

Define faulting, give the origin of faulting and explain the relief land forms explaining its mode of formation, illustration and example of every relief landform. I.e. Escarpments, rift valley, Grabens, block mountains (Rwenzori), fault guided valley and indirectly volcanicity.

8. Explain the impact of volcanicity on the development of relief land forms in Uganda.

Define volcanicity and give the origin of volcanicity.

Explain the relief land forms from volcanicity giving an example of each and illustration. E.g. Composite volcano, shield volcano, volcanic plug, mountain crater, calderas, lava plain and explosive crater.

9. Assess the importance of glaciation in Uganda.

Define glaciation, explain how glaciers formed, identify where glaciation occurs in Uganda (on mt. Rwenzori) and give examples of glacial erosional and depositional features.

Give the positive and then negative importances of glaciation giving examples of names of glacial features on every point.

Chapter 4.

UGANDAS DRAINAGE SYSTEM.

Drainage system refers to the various sources of water on the earth's surface in a given region or country. The major drainage features in Uganda include;

- Lakes like Victoria, Kyoga, Albert, Edward and George.
- Rivers like Victoria Nile, Albert Nil, Sezibwa, Katonga Kafu, Aswa
- Swamps/wetlands like Nabugabo and Nabajjuzi swamp in Masaka, Sango bay swamp in Rakai, Murchison bay swamp at Luzira around Lake Victoria, Nsooba, Busega and Lubigi Swamps in Kampala and others.

These drainage features cover about 41743.2square kilometers in Uganda.

ASKETCH MAP OF UGANDA SHOWING MAJOR DARINAGE FEATURES.

LAKES IN UGANDA.

A Lake is a body of water contained in a hollow/depression on the earth's surface.

Types of lakes.

Lakes in Uganda are categorized according to the mode of formation of the basin which they contain and these include.

Rift valley Lakes.

A rift valley lake is an amass of water contained in a Graben on the floor of a rift valley. They were formed as a result of secondary faulting either due to compressional forces or tensional forces acting on the rift valley floor. For example Lake Albert, Edward and George.

Tensional theory.

According to the tensional theory, heating by geochemical reactions and radioactivity beneath the earth's crust created convective currents that led to tensional forces. The tensional forces pulled the earth's crust apart leading to normal faults dividing it into several blocks. Continuous tensional forces resulted into sinking of the central block forming the rift valley. The rift valley was subjected to further tensional forces resulting into secondary faulting that led to the formation of a depression called Graben within the main rift valley. The depression was later filled with water from streams and rivers to form Lake Albert, Lake Edward and Lake George.

Illustration.

Compressional forces.

According to the compressional theory, heating by geochemical reactions and radioactivity beneath the earth's crust created convective currents. When convective currents reached the earth's crust they tended to converge leading to compressional forces that lead to secondary reversed faulting which created a smaller depression called Graben on the rift valley floor. The depression was filled with water from streams and rivers to form Lake Albert, George and Edward.

Illustration.

Crustal warped lakes.

A crustal warped lake is a body of water contained in a down warped basin crustal warped lakes were formed as a result of warping. Warping originates from convective currents generated by radioactivity and geochemical reactions beneath the earth's crust. During the formation of East Africa rift valley, the areas currently occupied by the eastern and western arms of the rift valley were uplifted /up warped. While the area in between the two up warped arms was down warped/sagged creating a broad shallow depression/basin i.e. kyoga and Victoria basins.

Due to uplift on either sides of the basin, rivers that were formerly flowing westwards such as river Katonga, River Kagera, and River Kafu reversed their direction of flow. Rivers such as Nzoia and Mara continued to flow west wards into the basin. The water from the heavy rainfall and rivers like Kafu and Victoria Nile filled Lake Kyoga while rivers like Katonga and Kagera filed Lake Victoria.

Illustration.

Volcanic lakes.

These are lakes formed as a result of volcanicity for example lava-dammed lakes like Lake Bunyonyi in Kabale, mountain crater lakes on mt Muhavura and explosive crater lakes like lake Katwe.

Explosive crater lakes.

An explosive crater lake is a mass of water contained in a circular depression resulting from explosive volcanic eruption on the ground.

They were formed due to geochemical reactions and radioactivity that generated intense heat and pressure, keeping the mantle rocks in molten state which created convective currents. The convective currents led to formation of fissures or lines of weaknesses through which magma passed to the earth's surface.

Violent gaseous eruption removed the overlying crystalline rocks to form a wide circular depression on the earth's surface. The fragments such as ash and dust thrown up in the air later fell back down and built up a rim around a depression.

The depression was filled with water from rainfall and internal springs resulting into explosive crater lakes like Lake Katwe, Nyamununka, munyanyange, Munyampaka and kikorongo in western Uganda.

Illustration.

Lava-dammed lakes.

A lava dammed lake is a body of water formed when lava blocks the flow of a river forcing it to back pond.

Lava- dammed were formed due to radioactivity producing intense heat in the interior of the earth, keeping the mantle rocks in a molten state which produced convective currents. Convective currents generated lines of weaknesses i.e. fissures. The molten rocks from the mantle were forced to rise up through the fissures/ vents which solidified forming a volcanic mountain. Successive eruption from the volcano created lava flows which blocked the river channels causing it to back pond resulting into a lake

of the same shape as the river valley for example Lake Bunyonyi Kabale and Mutanda in Kisoro, Chahafi, Gisozi in Kisoro and Mulehe in Kisoro.

Illustration.

Mountain crater lakes.

A mountain Crater Lake is an mass of water contained in a small circular depression found on the top of a volcanic mountain. Mountain crater lakes were formed as a result of geochemical reactions and radioactivity that generated intense heat keeping the mantle rocks in a molten state hence leading to convective currents. The convective currents led to the development of lines of weaknesses known as fissures and vents. The magma passed through faultiness to the earth's surface forming a volcanic mountain. The mountain crater lakes were formed during the first eruption which made the mountain summit /top to be blown off during violent eruption forming a depression known as a crater. The crater was later filled with water from rainfall to form crater lakes for example on Mt Muhavura Crater Lake, Mt Elgon Crater Lake and Lake Katunga in Bushenyi.

Illustration.

Cirque lakes /Tarns.

A cirque lake/tarn is a body of water contained in a semi- circular steep sided rock basin on a glaciated mountain. Tarns were formed as a result of glaciation. They were formed due to enlargement and deepening of the pre-glacial hollows progressively by a combination of processes like freeze and thaw, plucking, abrasion, leading to the formation of a cirque/corrie. The cirque was later filled with water from glaciers and streams forming a cirque lakes. For example Lac du Speke, Lac vert and lac Catherine on mountain Rwenzori.

Illustrations.

Lagoon lakes.

A lagoon lake is a body water separated from the main lake by materials like sand and mud as a result of marine deposition. The sand, mud, pebbles were deposited as a result of long shore drift which formed sand bars across bays. Part of the water of the lake/ sea was cut off by the sand bar and enclosed to create smaller lake. Within a lake or sea. For example lake Nabugabo on Lake Victoria.

Illustration.

Ox- bow lakes.

AN ox- bow lake is a body of water contained in a horse –shoe shaped depression formed when a meander loop is cut off as a river meanders in a plain.

Ox-bow lakes were formed due to erosion on the concave slope and deposition on the slip off slope/convex banks to produce two meander loops separated by a narrow neck of land. When the neck is eventually cut through, the meander loop forms an Ox –Bow Lake as edges are sealed –off with sediments. For example on river Rwizi and Semuliki.

Illustration.

Man-made lakes.

These are formed as barriers re constructed across rivers leading to the creation of artificial lakes called reservoirs for example Kabaka's lake and namugongo Martyrs Lake in Kampala and Lake Kibimba in butaleja. More so they can be created through man's continuous excavation into the earth's crust through carrying out a series of economic activities such as mining brick making hence creating depression which are filled with water hence forming man-made lakes.

Importances of drainage features in Uganda.

1. Drainage features act as fishing grounds which is a source of food in form of fish rich in proteins for example silver fish, tilapia and Nile perch from Lake Victoria and Kyoga.
2. Drainage features are sources of water used for domestic and industrial use for example Lake Victoria and Victoria Nile provide water used by Nile Breweries at Njeru.
3. Rivers have helped in the generation of Hydro Electric power at the waterfalls for example at Kiira Dam on the Lake Victoria Nile and Mubuku power station on river Mubuku, Nyagak power station on River Nyagak in Zombo.
4. Drainage features have promoted tourism ,research and education which earns foreign exchange to Uganda because they form a beautiful scenery for example the beautiful beaches like Nabugabo beach on lake Victoria , falls on rivers for example Murchison falls on the Victoria Nile.

5. Drainage features have promoted inland water transport and therefore facilitate both internal and external trade for example Lake Victoria connects Bukakata (Masaka) to Kalangala islands and port Bell in Uganda to Kisumu in Kenya.
6. Drainage features have helped in the modification of climate by forming convectional rainfall, which has boosted agriculture for example Lake Victoria encouraging tea growing in Buikwe.
7. Drainage features have promoted agriculture by providing water for irrigation for example Kakira sugar cane plantation uses water from Lake Victoria and Mubuku irrigation scheme uses water from river Sebwe.
8. Drainage features have promoted mining due to the presence of precious minerals for example salt from Lake Katwe, oil in Bulisa and Hoima on Lake Albert.
9. Drainage features have promoted industrialization since they provide the necessary raw materials like clay from Kajansi swamp for Uganda clays at Kajansi, fish from Lake Victoria for UGACHICK poultry feeds in Wakiso.
10. Drainage features have promoted international relationships between Uganda and other countries sharing these water bodies for example Lake Victoria shared by Uganda, Kenya and Tanzania.
11. Drainage features have promoted the growth of forests which has encouraged lumbering for example Ssesse island forests in Lake Victoria.
12. Drainage features have promoted wild life conservation and conservation of biodiversity since they act as habitats for fauna and flora for example flamingos on Lake Munyanyange in Kasere and crocodiles in Lake Edward.
13. Drainage features have promoted settlement and urbanization due to the presence of fertile soils and heavy convectional rainfall for example Jinja and Kampala around Lake Victoria.
14. Drainage features are used as dumping grounds for industrial waste products for example Lake Victoria is used as dumping ground for waste products from Nile breweries at Njeru.
15. Drainage features act as water reservoirs to control flooding by absorbing the excess water for example Lake Kyoga protects the neighboring areas like Lwampanga and Tumba from flooding.
16. Rivers and swamps have been used to demarcate district boundaries in Uganda for example Victoria Nile forms a natural boundary between Jinja and Buikwe district.

Negative importances /influence.

1. Drainage features have led to seasonal flooding during rainy seasons to the adjacent areas for example Tumba and Lwampanga on Lake Kyoga and Masese on Lake Victoria.
2. Drainage features provide habitat for dangerous wild animals which attack and sometimes kill people for example crocodiles and hippopotamuses in Lake Victoria and Lake Edward.
3. Drainage features are hiding places for wrong elements especially pirates leading to insecurity on Lake Victoria, Lake Kyoga and Lake Albert.
4. Drainage features have encouraged smuggling of goods across borders since it is difficult to monitor movement on lakes for example on Lake Victoria and Lake Albert.
5. Drainage features are breeding grounds for pests and diseases carrying vectors for example tsetse flies that spread sleeping sickness in humans in Mayuge around Lake Victoria.
6. Drainage features have led to accidents caused by storms which lead to loss of life for example on Lake Victoria, Lake Kyoga and Victoria Nile.
7. Drainage features have encourage interstate conflicts due to struggle for water resource ownership for example Mijingo island struggle in Lake Victoria between Uganda and Kenya.
8. Some lakes have led to atmospheric pollution especially lakes that produce bad smell for example Lake Nyamununka in Kasere.

9. Drainage features are a hindrance to the construction of transport and communication networks especially roads and railway for example Lake Victoria, Lake George and Lake Albert.
10. Drainage features have led to urbanization with its associated problems such as high rates of crime at kasenyi fish landing site on Lake Victoria.

REVISION QUESTIONS.

1. **Explain the factors that have influenced the drainage system in Uganda.**
 -Define drainage systems, identify the various drainage features and draw a sketch map of Uganda showing drainage features.
 -Explain the factors influencing drainage giving illustrations and examples. For example faulting led to rift valley lakes and fault guided rivers, warping led to crustal warped lakes, volcanicity led to lava dammed lakes, explosion crater lakes and mountain crater lakes, glaciation leads to formation of tarns, river erosion and deposition led to ox-bow lakes man's activities led to man-made lakes.
2. **Examine the importance of Uganda drainage system.**
 Define drainage system, identify the drainage features, and draw a sketch map showing drainage features.
 Explain the positive and negative importance of drainage features giving an example of a drainage feature on every point.
3. **Examine the importance of volcanic lakes in Uganda.**
 Define volcanic lakes, identify the origin of volcanic lakes and identify the types of volcanic lakes.
 Explain the positive and negative importance of drainage features giving an example of a drainage feature on every point.
4. (a) **Describe the process responsible for the formation of either Lake Albert or Lake Victoria.**
 Choose the lake, identify the process responsible for the formation of the lake and explain the formation of the basin which the lake occupies and later being filled by water.
 Draw an illustration for each.
 (b) **Assess the contribution of lakes to the development of Uganda.**
 Explain the positive and negative importance of lakes giving an example of a lake on every point.
5. (a) **Describe the process responsible for the formation of either Lake Katwe or Lake Bunyonyi.**
 Identify the process for the formation of the lake i.e. Vulcanicity (lake) Katwe-Explosion crater lake while lake Bunyonyi –lava dammed lakes, explain the process as seen above and draw an illustration.
 (b) **Examine the importance of the lake chosen to the people in the surrounding areas.**
 Explain the positive and negative importance of the lake chosen giving an example of the surrounding areas on every point.
6. **Explain the influence of tectonism on the formation of lakes in Uganda.**
 Define tectonism and give examples of tectonic processes like warping, faulting, volcanicity and earthquakes.
 Explain how these processes led to the formation of lakes, giving an example and diagrammatic illustration of every type of lake.

Chapter 5.

FIELD WORK.

Fieldwork refers to the scientific method of study which involves observation, recording, analysis and interpretation of various geographical phenomena of the land scape. Field work involves the systematic study of the physical and human environment and how the various geographical phenomena are interrelated.

Reasons why fieldwork is taught in schools.

1. To update the existing information due to the changing pattern of geographical phenomena such as vegetation, climate and the population patterns.
2. To acquire home and local example which in turns helps students to be familiar with their environment.
3. To equip students with skills that will be helpful in their future life for example working in the factories, ranches, being exposed to rural life etc.
4. To break monotony and boredom associated with classroom lessons due to various activities in field work like observation, measurement etc.
5. To encourage coverage of syllabus and prepare students for final examinations in fieldwork.
6. To prove what is learnt in geography classes and make geography real by observing directly what is taught in geography lessons.
7. To acquire skills necessary for future employment opportunities for example researchers.
8. To discover interrelationships between geographical phenomena for example physical-physical relationships, physical –human relationships and human –human relationships.
9. To obtain information for future reference by writing down information in form of research report.

Disadvantages of carrying out field work.

1. It is laborious since it involves many activities.
2. It is associated with accidents especially where long distances are involved.
3. There is a risk of hostility from the communities where the community doubts the aims of the research.
4. It is expensive especially where various costs are involved like transport tools. etc.
5. Un predictable changes for example political turmoil weather changes affect human life.

STAGES IN CARRYING OUT FIELD WORK.

Field work is divided into three stages i.e.

1. Pre-field study/preparation stage/before field work.
2. During field work/field work excursion/real field work/data collection/ actual field work.
3. Follow up stage/discussion stage/post field study.

1. Preparation stage.

This phase is the backbone to field excursion and it is divided into the following stages.

- a) Pilot study. This is the pre-field visit conducted before the actual field work. A pilot study must be undertaken so that the field researcher can identify and record the existing features and seek permission from the local authorities in the area of study.

A pilot study provides a sample raw material necessary for designing the topic and formulation of objectives of study.

- b) Choosing a topic of study. The field work study topic chosen should have the following features. It should be geographical i.e. the topic should be derived from the physical geography i.e. relief, drainage, soils, vegetation and human geography i.e. agriculture settlement, mining. It should show what was studied in form of a geographical relationship. It should show where the study took place in terms of a village, sub county, county and district.
- c) Formulation of objectives. Objectives are short term targets that have to be achieved in a short period of time. Field objective should be SMART, i.e. specific, measurable, Achievable, Realistic and time bound. NB. While stating objectives, we are supposed to use measurable phrases like to find out, to identify, to investigate, to assess, to examine, to suggest (only to solutions and problems.) to discover and to establish.

Do not use phrases like to know, to understand, to comprehend, to admire to see and to appreciate.

The objectives should be related to the topic of study but not a repetition of the topic of study rather a breakdown of the topic of study.

- d) Choosing/selecting methods to be used.

The methods to be used during field work should be related to the topic and objectives of the study. They include, observation, interviewing, questionnaire, measurement, pacing, sampling, Recording, Field sketching, Tabulation, Map orientation and Analysis of existing information.

- e) Selection/choosing of tools to be used. The tools selected should be in line with the methods chosen. Each method has got the necessary tools required for proper implementation of the method. Tools used include survey maps for map orientation, foot rulers/measuring tape for measuring cameras, pens, papers and clipboards etc. for recording, interview guide for interviewing and questionnaires for questionnaire method.
- f) Asking for permission from appropriate authorities.

This involves writing letters seeking official permission to visit and undertake studies in the area chosen for example in case of a ranch, permission must be sought from a ranch manager and other officials and the school.

- g) Formation of study groups.

When the number of students involved is larger, then they have to be divided into groups to encourage management and group study of geographical phenomena in the field.

h) Briefing and organizing for transport.

This is done to ensure that learners try to gather relevant information in the field and ignore what is irrelevant. Transport means are also cleared if the study involves moving long distances.

i) Departure to the area of study.

At the time of departure the researcher should ensure that he/ she has the topic of study, objectives of study and the necessary tools to be used during field work.

j) Real field work/data collection/actual field work.

This is the second stage of field work which involves application of the methods and tools selected to obtain information. Only information related to the topic and objectives should be collected. The methods used during field work.

a) Observation.

Observation involves using eyes with the help of other senses to see and interpret a geographical phenomena in the field and sort out information about them.

Advantages of observation.

- Firsthand information is got since geographical phenomena are seen directly.
- It saves time as a large field can be covered in a short term.
- It enables the researcher to develop a mental map of the area studied and therefore high chances of memorizing what the field is like.
- It is cheap because it does not involve expenditure.

Disadvantages of observation.

- It is hard to find out information that cannot be seen like historical background.
- Some important features can be left out especially when the researcher lacks proper observation skills and has sensory problems.
- Information from inaccessible places may not be obtained.
- Information obtained is largely subjective/biased depending on individual interpretation and preferences.
- It is limited by physical obstructions like dense forests, mist, fog, smoke and hilly land scape.

a) Interviewing.

Interviewing involves a face to face interaction between a researcher and respondent in the field where by the researcher asks oral questions and the respondents give oral answers.

Advantages of interviewing.

- It enables getting the required data on spot.
- It allows obtaining invisible information like historical background.
- It is very flexible because questions can be modified during the interview.
- Firsthand information is obtained which is often accurate.
- It creates the relationship between the interviewer and interviewee.

- The method can be administered to both the literate and illiterate.

Disadvantages of interviewing.

- It is affected by language barrier especially where the researcher does not understand the language being used by the local people.
- It is time consuming especially where a number of people have to be interviewed.
- Direct hostilities may occur where the people do not understand the aims of the research.
- The method is liable to exaggeration and bias.
- Some information can be left out because it is considered confidential or embarrassing for example on security and people's income.
- Many people are reluctant to spare time and give information.

b) Questionnaire method.

This involves use of predetermined questions to collect information about geographical phenomena where the researcher drafts questions and sends to a respondent to give written answers and send them back.

Advantages of questionnaire method.

- It saves time as many respondents can be reached in a short time.
- Reliable data is got since respondents answer independently.
- It is easy to administer since it can reach respondents in different ways.
- There is no risk of harassment by un cooperative respondents even when sensitive questions are asked.
- The method is suitable for obtaining information from distant places.

Disadvantages of questionnaire method.

- The method is rigid i.e. the information obtained cannot easily be changed in the absence of the respondents.
- The method is only limited to literate people who can write and read.
- Few people are willing to spare time to answer and return the questionnaires.
- The methods is expensive e.g. money is required to buy papers the questions and send them through post office and collect responses.
- It requires a lot time to formulate the questions, type them, send the questions and receive the feedback.
- The task of assessing and analyzing data is laborious because it deals with a number of people.

c) Measurement/measuring.

This involves the use of calibrated and non-calibrated instruments to establish/investigate the size, weight and area of geographical features in the field.

NB. Estimation involves the use of non-calibrated instruments to establish/ investigate size, weight area e.t.c of geographical features in the field for example pacing, using jerry cans etc. Pacing involves the use of strides to establish distance of the geographical features.

Advantages of measurement.

- It enables the researcher to establish the quantitative characteristics of geographical phenomena.
- It is flexible since different tools and techniques can be used.
- It enables making predictions about the phenomena investigated.
- Firsthand information is obtained.

Disadvantages of measurement.

- It is expensive since several instruments are required for example tape measure.
- It is laborious during conversion scale.
- It cannot be applied in inaccessible areas like flooded areas.
- Obsolete tools cannot generate accurate data.
- Faulty tools lead to wrong information obtained.
- There is always variation in paces.

d) Sampling.

Sampling involves taking part of the whole population to represent the whole/rest.

Advantages of sampling.

- It is time saving since few entities/items are chosen to represent the rest.
- It allows detailed study of the sample to be made, thus it yields a lot of information.
- Un biased data is got because the researcher comes into contact with the phenomena.
- It allows generalization to be made about other similar phenomena.

Disadvantages of sampling.

- It tends to generalize too much and some of the unique characteristics of geographical phenomena are left out.
- A sample which is not representative of the population leads to wrong conclusions.

e) Recording.

Recording refers to the writing/jotting/ noting or drawing or photographing or video covering of information in the field.

Advantages of recording.

- It is flexible and convenient since it can be done in different ways.
- It ensures a permanent record about the field for future reference.
- It enables making of inferences about the field studied.

Disadvantages of recording.

- It is expensive since it requires resource like pens, pencils, papers etc.
- It requires certain skills like drawing skills.

NB. Tabulation is a method of recoding involving summarizing of information obtained from the field in form of table.

f) Field sketching.

Field sketching is the technique of obtaining information from the field by drawing sketch maps, transects and panorama.

1. A sketch map. Should have a complete title, showing the name of the area studied and features required, a complete frame, compass direction, key/labeling and indicate the features required with their local place names. Also features should be represented by symbols and shadings and not pictures.
2. A panorama/Land scape Sketch involves sketching features in the field while standing at a view point. It should have a complete title showing the name of the area studied and features required, a complete frame, a view point, and labeling, and indicate features required in picture form. Features should be real pictures and not symbols.
3. Aline transect/cross section/transverse section/relief section should have a complete title showing name of the area studied, end points and features required, labeling/key, direction showing end points shaded land scape and features required. An arrow should touch the pictures, pictures should be drawn to represent prominent features (features with a vertical height above the ground) and an arrow should touch the ground in case of linear features (features which do not have vertical height above the ground) like a road, railway, stream etc. Pictures should touch the ground and not hang in space or enter the ground

Advantages of field sketching.

- It helps students to acquire skills in drawing sketches like sketch maps, transects and panorama.
- Sketches summarize geographical information obtained from the field.
- It ensures permanent record about the field for future reference.
- It enables the making of inferences/conclusions about the field studied.

Disadvantages of field sketching.

- The method is expensive since it requires various tools
- Un predictable changes in weather like heavy down pour may hinder the use of this method to collect information.
- Physical obstruction hinders effective application of the method.
- It is time consuming since many features are indicated.

g) Map orientation.

Map orientation involves alignment/rotating/turning of the survey map/base map so that the features on the base map tally/ match with features on the ground.

Advantages of map orientation.

- It helps in updating geographical information on a given survey map/base map.
- It helps in finding of directions of features.
- It helps in comparison of features on the map and those on the ground.

Disadvantages of map orientation.

- It is expensive to administer since it requires a lot of resources especially survey maps.

- Application of the method requires high degree of skills to interpret features on the map.

h) Analysis of existing information/library research/documentary review/literature review/documentation.

This is a method of data collection whereby the researcher gets information from existing records/ secondary sources and compares it with what is in the field at the time of study.

Advantages of documentary review.

- Information is provided in a short period of time.
- Accurate information based on research can be obtained.
- It helps in getting the back ground information about the topic of study.
- On spot observation from the field to cross check what is written

Disadvantages of documentary review.

- The existing information may be obsolete and therefore may not be useful for the field work study.
- Records may be non –existent because some people see no value of record keeping or some record is damaged for example due to poor storage

3. Follow up stage/post field study/discussion stage.

This is the third and final stage of field work. This stage is meant for re-organization of the results/information collected through data analysis, drawing accurate maps, graphs and tables.

The follow up stage involves the following activities.

- Presentation of collected data. This is where each student and group of students present what they have collected in the field.
- Making comparisons/relating of data collected. This is meant to come up with correct information and more relevant information.
- Sorting/re-organizing/re-arrangement of data collected. This is meant to re-organize dis-organized data collected in the field so that it is easily understood.
- Analysis of data collected. This is carried out to find out the relationships between the geographical phenomena and the cause of such a relationship.
- Interpreting data collected. This involves attaching meanings and significance to information collected by explaining descriptive pattern, looking for inter relationships and linkages from the data.
- Polishing of sketches. This involves re-drawing sketches which have been roughly drawn from the field adding in more relevant information.
- Drawing conclusions. This involves to find out the geographical inter- relationships in the area studied. I.e. physical to physical, human to human etc.
- Making recommendations to stake holders. Re commendations are suggested solutions to the problems faced by the people in the area of study.
- Compiling and writing a final report. This involves recording and storing what was studied, how it was studied, and organizing it in its mode of study to be easily understood.
- Dissemination of the report/data to the relevant authorities.

CASE STUDY.

Field work on a landing site.

For any field work you have conducted or carried out on a fish landing site.

1. State the topic of study.

The influence of physical factors to the growth and Development of Kasenyi fish landing site on the northern shores of lake Victoria, Nkumba parish Katabi sub county, Busihiro county Wakiso district.

2. Outline the objectives of the study.

- To find out the location of Kasenyi fish landing site.
- To find out the historical back ground of kasenyi fish landing site.
- To find out the factors for the location and growth of kasenyi fish landing site.
- To find out the physical features at and around kasenyi fish landing site.
- To find out the Land use activities around kasenyi fish landing site.
- To find out the influence of the landing site to the surrounding environment.
- To find out the fish species landed at kasenyi fish landing site.
- To find out the fishing methods used to catch fish landed at kasenyi fish landing site.
- To find out the problems facing the fisher men at kasenyi fish landing site.
- To find out the solutions to the problems facing kasenyi fish landing site.
- To find out the future prospects of kasenyi fish landing site.

3. Explain the preparations you made before going for field work.

Explain the steps you took before going for your field work.

Explain the pre-field work activities carried out before going for your field work.

Describe the activities you carried out before going for your field work.

Describe the techniques you used in preparing for your field work.

Describe how you organized for your field work.

- Our teacher and one of our class mates identified the area of study and went for a pilot study at kasenyi fish landing site to find out whether it would be possible to carry out field work and seek permission from the management of kasenyi fish landing site and assess whether the area was geographically rich.
- We formulated the topic of study which was, The influence of physical factors to the growth and Development of Kasenyi fish landing site on the northern shores of Lake Victoria, Nkumba parish Katabi Sub County, Busihiro county Wakiso district.
- We formulated the objectives of study and they included, To find out the location of kasenyi fish landing site, To find out the historical back ground of kasenyi fish landing site.
- We selected the methods to be used during our field work and these included observation, interviewing and measurement.
- We selected the tools to be used during field work and these included, pens, pencils, books, measuring tape and base map.
- We sought permission from the school administration to allow us carry out the field work.
- We were organized into groups of ten students and given tasks.
- We solicited funds and departed for our field work.

- 4. Draw a line transect/transverse section/relief section/cross section of the area studied and on it mark and name physical features and land use activities/man made features.**

5. Draw a sketch map of the area studied and on it mark and name physical features and land use activities. /man made features.

6. **Draw a panoramic view/a land scape sketch of the area studied and on it mark and name Physical features and land use activities.**

7. Describe the steps you took to collect information from your field of study

Describe the activities you carried out during your field work.

Explain the techniques you used in carrying out your field work.

Describe the methods you used to collect the information/data in your area of study.

- I used observation method. This involved the using of eyes to see with the help of other sense to interpret a geographical phenomenon. Using my eyes I saw the physical features around kasenyi fish landing site and these included; Bendegere hill, Lake Victoria, Nakasunda head land etc.
- I used interviewing method. It involves a face to face interaction between a researcher and a respondent in the field where by the researcher asks oral questions and the respondent gives back oral answers. Using the interviewing guide, I asked Mr Kawanuka Duncan the problems facing kasenyi fish landing site and he told me that they included the problem of dangerous aquatic animals that claim the life of the fisher men and fish.
- I used Questionnaire method. This involves use of predetermined questions to collect information about geographical phenomena where the researcher drafts questions and sends written questions for a respondent to give written answers. I wrote and sent the following to the field work manager and he gave us answers in a written form. What is the location of kasenyi fish landing site? It is located in the south eastern part of Abaita ababiri a nearest trading Centre. It is in Bendegere L.C.1. Zone, Nkumba parish, katabi Sub County, Busiiri county of Wakiso.
- I used measurement/measuring. This involved the use of calibrated and non-calibrated instruments to establish/investigate size, weight, area etc. of geographical features in the field. I stretched a tape measure to establish the distance covered by kasenyi beach and found that the distance was 100 metres.
- I used pacing. This involved the use of strides to estimate and establish distance, length of the geographical features. I took strides along kasenyi market to kasenyi pier and it was 100 metres.
- I used sampling. This involved taking part of the whole population to represent the whole/rest of the population. Using a hoe, and spade, I picked part of the soil from kasenyi shore and found out that it was sandy.
- I used recording. This involved writing/jotting/noting down of information got in the field. Using a pen and paper, I wrote down the problems faced by the fisher men at Kasenyi fish landing site which included; dangerous aquatic animals shortage of food and accommodation.
- I used field sketching. This is the technique of obtaining information from the field by drawing sketches such as sketch maps, line transects, panoramas, I used a pencil and paper and drew the sketch map of the area around kasenyi fish landing site showing physical features and land use activities as seen bellow.(make sure you draw any)
- I used map orientation. This involves aligning/rotating/turning the survey map/base map so that the features on the base map tally / match with features on the actual ground. We turned the base map of Wakiso while standing at Nakasunda headland until kasenyi fish landing site matched with that on the ground and found out that kasenyi landing site is on the northern shore of lake Victoria.
- We used analysis of existing information/library research/documentary review/literature review/documentation. This is a method of data collection where by the researcher gets information from already existing information from existing records/secondary sources and compares it with what is in the field at the time of study. We read about historical

background of kasenyi fish landing site in research report by Matovu Francis and found out that the name kasenyi was a result of the eroded fine sand along the shore line and it has been used since the early 1960s.

8. Explain the merits of using the above methods.

- Using observation method, I got first-hand information since geographical features were seen directly.
- Observation was time saving since a large field was covered in a short time.
- Observation was cheap because it did not involve expenditure.
- Interviewing enabled me getting the required data on the spot.
- Interviewing enabled me to obtain invisible information like historical background.
- Interviewing was very flexible because questions were modified during the interview.
- Questionnaire method was time saving as many respondents were reached in a short time.
- Reliable data was got while using questionnaire since respondents answered independently.
- Questionnaire method was easy to administer since it reached respondents in different ways.
- Measurement was flexible since different tools and techniques were used.
- Measurement enabled making predictions about phenomena investigated.
- Firsthand information was obtained using measurement since tools were used.
- Sampling was time saving since few entities/ items were chosen to represent the rest.
- Un biased data was got using sampling because I came into contact with the phenomena.
- Sampling allowed generalization to be made about other similar phenomena.
- Using documentary review, information was provided in a short period of time.
- Accurate information based on research was obtained using documentary review/documentation.
- Documentary review helped in getting the back ground information about the topic of study.

9. Explain the demerits of using the above methods.

Explain the problems/ challenges you encountered while using the above methods during the field work.

Explain the limitations of using the above methods during the field work study.

Explain the problems/challenges you encountered during your field work.

Explain the limitations of your field work study.

- I faced the problem of language barrier while using interviewing since my respondents the fishermen only knew Luganda and therefore I failed to get the problems facing fisher men at kasenyi fish landing site.
- We faced the problem of un co-operative respondents while using interviewing at kasenyi market and therefore, we failed to get the historical background of kasenyi market.
- We faced a problem of loss of questionnaires while using questionnaire method due to disappearance of respondents and therefore we failed to get information on the historical back ground of kasenyi fish landing site.
- We faced a problem of physical obstruction by Bendegere forest while using observation method and therefore we failed to identify the land use types in Bendegere village.
- We faced a problem of inaccessibility due to the presence of Bendegere forest while using recording method and we failed to write down the land use activities in Bendegere village around kasenyi landing site.

- We faced a problem of noise pollution by kasenyi boat factory while using interviewing/ recording and therefore, we failed to hear/ note down the problems facing fisher men at kasenyi fish landing site.
- We faced the problem of sudden weather changes due to heavy down pour while using recording method which destroyed our writing materials and therefore we failed to write down the future prospects of kasenyi fish landing site.

10. Explain the skills you obtained from your field work study.

- We gained the skill of interviewing by asking respondents oral questions and they gave us oral answers for example we asked Mr. Kawanuka Duncan the location of Bendegere hill and he told me that it is found in Nkumba Parish, Wakiso District.
- We gained We gained the skill of observation by using my eyes to see physical features for example Bendegere hill north east of kasenyi fish landing site.
- I gained the skill of measuring by stretching the tape measure to find the distance from Kasenyi market to the pier which was 50 metres.
- We gained the skill of sampling by using a hoe to pick part of the soil from kasenyi beach which we found out that it was mainly sandy soil.
- we gained the skill of recording by using a pen and paper to write down information in the field for example I wrote down physical features around kasenyi fish landing site like Bendegere hill north east of kasenyi fish landing site
- We gained the skill of field sketching by drawing the sketch map of the area around kasenyi fish landing site showing physical features and land use activities as seen below (draw it and show some features).

11. Describe the follow up activities carried out after fieldwork

Or, what were the post-field activities carried out during the study

Or, explain how you processed data during the study.

- We presented our data collected by the different groups for example group 1 presented the location of Kasenyi fish landing site i.e. Katabi Sub-county, Wakiso District.
- We compared data collected by the various groups for example concerning the distance from Kasenyi market to Kasenyi pier and we finally concluded that it was 100metres.
- We reorganized data collected which only included the required information to be compiled following our topic and objectives of study.
- We polished our field sketches by redrawing the sketch map around Kasenyi fish landing site and included Nakasunda headland which was missing.
- We wrote a fieldwork report concerning what we studied at Kasenyi fish landing site, how we studied it and the results obtained from the study.
- We drew conclusions from the field by giving geographical relationships. For example we concluded that the presence of Bendegere hilltop has encouraged the establishment of MTN telecommunication masts due to high altitude which ensures easy transmission of signals.
- We made recommendations to the people of Kasenyi fish landing sites for example we advised farmers on Bendegere hill to carry out terracing so as to control soil erosion.
- We disseminated the findings of the study to the relevant authorities for example one of our fieldwork report was handed over to the head of department.

12. Explain the conclusions you made after fieldwork study

OR, explain the significance of the fieldwork study

OR, to what extent was the fieldwork study geographical

OR, what was the geographical significance of the fieldwork study?

OR, what were the outcomes/results of the fieldwork study?

OR, how did the fieldwork study help you to understand the geography of the area?

OR, how was the fieldwork study a sample of the environment?

OR, Explain the data of collected.

OR, Explain the findings of your study.

OR, Outline the conclusions of your field work study.

Physical- physical relationships

- The presence Bendegere hill in the north of Kasenyi landing site has encouraged the growth of Bendegere natural forest because of the presence of deep fertile soils.
- The presence of Lake Victoria in the south of Kasenyi fish landing site has favoured the growth of Kasenyi papyrus vegetation due to water logging conditions.
- Victoria basin has favoured the formation of L. Victoria since it is a depression. L. Victoria is a source of fish.
- The gentle slopes of Bendegere hill have favoured the formation of fertile soils due to deposition. This has promoted agriculture hence providing food to the fishermen.
- L. Victoria has favoured the formation of Kasenyi beach due to wave deposition. This has favoured the loading and off-loading of the fishing boats.
- L. Victoria has favoured the formation of bays and headlands due to wave erosion. These are breeding grounds for fish.
- Steep slopes on Bendegere hill have favoured the growth of Bendegere tropical forests due to their fertile soils. This has promoted the boat making industry since the forest is a source of wood.

Physical-human relationships

- The presence of gentle slopes of Bendegere hill in the north of Lake Victoria has encouraged settlement at Bendegere village due to easy construction of houses
- The presence of Lake Victoria in the South of Kasenyi fish landing site has encouraged water transport due to the presence of water.
- The presence of Bendegere forest in the north of Kasenyi fish landing site has encouraged the growth of Kasenyi boat making factory due to the presence of commercial tree species like Mvule.
- Gentle slopes of Kasenyi have favoured the construction of Nabagereka road due to easy mechanization which is used to transport fish.
- Gentle slopes of Kasenyi have favoured the establishment of Kasenyi market due to easy mechanization. This is where fish is sold.
- L. Victoria has promoted fishing activities since it is a fishing ground. This has improved people's standards of living.
- Gentle slopes of Kasenyi have attracted dense settlements since they are easy to construct. These act as market for the fish.
- Bendegere forest has favoured the establishment of Kasenyi boat making workshop since it is a source of raw materials, these boats are used for fishing.

Human-human relationships

- The presence of Nabagereka road in the north of Kasenyi fish landing site has encouraged settlement at Kasenyi due to easy accessibility.
- The presence of Kasenyi boat making factory in the north of Kasenyi fish landing site has attracted dense settlement at Kasenyi due to provision of employment opportunities.
- The presence of dense settlement at Kasenyi has encouraged the growth of Kasenyi market because of provision of ready market for goods

- The existence of Nabagereka road has attracted linear settlement due to easy accessibility. This is a source of market for the fish.
- Settlements at Kasenyi have favoured the establishment of Kasenyi market due to either high purchasing power. This has promoted selling and buying of fish.
- Lumbering in Bendegere forest has promoted Kasenyi boat making workshop since it provides a raw materials. This has promoted the fishing activities.
- Existence of Nabagereka road has favoured the establishment of Kasenyi market due to easy accessibility. Where fish landed at Kasenyi fish landing site is sold and bought.

13. Explain the relationship between the physical environment and land use activities in the area studied

- The presence of gentle slopes of Bendegere hill in the north of Kasenyi fish landing site has encouraged settlement at Bendegere due to easy construction of houses
- The presence of fertile soils of Bendegere hill in the north of Kasenyi fish landing site has encouraged the growth of coffee and bananas in Bendegere village since these crops require deep fertile soils to grow well.
- The presence of Bendegere forest in the north of Kasenyi fish landing site has encouraged lumbering due to the presence of valuable tree species like Mahogany.

14. Explain the relationship between physical features and land use activities in the area studied.

- The presence of gentle slopes of Bendegere hill in the east of Kasenyi fish landing site has encouraged settlement at Bendegere village due to easy construction of houses
- The presence of Bendegere forest in the north of Kasenyi fish landing site has encouraged lumbering due to the presence of valuable tree species like Mahogany.

15. Explain the relationship between relief and land use activities in the area studied.

- The presence of gentle slopes of Bendegere hill in the north of Kasenyi fish landing site has encouraged settlement at Bendegere due to easy construction of houses
- The presence of Bendegere hilltop has encouraged the establishment of MTN telecommunication masts due to high altitude which ensures easy transmission of signals.
- The presence of steep slopes of Bendegere hill in the north of Kasenyi fish landing site has encouraged stone quarrying due to the presence of outcrop rocks
- The presence of gentle slopes of Kasenyi in the north of Kasenyi fish landing site has encouraged the construction of Nabagereka road due to low cost of construction.

16. Assess the impact of the fish landing site on the environment

OR, Assess the impact of the fish landing site on the development of the surrounding areas.

NB. Give both positive and negative effects giving an example in terms of place name/direction.

Positive impacts include;

- It has encouraged growth and development of Kasenyi trading Centre in the north of Kasenyi fish landing site because of increased population.
- It has facilitated the development of infrastructure like Nabagereka road in the north of Kasenyi fish landing site.
- It has provided market for goods sold in Kasenyi market for example agricultural products like potatoes and domestic items.

- It has provided employment opportunities to the people for example fishermen in Lake Victoria in the South of Kasenyi fish landing and shop attendants in Kasenyi market in the north of Kasenyi fish landing site
- It has encouraged the development of industries for example Kasenyi boat making factory in the north of Kasenyi fish landing site.
- It is a source of government revenue through taxing people employed for example as fishermen in Lake Victoria south of Kasenyi fish landing site and business men in Kasenyi market in the North of Kasenyi fish landing site.

Negative effects include;

- It has led to pollution of water, land and air from industries for example Kasenyi boat factory in the north of Kasenyi fish landing site.
- It has led to urban related problems like prostitution and robbery in Kasenyi trading Centre due to increased population
- It has led to deforestation due to infrastructural development for example Kasenyi forests were destroyed to establish Kasenyi market.
- It has led to competition for labour with other sectors like agriculture in Nkumba and Bendegere village living these sectors underdeveloped.
- It has led to increased school drop out to join fishing activities for example from Bendegere village and Nkumba.
- It has led to rural-urban migration with its negative effects for example from Nkumba to Kasenyi fish landing site.

17. Explain the impacts of the growth of the landing site on the physical environment.

NB. Give both positive and negative effects giving an example in terms of place name/direction on every point

Positive effects include;

- Afforestation on Bendegere hill north of Kasenyi fish landing site has promoted the modification of the local temperatures to global warming through releasing moisture to the atmosphere.
- Application of manure in Bendegere village north of Kasenyi fish landing site has helped to improve soil fertility.
- Contour ploughing on Bendegere hill has helped in controlling soil erosion hence improving soil fertility.
- Afforestation in in Bendegere hill has helped in increasing the green vegetation cover.

Negative effects include

- Lumbering in Bendegere forest north of Kasenyi fish landing site has led to destruction of vegetation cover
- Industrialization at Kasenyi boat factory north of Kasenyi fish landing site has led to environmental pollution from the wood dust which has affected human health.
- Settlement on Bendegere hill north of Kasenyi fish landing site has led to destruction of Bendegere forest leading to loss of vegetation cover
- The construction of Nabagereka road in the north of Kasenyi fish landing site has led to destruction of Kasenyi forest leading to destruction of vegetation cover.
- Stone quarrying on Bendegere hill north of Kasenyi fish landing site has led to destruction of landscape by creating depressions.

18. Explain the problems faced by the people using the fish landing site.

NB. Explain how a problem leads to a problem.

- Poor sanitation leading to diseases like cholera and dysentery which have affected human life.
- Remoteness of the area of Kasenyi landing site with poorly developed roads has discouraged movement of goods by Kasenyi traders to the landing site.
- Limited fish stock as a result of overfishing in Lake Victoria has led to low fish catch leading to low levels of income.
- Perishability of the fish due to traditional fish preservation methods like smoking which lead to losses.
- Price fluctuation due to over production has discouraged fishermen in Lake Victoria to produce more fish.
- Low incomes among fishermen in Lake Victoria leading to use of poor methods of fishing which are highly inefficient leading to low output.
- Limited research conducted by the fishermen in Lake Victoria has led to low fish catch
- Rugged terrain for example due to Bendegere hill has discouraged the construction of roads to deliver fish to the market centers.
- Siltation of Lake Victoria has led to reduction in breeding grounds for fish leading to low fish catch.
- Insecurity due to pirates in Lake Victoria and robbers in Kasenyi Trading Centre who destabilise peace.
- Changes in water levels leading to fluctuation in fish catch hence leading to fluctuation in incomes.

19. Describe the recommendations you made to the people using the fish landing site.

NB. Give solutions to the problem, showing the problem and solution

- We advised the fishermen at Kasenyi fish landing site to carry out market research to expand the market for fish their fish.
- We advised the police force at Kasenyi police station to carry out more operations to promote security in Kasenyi trading Centre.
- We advised fishermen at Kasenyi landing site to improve on fishing methods to increase fish catch and increase on their income.
- We advised fishermen at Kasenyi fish landing site to improve on fish preservation methods to reduce losses.
- We advised traders at Kasenyi market to ensure proper disposal of garbage to solve the problems resulting from poor sanitation.
- We advised the residents of Kasenyi market to boil water to prevent waterborne diseases like Cholera.

20. Give the impact of human activities on the physical environment in your area of study. Suggest the negative effects of the human activities on the environment in your area of study.

Negative

- Vegetation destruction due to lumbering activities during boat making.
- Air pollution due to the smoking of fish.
- Water pollution due to the use of poor fishing method e.g. using boat engines with spills.
- Soil exhaustion due to monoculture i.e. Bendegere forest.
- Loss of vegetation/ Destruction of the soil texture due to food construction.
- Loss of bio diversity due to lumbering activities during boat making.
- Loss of the beautiful scenery during road construction.

Positive

- Planting of trees to control soil erosion.
- Increase in soil fertility due to use of fertilizers.
- Controlled overfishing due to use of standard nets.
- Control of floods due to constant dredging.

Chapter 6.

UGANDAS CLIMATE.

Climate is the average weather condition of the atmosphere of an area recorded over a long period of time of at least 30-35 years.

Weather on the other hand refers to the state or condition of the atmosphere of a given place at a particular time.

Climate is obtained after studying weather elements such as rainfall, temperature, wind, atmospheric pressure, cloud cover, humidity and sunshine for a long period of time.

TYPES OF CLIMATE IN UGANDA.

The major types of climate in Uganda include;

- a) Equatorial climate in Jinja, Entebbe, Kampala, Buikwe, Wakiso
- b) Modified equatorial climate/montane climate in Bundibugyo, Mbale, and Kabale. etc.
- c) Tropical savannah climate in Gulu, Lira and Masindi.
- d) Semi-desert climate in Kaabong, Kotido, Moroto, Kiruhura and Lyantonde.

ASKECTH MAP OF UGANDA SHOWING CLIMATIC REGIONS.

(a) Equatorial climate.

This is type of climate found around Lake Victoria for example in Masaka, Entebbe and Kampala.

Characteristics of Equatorial climate.

- Heavy rainfall is received and is well distributed throughout the year with rainfall totals between 1200mm-2000mm per annum on average.
- Bi-modal pattern of rain fall is received i.e. double maxima with peaks in April and October.
- Convectional rainfall is usually received during the afternoons and evening accompanied by thunderstorms and lightening.
- Temperatures are generally hot ranging between 25-28 on average
- The diurnal range of temperature is small about 2-3 on average.
- Humidity is very high throughout the year due to high rates of evapotranspiration from water bodies and plants and relative humidity is about 80%.
- The area is dominated by air masses that converge at the ITCZ because there is low pressure due to hot temperatures.
- There is thick cloud cover throughout the year due to high rates of evaporation and condensation

(b) Montane climate/alpine climate/modified equatorial climate.

This is confined in the mountainous areas for example Mbale, Manafwa, Sironko on mountain Elgon, Kabale and kisoro on mt Muhavura, kasese and Bundibugyo on mt Rwenzori.

Characteristics of montane climate.

- Heavy rain fall of above 1500mm per annum is received on the wind ward sides of mountains.
- Low rain fall amounts are received on the lee ward sides of the mountains.
- Temperatures decrease with an increase in altitude at the rate of 1 oc for every 100 metres of ascend.
- Atmospheric pressure reduces with altitude.
- Relative humidity is high throughout the year.

(c) Tropical savanna climate.

This covers the biggest percentage of the total land area of Uganda in areas like Soroti, kumi, Gulu, Arua, Hoima, Masindi.

Characteristics of tropical savannah climate.

- Moderate rainfall is received ranging between 750-1500mm per annum.
- The area experiences alternate wet and dry season with rainfall season extending from April to October.
- Rain fall is mainly received in summer and winters are normally dry.
- Temperatures re generally hot ranging between22-28.
- The summers are hot with temperatures above 26 while winters are warm with temperatures usually about 15
- The annual temperature range is moderate between7-10.
- There is a large diurnal range of temperature 14-17.
- Humidity is high during the wet season and low during the dry season.
- There is heavy cloud cover towards the equator and less cloud cover towards the semi desert.

(d) Semi-desert climate.

This is found in Karamoja region i.e. Kabong, Kotido, Moroto, Ankole- Masaka dry corridor in Kiruhura, Lyantonde and in parts of Kasese and Nakasongola.

Characteristics of semi-desert climate.

- Low rainfall amount of less than 750mm per annum is received, which is un evenlly distributed.
- The areas receive unreliable/ seasonal rain fall.
- Hot temperatures of above 30 are experienced with a high diurnal temperature range of about 10
- There is no definite wet season.
- Relative humidity is very low usually less than 25% because of intensive dry skies and low level of evapotranspiration.
- The areas experience a long dry season of over 9 month and a short wet season of about 3 month.
- The air is dry due to constant dry winds blowing across the area.
- Little or no rainfall circumstances are evidenced.
- The areas are characterized with cloudless skies.
- The area is characterized with low atmospheric pressure.

Factors influencing the climate of Uganda.

1. The distance from the sea/water bodies like lakes.
 - Areas near water bodies like Lake Victoria experience equatorial climate characterized by heavy rainfall of above 1500mm per annum and hot temperatures ranging between 25-28 in areas like Mukono, Jinja, Masaka, and Entebbe. This is because the lake has contributed to the formation of convectional rainfall through evapotranspiration and due to the influence of land and lake breeze which create a simple convergence zone leading to rain fall formation.
 - The land and lake breeze also makes the areas around water bodies humid for example Kampala, Entebbe and Jinja around Lake Victoria.
 - While those areas with limited water bodies like Kotido, Kaabong and Moroto receive low rainfall amounts less than 750 per annum with very hot temperatures of above 30.
2. Relief/Topography.
 - Mountainous/highland areas receive heavy orographic rain fall on the wind ward sides for example Mbale, Manafwa, Bududa and bulamburi on mt Elgon. This is due to their ability to disrupt moist winds forcing them to rise, condense and form relief rain fall, which is mainly received on wind ward sides. On the other hand low rain fall amount is received on the leeward sides for example Kasese on Mt Rwenzori, Nakapiripirit on Mt Elgon.
 - Plateau areas receive moderate rainfall due to their relatively fat nature, which does not significantly disrupt moisture bearing winds for example in Soroti, Luweero, Isingiro, Gulu, Apac, Arua, and Masindi
 - Low lands especially the rift valley floor have a general absence of highlands to trap the winds and therefore receive low rainfall amounts and they are characterized by descending winds which become heated adiabatically leading to very hot temperatures for example in Butiaba, Bulisa, Ntoroko and parts of kasese.
3. Altitude.
 - High altitude areas have cool temperatures since temperatures decrease with altitude at the rate of 1 for every 100 metres ascend for example Bundibugyo, Kabarole, parts of kasese on mt Rwenzori, Mbale, Kapchorwa, Manafwa, Bududa and Kwen on mt Elgon , Kabale and kisoro on Mt Muhavura.

- On the other hand, low altitude areas experience hot temperatures for example Butiaba, Bulisa, Ntoroko Katwe, and Muhokya since they are characterized by descending winds which are heated adiabatically.
- 4. Influence of prevailing winds.** The climate of Uganda is affected by three major prevailing winds.
 - The north east trade winds blowing from Saudi Arabia through Somalia, Ethiopia, to North West Kenya to Karamoja districts of Kaabong Kotido and Moroto. It is a dry wind responsible for the dry conditions/ low rainfall amounts in the region.
 - The south east trade winds from the Indian Ocean is a moisture laden wind responsible for heavy rain fall around Lake Victoria in Jinja, Mukono, Kampala and Entebbe.
 - Equatorial westerlies from Democratic Republic of Congo are moisture laden winds responsible for heavy rainfall on the western slopes of highlands in western Uganda for example Bundibugyo on Mt. Rwenzori and Kisoro on Mt Muhavura.
- 5. Latitudinal location.**
 - Areas which lie across or near the equator experience equatorial climate where heavy rainfall is received, which is distributed throughout the year with a double maxima in April and October due to apparent overhead sun and the temperatures are warm above 21 due to high altitude of the sun throughout the year in areas like Entebbe, Masaka, Kampala and Jinja.
 - On the other hand, areas which are far away from the equator receive moderate seasonal rainfall ranging between 750mm-1500mm per annum received mainly from April to September and dry season from October to march for example in Gulu, Lira, Soroti, Kitgum and Amuru
- 6. Vegetation Cover.**
 - Areas with large tropical rain forests receive heavy rainfall due to evapotranspiration from swamps and forests and temperatures are modified by the moisture released by forests like Budongo forest in Masindi, Mabira forest in Buikwe and South Busoga forests in mayuge.
 - Areas with savannah grassland vegetation receive moderate rainfall ranging between 750mm-1500mm per annum due to limited rate of evapotranspiration for example Soroti, Kumi, Lira, Amuru and Gulu.
 - Areas with scanty vegetation cover for example the dry bush savannah in Kaabong, Kotido, Moroto, Lyantonde and Kiruhura experience dry condition with low rainfall amounts received below 750 per annum due to limited evapotranspiration.
- 7. Global warming/Climate changes,**
 - As a result of climate changes the planetary/global winds carry moisture from the melting ice sheets of the Polar Regions to the low latitudes where Uganda lies. They drop it as heavy rainfall resulting into El-Nino for example in Mukono, Luweero and Kampala in 1997/1998 or periods of drought (La-Nino).
- 8. Human activities.**
 - Human activities like settlement, industrialization and construction of transport route, swamp reclamation and agriculture have resulted into the destruction of forests which has resulted into low rainfall formation for example Mabira forest in Buikwe destroyed by sugar corporation of Uganda limited(SCOUL), reclamation of kiruruma swamp in Kabale.
 - On the other hand man's activities like afforestation for example Mafuga and Muko forests in Kabale and katuugo forest in Nakasongola and the government policy of gazetting forests as forest reserves and wild life reserves such as Mabira forest in Buikwe, Mt Elgon forests in Mbale has led to preservation of forests that have encouraged rainfall formation.

RAIN FALL DISTRIBUTION IN UGANDA.

Rain fall distribution refers to the spread out of rainfall amounts over different areas in a given period of time.

The rain fall amounts in Uganda is un evenly distributed, some areas receive heavy rainfall, moderate rainfall or low rainfall amounts.

- Areas receiving heavy rain fall of over 1500mm per annum include ,Kalangala, Entebbe, Kampala, Buikwe, Jinja and Mukono in central Uganda, Mbale, Manafwa and Bududa on mountain Elgon, Kisoro, Kabale, and Rukungiri on the Kigezi highlands.
- Areas receiving moderate rain fall of between 1000-1500mm per annum include Luweero, Mpigi, Soroti, Kumi and Lira.
- Areas of low rain fall amount of below 750mm per annum include, Kaabong, Kotido, Nakapiripirit and Moroto in Karamoja region, Ssembabule, Rakai, Kiruhura and Lyantonde in Ankole- Masaka dry Corridor , Nakasongola In central Uganda and Ntoroko, Bulisa and Kasese in the rift valley region.

ASKETCH MAP OF UGANDA SHOWING RAIN FALL DISTRIBUTION.

Factors influencing rain fall distribution in Uganda.

1. The distance from the water bodies like lakes.
 - Areas near water bodies like Lake Victoria receive heavy rainfall of above 1500mm per annum in areas like Mukono, Jinja, Masaka, Kampala and Entebbe. This is because the lake has contributed to the formation of convectional rain fall through evaporation and due to the influence of land and sea breeze which create a simple convergence zone leading to rainfall formation.
 - While those areas with limited water bodies like Kotido, Kaabong and Moroto receive low rainfall amounts less than 750MM per annum due to limited evapotranspiration.
2. Relief/Topography.
 - Mountainous/ highland areas receive heavy orographic rainfall on the wind ward side for example Mbale, Manafwa, Bududa, Bulamburi on Mt elgon and low rain fall amount on the leeward sides for example Kasese on Mt. Rwenzori and Nakapiripirit on Mt Elgon .This is due to their ability to disrupt moist winds forcing them to rise, condense and form relief rainfall which is mainly received on the wind ward side.
 - Plateau areas receive moderate amount of rainfall due to their relatively flat nature, which does not significantly disrupt moisture bearing winds for example in Soroti, Luweero, Isingiro, Gulu, Apac, Arua and Masindi.
 - Lowlands especially the rift valley floor have a general absence of highlands to trap the winds and therefore receive low rainfall amounts for example in Butiaba, Bulisa, Ntoroko and parts of Kasese.
3. Influence of prevailing winds.
 - The north east trade win ds blowing from Saudi Arabia through Somalia, Ethiopia to North West Kenya to Karamoja districts of Kaabong Kotido and Moroto. It is a dry wind responsible for the dry conditions/low rainfall amounts in the region.
 - The south east trade winds from the Indian Ocean is moisture laden wind responsible for heavy rain fall around Lake Victoria in Jinja, Mukono, Kampala and Entebbe.
 - Equatorial westerlies are moisture laden winds responsible for heavy rainfall on the western slopes of highlands in western Uganda for example Bundibugyo on mount Rwenzori and Kisoro on mount Muhavura
4. Latitudinal location.
 - Areas which lie across or near the equator receive heavy rainfall, which is distributed throughout the year with double maxima in April and October due to the apparent overhead sun which creates low pressure zones (ITCZ) due to high altitude of the sun throughout the year in areas like Entebbe, Masaka, Kampala and Jinja.
 - On the other hand „areas which are far away from the equator receive moderate seasonal rainfall ranging between 750mm-1500mm per annum received mainly from April to September and dry season from October to march for example in Gulu, Lira, Soroti.
5. Vegetation.
 - Areas with large tropical rain forests receive heavy rainfall due to evapotranspiration form swamps and forests and temperatures are modified by the moisture released by forests like Budongo in Masindi, Mabira in Buikwe and Bugoma in Hoima.
 - Areas with swamps, grassland vegetation receive moderate rainfall ranging between 750mm-1500mm per annum due to moderate rate of evapotranspiration for example Soroti, Kumi, Lira, Amuru and Gulu.

- Areas with scanty vegetation cover for example the dry bush savannah in Kaabong, Kotido, Moroto, Lyantonde and Kiruhura experience dry conditions with low rainfall amounts received below 750mm per annum due to limited evapotranspiration.
- 6. Global warming/Climatic changes.**
 - Due to the climate changes, the planetary/ global winds carry moisture from the melting ice sheets of the Polar Regions to the low latitudes where Uganda lies. They drop it as heavy rainfall resulting into EL-Nino or periods of drought (La-Nino) for example in Mukono, Luweero and Kampala in 1997/1998.
- 7. Human activities.**
 - Human activities like settlement, industrialization, construction of transport route, swamp reclamation, Agriculture have resulted into the destruction of forests which has resulted into low rainfall formation for example Mabira forest in Mukono destroyed by scoul, reclamation of kiruruma swamp in Kabale.
 - On the other hand , man's activities like afforestation for example at Mafuga and Muko forests in Kabale and Lendu forest in Nebbi and the Government Policy of gazzetting forests as forest reserves and national parks such as Mabira forest in Buikwe, Mt Elgon Forests in Mbale has led to preservation of forests that have encouraged rainfall formation.

CLIMATE CHANGE.

Climate change refers to the shift in the global temperatures and precipitation over time. The indicators of climatic change include; unreliable rainfall, changing seasons, increase in temperatures, Frequent floods declining glacial coverage in mountainous areas, drying vegetation, aridity and desertification.

ARIDITY AND DESRTIFICATION IN UGANDA.

Aridity refers to a geographical phenomenon when the rate of evapotranspiration exceeds the rate of precipitation leading to insufficient moisture in the soil. It results from prolonged deficiency of rains, imbalance in the hydrological cycle or excessive evapotranspiration.

Desertification refers to the extension of the desert-like/arid- like conditions such as increased/hot temperatures, reduced rainfall, strong dry winds, low humidity and less cloud cover to areas that were not originally having them.

The major areas in Uganda experiencing desertification and aridity include Kaabong, Kotido, Moroto, and Nakapiripiriti in north eastern Uganda Nakasongola and Kiboga in central Uganda, Ntoroko, and Parts of kasese Butiaba, Bulisa on the rift valley floor (Albert flats), Rakai, Ssembabule, Kiruhura, and Isingiro in the Ankole- Masaka dry Corridor.

ASETCH MAP OF UGANDA SHOWING AREAS AFFECTED BY ARIDITY/ DESERTIFICATION.

CAUSES OF ARIDITY AND DESERTIFICATION IN UGANDA.

Physical factors.

1. Relief. Highlands and mountains create arid conditions on their leeward side due to dry descending winds for example Kasese on mt Rwenzori and Nakapiripiriti on MT Elgon.
2. Pests and diseases lead to destruction of vegetation leading to reduction in rainfall for example periodic invasion of locusts in Masindi, Kotido and Kaabong.
3. The effect of dry prevailing winds which lead to dry conditions in the adjacent areas for example the north East Trade winds sweeping over the Karamoja region in Kaabong, Moroto and Kotido.
4. Destructive effects of wild animals which destroy vegetation cover leading to reduction in rainfall for example Buffaloes and Elephants in Queen Elizabeth National Park n Kasese.
5. The scanty vegetation cover leads to low rates of evapotranspiration leading to low amount of rainfall for example in Kaabong, Moroto and Kotido.
6. Limited occurrence of surface water which discourages the growth of vegetation leading to low rate of evapotranspiration and low amounts of rainfall for example in Nakasongola, Kotido and Kaabong.
7. Low altitude for example the rift valley region leads to dry conditions due to winds passing over the trough for example in Ntoroko, Bulisa, parts of kasese and Butiaba
8. Global warming due to increased emission of greenhouse gases in the atmosphere, which has led to reduction in rainfall amounts and increased temperatures for example in Kaabong, Kotido and Moroto.
9. Occurrence of wild fires set by lightening has led to the destruction of forests thus affecting rainfall formation for example in Kaabong, Kotido and Moroto.

Human factors.

10. Agricultural activities which have led to destruction of vegetation affecting rainfall formation for example overgrazing in Kaabong, Moroto, Kotido.
11. Lumbering leading to destruction of forests and reduction in rainfall formation for example part of Mabira forest in Buikwe, Budongo forest in Masindi and Bugoma forest in Hoima.
12. Wood extraction leads to destruction of forests and wetlands leading to reduction in rain fall formation for example charcoal burning in Nakasongola, Kiruhura, Rakai and Lyantonde.
13. Mining activities have led to destruction of vegetation and wetland leading to reduction in rainfall formation for example sand quarrying in Lyantonde and clay mining at Kajansi.
14. Swamp reclamation has led to the destruction of vegetation cover and loss of surface water resulting into decline in rain fall formation for example the reclamation of kiruruma swamp in Kabale, Katonga wetland in Masaka lubenge swamp in Nakasongola.
15. Industrialization has led to reclamation of wetlands and destruction of forests for example Wasibi-Wagala forests in Nakasongola for ammunition factory leading to reduction in rainfall formation and increase in temperatures.
16. Sinking/drilling of bore holes has led to lowering of the water table which interferes with the hydrological cycle leading to decrease in rainfall formation and the increase in temperatures for example in Nakasongola, Moroto and Kotido.
17. Construction of transport lines especially roads has led to the destruction of wetlands forests leading to reduction in rainfall formation in Nakasongola, Kaabong and Kiruhura for example the construction of Kampala-Jinja road led to the destruction of part of Mabira forests.
18. Urbanization and settlement have led the destruction of vegetation leading to reduction in rainfall formation in Kaabong, Nakasongola and Kiruhura.

19. Political instability has led to destruction of vegetation to get rid of hiding places of rebels and wrong elements leading to reduction in rainfall formation and increase in temperature in Kaabong, Moroto and Kotido for example Opit and Abera in Gulu to get rid of the LRA rebels.
20. Bush burning by the hunters, pastoralists in Kaabong, Kiruhura and Ntoroko has led to destruction of vegetation cover leading to reduction in the rate of rainfall formation.

Effects of desertification/aridity in Uganda.

1. It has promoted nomadic pastoralism due to scanty vegetation and limited water which forces farmers to move continuously in search of water and pasture for the animals for example in Kaabong, Moroto, Kotido, Kiruhura and Ntoroko.
2. It has led to growth of seasonal crops like millet and sorghum due to seasonal unreliable rainfall in Kaabong, Moroto, Kotido Kiruhura and Ntoroko.
3. It has promoted mining due to hot climatic conditions especially salt mining in Lake Katwe in Kasese since salt mining requires hot temperatures to promote crystallization of salt.
4. It has promoted wild life conservation and tourism since semi-arid areas have been gazetted as national parks like Kidepo valley national parks in Kaabong, Lake, Mburo in Kiruhura, wild life reserves like matheniko in Moroto.

Negative, effects.

5. Prolonged droughts due to failure in rainfall leads hunger and famine for example in Kaabong, Moroto, Kotido, Kiruhura and Ntoroko.
6. It has led to degradation of vegetation cover leading to scarcity of pasture and rainfall for water which has affected livestock farming for example in Kaabong, Moroto, ,Kotido.
7. It has led to the lowering of the water table leading to scarcity of water for example in Kaabong, Moroto, Kotido, Kiruhura and Ntoroko.
8. It encourages high rates of evaporation leading to saline conditions for example in Kaabong, Moroto, Kotido, Kiruhura and Ntoroko.
9. It leads to air pollution resulting from the dust bowls in Kaabong, Moroto, Kotido, Kiruhura and Ntoroko.
10. It has accelerated wind erosion due to formation of dusty soils which is easily blown by wind for example in Moroto, Kaabong, Kotido and Lyantonde.

Steps being taken to control desertification/ aridity in Uganda.

1. Sensitization of the public on the major causes of desertification especially deforestation and effects of desertification using the press, seminars organized by NEMA in areas like Moroto, Kaabong, Kotido and Lyantonde.
2. Establishment and empowering institutions responsible for spear heading proper management of the environment and therefore control desertification for example NEMA, Uganda wildlife Authority in Areas like Kaabong and Moroto.
3. Encouraging modernization of agriculture for sustainable exploitation of the environment for example practicing agro-forestry in Mukono, Luweero, Nakasongola and Moroto.
4. Promoting afforestation and re-afforestation programs to increase on vegetation cover and increase on the rate of evapotranspiration and rainfall formation for example katuugo forest, Nakasongola and Muko forest in Kabale.

5. Eviction of encroachers on forests and wetlands who could cause destruction of vegetation and loss of water in swamps for example from Lubigi swamp in Wakiso and Mabira forest in Buikwe.
6. Development of other sources of fuel to reduce destruction of forests like Mabira forest in Buikwe, and wetlands like Nabajjuzi wetland in Masaka for example hydroelectricity power by rural electrification and use of solar energy in Luweero and Kampala.
7. Controlling population growth rate to reduce on the encroachment on swamps like lubenge swamp in Nakasongola, Nabajjuzi swamp in Masaka and forests like Mabira in Buikwe.
8. Public involvement in the conservation of the environment to reduce desertification for example move against the destruction of Mabira in Buikwe in 2011.
9. Government policy of gazetting forests as forest reserves, national parks and wetlands to encourage formation of rainfall for example Mabira forest in Buikwe, Budongo forest in Masindi.
10. Mobilizing funds necessary for environmental protection and research for example from Norwegian government and European Union for the protection of Mabira forest in Buikwe, Nabajjuzi wetland in Masaka Murchison bay wetland in Kampala.

REVISION QUESTIONS.

1. **Explain the factors that have influenced the climate of Uganda.**
 Define climate, identify the types of climate in Uganda and draw a sketch map showing the types of climate in Uganda.
 Explain the factors giving an example of the type of climate and place names on every point and using correct adjectives.
2. **Account for the climatic Zonation in Uganda.**
 Define climate, identify the climatic zones in Uganda and draw a sketch map of Uganda showing climatic zones.
 Explain the factors for climatic zonation giving an example of climatic zone and place name on every point.
3. **To what extent has the climate of Uganda been influenced by altitude.**
 Define climate, identify the types of climate in Uganda and draw a sketch map of Uganda showing types of climate.
 Give the influence of altitude on climate i.e. low altitude, plateau areas and highlands and then bring out other factors influencing climate giving the type of climate and place name.
4. **To what extent has relief influenced rainfall distribution in Uganda?**
 Define rainfall distribution, identify areas with heavy rainfall, moderate rainfall and low amounts of rainfall and draw a sketch map of Uganda showing these areas
 Give the role of relief on rainfall distribution i.e. highlands, plateau lands and low lands giving examples of areas on each point.
 Give other factors influencing rainfall formation. NB. Use correct adjectives like heavy, moderate, and low amounts of rainfall.\
5. **To what extent have human activities contributed to desertification in Uganda?**
 Define desertification, identify areas affected by desertification and draw a sketch map of Uganda showing areas affected by desertification.
 Explain the human activities that cause desertification, give other factors giving examples of place names on every point.

6. Account for the variation in rainfall distribution in Uganda.

Define rain fall, identify areas with heavy rainfall, moderate rainfall and low amounts of rainfall and draw a sketch map of Uganda showing these areas

Explain the factors for the rainfall distribution giving an example of names of areas on each point. NB. Use correct adjectives like heavy, moderate and low amounts of rainfall.

7. Explain the causes and effects of aridity in Uganda.

Define aridity, identify areas in Uganda experiencing aridity and draw a sketch map of Uganda showing areas experiencing aridity.

Explain the causes and the effects of aridity, giving an example an area experiencing aridity on every point.

Chapter 7.

UGANDAS NATURAL VEGETATION.

Natural vegetation refers to the natural plant cover on the earth's surface which is best suitable to the physical conditions in the area i.e. grows without influence of human activities.

Types of vegetation in Uganda.

- Tropical lowland forests like Mabira forest in Buikwe, Budongo forest in Masindi
- Tropical highland forests like Mt Elgon forest in Mbale and Mgahinga forest.
- Savannah woodland like Zulia forest, Timu forest, Agoro forest, Agu forest.
- Savannah grass land for example in Mukono, Kayunga, Pallisa, Kumi and Soroti.
- Dry bush savannah /semi desert vegetation for example Kaabong, Moroto, Kiruhura, Isingiro Kasese, Kotido, Nakapiripit, Rakai, Sembabule, and Nakasongola.
- Swamp vegetation for example river Katonga forests and river Kafu forests

ASKETCH MAP OF UGANDA SHOWING THE DISTRIBUTION OF VEGETATION.

TROPICAL RAIN FORESTS.

Tropical rain forests are forests which are found in tropical land receiving heavy rainfall of above 1500mm per annum.

Tropical rain forests in Uganda can be categorized as.

- Tropical high land forests like mountain Elgon forest in Mbale and mountain Rwenzori forests in Bundibugyo.
- Tropical low land forests like Mabira in Buikwe and Budongo in Masindi.
- Riverine forests like along river Katonga, Kafu, and Victoria Nile.

Characteristics of tropical rain forests.

- Trees appear in mixed stands growing profusely with over 25 trees species growing in one area due to ample water supply.
- The trees have straight and tall trunks due to ample water supply.
- Trees form canopies usually of three layers.
- The forest is composed of predominantly hard wood trees like musizi, mahogany, red heart and Mvule.
- Most trees have buttress roots ranging between 1-2 metres that give support to the huge and tall trees
- They have climbing plants such as lianas and epiphytes that get support from huge and tall trees.
- The trees have broad leaves which trap enough sunlight energy for photosynthesis and increase on the rate of evapotranspiration in case of excess water.
- Trees have a long gestation period to mature of over 50 years
- The trees have thin under growth or no under growth due to the three layers of canopies which lead to inadequate sun light reaching the ground.
- The forest are ever green since trees shed off their leaves at different interval.
- The forests are ever green since trees shed off their leaves at different intervals.
- The Forests are associated with luxuriant growth due to ample rainfall received
- The trees have thick and smooth barks.

SAVANNAH VEGETATION.

This is the type of vegetation in tropical lands that grows in areas which receive moderate rainfall of between 750-1500mm per annum. It is the most dominant type of vegetation in Uganda. Savannah vegetation in Uganda is divided into savannah woodland, savannah grassland and dry bush savannah

Savannah woodland.

This is a type of savannah vegetation that grows near tropical rainforests where rainfall is about 750-1000 per annum for example Otze, Mt. Kei, Agoro-Agu, Zulia, Morongole, Timu, Kilak woodlands.

Characteristics of savannah woodlands.

- Trees form almost complete plant cover of trees and shrubs intertwined.
- The trees are tropical hard woods and of mixed stands.

- They have a variety of trees of medium height ranging from 8-16m tall.
- The trees are deciduous, shedding off their leaves during dry season.
- Vegetation has thick under growth in form of bushes, tall grass and shrubs because the light can penetrate through the leaves
- Trees are generally umbrella shaped.
- Drought resistant tree species like baobab and acacia are common here.
- The trees tend to be fire resistant.
- Trees have long tap roots to suck water from the great depth.

Savannah grass lands.

This is the type of savannah vegetation that grows in the periphery of savannah woodland where rainfall ranges between 500mm-750mm per annum. It is common in Lira, Gulu, Kumi, Soroti, and Pallisa. Etc.

Characteristics of savannah grass lands.

- Grasses for a dominant plant life due to low rainfall amount received supporting the growth of grass.
- Grasses turn brown or yellow during the dry season.
- Grasses grow at the height of about 0-5 metres tall.
- The grasses have scattered trees which have small leaves
- Trees have thick barks.
- Trees are highly deciduous due to seasonality of rainfall for example acacia and baobab.

Dry bush savannah vegetation. /semi-arid

This type of vegetation is dominant in dry areas which receive less than 500mm per annum. For example in Moroto, Kotido, Kaabong, Lyantonde, Rakai, Ntoroko and parts of Kasese.

Characteristics of dry bush savannah.

- The vegetation consists of thorny bushes with shrub growing between them.
- The vegetation consists of short grasses with bare sand between them.
- Drought resistant trees such as baobab and acacia are common.
- The trees have small leaves to reduce on the rate of transpiration.
- Trees tend to develop long tap roots to penetrate underground to obtain water.
- Some trees like baobab have swollen trunks to store food during dry season.

MONTANE FORESTS/VEGETATION.

This is the type of vegetation found in mountainous areas of Uganda for example Mt.Elgon forests in Mbale, Mt Rwenzori forests in Kasese and Bundibugyo.

Characteristics of montane vegetation.

- Savannah vegetation is found in areas below 1800m above sea level characterized by tall grass like elephant grass and spear grass, scattered trees, deciduous trees, trees are umbrella shaped, and grass dries during dry season, yellow / brown grass during dry season.

- Rain forests are found at an altitude of about 1800m -2500m above the sea level characterized by tall grass up to 50 m, trees are ever green, trees are thick, three layers of canopies, trees have buttress roots little or no under growth, climbing plants.
- Temperate forests are found at an altitude of about 2500-3000 metres above the sea level characterized by coniferous soft wood trees like cedar, pod carp and camphor, trees are ever green, have straight trunks, thick barks, and needle shaped leaves no under growth.
- Bamboo forests are found at an altitude of about 3000-3500 metres above sea level characterized by bamboo plants which have segmented stems and are hollow inside, have small tough painted leaves , are ever green have pop roots, are in single layers.
- Heath and moorland is found at an altitude of above the 3500-4500 metres above the sea level. Consists of grass, shrubs and flowers, plants include lobelia and giant groundsel.

SWAMP VEGETATION.

Swamp vegetation is type of vegetation found in lowland areas with impeded drainage. For example around lakes, in swamps like Murchison bay wetland, Sango bay wetlands around Lake Victoria, Tumba wetland, Lwampanga wetland on Lake Kyoga along rivers for example river Kafu and Katonga wetland and in open valley's like lubenge wetland in Nakasongola, Lubigi in Kampala. This type of vegetation is dominated by papyrus, palms and grasses which like water logging conditions.

Characteristics of swamp vegetation.

- They are composed of evergreen plants like papyrus and palm trees due to water logging conditions.
- Trees have broad leaves to increase on the rate of evapotranspiration.
- Trees have aerial roots.
- Trees are mainly soft wood trees like papyrus and palms.
- Trees have short trunks and stumps due to lack of strong taproots.

Factors influencing vegetation distribution in Uganda.

Vegetation distribution refers to the way in which vegetation is spread out over different areas in a given period of time.

Physical factors.

1. Climate.
 - Areas with equatorial climate receive heavy rainfall above 1500mm per annum and well distributed throughout the year which has encouraged the growth of tropical rain forests for example tropical low land forests like Mabira forests in Buikwe, Budongo forest and tropical highland forests like mt Rwenzori in Kasese and Mt Elgon forest in Mbale.
 - Areas with tropical climate receiving moderate rainfall ranging between 750-1000mm per annum have encouraged the growth of savannah woodland for example Mt. Kei, Zulia forests.
 - Areas with semi- desert climate receive low rainfall amounts less than 500mm per annum which has encouraged the growth of dry bush savannah for example in Moroto, Kaabong, Kotido, Kiruhura.

2. Soils.

- Areas with deep fertile soils have encouraged the growth of tropical rain forests for example the fertile volcanic soils in Mbale and Manafwa have encouraged the growth of tropical highland forest like Mt Elgon forests.
- The fertile tropical loam soils have encouraged the growth of tropical low land forests like Mabira forest in Buikwe, Budongo, forests in Masindi Bugoma Forest in Hoima.
- Areas with soils of medium productivity have led to the growth of savannah vegetation for example savannah grasslands in Soroti, Gulu, kumi and Lira.
- Areas with soils of low productivity have led to the growth of dry bush savannah in Kaabong, Kotido, and Kiruhura.

3. Altitude.

- Between 600-1000m above the sea level, there is dry bush savannah vegetation due to hot temperatures experienced for example in Kasese, Ntoroko, Bulisa.
- The altitude has also encouraged the growth of swamp vegetation due to water logging conditions for example along Katonga swamp and Victoria Nile.
- Between 1000-1800m above the sea level, there is savannah vegetation due to fairly fertile soils and hot temperatures for example Soroti, Kumi, Lira, and Gulu.
- Between 1800-2500m above the sea level there is tropical rain forests like Budongo forests, Mabira forest, Bugoma forest, Itwara forest and south Busoga forest due to hot temperatures, High humidity of about 80% and fertile soils.
- Between 2500-3000 metres above the sea level there are temperate forests due to low temperatures moderate rainfall and fairly thin well drained soils for example mountain Rwenzori forests.
- Between 3000-3500metres above the sea level there are bamboo forests due to fairly fertile soils and moderate rainfall.
- Between 3500m-4500m above the sea level there is heath and moorland due to low rainfall, low humidity and thin soils.

4. Relief.

- Steep slopes of high mountains have encouraged the growth of montane forest, heath and moorland due to low temperature and thin soils for example mountain Rwenzori forest.
- Plateau areas receive moderate rainfall leading to the growth of savannah grassland for example in Soroti, Kumi, Gulu and Lira and Tropical rainforests like Mabira, Budongo forest and Bugoma forest.
- Lowlands experience dry conditions leading to the growth of dry bush savannah in Kasese, Ntoroko, Bulisa and Butiaba.

5. Drainage.

- Poorly drained areas in low lands and valleys characterized by flooding have led to the growth of swamp vegetation in Katonga swamp, Murchison bay swamp around Lake Victoria, Lubenge swamp in Nakasongola.
- Poorly drained areas of high mountains have led to the growth of heath and moorland for example mount Rwenzori.
- Areas with well drained soils have encouraged the growth of tropical rain forests like Mabira in Buikwe, Budongo in Masindi and savanna grasslands in Soroti, kumi, Gulu and Lira

6. Organisms like wild animals influence vegetation distribution. Through overgrazing, the vegetation changes to secondary type for example in Queen Elizabeth National park in Kasese where elephants and hippopotamus have over grazed on the natural vegetation leading to dry bush savannah vegetation. Insects like periodic invasion of locusts in Masindi, Kaabong, Kotido and Aphids in Muko and Mafuga forests in Kabale destroy the vegetation in the areas.
7. Occurrence of natural fires, which is often started by lightning leads to destruction of vegetation especially swamps like Katonga swamp.

Human Activities.

8. Agricultural practices have led to destruction of vegetation to establish plantations for example Mabira being destroyed by Lugazi SCUL plantation, Bugala Island forests being destroyed by palm oil plantations over grazing has also led to destruction of forests and grass lands creating dry bush savannah vegetation in Kaabong, Kotido, Kiruhura and Rakai.
9. Settlement and urbanization has led to clearing of vegetation for example destruction of Nsooba, Destruction of savannah grassland in Kumi and Soroti for settlement.
10. Industrialization has led to destruction of forests to establish industries and to acquire raw materials for industries for example the establishment of the coca cola industry at Namanve led to the destruction of Namanve forests.
11. Mining activities have led to destruction of vegetation to establish the clay mines for example Kajansi clay extraction has led to destruction of Kajansi Swamp Vegetation.
12. Government policy of gazettement forests and grasslands as national parks, game reserves and forest reserves has led to preservation of forests and wetlands for example Mt. Elgon forest, Mabira forest and Budongo forest.
13. Afforestation and re-afforestation programmes have helped to replace the destroyed natural vegetation for example Katungu, forest in Nakasongola, Mafuga and Muko in Kabale, Lendu forest in Nebbi.
14. Bush burning which is brought about by pastoralists and hunters to easily acquire wild animals and fresh pasture at the onset of the wet season has led to destruction of forests and grass lands for example the grass lands in Soroti, Kumi, Lira and Nakasongola.
15. Construction of transport and communication network for example roads has led to the destruction of vegetation for example the construction of Kampala-Jinja road led to the destruction of part of Mabira forests, the construction of northern bypass in Kampala led to the destruction of part of Lubigi Swamp vegetation.

REVISION QUESTIONS.

- 1. Explain the factors influencing the distribution natural vegetation in Uganda.**
 - Define natural vegetation, identify the types of natural vegetation in Uganda with place names and draw a sketch map of Uganda showing the types of natural vegetation.
 - Explain the factors influencing the distribution of natural vegetation giving an example of type of vegetation and place name.
- 2. (a)Examine the impact of climate on the growth of vegetation in Uganda.**
 - Define vegetation, identify the types of vegetation in Uganda with place names and draw a sketch map of Uganda showing the types of vegetation.

- Explain the influence of climate on the growth of vegetation and then other factors giving an example of vegetation type and place name on every point.

(b).Explain how the vegetation is an indicator of land use patterns in Uganda.

- Give the different land use types in the different types of vegetation giving an example of type of vegetation and place name on every point.

3. (a) Describe the characteristics of tropical rain forests.

- Define tropical rain forests, identify the types of tropical rain forests giving an example of a forest, and draw a sketch map of Uganda showing the types of tropical rainforests and name of forests.
- Outline the characteristics of tropical rain forests.

(b).Explain the factors limiting the effective utilization of tropical rain forests in Uganda.

- Explain the factors giving an example of name of a forest in every point.

4. (a) Account for the characteristics of tropical rain forests in Uganda.

- Define tropical rainforests, Identify the types of tropical rainforests with their place names and draw a sketch map of Uganda showing the tropical rain forests.
- Give the characteristics of tropical rainforests giving the reason for such a characteristics and an example of a forest on every point.

(b).Explain the causes of disappearance of tropical rainforests in Uganda.

- Explain the causes of disappearance of tropical rainforests in Uganda. Giving an example of the forest on every point.

5. Account for the growth of savannah vegetation in Uganda.

- Define savannah vegetation, identify the types of savannah vegetation with place names and draw a sketch map of Uganda showing types of savannah vegetation.
- Give the factors for the growth of savannah vegetation (from factors influencing vegetation distribution) giving an example of place names on every point.

6. Examine the importance of dry bush savannah vegetation in Uganda.

- Define dry bush savannah vegetation, Identify areas where it is found and draw a sketch map of Uganda showing areas with dry bush savannah vegetation.
- Give the positive and negative importance of dry bush savannah vegetation, giving areas where it is found on every point.

Chapter 8.

FORESTRY IN UGANDA.

Current status of the forestry industry in Uganda.

- Currently the district with the highest acreage of tropical forests is Kyenjojo followed by Bushenyi, Mukono, Hoima and Kibale.
- The forest cover currently is about 24% of the total land area in Uganda.
- Some forests have been re-demarcated and others gazetted.
- There are 698 gazetted forest reserves in Uganda both local and central.
- The national forestry authority manages forest conservation and utilization in collaboration with the Uganda wild life Authority.
- There is a high rate of deforestation of forests and the average rate of forest destruction is 1.8% per annum for the last 15 years.
- Some forests have been degazetted for example Namanve forest.
- Afforestation and re-afforestation is on an increase in many areas in Uganda.
- Planted forests currently cover 0.8% of the total land area in Uganda.
- Common planted tree species include pine and eucalyptus trees.
- Much of the forest destruction is due to the need for charcoal and fire wood (biomass), agriculture and settlement.
- The government of Uganda has established the National Forestry Authority to co-ordinate the forestry activities.

Types of forests in Uganda.

The major types of forests in Uganda include.

- Tropical low land forests like Mabira forest in Buikwe, Budongo forest in Masindi, Bugoma forest in Hoima and South Busoga forest in Mayuge.
- Tropical highland forests/ montane forests for example mountain Rwenzori forests in Bundibugyo, Mountain Elgon forests in Mbale and Muhavura Forests in Kisoro.
- Woodland forests like Otze, Timu and mount Kei forests.
- Riverine forests such as river Katonga forest, Victoria Nile forests, Kafu forests and Mayanja forests.
- Planted/ Artificial forests example Mafuga, forest and Muko forest, in Kabale, Abera forest in Gulu, Lendu forest in Nebbi, Katuugo forests in Nakasongola,, Kateera forest in Kiboga, Magamaga forest in Jinja.

ASKETCH MAP OF UGANDA SHOWING THE DISTRIBUTION OF FORESTS.

Factors which have favoured the development of the forestry industry in Uganda.

Physical factors.

1. The presence of valuable tree species which are highly demanded with hard wood species like mahogany and Mvule in Mabira forest in Buikwe and Budongo forest in Masindi and soft wood tree species like pines in katuugo forest in Nakasongola.
2. Ideal climatic conditions like heavy rainfall of above 1500mm per annum and hot temperatures of about 21 encourage the growth of forests like Mabira forest in Buikwe and Budongo forest in Masindi, Mafuga forest and Muko forest in Kabale.
3. The presence of fertile soils encourage the growth of forests like Mabira forest in Buikwe, Budongo forest in Masindi, Mafuga forest and Muko forest in Kabale.
4. The mountainous nature of some parts makes these areas accessible leading to the growth of forests like mountain Elgon forest in Mbale, Mountain Rwenzori forest in Bundibugyo, Mgahinga forest and Muko forest in Kabale.
5. Presence of vast land has encouraged large scale planting of forests like Katuugo forest in Nakasongola, Kateera forest in Kiboga, Muko Forest and Mafuga forest in Kabale.

Human factors.

6. Availability of adequate capital to invest in the forestry industry for example in paying labour to exploit forests such as Mafuga and Muko forest in Kabale.
7. The availability of abundant supply of cheap labour to work as lumber jacks in Katuugo forest in Nakasongola and Mafuga forest in Kabale.
8. The availability of reliable power and energy for example hydro-electric power and petroleum used in running machines in Katuugo forest in Nakasongola hence easing exploitation.
9. The availability of a large market supply for the forest products like Timber and furniture both at home and abroad for products from Mabira forest in Buikwe and Mafuga forest in Kabale.
10. The availability of numerous processing industries to process forest products for example Nile ply wood in Jinja for products from Katuugo forest in Nakasongola.
11. Availability of improved / modern technology in forest exploitation and transportation e.g. power driven saws, tractors and trailers has encouraged exploitation of Muko forest in Kabale, Lendu forest in Nebbi and Katuugo forest in Nakasongola.
12. The favorable government policies of afforestation and re-afforestation and encouraging investors to invest in the forestry industry in forests like Mafuga forest and Muko forest in Kabale, Lendu forest in Nebbi, Katuugo forest in Nakasongola.
13. Availability of improved transport network for the delivery of forest products to market centres for example Kampala- Gulu road for Katuugo forest, Kampala- Jinja road for Magamaga forest in Jinja, Muko- Kabale road for Muko forest in Kabale.
14. Intensive research conducted by the National Forestry Authority and NEMA, has encouraged sustainable exploitation of forests such as Mabira forest in Buikwe, Budongo forest in Masindi, Mafuga Forest and Muko forest in Kabale.
15. The relative political stability has encouraged investors to invest in the forestry industry for example in Planted forests like Katuugo forest in Nakasongola, Mafuga and Muko forest in Kabale and Lendu forest in Nebbi.

Contributions of the forestry industry to the development of Uganda.

Positive Contributions/Effects.

1. Forestry is a source of employment opportunities to people as forest rangers, lumber jacks in the exploitation of Mabira forest in Buikwe, Budongo forest in Masindi, Mafuga forest and Muko forest in Kabale.
2. It is a source of government revenue through imposing taxes on people and companies involved in the exploitation of Mafuga forest in Kabale and Katuugo forest in Nakasongola.
3. Forestry has encouraged Urbanization where saw milling centres have developed into prominent towns for example Katuugo on katuugo forest in Nakasongola and Nyabyeya on Budongo forest in Masindi.
4. Forests have boosted tourism leading to increased foreign exchange for example Mabira forest in Buikwe and Budongo forest in Masindi.
5. Forestry has boosted the development of transport infrastructures especially roads connecting forests to saw mills and to market centres for example road from Mbale to mountain Elgon forests in Mbale, Nyabyeya to Budongo forest in Masindi, Katuugo forests in Nakasongola.
6. Forestry has encouraged diversification of the economy thus reducing over dependence on Agriculture by generating some income from Mabira forest in Buikwe and Mafuga forest in Kabale.
7. Forestry is a source of foreign exchange through exportation of forest products like timber from Lendu forest in Nebbi and Katuugo forest in Nakasongola.
8. Forestry has promoted international co-operation between Uganda and her trade partners in Forest products from Mafuga forests and Muko forest in Kabale and Lendu forest in Nebbi.
9. Forests are source of medicine and food to cure various diseases for example wild honey from Mabira forest in Buikwe, Budongo forest in Masindi, Mafuga forest and Muko forest in Kabale.
10. Forestry has boosted industrialization by providing raw materials for forest related industries like Nile ply wood in Jinja using products from Katuugo forest in Nakasongola.
11. Forests have promoted soil conservation through controlling soil erosion and addition of manure to the soil in forests like, Mabira forest in Buikwe and Budongo forest in Masindi.
12. Forests are source of fuel for domestic and industrial use in form of fire wood obtained from Mabira forest in Buikwe, Budongo forest in Masindi, Mafuga forest and Muko forest in Kabale.
13. Forests have promoted climatic modification through evapotranspiration which leads to formation of convection rain fall encouraging agriculture for example Mabira forest in Buikwe and Budongo forest in Masindi.
14. Forestry has encouraged wild life conservation and conservation of biodiversity sine forests act as habitants for wild animals for example monkeys and gorillas in Bwindi impenetrable forests and Mgahinga forests in Kisoro.
15. Forests help in the purification of the atmosphere by absorbing greenhouse gases like carbon dioxide and methane for example Mabira forest I Buikwe and Budongo forest in Masindi.
16. Forests act as water catchment areas for numerous rivers which encourage fishing and other economic activities for example river Sezibwa from Mabira forest in Buikwe, River Sipi and Manafwa from Mountain Elgon forest in Mbale.

Negative contributions.

17. Forests act as habitats for dangerous wild animals which threaten human life for example lions and leopards from Mabira forest in Buikwe, Budongo forests in Masindi and Mafuga forest in Kabale.
18. Forests are breeding grounds for pests and disease carrying vectors affecting human settlement for example tsetse flies in south Busoga forests in Mayuge and Budongo forests in Masindi.
19. Dense forests hinder the construction of transport and communication network especially roads since they are expensive to clear for example Mabira forest in Buikwe and Budongo forest in Masindi.
20. Forests act as hiding places for rebels and wrong elements who destabilise peace in the country for example ADF rebels in mountain Rwenzori forests in Bundibugyo.
21. Exploitation of forests has led to urbanization with its associated problems like prostitution, Unemployment and others for example at Katuugo on Katuugo forest in Nakasongola and Nyabyeya on Budongo forest in Masindi.
22. Exploitation of forests has led to industrial pollution from forest related industries like Nile plywood in Jinja for Magamaga forest and furniture making industries for example at Katuugo on Katuugo forest in Nakasongola and Nyabyeya on Budongo forest.
23. Planted forests highly drain the soil making it less productive for agriculture for example Mafuga forest and Muko forest in Kabale and Abera forest in Gulu.
24. Exploitation of forests is associated with accidents leading to loss of lives during felling and loading of logs in Mabira forest in Buikwe, Budongo forest and Katuugo forest in Nakasongola.

FOREST DESTRUCTION IN UGANDA.

1. Destruction of forests by herbivorous wild animals especially elephants and giraffes in parabong forests in Nebbi, Budongo forests in Masindi and Bwindi impenetrable forests in Kisoro.
2. Destruction of forests by wild fires caused by lightning, poachers for example Katonga forest in Masaka and Sezibwa forest in Kayunga.
3. Destruction of forests by natural calamity for example landslides in Bududa and Bulamburi districts led to the destruction of mountain Elgon forests in Bududa.
4. Climate changes in Uganda for example prolonged drought affects the growth of trees in forests like Mabira forest in Buikwe and Budongo Forest in Masindi, while heavy rain fall triggers off landslides leading to destruction of forests like Mt Elgon forests in Mbale.
5. Destruction of planted forests by pests and diseases for example wood peckers and aphids destroy planted forests in Muko forest and Mafuga forest in Kabale.
6. The long gestation period of tree species like mahogany and Mvule has led to quick depletion of forests without replacement for example Mabira forest in Buikwe, Budongo forest in Masindi and south Busoga forest in Mayuge.

Human factors,

7. Increased demand for agricultural land especially plantation agriculture has led to destruction of forests like Mabira forest in Buikwe for sugar cane growing by Lugazi Sugar plantation, Budongo forests destroyed by Kinyara sugar plantation and Bugala Island forest in Kalangala for oil palm plantations.

8. Increased demand for land for settlement due to population pressure in Uganda has led to the destruction of Mabira Forest in Buikwe and Budongo forest in Masindi.
9. Increased demand for energy in form of fire wood from forests like Mabira forest in Buikwe, Budongo forest in Masindi, Mafuga forest and Muko forest in Kabale.
10. Improved technology with its negative effects for example use of power driven machines has led to massive destruction of forests like Mabira forest in Buikwe, Budongo forest in Masindi, Mafuga forest and Muko forest in Kabale.
11. Land tenure system where by some forests are owned by private individuals leading to their destruction for example Ngajju forest in Luweero and Katuugo forest in Nakasongola.
12. Increased demand for forest products like electric poles, Timber for furniture leading to the destruction of Mabira forest in Buikwe, Budongo forest in Masindi, Mafuga forest and Muko in Kabale.
13. Need to control dangerous pests and dangerous that cause disease for example tsetse flies in South Busoga Forest in Mayuge and Budongo forest in Masindi.
14. Bush burning either by hunters to easily obtain wild animals or by pastoralists for example Abera forest and Opit forest in Gulu, Mabira forest in Buikwe and Budongo forest in Masindi.
15. un supportive government policies to conservation for example giving out forest for different land use activities for example Namanve forest in Wakiso given to Century bottling company and Bugala island in Kalangala given out for oil palm plantations.
16. Industrialization has led to the destruction of forests to expand industries and obtain fire wood used in industries for example Namanve forest in Wakiso has been destroyed to establish the century bottling company Katuugo forest in Nakasongola and Magamaga forests in Jinja destroyed to obtain fire wood.
17. Mining activities have led to destruction of forests to extract the minerals for example gold mining in Kitaka mine sled to the destruction of Kitaka forest reserve in Kamwenge, Gold mining in Buhweju led to the destruction of Kyamahunga forest.
18. Destruction of forests due to political instability to get rid of the hiding places for rebels for example Nyamityobora forest in Mbarara and Namanve forest in Wakiso.
19. Need to control dangerous pests and disease carrying vectors which may be harmful to humans for example tsetse flies in South Busoga forest in Mayuge, Mabira forest in Buikwe and Budongo Forest in Masindi.
20. Corruption in the forestry department which involves illegal sale of timber and collection of bribes leading to destruction of Mabira forest in Buikwe and Budongo forest in Masindi.
21. Construction of transport infrastructure especially roads for example the construction of Kampala- Jinja road led to the destruction of Mabira forest in Buikwe, Mityana –Fort portal road led to the destruction of Kibale forest in Kyenjojo.
22. Increased herbal collection leading to destruction of trees in forests like Mabira forest in Buikwe and Budongo forest in Masindi.
23. De-gazetting of some forests for either settlement or agriculture for example Bugala island forests in Kalangala for the growing of oil palms and Namanve forest in Wakiso for establishment of Century bottling companies and other industries.

Effects of forest destruction.

1. It has resulted into desertification with its characteristics like low rain fall amounts, hot temperatures due to destruction of forests like Mabira forest IIN Buikwe, Budongo forest in Masindi.
2. It has led to the destruction of habitats for wild life hence leading to reduction in Biodiversity for example in Mabira forest in Buikwe, Budongo forest in Masindi.
3. It has led to increased soil erosion due to loss of vegetation cover that would protect the soil for example in Bududa, Bulucheke and Bulamburi due to the destruction of mountain Elgon Forests.
4. It has accelerated landslides due to loss of vegetation cover that would protect the soil for example in Bududa, Bulucheke and Bulamburi due to destruction of Mount Elgon forests.
5. It has led to siltation of rivers leading to flooding since material is eroded from hills and deposited in Rivers for example River Nyamwamba due to destruction of mount Rwenzori forest in Kasese and River Sipi due to destruction of Mount Elgon forest in Mbale.
6. It has resulted into reduction in the water levels in lakes and rivers such as Lake Victoria and River Nile due to destruction of Mabira forest in Mbale and Ssesse island forest in kalangala.
7. It brings people into close contact with dangerous wild animals due to destruction of their habitats for example people adjacent to forests like Mabira forest in Buikwe and Mt elgon forest in Mbale.
8. It has led to loss of medicinal plants for curing diseases for example from Mabira forest in Buikwe.
9. It has led to lowering of the water tale of the adjacent areas due to reduction in rainfall formation in Mukono, Luweero and Kampala due to Destruction of Mabira forest in Buikwe.
10. It has led to shortage of wood in many parts of Uganda due to reduction in the forest cover in Mabira forest in Buikwe, Budongo forest in Masindi, Mafuga forest and Muko forest in Kabale.
11. It led to loss of base for people's livelihood especially those who depend on forests as source of income due to destruction of Mabira forest in Buikwe, Budongo forest in Masindi and Mafuga forest in Kabale.
12. It has led to reduction in grants from developed countries and donor communities like World Bank on preservation of forests since they are discouraged by massive destruction of Mabira forest in Buikwe and Budongo forest in Masindi.

Problems facing forest exploitation in Uganda.

Physical factors.

1. Most forests have trees which appear in mixed stands with over 25 tree species growing in one hectare which makes selection of valuable tree species difficult in Mabira forest in Buikwe, Budongo forest in Masindi and South Busoga forest in Mayuge.
2. The hard wood nature of forest trees which take long to mature and have heavy logs increasing transportation costs in exploitation of Mabira forest in Buikwe, Budongo forest in Masindi and south Busoga forest in Mayuge.
3. The presence of pests and disease carrying vectors which scare away the lumber jacks and other forest exploiters for example mosquitoes, and tsetse flies I Mabira forest in Buikwe, Budongo forest in Masindi and South Busoga forest in Mayuge.

4. The rugged relief in mountainous areas discourages construction of transport infrastructure and accelerates soil erosion and landslides which affects the growth of trees in mountain Rwenzori forest in Kasese, mountain Elgon forest in Mbale, Bwindi forest and Mgahinga forest in Kisoro.
5. The hostile forest environment for example constant boggy conditions and heavy rainfall that interrupt the exploitation of Mabira forest in Buikwe, Budongo forest in Masindi and south Busoga forest in Mayuge.
6. The presence of few commercial tree species like mahogany, ebony and Mvule surrounded by trees of poor quality timber making felling difficult in Mabira forest in Buikwe and Budongo forest in Masindi.
7. The existence of wild animals like leopards and lions which scare away labour engaged in forest exploitation of Mabira forest in Buikwe, Budongo forest in Masindi and South Busoga forest in Mayuge.
8. The presence of climbing plants like lianas and epiphytes make felling of trees difficult hindering exploitation of Mabira forest in Buikwe, Budongo forest in Masindi and South Busoga forest in Mayuge.
9. Inaccessibility since most forests are located in remote areas leading to difficulty in the transportation of forest products from Mabira forest in Buikwe, Budongo forest in Masindi and South Busoga forest in Mayuge.
10. The trees have buttress roots which makes felling difficult since felling require using ladders during felling which leads to accidents in exploiting Mabira forest in Buikwe, Budongo forest in Masindi and south Busoga forest in Mayuge.

Human factors.

11. Over exploitation of forests with valuable tree species leading to exhaustion of forests like Mabira forest in Buikwe and Budongo forest in Masindi.
12. Limited power supply to be used to run the machines in exploitation of Mabira forest in Buikwe, Budongo forest in Masindi South Busoga forest in Mayuge.
13. Un favorable government policy of restricting the exploitation through gazetting forests and forest reserves and national parks for example Mabira forest in Buikwe, Budongo forest Masindi and South Busoga forest.
14. Competition from alternative raw materials especially plastics reduces demand for forest products from Mabira forest in Buikwe and Budongo forest in Masindi.
15. Low level of technology used in forest exploitation for example the use of pangas, axes and hand saws in felling trees which are inefficient limiting the exploitation of Mabira forest in Buikwe and Budongo forest in Masindi.
16. Inadequate capital to purchase modern power saws and pay labour in exploitation of forests like Mabira forest in Buikwe and Budongo forest in Masindi.
17. Shortage of market due to competition with soft wood trees from Norway and Sweden which reduces demand for forest products from Mabira forest in Buikwe, Budongo forest in Masindi and South Busoga forest in Mayuge.
18. Bush burning by hunters and pastoralists leading to destruction of Mabira forest in Buikwe, Budongo forest in Masindi and south Busoga Forest in Mayuge.

19. Limited skilled labour to work in the exploitation and protection of forests in terms of forest guards and forest rangers in Mabira forest in Buikwe, Budongo forest in Masindi, south Busoga forest in Mayuge, and mountain Rwenzori forest in Kasese.
20. Competition for labour and capital with other sectors of the economy like agriculture and industry limits exploitation of Mabira forest in Buikwe, Budongo forest in Masindi and South Busoga Forest in Mayuge.
21. Limited research conducted by National forests Authority and NEMA concerning sustainable exploitation of forests like Mabira forest in Buikwe, Budongo, forest in Masindi and south Busoga forest in Mayuge.
22. Political insecurity in some parts of Uganda which scare away labour from forest exploitation for example ADF in mountain Rwenzori forest in kasese, armed robbers in Mabira forest in Buikwe and Bugoma forest in Hoima.
23. Corruption in the forestry department involving illegal sale of timber collection of bribes and smuggling of forest products from Mabira forest in Buikwe, Budongo forest in MAINDI AND South Busoga forest in Mayuge.
24. Accidents during felling and loading of forest products discourages people from carrying out lumbering and other forest related activities in Mabira forest in Buikwe, Budongo forest in Masindi and Katuugo forest in Nakasongola.

Measures being taken to conserve forest in Uganda.

1. Empowering support institutions to ensure sustainable exploitation of forest resources for example National Forest Authority and National Environmental Management Authority to protect forests like Mabira forest in Buikwe, Budongo forest in Masindi and South Busoga forest in Mayuge.
2. Regular patrols by the officials in the National Forest Authority and National Environmental Management Authority is being done to protect forest like Mabira forest in Buikwe and Budongo forest in Masindi.
3. Limiting exploitation by licensing of exploiters of forests to reduce over exploitation of forest like Mabira in Buikwe, Budongo forest in Masindi, south Busoga forest in Mayuge and Mountain Rwenzori forest in Kasese.
4. Evicting any encroachers of forests to reduce the rate of deforestation in the periphery of forests like Mabira forests in Buikwe and Budongo forest in Masindi.
5. Sensitization of the public about the importance of preserving and conserving forests and the dangers of deforestation to protect Mabira forest in Buikwe, Budongo forest in Masindi, south Busoga forest in Mayuge.
6. Afforestation and re-afforestation programmes are being encouraged to replace the lost forest by planting forests like Katuugo forest in Nakasongola, Muko forest and Mafuga forest in Kabale, Lendu Forest in Nebbi.
7. Other sources of power and energy are being developed other than fire wood and charcoal for example hydro-electricity power and solar energy to save forests like Mabira forests in Buikwe and Budongo forest in Masindi.
8. Agro forestry s being encouraged in which elements of agriculture are combined with forestry to encourage the growth of trees for example at Kalengye and Kachwekano in Kabale at kabanyoro and Kawanda to supplement Mabira forest in Buikwe and Budongo forest in Masindi.

9. Gazetting forests as forest reserves and national parks to ensure sustainable exploitation of Mabira forest in Buikwe, Budongo Forest in Masindi, south Busoga forest in Mayuge and Mountain Rwenzori Forest in Kasese.
10. Research is being carried out by National Forestry Authority and National Environmental Authority concerning sustainable exploitation of Mabira forest in Buikwe, Budongo forest in Masindi, South Busoga forest in Mayuge, and Mt Rwenzori forest in Kasese.
11. Political stability is being ensured by the army (UPDF) and other security organs to ensure security and reduce destruction of forests like Mabira forest in Buikwe, Budongo forest in Masindi and South Busoga forest in Mayuge.
12. Promoting Eco- tourism which involves protecting fauna and flora and preservation of soil for purpose of promoting tourism in Mabira forest in Buikwe, Budongo forest in Masindi and south Busoga forest in Mayuge.
13. Soliciting for foreign donation from donor countries like Norway, European Union to fund sustainable exploitation of Mabira forest in Buikwe, Budongo forest in Masindi and south Busoga forest in Mayuge.
14. Encouraging the use of alternative sources of raw materials for example plastics from Nice House of Plastics in Kampala, metallic poles from steel rolling mills in Jinja instead of using forest products from Mabira forest in Buikwe, Budongo forest in Masindi and south Busoga forest.
15. Education and training through higher institutions of learning like those doing Zoology, Botany environmental science from MAKERERE University to acquire skilled labour force to protect forests like Mabira forest in Buikwe, Budongo forest in Masindi.
16. Cultural initiative to preserve forests for cultural purposes for example Nakayima tree in Mubende, fight against destruction of Mabira forest by the Buganda of Buikwe.
17. Demarcating forest boundaries to reduce encroachment with in the periphery for example Mabira forest in BUIKWE, Budongo forest in Masindi, South Busoga forest and Mountain Rwenzori forest in Kasese
18. Establishing tree nurseries by the forest Department to increase afforestation and agroforestry for example at Namanve National Tree seed Centre for planted forests like Katuugo forest in Nakasongola.
19. The government is encouraging population control through Family planning to reduce population pressure and encroachment on forests like Mabira forest in Buikwe, Budongo forest in Masindi and South Busoga Forest in Mayuge.

REVISION QUESTIONS.

- 1. To what extent have physical factors favoured the development of the forestry industry in Uganda?**
 - Introduce by giving the current status of forestry identify the type of forests with place names and draw a sketch map of Uganda showing the distribution of forests.
 - Explain the role of physical factors in the development of the forestry industry and then give other factors, giving an example of a forest on each point.
- 2. Assess the contribution of forestry to the development of Uganda.**
 - Introduce by giving the current status of forestry, identify the type of forests with place names and draw a sketch map of Uganda showing the distribution of forests.

- Explain the positive and the negative contributions of forestry, giving an example of a forest on each point.
- 3. **Explain the factors hindering the effective exploitation of forest resources in Uganda.**
 - Introduce by giving the current status of forestry, Identify the type of forests with place names and draw a sketch map of Uganda showing the distribution of forests.
 - Explain the factors giving an example of a forest on every point.
- 4. **(a) To what extent have the human factors led to the destruction of forests in Uganda?**
 - Introduce by giving the current status of forestry, identify the type of forests with place names and draw a sketch map of Uganda showing the distribution of forests.
 - Explain the human factors and then other factors that have led to destruction of forests, giving an example of a forest on every point.
- (b). What measures are being taken to ensure sustainable exploitation of forest resources in Uganda.**
 - Explain the measures maintaining the tense in which the question is asked and attach an example of a forest on each point.
- 5. **Examine the importance of Afforestation in Uganda.**
 - Introduce by Defining Afforestation as the planting of trees where they have never existed, Identify the planted forests in Uganda and draw a sketch map of Uganda showing only planted forests.
 - Explain the positive and then the negative importances of afforestation, giving an example of a planted forest on every point.

Chapter 9

WETLANDS/SWAMPS IN UGANDA.

Wetlands/ swamps are areas with plants and animals which experience seasonal or permanent flooding in a given period of time.

Current status of wetlands in Uganda.

- Wetlands (swamps) in Uganda occupy about 10 % of the country and of which about One- third is permanently flooded.
- The wetlands in Uganda are hydrologically connected to rivers and lakes.
- It is estimated that 30% of the original wetlands have been converted to other land uses such as settlement and Agriculture.
- There is high rate of swamp destruction in Uganda today.
- There is government initiative to avoid encroachment on wetlands.
- Some wetlands are being gazetted by National Environmental Management Authority.
- National Environmental Management Authority is the established government body in charge of conservation and ensuring sustainable utilization of wetlands.

Types of swamps/ Wetlands in Uganda.

Swamps can be categorized into three i.e.

- Lacustrine/Lake shore wetlands; These are wetlands around major lakes for example Nabugabo and Bayuga bay swamp in Masaka, Sango Bay swamp in Rakai and Murchison bay swamp at Luzira around L .Victoria, Bukungu swamp in Buyende, Galiraya swamp in Kayunga on L. kyoga, Opeti swamp in Katakwi on Lake Opeti.
- Riverine wetlands; These are wetlands found along rivers for example River Mpologoma Swap in Pallisa, Victoria Nile Swamp and Sezibwa wetland in Kayunga, Katonga wetland in Gomba and Kafu wetland in Masindi.
- Valley or low land wetlands or Dombos. These are wetlands in open valleys for example Lubigi swamp in Wakiso, Nsooba swamp and Busega Swamp in Kampala, Mukote and Lubenge swamp in Nakasongola and Kiruruma swamp in Kabale.

A SKETCH MAP OF UGANDA SHOWING THE DISTRIBUTION OF WETLANDS.

Importances of wetlands in Uganda.

1. Wetlands have favoured mining especially sand quarrying and clay extraction which provides employment to the people for example clay from Kajansi swamp in Wakiso.
2. Wetlands have favoured agriculture especially water loving plants like rice in Mpologoma swamp in Pallisa, Doho rice scheme in river Manafwa Swamp in Butaleja, Yams in Kawaala Swamp in Kampala.
3. Swamps have promoted fishing due to the presence of various fish species like lung fish, mud fish, Tilapia in Sezibwa Swamp in Luweero, Mpologoma wetland in Pallisa and Nabugabo swamp in Masaka.
4. Swamps have favoured wild life conservation and conservation of biodiversity for example Kazinga Channel and Katwe swamp, on Lake Edward and Kasenye Swamp on George in Kasese since wetlands are habitats of different species of animals like hippopotamus, crocodiles and others.
5. Wetlands have contributed to climatic modification of the adjacent areas through evapotranspiration which has promoted agriculture for example along Katonga swamp in Gomba, Sezibwa Swamp in Luweero and Opeti swamp in Katakwi.
6. Wetlands are used as dumping grounds for industrial wastes and they help to filter toxic industrial wastes for example Nakivubo and Murchison bay swamp in Kampala filter toxic industrial waste products from Kampala before being discharged into Lake Victoria.
7. Swamps provide water for domestic and industrial use for example Sezibwa swamp to Bukolooto and Kayunga, Kajansi swamp to Uganda clays Kajansi, Nabajjuzi swamp to Masaka.
8. Wetlands are used for research and study purposes for example Zoology and Botany for example wetlands like Nabugabo swamp in Masaka Lubigi swamp in Wakiso, Murchison bay wetland at Luzira.
9. Wetlands act as water reservoirs for the collection of excess water that would cause flooding for example Lubigi swamp in Wakiso and Nsooba swamp in Kampala.
10. Wetlands act as catchment areas to supply lakes with water for example Nabugabo wetland in Masaka and Murchison bay swamp at Luzira to Lake Victoria while Sezibwa in Kayunga and Mpologoma swamp in Pallisa supply water to Lake Kyoga.
11. Wetlands have favoured the development of the art and craft industry due to the presence of raw materials like clay in Kajansi wetland in Wakiso for Uganda clays Kajansi, Pal Trees and papyrus from Sezibwa wetland in Kayunga for the manufacture of mats and baskets in Kayunga.
12. Wetlands have favoured hunting of wild animals and food gathering for example the hunting of antelopes, hippopotamus and collection of wild honey in Sezibwa swamp in Kayunga and Nabajjuzi swamp in Masaka and Murchison bay wetland at Luzira.
13. Wetlands are used to demarcate districts and country boundaries for example Sezibwa swamp separates Luweero from Kayunga district, Katonga swamp separates Gomba from Ssembabule.
14. Some wetlands have favoured water transport to the people which has promoted both internal and foreign trade for example Sezibwa wetland from Luweero to Kayunga.

Negative importances of wetlands in Uganda.

15. Wetland have hindered the construction of transport and communication network especially roads and railways for example Mpologoma swamps in Pallisa and Katonga swamp in Gomba.

16. Wetlands harbours dangerous wild animals which are a threat to human for example Snakes, crocodiles, Hippopotamus in Lwampanga swamp on Lake Kyoga in Nakasongola and Sezibwa wetland in Kayunga.
17. Some wetlands are hiding places for wrong elements leading to insecurity for example highway robbers along Kampala-Masaka-Mbarara road in Katonga wetlands in Masaka.
18. Most wetlands experience flooding which discourages settlement and other activities for example Nsooba, Kawaala and Bwaise wetlands in Kampala.
19. Some navigable swamps have led to water accidents especially when the papyrus vegetation blocks the routes for example Katonga wetland in Masaka and Sezibwa wetland in Kayunga.
20. Wetlands harbours dangerous pets and diseases carrying vectors for example mosquitoes in Busega wetland and Nsooba Swamp in Kampala.

WETLAND RECLAMATION/DESTRUCTION IN UGANDA.

Wetland reclamation refers to the conversion of wetlands to other land uses. The reason for wide spread encroachment includes rice cultivation, dairy farming, industrial development, urban settlement, Brick-making, sugarcane plantation, floriculture and horticulture.

Causes of wetland destruction in Uganda.

1. Agricultural activities, where many swamps have been cleared for the growth of crops and animal grazing for example Mpologoma swamp in Pallisa and Manafwa swamp in Butaleja for the growth of rice, Kawaala swamp in Kampala for yams and Mutai swamp in Jinja sugar canes by Kakira sugar works.
2. Industrialization leads to destruction of swamp vegetation like palms and papyrus to establish industries for example Novelty Leather Factory in Nabajjuzi swamp in Masaka, Crested cranes in Katengo swamp in Kyotera.
3. Mining and quarrying activities, lead to destruction of swamp vegetation for example in Kajansi wetland in Wakiso and seeta wetlands in Mukono for clay extraction for the manufacturing of bricks.
4. Urbanization and settlement leads to destruction of swamp vegetation like palms and papyrus like Nsooba settlement and Karelwe in Nsooba swamp, Bwaise in Bwaise wetlands and Busega in Busega swamp.
5. Construction of infrastructure especially transport routes leads to destruction of swamp vegetation and drainage of water for example the construction of Kampala-Masaka road led to the destruction of Busega in Kampala and Mukono- Kayunga road led to the destruction of Sezibwa wetlands in Kayunga.
6. Destruction of wetlands by wildfires which is either set by hunters and pastoralists or by lightning which leads to destruction of swamps vegetation for example Katonga swamp in Masaka and Sezibwa swamps in Kayunga.
7. Climatic changes resulting from global warming has led to reduction in water levels and therefore destruction of wetlands like Sezibwa swamp in Kayunga, Kiruruma swamp in Kabale and Mpologoma swamp in Pallisa.

8. Destruction of wetlands by natural calamity, which leads to destruction of swamp vegetation like palms and papyrus for example landslides in Bududa led to destruction of Nametsi, Namaaga and Bunakasale wetlands.
9. Increased demand for raw materials used for art and craft materials like palm leaves and papyrus has led to destruction of swamp vegetation from Sezibwa swamp in Kayunga.
10. Increased demand for fuel and energy used for domestic and industrial use leads to destruction of swamps like palms and papyrus for example riverine forests from Katonga swamp in Masaka and Mpologoma swamp in Pallisa destroyed for charcoal burning and fire wood.
11. Destruction of wetlands to get rid of disease carrying vectors for example Kityerera wetlands in Mayuge to get rid of tsetse flies, Mulago- Makerere swamp and Mengo swamps were cleared to get rid of disease carrying vectors.
12. Destruction of wetland to get rid of hiding places for wrong doers for example Namanve wetlands in Wakiso.
13. Corruption in the water and environmental protection and NEMA leading to the giving a way of wetlands to private individuals for alternative land uses hence destruction of wetlands like Nabajjuzi wetland in Masaka, Lubigi swamp in Wakiso and Busega swamp Kampala.
14. Un supportive and contradicting government policies, for example government licensing Kampala Capital City Authority to dump Wastes in Wakaliga and Kololo wetlands and allowed NWSC to operate in Lubigi Swamp. The Ministry of Agriculture animal industries and fisheries has also encouraged fish farming to take place in Lweza, Nabajjuzi and Katonga wetlands in Masaka.
15. Poor deposition of industrial wastes has led to destruction of swamp vegetation and death of aquatic life in wetlands for example Mukwano industry in Kampala releases industrial effluent to Nakivubo wetland Polythene bags deposited in Nsooba wetland.
16. Recreational activities lead to destruction of swamp vegetation and drainage of water streams to establish play grounds for example Kitante golf club in Kitante wetland, Nakivubo stadium in Nakivubo Wetland, Lugogo trade show ground in Lugogo wetland in Kampala.
17. Trade and commerce where wetland have been cleared to establish market and shops for example Karelwe market has led to destruction of Nsooba swamp, Balikuddembe market led to the destruction of Nakivubo wetland.
18. Afforestation has led to destruction of swamp vegetation for the planting of trees for example Lyamuliro wetlands in Kabale and Katuugo wetland in Nakasongola.
19. Brick making has led to destruction of swamp vegetation to extract clay for the manufacture of tiles and bricks for example in the Kajansi swamp in Wakiso and seeta wetland in Mukono.

Effects of wetland reclamation in Uganda.

Positive Effects.

1. Swamp reclamation has led to the destruction of hiding places and breeding grounds for disease carrying vectors for example Luzira-Mutungo wetland and Nsooba swamp in Kampala.
2. Reclamation of wetlands has created room for agriculture for example Kibimba swamp for the growth of rice by Kibimba Tilda rice scheme in Bugiri, Manafwa swamp for the growth of Rice by Doho scheme in Butaleja, Mpologoma Wetland in Pallisa for the growth of rice.
3. The reclamation of wetland has created room for settlement and urbanization for example Port Bell and Luzira in Luzira swamp , Nsooba and Karelwe in Nsooba wetland and Busega wetland in Kampala

4. It has encouraged the development of the Art and craft industry like palms and papyrus from Sezibwa swamp in Kayunga, Katonga swamp in Masaka, Busega Swamp in Kampala, Lubigi swamp in Wakiso for the manufacture of mats and baskets.
5. It has created space for establishment of industries for example Novelty Leather Factory in Nabajjuzi swamp in Masaka and Crested Cranes in Katengo swamp in Kyotera.
6. It has created space for the establishment of transport network especially roads for example the construction of Kampala-Masaka in the Busega Swamp in Kampala and the construction of Mukono-Kayunga road in the Sezibwa wetlands in Kayunga.
7. It has created space for the establishment of recreational activities for example Kitante wetland, Nakivubo stadium in Nakivubo wetland, Lugogotrade show ground in Lugogo wetland.
8. It has created space for the development of trade activities for example Karelwe market in the Nsooba Swamp, Balikuddembe market in the Nakivubo wetland.
9. It has created space for the deposition of waste products especially in urban centres for example Mukwano industries in Kampala releases industrial effluent to Nakivubo wetland, Polythene bags and other domestic wastes deposited in Wakaliga wetland and Nsooba wetland in Kampala.
10. It has promoted mining and quarrying activities for example Kajansi wetland in Wakiso and seeta wetland in Mukono for clay extraction for the manufacture of bricks and tiles.

Negative effects of wetland destruction/Reclamation.

1. The destruction of wetlands has led to destruction of biodiversity due to destruction of vegetation and habitats for aquatic animals like snakes, lungfish from Katengo swamp in Kyotera, Nabajjuzi swamp in Masaka, Murchison bay wetland and Nsooba wetland in Kampala.
2. It has reduced the wetlands capacity to purify the contaminated water from industrial wastes leading to pollution of water bodies for example the reclamation of Luzira-Mutungo wetland and Nakivubo wetland has led to pollution of Murchison bay wetland in Kampala.
3. It has led to increased flooding in reclaimed land as a result of reduction in water storage capacity of wetlands for example Nsooba settlement and Karelwe due to destruction of Nsooba swamp in Kampala.
4. It has led to reduced rainfall formation leading to desertification for example in Tororo and Butaleja due to destruction of Manafwa wetlands, Kabale due to destruction of Kiruruma wetland, Masaka due to destruction of Katonga wetland.
5. It has led to the lowering of the water table resulting from reduction in rainfall and loss of surface water for example in Tororo and Butaleja due to destruction of Manafwa wetlands, Kabale due to destruction of Kiruruma wetland.
6. It has led to siltation of streams and rivers for example the reclamation of Mutai swamp by Kakira sugar works has led to siltation of river Kiko, the reclamation of Manafwa wetland by Doho rice scheme has led to Siltation of River Manafwa.
7. It has led to increased spread of diseases due to flooding which provides breeding grounds for vectors like mosquitoes spreading malaria at Bwaise in Bwaise wetland, Nsooba settlement in Nsooba wetland, Wakaliga and Nateete in Wakaliga wetland.
8. It has reduced on areas of dumping industrial and domestic wastes for example settlement in Wakaliga swamp and Kololo wetlands that was given to KCCA to dump their wastes from Kampala

9. It has accelerated soil erosion leading to soil exhaustion due to loss of swamp vegetation over for example in Tororo and Butaleja due to destruction of Manafwa wetlands, Kabale due to destruction of Kiruruma wetland, Masaka due to destruction of Katonga wetland.
10. It has led to loss of raw materials for art and craft, and construction industry for example palms and papyrus from Sezibwa swamp in Kayunga, Katonga swamp in Masaka, Busega swamp in Kampala, Lubigi swamp in Wakiso.

Steps being taken to conserve wetlands in Uganda.

1. Demarcating and gazetting of wetland areas to reduce encroachment on wetlands for settlement, agriculture etc. for example Katonga wetland and Nabajjuzi swamp in Masaka, Lubigi swamp in Wakiso and Murchison bay wetland at Luzira.
2. Setting strong laws concerning environmental conservation by ministry of water and environmental protection and NEMA for the protection of wetlands such as Katonga wetland and Nabajjuzi wetland in Masaka, Lubigi swamp in Wakiso and Murchison bay wetlands at Luzira.
3. Sensitization of the public about the importance of wetlands and problems resulting from wetland destruction using local media like radios, newspapers, Televisions to save wetlands such as Katonga wetland and Nabajjuzi swamp in Masaka, Lubigi swamp in Wakiso and Murchison bay wetland at Luzira.
4. Treatment and recycling of waste products before being discharged in wetlands, rivers and lakes for example sewage by NWSC at Bugolobi and waste plastics are recycled before being discharged in Luzira wetland on Lake Victoria and Busega wetland in Kampala.
5. Establishment of support organizations to spearhead the protection of wetlands for example. National Environmental Management Authority(NEMA) to protect wetlands such as Katonga wetland and Nabajjuzi swamp in Masaka, Lubigi swamp in Wakiso and Murchison bay wetland at Luzira.
6. Eviction of encroachers on the wetlands for example Lubigi swamp and Busega swamp in Kampala, Abuket and Awoja swamp in Soroti.
7. Creation of alternative sources of energy instead of depending on charcoal and fire wood from riverine forests for example the use of electricity and solar energy to save wetlands such as Katonga wetland and Nabajjuzi swamp in Masaka, Lubigi swamp in Wakiso and Murchison bay wetlands at Luzira.
8. Discovery of alternative sources of raw materials for the art and craft and construction industry for example use of straws for the manufacture of mats and bags to save papyrus and palms from Katonga wetland and Nabajjuzi swamp in Masaka and Lubigi swamp in Wakiso.
9. Joining international bodies and treaties aimed at protecting environment and therefore wetlands for example the Ramsar convention of 1988 for the conservation of wetland habitats in Nabajjuzi swamp in Masaka, Lake Opeta wetland and Bisina wetlands in Katakwi and Nakuwa wetland in Kaliro.
10. Introduction of upland rice to reduce rice growing in wetlands for example in Luweero, Nakaseke and Kayunga to save wetlands such as Nabajjuzi swamp in Katonga wetland in Masaka.
11. Introduction of Zero grazing in Kampala, Jinja and Luweero to reduce overgrazing in wetlands such as Nabajjuzi swamp in Masaka and Lubigi swamp in Kampala.

12. Encouraging population control through family planning to reduce encroachment to wetlands like Busega swamp in Kampala and Sezibwa swamp in Kayunga.
13. Intensive research is being carried out by NEMA to ensure sustainable exploitation of wetlands like Katonga swamp in Masaka, Kiruruma swamp in Kabale and Nabugabo swamp in Masaka.

REVISION QUESTIONS.

1. Examine the importance of wetlands in Uganda.

- Introduce by defining wetlands, identify the types of wetlands and draw a sketch map of Uganda showing wetlands.
- Explain the positive and negative importance of wetlands, giving an example of a wetland on every point.

2. Examine the causes and effects of wetland reclamation in Uganda.

- Introduce by defining wetland reclamation as the conversion of land occupied by wetlands into other productive land use activities, identify the types of wetlands in Uganda and draw a sketch map of Uganda showing types of wetlands.
- Explain the causes of wetland reclamation, giving an example of a wetland on every point.
- Explain the positive and then negative effects of wetland reclamation giving an example of a wetland on every point.

3. Explain the causes and effects of wetland destruction in Uganda.

- Introduce by giving the current status of wetlands in Uganda, Identify the types of wetlands and draw a sketch map of Uganda showing types of wetlands.
- Explain the causes of wetland destruction and only negative effects of wetland destruction, giving an example of a wetland on every point.

Chapter 10.

TRANSPORT AND COMMUNICATION.

Current status.

- Road transport is the most dominant type of transport with 99% passenger traffic and 95% of freight.
- The sector is developing as a result of economic privatization and liberalization.
- Air transport is limited to a few areas with domestic flights at Entebbe international airport to air strips at Kasese, Arua, Gulu, Tororo, Jinja and Soroti.
- Water transport is limited to lakes and sections of rivers which are navigable.
- The railway transport has declined in importance and most of the routes have gone out of use except the Tororo –Jinja –Kampala route.
- There are plans to renovate the railway routes that are out of use for example Tororo-Lira-Gulu-Pakwach route.
- The railway transport has been privatized from Uganda Railway Corporation to Rift valley Railways.
- Railway transport is the least important type of transport in terms of passengers.
- Water transport is dominated by private investors.
- There is revival of air transport with the introduction of the new bombardier plane as Uganda Airlines.
- There is increased use of boda-boda motor cycles on roads throughout the country.

Types of transport in Uganda.

1. Road transport with route such as,

- Kampala-Kampala-Jinja-Tororo-malaba road.
- Kampala -Masaka-Mbarara-Kabale road.
- Kampala-Mubende –Fort portal –Kasese road.
- Kampala –Kiboga –Hoima road.
- Kampala – Nakasongola –Gulu road.
- Mbale –Soroti – Moroto –Kotido road.
- Tororo-Mbale –Soroti –Lira road.

2. Railway transport with railway line routes such as,

- Tororo –Jinja- Kampala railway (currently active).
- Tororo – Lira -Gulu – Pakwach railway.
- Kampala – Kasese railway.
- Kampala – port bell railway.

3. Water transport with routes such as.

- Port bell –Jinja route, port bell –Kisumu route, Port bell- Mwanza route, Bukakata- Kalangala route on Lake Victoria.
- Zengebe –Namasale route, Bukungu – Lalle route, Kakooge – Mulondo route on Lake Kyoga.
- Bulisa –Mahagi port route, Bulisa – Butiaba route, Ntoroko –Bulisa route on Lake Albert.
- Rwenshama –Katwe route on Lake Edward, Kazinga channel route on Lake Edward and George, Katunguru- kazinga channel route on Lake George, masyoro- Kahendero route on Lake George.

— Kasenye – Masyoro route on Lake George.

4. Air transport with routes such as,

— Entebbe Airport –Kololo air strips.

— Entebbe Airport – Gulu airfield.

— Entebbe airport – Kasese air strip.

— Entebbe Airport – Jinja air strip.

— Entebbe Airport – Tororo air strip.

— Entebbe Airport _ Nyakishara air strip in Mbarara.

— Entebbe Airport –Arua air strip

— Entebbe Airport – Soroti Air field.

ROAD TRANSPORT IN UGANDA.

Current status of road transport in Uganda.

- The sector is developing as a result of economic liberalization and privatization of the economy.
- Road transport is the most dominant type of transport with 99% passenger traffic and 95% of freight.
- Many of the murrum roads have been up graded to tarmac roads.
- Many of the roads that were under local government have been taken over by the central government under Uganda roads authority.
- Many feeder roads have been opened especially in rural areas.
- Rehabilitation of major high ways is being done for example Kampala-Masaka- Mbarara-High way, Kampala- Gulu High way.
- The dominant means of transport used in Uganda are cars, Lorries, Motorcycles. etc.

The major roads include.

- KampalaKampala-Jinja-Tororo-malaba road.
- Kampala-Masaka-Mbarara-Kabale road.
- Kampala-Mubende –Fort portal –Kasese road.
- Kampala –Kiboga –Hoima road.
- Kampala – Nakasongola –Gulu road.
- Mbale –Soroti – Moroto –Kotido road.
- Tororo-Mbale –Soroti –Lira road.

ASKETCH MAP OF UGANDA SHOWING MAJOR ROADS.

Factors influencing the distribution of road transport in Uganda.

Physical factors;

1. Nature of relief. Areas with gentle slopes make it easy and cheap to construct roads encouraging road construction for example Kampala and Jinja with Kampala- Jinja road, Kampala- Entebbe road and Kampala –Masaka road. While areas with steep slopes have led to poorly developed road transport network due to difficulty in construction for example. Bundibugyo with Fort portal road – Bundibugyo road.
2. Drainage, Areas with water bodies like swamps and rivers make road construction difficult and expensive leading to poorly developed road transport for example Kayunga –Luweero road a cross river Sezibwa, While areas with limited drainage features have promoted the development of road network systems for example Kampala – Jinja road, Kampala – Entebbe road.
3. Nature of vegetation. Areas with limited vegetation cover encourage road construction for example Kampala-Jinja road which only crosses Mabira forest while areas covered with thick vegetation cover have discouraged road construction for example Masindi- Butiaba road across the Budongo forest.
4. Climate, Areas which receive heavy rainfall of above 1500mm per annum normally experience flooding which destroy transport routes like roads discouraging road construction for example in Kalangala while Areas which receive moderate rainfall amounts of about 750-1500mm per annum have encouraged settlement and road construction for example Kampala with Kampala - Jinja road.
5. The nature of soils. The presence of marrum in Kayunga and Mukono has encouraged the construction of marrum roads for example Kayunga-Bbaale road in Kayunga while absence of marrum roads have discouraged road construction.
6. The nature of basement rocks. Areas with hard basement rocks have encouraged road construction for example Kampala with Kampala-Jinja road.
7. Pests and diseases, Areas with pests and diseases have discouraged settlement leading to poorly developed road transport for example in Masindi with Masindi-Butiaba road.

Human factors.

8. Historical factors. Areas which were economically and administratively significant during the colonial government have well developed transport network for example Entebbe and Kampala with Kampala- Entebbe road.
9. Cultural factors. Areas which had organized kingdoms mobilized for the construction of local roads which later were developed into roads for example Kampala-Jinja road, Kampala – Entebbe road in Buganda.
10. Mining activities. Mining centers have attracted the construction of roads to facilitate the delivery of minerals to market centres and processing centres for example Kasese-Kilembe road to copper mining at Kilembe.
11. Urbanization, urban areas such as Kampala and Jinja have more developed roads than rural areas due to the presence of numerous economic activities for example Kampala-Jinja road, Kampala – Entebbe road.

12. Agricultural activities, some roads have been constructed to facilitate the delivery of agricultural products to market centres for example Kampala-Masaka-Mbarara road for milk from Mbarara and coffee from Masaka.
13. Tourism. Tourist centres have encouraged the construction of road transport to facilitate the movement of tourists for example Kampala-Masaka-Mbarara –Kasese road to Queen Elizabeth National park, Fort portal-Bundibugyo road to Mount Rwenzori and Sempaya hot springs.
14. Exploitation of forest resources such as lumbering as encouraged the construction of road networks to aid in the exploitation of the forest resources for example Masindi –Nyabyeya road for Budongo forest.
15. Industrialization. Many roads have been constructed to link industrial centres to market centres for example Kampala – Gulu road, Kampala - Jinja road for products from Mukwano industries.
16. Fishing activities. Many have been constructed to link landing sites to marketing centres for example Mukono-Katosi road on Lake Victoria, Sasira-Tumba road on Lake Kyoga.
17. Government policy on road distribution. The government of Uganda dictates on the priority roads to be constructed for example Kampala-Masaka- Mbarara road, Kampala –Jinja road and Kampala -Entebbe road.
18. Security, Areas which are peaceful have attracted a large population encouraging the construction of roads for example Kampala, Jinja, Mukono, and Mbarara leading to the construction of Kampala-Masaka- Mbarara road, Kampala –Jinja road.
19. The presence of other means of transport. Many roads have been constructed to supplement other types of transport for example Kampala-Entebbe road to Entebbe international airport, Kampala- Port bell road to Port bell – Mwanza route on Lake Victoria,

Importance of road transport in Uganda.

1. It has promoted internal and external trade by encouraging the movement of traders to market centres for example Kampala-Masaka –Mbarara road and Kampala – Jinja road.
2. It has promoted international relationships with other countries through crossing borders for example Mbarara-Kabale- Katuna road to Rwanda and Jinja-Iganga –Busia road to Kenya.
3. It has led to the opening up of rural areas by the use of feeder roads for example Katosi landing site on Lake Victoria is linked to Mukono by Mukono – Katosi road.
4. Road transport complements other means of transport such as water, Rail and Air Transport for example Kampala-Mubende-Fort portal –Kasese road links Kasese to Kampala where the railway line collapsed.
5. It has boosted tourism by encouraging the movement of tourists to tourist centres for example Kampala-Mubende-Fort portal –Bundibugyo road to mountain Rwenzori and Semuliki, Rwenzori National Park.
6. It has encouraged the development of the forestry industry by encouraging the movement of forest products to market centres for example Katungu forest along Kampala Gulu road.
7. It has encouraged the development of the mining sector by promoting continuous exploitation of minerals through aiding the delivery of mineral to marketing and processing centres for example Bukakata –Masaka road for sand at Bukakata, Fort portal Kasese road for lime stone at Hima in Kasese.
8. It has led to the development of the fishing industry by encouraging the movement of fish and fish products to market centres for example Mukono –Katosi road on Lake Victoria.

9. It has promoted the development of agriculture through delivery of agricultural products to market centres for example Kampala –Masaka –Mbarara road for Bananas in Masaka and Cattle from Mbarara.
10. It has encouraged the development of the industrial sector by encouraging delivery of industrial products to market centres for example Mukwano industry in Kampala with Kampala-Jinja road, Kampala –Gulu high way road.
11. It has encouraged the development of urban centres due to accessibility created by roads for example Mukono along Kampala –Jinja road, Migeera along Kampala –Gulu road.
12. It has created employment opportunities to the people in Uganda for example those in UNRA and Taxi operators along Kampala –Jinja road and Kampala –Masaka –Mbarara road.
13. Source of government revenue through taxing people who are employed along Kampala-Masaka road and Kampala –Jinja road as taxi drivers and also in UNRA, vendors among others..
14. Road transport has encouraged diversification of the economy and reduced over dependence on agricultural sector through generating more income from activities involved on roads such as transport on Kampala –Jinja high way.

Negative impacts of road transport.

1. Road transport has led to destruction of natural vegetation such as swamps and forests for example the construction of Kampala –Jinja road has led to the destruction of part of Mabira forest.
2. Road transport is associated with a lot of accidents that claim people's lives for example along Kampala – Masaka Road
3. It has facilitated the easy spread of diseases by encouraging the movement of infected people for example AIDS was spread to other parts of Uganda in the 1990s by use of Kampala-Masaka road and Ebola using the Kampala –Gulu road.
4. It has led to land degradation through constructing roads along steep slopes for example along Mbarara –Kabale –Kisoro road.
5. It has led to environmental pollution through fumes released to the atmosphere for example along Kampala –Jinja road and Kampala –Masaka road.
6. Roads are associated with high costs of maintenance resulting g into loss of government revenue for example the construction of Kampala-Masaka road and Kampala-Gulu road.
7. The construction of roads has led to displacement of people leaving some homeless for example the construction of Kampala- Entebbe express high way and Mukono –Katosi road.
8. Road transport has encouraged smuggling of goods through encouraging movements across borders for example goods from DRC using Kabale-Kisoro – Kyanika road and from Kenya using Jinja – Iganga- Busia road Rwanda using Kabale –Katuna.
9. Road transport is associated with highway robbers who distabilise peace for example in Mabira forest along Kampala-Jinja road.
10. It has resulted into rural –urban migration with its associated problems for example from Masaka to Kampala using Kampala-Masaka road.
11. It has led to diversion of labour from other sectors like agriculture leaving those sectors underdeveloped for example Kampala-Masaka-Mbarara road and Kampala –Gulu road.

Factors limiting the development of road transport in Uganda.

1. Rugged relief/steep slopes which increases the costs of road construction for example Kampala-Kabale road.
2. The presence of drainage features like swamps increase the costs of road construction for example river Katonga along Kampala-Masaka-Mbarara road.
3. The presence of thick forests lead to high costs of construction and maintenance for example Mabira Forest along Kampala-Jinja road and Budongo forest along Masindi – Butiaba road.
4. Natural calamities like flooding and landslides destroy roads for example Tororo – Nagongera Road and Busembatya –butaleja Road affected by Flooding.
5. The presence of hard basement rocks which make construction difficult and expensive for example along Mbarara – Kabale road.
6. Limited capital to be invested in the maintenance and construction of roads like Kampala – Masaka –Mbarara road leading to external borrowing.
7. Limited skilled labour to be employed in the construction and maintenance of roads for example Kampala –Jinja road and Kampala –Gulu road leading to dependence on Expatriate labour from china and japan.
8. Corruption and Embezzlement of funds meant to construct and repair roads by Government officials for example in the construction of Mukono –Katosi road, Kampala –Jinja road.
9. Low levels of technology leading to heavy dependence on foreign technology from Japan and China for the construction and Maintenance of Mukono –Katosi road and Kampala –Jinja road.
10. Insecurity in some parts of Uganda discouraging the users of road transport for example Fort portal –Bundibugyo road due to ADF rebels.
11. Limited basic raw materials like Bitumen leading to importation of such in the construction and rehabilitation of roads like Kampala –Jinja road and Kampala –Gulu high way.
12. The rising fuel prices has increased the cost of transport for example along Kampala –Jinja and Kampala – Masaka –Mbarara road.
13. Profit repatriation by foreign companies has reduced the rate of re-investment for example Chongqing construction International Corporation for Mukono –Katosi road.
14. Congestion and traffic jam due to increased use of cars especially in urban centres which lead to delays for example along Kampala – Jinja road.
15. Competition from other types of transport for example water transport and railway transport limits passengers using Kampala –Masaka road.
16. High costs of compensation of occupants in road reserves leading to loss of government revenue meant to develop road networks for example along Kampala –Entebbe Express high way and Mukono – Katosi road.

Measures being taken to improve the road transport sector.

1. Construction and rehabilitation of roads by the Uganda National Roads Authority (UNRA) for example Kampala – Gulu road, Kampala –Masaka –Mbarara road.
2. Attracting foreign road construction companies to construct standard roads for example sterling from Italy, Specon from Japan for the rehabilitation of Kampala-Masaka road, CICO from china for Mukono –Katosi road.
3. Privatization and liberalization of the transport sector which has led to emergence of new companies like Gaaga buses used along Kampala-Gulu high way.

4. Decentralization of some roads where some roads are now maintained by the local government like, Kawempe –Mpererwe road.
5. Education and training of labour skills necessary for road construction for example civil engineers and drivers along Kampala-Masaka road.
6. Promoting peace and stability to encourage investment in the road sector for example Kampala –Gulu road.
7. Importation of foreign technology from developed countries for example graders and trailers for rehabilitation of Kampala – Masaka road.
8. Use of traffic police to regulate the movement on roads and therefore reduce accidents for example along Kampala –Masaka road.
9. Acquisition of foreign aid from donor communities like World Bank for construction and rehabilitation of roads like the Kampala- Masaka road.
10. Introduction of weigh bridges to reduce on over loading for example at Luweero along Kampala Gulu road.
11. Establishment and empowerment of support organizations like Uganda National Roads Authority (UNRA) to spear head the construction of roads like Kampala Masaka road.
12. Construction of winding roads along contours in the mountainous areas to dodge steep slopes for example along Mbarara- Kabale – kisoro road.
13. Construction of bridges and culverts to reduce the risks of breakdown of roads during floods for example Karuma bridge along Kampala –Gulu road, Sezibwa Bridge along Mukono K Kayunga road.
14. Fighting corruption and mismanagement of funds by using the IGG and Anti -corruption unit to ensure proper allocation of funds for road construction for example Mukono –Katosi road.
15. Widening of roads to reduce on the black spots and therefore reduce on the accidents for example Kampala – Masaka road.
16. Construction of bypass roads and fly overs to reduce on the congestion in urban areas for example Northern by Pass and Kampala –Entebbe express high way.

WATER TRANSPORT IN UGANDA.

Current status of water transport.

- Water transport is limited to lakes and sections of rivers which are navigable.
- Water transport is the cheapest mode of transport in Uganda.
- Lake Victoria is the most important inland water way in Uganda.
- Water transport is mainly dominated by boats.
- There is government initiative in the improvement of water transport for example in provision of ferries like Zengebe – Namasale ferry on Lake Kyoga.
- Water transport in Uganda is developing as result of privatization and liberalization of the economy.

Water transport routes include,

- Port bell –Jinja route, port bell –Kisumu route, Port bell- Mwanza route, Bukakata- Kalangala (Luuku) route on Lake Victoria.
- Zengebe –Namasale route, Bukungu – Lalle route, Kakooge – Mulondo route on Lake Kyoga.
- Bulisa –Mahagi port route, Bulisa – Butiaba route, Ntoroko –Bulisa route, Wanseko-Panyimur route on Lake Albert.
- Rwenshama –Katwe route on Lake Edward, Kazinga channel route on Lake Edward and George,
- Katunguru- kazinga channel route on Lake George,
- Masyoro- Kahendero route on Lake George.
- Kasenyi –Masyoro route on Lake George.
- Laropi (Moyo) –Umi (adjumani) route across Albert Nile.
- Masindi port (Masindi) –Kingu (Apac) route across the Victoria Nile.

ASKETCH MAP OF UGANDA SHOWING MAJOR WATER TRANSPORT ROUTES.

Factors limiting the effective utilization of water transport in Uganda.

Physical factors.

1. Occurrence of strong water waves resulting from strong winds that result into accidents for example on Bulisa –Ntoroko port Route on Lake Albert, Kayindi –Buvuma route On Lake Victoria and Masindi port (Masindi) –Kungu (Apac) route across Victoria Nile.
2. The presence of water weeds especially water hyacinth hinders the movement of water going vessels like boats across Kayindi –Buvuma route on Lake Victoria, Zengebe –Namasale route on lake kyoga and Masindi port-Kungu route across Victoria Nile.
3. The presence of sea rocks at the bottom of lakes and river channels has led to accidents for example across Bulisa –Butiaba route on Lake Albert, Kayindi –Buvuma route on Lake Victoria.
4. The presence of water falls and rapids across rivers which slow down the movement of water going vessels and sometimes led to accidents across ,Laropi(Moyo) –Umi (adjumani) route across Albert Nile, Masindi port (Masindi) –Kungu (Apac) route across the Victoria Nile.
5. The presence of dangerous aquatic animals like crocodiles and Hippos lead to accidents for example a cross Bulisa-Mahagi port route on Lake Albert, Kiyindi –Buvuma route on Lake Victoria and Masindi port(Masindi)-Kungu (Apac) route across the Victoria Nile.
6. Remoteness of ports due to physical barriers like escarpments for example Butiaba escarpments on Lake Albert has limited the use of Bulisa –Butiaba route on Lake Albert.
7. Climatic changes like prolonged drought has led to reduction in water levels in the rivers and lakes limiting the use of big vessels for example across Kiyindi –Buvuma route on Lake Victoria.
8. The presence of thick swamp vegetation which sometimes block ports and water routes hindering movements for example across Kiyindi –Buvuma route on Lake Victoria,Zengebe – Namasale route on Lake Kyoga and Masindi port(Masindi)_Kungu(Apac) route across the Victoria Nile.
9. The presence of shallow water bodies hinder the movement of water vessels for example across Kiyindi –Buvuma route on Lake Victoria Zengebe –Namasale route on Lake Kyoga and Masindi port (Masindi) –Kungu (Apac) route across the Victoria Nile.
10. The narrow river channels make them less developed for water transport for example River Nyamwamba,River Sipi, River Mpanga and River Mubuku and Masindi port (Masindi) –Kungu (Apac) route across the Victoria Nile.

Human factors,

11. Limited capital to be invested in buying improved water vessels leading to use of small boats for example across Kiyindi –Buvuma route on Lake Victoria, Zengebe –Namasale route on Lake Kyoga and Masindi port (Masindi) –Kungu(Apac) route across the Victoria Nile.
12. Limited skilled labour to be employed in handling water transport vessels inform of captains and engineers for example across Kiyindi –Buvuma route on Lake Victoria, Zengebe –Namasale route on Lake Kyoga and Masindi port (Masindi)- Kungu(Apac) route across the Victoria Nile.
13. Corruption and embezzlement of funds by government officials meant to develop the water transport for example across Kiyindi –Buvuma route on Lake Victoria, Zengebe –Namasale route on Lake Kyoga and Masindi port(Masindi) -=Kungu(Apac) rout across the Victoria Nile.

14. Low levels of technology like the use of small boats leading to accidents for example across Kiyindi-Buvuma route on Lake Victoria, Zengebe –Namasale route on Lake Kyoga and Masindi Port (Masindi)-Kungu (Apac) route across the Victoria Nile.
15. Insecurity in form of water pirates leading to loss of life and property for example across Kiyindi –Buvuma route on Lake Victoria, Zengebe-Namasale route on Lake Kyoga and Masindi port (Masindi)-Kungu(Apac) route across the Victoria Nile.
16. Poorly developed port handling facilities discourages large scale shipping for example across Kiyindi –Buvuma route on Lake Victoria, Zengebe –Namasale route on Lake Kyoga and Masindi port(Masindi) –Kungu (Apac) route across the Victoria Nile.
17. The rising fuel prices has increased the cost of water transport discouraging the use of motorized boats for example across Kiyindi-Buvuma route on Lake Victoria, Zengebe-Namasale route on Lake Kyoga and Masindi port (Masindi) –Kungu (Apac) route across the Victoria Nile.
18. Profit repatriation by foreign companies such as Hwan sung has reduced the rate of re-investment in boat making, limiting water transport across Kiyindi –Buvuma route on Lake Victoria, Zengebe-Namasale route on Lake Kyoga.
19. Competition from other types of transport for example road transport and Air transport has limited passengers using Kiyindi-Buvuma route on Lake Victoria, Zengebe –Namasale route on Lake Kyoga and port bell Kisumu route on lake Victoria.

Measures being taken to improve on water transport in Uganda.

1. Constant removal of water weeds like water hyacinth to improve navigation for example a cross Kiyindi –Buvuma route on Lake Victoria, Zengebe-Namasale route on Lake Kyoga and Masindi port(Masindi)-Kungu(Apac) route across the Victoria Nile.
2. Encouraging the use of life saving jackets to ensure safety in case of water accident across Kiyindi –Buvuma route on Lake Victoria, Zengebe –Namasale route on Lake Kyoga and Masindi port (Masindi) - Kungu (Apac) route across river Nile.
3. Construction and rehabilitation of roads leading to ports for example Kampala –Port bell road for port bell –Kisumu route on Lake Victoria, Masaka –Bukakata road for Bukakata- Kalangala route on Lake Victoria.
4. Ensuring security on most water bodies to fight pirates for example Kiyindi –Buvuma route on Lake Victoria, Zengebe –Namasale route on Lake Kyoga and Masindi port(Masindi) –Kungu (Apac) route across the Victoria Nile.
5. Improving on the port handling facilities by constructing improved piers for landing of ships for at port Bell for port Bell –Mwanza route on Lake Victoria.
6. Establishment of support institutions to improve on the water transport for example the ministry of works and transport for the development of Kiyindi –Buvuma route on Lake Victoria, Zengebe –Namasale route on lake kyoga and Masindi port (Masindi)-Kungu(Apac) route across the Victoria Nile.
7. Importation of improved technology to facilitate the efficient movement on the water bodies for example use of heavy engines and the motorized boats for Kiyindi –Buvuma route on lake Victoria, Zengebe –Namasale route on Lake Kyoga and Masindi port (Masindi) –Kungu (Apac) route across the Victoria Nile.

8. Fighting corruption and embezzlement of funds through IGG to reduce mismanagement of funds meant for the development of water transport like Kiyindi –Buvuma route on Lake Victoria ,Zengebe –Namasale route on lake Kyoga.
9. Education and Training of labour to acquire skilled labour to encourage the development of water transport along routes like Kiyindi –Buvuma route on Lake Victoria, Zengebe –Namasale route on lake Kyoga and Masindi port(Masindi) –Kungu (Apac) route across Victoria Nile.
10. Availing loans from financial institutions like banks and micro-finance to act as capital for investment in buying the water transport vessels used along Kiyindi-Buvuma route on Lake Victoria.
11. Constant removal of water weeds especially the water hyacinth and papyrus vegetation using machines to clear the routes and facilitate transportation along Kiyindi –Buvuma route on Lake Victoria, Zengebe –Namasale on Lake Kyoga.
12. Uganda Wild Life Authority is relocating wild animals like crocodiles to reduce their disastrous effects along Kiyindi –Buvuma route on Lake Victoria, Zengebe –Namasale route on Lake Kyoga.
13. Liberalization and privatization of water transport to encourage efficiency in the operations for example in the boat construction by Hwan Sung and private motorized boats along Kiyindi – Buvuma route on Lake Victoria, Kasenyi –Masyoro route on Lake George.
14. Introduction of ferry services like along Kiyindi –Buvuma Route on Lake Victoria, Zengebe – Namasale Route on Lake Kyoga and Masindi port (Masindi) –Kungu (Apac) route across Victoria Nile.
15. Conducting research on improvement in water transport by the ministry of works and transport for example along Kiyindi –Buvuma route on Lake Victoria, Zengebe –Namasale on Lake Kyoga, Bulisa - Butiaba on Lake Albert.

RAILWAY TRANSPORT.

Current status of railway transport in Uganda.

- The railway transport has declined with the only active route being Malaba –Tororo –Jinja – Kampala railway.
- The freight services is being privatized to the Rift valley railways.
- There is a plan by the government of Uganda to rehabilitate the railway routes that had collapsed like Tororo –Gulu-pakwach Railway.
- Railway transport is mainly used to transport bulky goods.
- Railway transport has the least number of passengers.
- Passenger services using railway transport has declined.

Railway transport has railway line routes such as,

- Tororo –Jinja- Kampala railway (currently active).
- Tororo – Lira -Gulu – Pakwach railway.
- Kampala – Kasese railway.
- Kampala – port bell railway.

ASKETCH MAP OF UGANDA SHOWING RAILWAY TRANSPORT NET WORK/ROUTES.

Factors for the low levels of development of railway transport in Uganda.

1. Limited capital to be invested in the maintenance of railway lines like Kampala –Kasese railway and Tororo –Jinja –Kampala railway.
2. Limited skilled labour to be employed in the construction and maintenance of railway lines for example Kampala-kasese railway and Tororo –Jinja –Kampala railway leading to dependence on expatriate labour from china and Japan.
3. Corruption and embezzlement of funds meant to construct and repair railway routes by government officials for example Kampala –Kasese railway and Tororo –Jinja –Kampala railway.
4. Low levels of technology leading to heavy dependence on foreign technology from Japan and China for the maintenance of Kampala- Kasese Railway and Tororo- Jinja –Kampala railway.
5. Insecurity in some parts of Uganda discouraging the users of railway Transport for example Kampala –Kasese railway and Tororo –Jinja –Kampala railway.
6. Limited spare parts leading to expensive importation of such in the construction and rehabilitation of railway routes like Kampala- Kasese railway and Tororo –Jinja –Kampala railway
7. Profit repatriation by foreign companies has reduced the rate of re- investment for example for example Rift –Valley Railway for Kampala –Kasese railway and Tororo –Jinja –Kampala railway.
8. Stiff competition from other types of transport for example road transport, water transport and Air transport limits passengers using Kampala- Kasese Railway and Tororo –Jinja –Kampala railway.
9. The collapse of the East African community left the railway network with limited funding which led to its collapse in Uganda for example Kampala –Kasese railway.
10. The closure of mining centres like Kilembe copper mines led to the collapse of the Toro –Lira – Gulu –Pakwach railway route.
11. The decline in cotton production led to the collapse of the Tororo –Lira –Gulu –Pakwach railway route.
12. High levels of Vandalisation of the railway slippers by metal scrap dealers for manufacture of metallic products for example Kampala –Kasese railway route.

Measures being taken to improve railway transport in Uganda.

1. Rehabilitation of sections of railway routes for example Malaba –Tororo –Lira –Gulu –Pakwach railway.
2. Privatization and liberalization of the railway transport to ensure efficiency for example to Rift valley Railways for the Malaba –Tororo –Jinja –Kampala route.
3. Ensuring security to protect the users of railway transport for example along Malaba –Tororo – Jinja –Kampala railway.
4. Education and training of skilled labour to operate railway transport for example workers in the ministry of works and Transport for the development and operation of the Malaba –Tororo – Jinja –Kampala railway route.
5. Establishment of supportive institutions to facilitate the operations of railway networks in Uganda for example Rift Valley railways for the Tororo- Jinja –Kampala railway.
6. Fighting against Vandalisation of railway slippers by employing a strong police force for example along Tororo –Jinja –Kampala railway.
7. Railway transport is being used as an important route to transport fuel from Kisumu to Kampala along Tororo- Jinja – Kampala railway.

8. Railway is being used to complement water transport by linking major inland ports to commercial areas e.g. port bell along Lake Victoria using Kampala –Luzira railway.

REVISION QUESTIONS.

1. Assess the contribution of the transport sector to the development of Uganda.

- Introduce by giving the current status of the water transport in Uganda, identify the types of transport in Uganda and Draw a sketch map showing the distribution of transport routes.
- Give the positive and negative contributions of the transport sector giving an example of a transport route on every point.

2. Explain the factors influencing the distribution of road transport in Uganda.

- Introduce by giving current status of road transport, identify the road network in Uganda and draw a sketch map of Uganda showing the distribution of road transport.
- Explain the factors influencing the distribution of road transport giving an example of a road on each point.

3. Assess the contribution of road transport to the development of Uganda.

- Introduce by giving the current status of road transport, identify the road network in Uganda and draw a sketch map of Uganda showing the distribution of road transport.
- Explain the positive and negative contribution of road transport giving an example of a road on every point.

4. Examine the factors limiting the effective utilization of water transport in Uganda.

- Introduce by giving a current status of water transport, Identify the water routes in Uganda and draw a sketch map of Uganda showing the distribution of water transport routes.
- Explain the factors limiting the effective utilization of water transport giving examples of a water route on each and every point.

5. (a) To what extent have physical factors limited the development of water transport in Uganda?

- Introduce by giving a current status of water transport, Identify the water routes in Uganda and Draw a sketch map of Uganda showing the distribution of water transport routes.
- Explain the physical factors and then other factors limiting the development of water transport giving an example of a water route and water body on every point.

(b) Explain the measures being taken to improve water transport in Uganda.

- Explain the measures in the present tense giving an example of a water route and a water body on every point.

6. Account for the decline in railway transport in Uganda.

- Introduce by giving a current status of railway transport, Identify the railway lines in Uganda and Draw a sketch map of Uganda showing the distribution of railway transport routes.
- Explain the factors for the decline of railway transport, giving an example of a railway line in Uganda on every point.

Chapter 11.

POWER AND ENERGY SOURCES IN UGANDA.

Current status of power and Energy sources in Uganda.

- Energy from biomass contributes 92% of the energy used in Uganda.
- Fossil fuel/petroleum accounts for 6% of the energy used in Uganda.
- Hydroelectric power accounts for 1% of the energy used in Uganda.
- Other sources of energy account for 1% of the energy used in Uganda.
- Prepayment arrangements (yaka) for hydroelectric power have been established in different parts of the country to reduce on the energy thefts.
- There is increased use of solar energy in most parts of the country because of high tariffs of hydroelectric power.
- Hydroelectric power production, distribution and marketing has been privatized.
- There is increased production of hydroelectric power by construction of more dams.
- Petroleum production is still in its infant stages.
- There is increased use of biogas in Uganda.
- There is extension of power to rural areas under rural electrification programme.
- Petroleum energy used in Uganda is still imported.

Major power and Energy sources in Uganda include,

- Hydroelectric power generated at Nalubaale power station and Kiira dam on Victoria Nile at Jinja, Mubuku power station on River Mubuku in Kasese, Nyagak power station on River Nyagak in Zombo.
- Solar energy is widely used in hospitals schools, organizations and individual people for example in Mbarara, Kabale, Jinja, Mbale, Kisoro Bundibugyo and Rukungiri.
- Biomass is made up of energy from vegetation for example wood fuel and charcoal from Mabira forest, Budongo forest, Mt elgon forest.
- Biogas is generated from plants and animal wastes like cattle dung for example in Mbarara, Kiruhura, Isingiro, Nakasongola, Kaabong, Moroto and Kotido.
- Geothermal energy is generated in hot springs for example Sempaya hot spring in Bundibugyo, Kitagata hot springs in Bushenyi and Kisizi hot springs in Rukungiri.
- Thermal energy/petroleum used in Uganda is mainly imported in form of petrol, diesel and kerosene and is used in many places like Kampala, Jinja, Mbale and Luweero, Mining of petroleum has started on the Albertine region for example in Bulisa and Hoima.
- Wind energy is generated in areas with scanty vegetation cover and direct suns insolation for example Kaabong, Napak and Moroto.

ASKETCH MAP OF UGANDA SHOWING POWER AND ENERGY SOURCES.

Factors which have favoured the development of power and energy sources in Uganda.

1. Presence of forests for the generation of biomass for example, from Mabira forest, Ssesse island forests, Budongo forests, Katuugo forests and Lendu forest,
2. The presence of numerous rivers with water falls used in the construction and establishment of dams for generation of hydroelectric power for example Nalubaale power station in Jinja on Victoria Nile, Mubuku power station in Kasese on river Mubuku and Nyagak power station in Zombo on River Nyagak.
3. The presence of hot springs for the generation of geothermal energy for example at Sempaya hot springs in Bundibugyo and Kitagata hot springs in Bushenyi.
4. The presence of petroleum deposits in Bulisa and Hoima and imported petroleum for the generation of petroleum energy in Kampala, Jinja and Mbale.
5. The location of Uganda astride the equator in the heat belt for maximum solar energy in Kampala, Entebbe, Kasese and Mukono.
6. The scanty vegetation which aid the movement and the occurrence of strong winds for generation of wind energy from Kaabong Kotido and Moroto.
7. The presence of abundant animal wastes like cattle, dung for the generation of biogas in Mbarara, Kiruhura, Lyantonde. Kaabong, Moroto and Napak.
8. Availability of adequate capital invested in buying in puts and construction of Dams for generation of hydro – electric power at Nalubaale power station and Kiira in Jinja and buying of solar panels for the generation of solar energy in Masaka, Entebbe and kasese.
9. Availability of skilled labour to work in the generation of power and energy for the construction of dams for generation of hydroelectricity at Nalubaale power station and Kiira dam in Jinja.
10. Improved technology used in the generation of power and energy for example imported technology like turbines used in the generation of hydroelectricity for example at Nyagak power station in Zombo and Nalubaale power station at Jinja.
11. Supportive government policy in terms of soliciting for foreign aid and assistance such as from the World Bank to tap energy sources for example hydroelectricity at Bujagali power station and Nalubaale power station in Jinja.
12. Availability of a large market for energy resources for example biomass from Mabira forest in Buikwe and Katuugo forest and Hydro electricity from Nalubaale power station used in urban areas like Kampala, Jinja and Mbarara.
13. Availability of well-developed transport network for delivery of power and energy sources to market centres for example Biomass from Mabira forest and Petroleum from Kampala.
14. The relatively political stability has encouraged investment in generation of energy resources like hydroelectric power from Nalubaale power station and Kiira dam at Jinja.
15. Intensive research conducted by the ministry of energy and mineral development concerning sustainable and large scale generation of power and energy for example hydroelectricity generated at Kiira dam and Nalubaale power station in Jinja.

Contribution of power and energy sources to the development of Uganda.

1. Power and energy has encouraged industrialization since it is used in running machines, lighting and extraction of raw materials for example steel rolling mills in Jinja and roofing's factory in Kampala use hydroelectricity generated from Nalubaale power station and Kiira dam in Jinja.

2. Power and energy has boosted tourism/ education and research for students from higher institutions of learning for example those carrying out electrical engineering use carry out research on hydroelectricity at Nalubaale power station in Jinja.
3. Sources of foreign exchange through exportation of power and energy to foreign countries for example hydro electricity from Nalubaale power station at Jinja exported to Kenya.
4. Power and energy has promoted and encouraged economic diversification and reduced over dependence on one sector especially agriculture through generation of income from solar energy in Masaka , Hydro electricity from Nalubaale power station and Kiira dam in Jinja.
5. Source of employment opportunities in terms of engineers and transmitters of hydro electricity generated from Kiira dam and Nalubaale power station in Jinja like those working in UMEME.
6. The generation of power and energy has promoted urbanization with its benefits for example in Jinja where hydroelectricity is generated from Kiira dam and Nalubaale power station at Jinja and Mubuku due to Mubuku power station in kasese.
7. Power and energy has promoted international cooperation between Uganda and where it is exported for example Hydroelectricity from Nalubaale power station at Jinja exported to Kenya.
8. Power and energy has promoted the development of transport and communication for example imported petroleum in Kampala, Jinja and Mbarara in form of petrol and diesel is used by all kinds of vehicles along Kampala- Jinja road, Kampala –Masaka Road
9. Source of government revenue through taxing the people and companies engaged in the generation of power and energy for example Umeme for generation of hydroelectricity from Nalubaale, Kiira dam and Nalubaale power station at Jinja.
10. It has encouraged the exploitation of natural resources for example mining of Mica in Nebbi and lumbering using petroleum, Lime stone at Hima and Tororo using Hydro Electricity from Nalubaale Kiira dam and Nalubaale power station at Jinja.
11. It has encouraged infrastructural development since power and energy is used to run machine s for example in Kampala and Jinja due to the presence of hydro electricity from Nalubaale, Kiira power station at Jinja.

Negative effects.

1. Power and energy sector has led to profit repatriation by foreign companies engaged in the sector for example Umeme from South Africa for hydro –Electricity from Nalubaale power station and Kiira dam, Tullow oil and gas company from UK, for petroleum in Hoima and Bulisa.
2. Power and energy has resulted into destruction of vegetation cover for example deforestation resulting from Exploitation of biomass from Mabira forest and Budongo forest.
3. It has led to environmental pollution for example dangerous fumes released from v vehicles using petroleum from Kampala and Jinja.
4. Power and energy is associated with accidents especially electric shock from Hydro electricity generated from Nalubaale power station and Kiira dam at Jinja.
5. Power and energy sector has led to urban related problems like rural-Urban migration with its associated problems in Urban centres like Jinja due to hydro Electricity generated from Kiira dam and Nalubaale power station, Bulisa due to petroleum energy /Oil.
6. It has led to competition for labour and capital from other sectors of the economy leading to their under developed for example hydroelectricity generated from Kiira dam and Nalubaale power station at Jinja and Nyagak power station in Zombo.

7. It leads to regional imbalance in terms of development since areas like Kampala and Jinja with hydroelectricity generated from Kiira dam are more developed than areas without electricity.
8. It has led to economic dependence because of the loans obtained for constructing dams for hydroelectricity generated at Nyagak power station in Zombo, Kiira dam and Nalubaale Power station at Jinja.
9. The exploitation and extraction of power and energy resources has led to displacement of many people leaving those homeless for example the extraction of oil and natural gas in Hoima and Bulisa.

Reasons for the low levels of development of power and energy sector in Uganda.

1. Low levels of technological development leading to over dependence on imported technology which is expensive for example extraction of oil and natural gas in Hoima and Bulisa Hydroelectricity generated at Nyagak power station in Zombo, Kiira dam and Nalubaale power station at Jinja.
2. Limited skilled labour to tap the existing power and energy resources leading to dependence on expatriate labour for example hydroelectricity generated at Tullow oil and Gas Company for petroleum in Hoima and Umeme for Hydroelectricity at Kiira dam and Nalubaale station at Jinja.
3. Limited research conducted concerning sustainable exploitation of power and energy resources for example wood fuel from Mabira forest.
4. Competition from other land uses for example forestry for environmental protection limiting the extraction of biomass /wood fuel and the generation hydroelectricity at Bujagali power station.
5. Depletion of forest resources like Namanve forest, Sango bay forest, Mt Kadam forest which has reduced on the extraction of wood fuel and charcoal.
6. Limited capital to develop the energy sector for example Hydroelectricity generated from Kiira dam and Nalubaale power station at Jinja.
7. Limited market for power and energy due to high prices of power for example for hydroelectricity generated from Kiira dam and Nalubaale power station at Jinja.
8. Insecurity in some parts of Uganda has led to low levels of investment necessary for the development of power and energy sector especially hydroelectricity generated at Nyagak power station in Jinja and Biomass from mountain Rwenzori forests.
9. Poorly developed transport network for example roads to distribute power and energy sources like petroleum from Kampala to rural Areas.
10. Corruption and Embezzlement of funds meant for the development of the power and energy sector for example for hydroelectricity from Bujagali power station.
11. The scattered settlement pattern has hindered government policy of rural electrification in Kiboga, Luweero and Nakasongola for hydro electricity generated from Nalubaale power station and Kiira dam at Jinja.
12. The high level of bureaucracy involved in the development of power and energy for example in the construction of hydroelectric power stations like Bujagali power at Jinja and Nyagak power station in Zombo.
13. High population growth rate has led to increased competition for the limited power and energy like wood fuel and charcoal from Mabira forest and hydroelectricity from Nalubaale power station and Kiira dam in Jinja.

14. Fluctuation in power supply due to natural disaster like cloudy days affected solar energy in Kampala, Fluctuating water levels in Lake Victoria affects generation of hydroelectricity at Nalubaale power station and Kiira dam.
15. Physical barriers for example steep slopes of mountains hinder the distribution of power and energy in mountainous areas for example hydroelectricity from Nalubaale Kiira dam and Nalubaale power station.
16. Profit repatriation by the foreign owned enterprises like UMEME from South Africa has limited the rate of profit plough back for hydroelectric power from Nalubaale power station Kiira dam and Nalubaale power station.
17. High wastage and loss of power through illegal connections has led to losses for the generation of hydro electricity from Kiira dam and Nalubaale power station.
18. Limited capital to be invested in the generation of power and energy sources in Uganda for example in buying solar panel for solar energy in Luweero.

Steps being taken to develop the energy sector in Uganda.

1. Setting up more hydroelectricity power station in addition to the existing ones to increase power supply for example Bujagali Hydroelectric power station in Jinja and Nyagak hydroelectric power station in Zombo.
2. Construction of thermal plants to supplement hydroelectricity at Kiira dam and Nalubaale power station for example a 50MW heavy fuel oil thermal plant at Namanve and the use of Standby generations in Kampala.
3. Soliciting fir funds to develop the energy sector for example Hydroelectricity at Bujagali power funded by the African Development Bank and the Government of Japan.
4. Liberalization and privatization of the economy by attracting foreign investors with capital and skills in the energy development for example Sithe Global power, Japanese International Cooperation Agency for hydroelectricity at Bujagali power station, Tullow oil and gas Company for petroleum in Bulisa.
5. Promoting the use of pre-paid meters by Umeme to reduce power theft for Hydroelectricity from Kiira dam and Nalubaale power station in Jinja.
6. Improvement in transport and communication network to distribute power and energy to rural areas for example petroleum from Kampala to Masaka via Kampala –Masaka road.
7. Intensive research is being carried out by the ministry of energy and mineral development concerning energy development and conservation for example Biomass from Mabira forest in Buikwe and Budongo forest.
8. Encouraging afforestation and re- Afforestation programmes to replace the depleted forests and therefore increase on the supply of biomass for example from Katuugo forest in Nakasongola and Lendu forest in Nebbi.
9. Encouraging power production from biomass residues for example Bagasse from Sugar mills at Kakira sugar works and Kinyara sugar factory to save biomass from forests like Mabira forest.
10. Encouraging the use of energy saving equipment for example UGA stove for saving charcoal from Budongo forest and energy saving bulbs to save hydroelectricity from Nalubaale power station at Jinja.
11. Gazetting forests into forest reserves so as to preserve them for future generation for Biomass from Mabira forest and Budongo forest.

12. Education and training of labour to acquire necessary skills for generation and distribution of hydroelectricity from Nalubaale power station and Kiira dam at Jinja.
13. Establishing support institutions like ministry of energy and mineral development to ensure effective generation of power and energy for example ministry of energy and mineral development for hydroelectricity from Kiira dam and Nalubaale power station at Jinja.
14. Adopting load shedding (power rationing) to effectively utilize the exploitation of Hydroelectricity from Nalubaale power station and Kiira dam at Jinja.
15. Promoting rural electrification to ensure that the rural community can access hydroelectricity to increase the size of the market for hydroelectric power generated from Kiira dam and Nalubaale power station at Jinja.
16. Fighting corruption and embezzlement of funds to reduce mismanagement of funds meant for development of power and energy sources like hydro electricity generated from Kiira dam and Nalubaale power station at Jinja.
17. Ensuring security in most parts of Uganda to encourage the distribution of energy and power sources like hydroelectricity generated from Kiira dam and Nalubaale power station at Jinja.
18. Fighting and disconnecting all illegal connections by UMEME to reduce wastage of power and energy sources like electricity generated from Kiira dam and Nalubaale power station at Jinja.
19. Importation of modern technology in the country to facilitate the generation of power and energy sources for example solar panels for solar energy in Kampala.
20. Acquisition of loans from financial institutions to facilitate the buying of the necessary equipment for example solar panels and batteries for solar energy in Kampala.

REVISION QUESTIONS

1. **Explain the factors which have favoured to the development of power and energy sources in Uganda.**
 - Introduce by giving the status of power and energy sector in Uganda, Identify the forms of power and energy and draw a sketch map of Uganda showing energy sources.
 - Explain the factors, giving an example of a form of energy and where it is generated.
2. **Assess the contribution of power and energy sector to the development of Uganda.**
 - Give the current status of power and energy sector in Uganda, Identify the forms of power and energy and draw a sketch map of Uganda showing energy sources.
 - Explain the positive and negative contribution, giving an example of form of energy and where it is generated.
3. **(a) Explain the problems facing power and energy sector in Uganda.**
 - Give the current status of power and energy sector in Uganda, Identify the forms of power and energy and draw a sketch map of Uganda showing energy sources.
 - Explain the problems giving an example of form of energy and where it is generated.

(b) Suggest measures taken to improve power and energy sector in Uganda.

 - Use suggestive language using words like should, may, can, etc. giving an example of form of energy and where it is generated.
4. **Assess the contribution of hydroelectric power to the development of Uganda.**
 - Give the current status of hydroelectricity in Uganda, Identify the hydroelectric dams and draw a sketch map of Uganda showing hydroelectricity dams.

- Explain the positive and negative contribution of hydroelectricity, giving an example of a dam and the river on which it is found.

Chapter 12.

POPULATION AND SETTLEMENT IN UGANDA.

Population refers to the number of people living in an area at a particular period of time.

Major terms used in studying population.

1. **Birth rate**, This refers to the total number of children born alive per 1000 of the total population in a country with in a year .It is obtained by dividing the total number of birth by the total population times 1000 i.e.
2. **Death rate**, this refers to the total number of people that die per 1000 of the total population in the country within a year. It is obtained by dividing the total number of deaths by the total population times 1000.
3. **Population growth rate**; this refers to the increase in the number of people in a given place in a given period of time usually a year. OR. It refers to the annual positive percentage change in the population of a given area. Natural population growth rate is calculated as the percentage difference between birth rate and death rate.
4. **Fertility rate**. This refers to the average number of children that a normal woman can produce in her production span.
5. **Infant mortality rate**. This refers to the number of children who die before the age of one year/before reaching their first birth date.
6. **Population Density**. This refers to the number of people per square kilometer in an area. It is obtained by dividing total population by total land area.
7. **Life expectancy**. This refers to the average number of years one is ought to live from time of birth to death.
8. **Population distribution**; This refers to the way in which people are spread out in a given area over a period of time.

The current status of Uganda's population.

- Uganda's population is characterized by a high population growth rate.
- The fertility rate of both women and men is high in Uganda.
- The total fertility rate is higher in rural areas as compared to urban centers.
- Uganda's population has a high dependency ratio.
- Most Ugandans live in rural areas.
- Uganda's population comprises more females than males.
- The population density is about 123 people per square kilometer.
- More than 49% of the population is bellow 15years.
- Infant mortality rate is about 76 deaths per 1000 live birth.
- Life expectancy at birth is about 50years.

- The majority of the population is employed in agricultural sector employing about 65.6% of the working population.
- Uganda's population has been growing rapidly over the years.

Population structure.

Population structure refers to the composition of the population in terms of age and sex.

The best way to describe the population structure is the use of an age sex graph/ population pyramid. A population pyramid is a pictorial representation of the age distribution of a given population. Its shape is determined by the past birth and death rates in that population.

Uganda's population is characterized by the following.

- High birth rates due to large number of people under 15 years of age
- High death rates due to rapid fall in age groups upwards.
- A short life expectancy since the top is very narrow, implying few people living beyond 65 years,
- High infant mortality rate evidenced by rapid fall from the broad base.
- Generally females are more than males in all age groups.

Reasons for a broad base.

- Limited use of birth control measures such as family planning.
- Most cultures encourage polygamy.
- Influence of religion such as Catholicism and Islam encouraging large families.
- Social and cultural attachment to many children such as providing field labour.
- Low levels of education especially among women, making them to prefer large families.
- Low desire for savings and investment among the most people.

Reasons for a narrow apex.

- Rampant disease epidemics killing many people.
- Poor medical services in many areas such as limited essential drugs, few doctors leading to high mortality.
- Famine due to insufficient food supply in many areas.
- Low life expectancy due to poor hygiene and malnutrition, with few people living beyond 50 years.

POPULATION DISTRIBUTION IN UGANDA.

Population distribution refers to the way in which people are spread out in a given area over a period of time. The population of Uganda is not evenly distributed i.e. some areas are densely populated; others are moderately populated while others are sparsely populated.

- Densely populated areas include areas with population of over 300 people per square kilometer for example Kampala, Entebbe, Jinja, Tororo, Mbale, Kabale, Kisoro and Bushenyi.

- Moderately populated areas include areas with population density between 100-300 people per square kilometer for example in Lira, Soroti, Kumi, Kasese and Arua.
- Sparsely populated areas include areas with density of less than 100 people per square kilometer for example in Kaabong, Kotido, Rakai, Nakapiripirit, Moroto, Lyantonde, Kiruhura and Ntoroko.

ASKETCH MAP OF UGANDA SHOWING POPULATION DISTRIBUTION.

POPULATION DENSITY IN UGANDA.

Population Density refers to the number of people in an area per square kilometer. It is obtained by dividing total population by the total land.

The population density of Uganda is not uniform i.e. .some areas are densely populated, others are moderately populated while others are sparsely populated.

- Densely populated areas include areas with population of 300 people and above per square kilometer for example Kampala, Entebbe, Jinja, Tororo, Mbale, Kabale, Kisoro, and Bushenyi.
- Moderately populated areas include areas with population density between 100-299 people per square kilometer for example in Lira, Soroti, Kumi, Kasese and Arua.
- Sparsely populated areas include areas with population density of 99 people and below per square kilometer for example in Kaabong, Kotido, Nakapiripiriti, Moroto, Lyantonde, Kiruhura and Ntoroko.

ASKETCH MAP OF UGANDA SHOWING POPULATION DENSITY,

Factors influencing population distribution/Population density in Uganda.

1. Climate factors. Areas with heavy rainfall which are well distributed throughout the year, attract a dense population for agriculture for example. Mt Elgon slopes in Mbale, Bududa, Kigezi highlands in Kisoro and Kabale, Lake Victoria shores for example in Mukono, Kampala and Wakiso. Whereas areas with low rainfall amount, which is in most cases unreliable have a sparse population for example north eastern Uganda in districts like Moroto, Kotido and Nakapiripiriti.
2. Nature of soils Areas with fertile soils tend to attract a dense population for agriculture like the volcanic soils on the slopes of mount Elgon in Bududa, bale, Kigezi areas in Kabale and Kisoro and the shores of lake Victoria in Mukono, Jinja and Buikwe with alluvial soils. Whereas areas with soils of low productivity have sparse population for example Kotido, Moroto, Lyantonde and Kiruhura.
3. Drainage. Areas which are well drained tend to attract a dense population for settlement and agriculture like parts of Buganda region in Mukono, Experience both seasonal and permanent flooding leading to sparse population for example Lake Kyoga shores at Tumba, Lwampanga and Galiraya.
4. Biotic factors .Areas which area infected with pests and diseases tend to limit population settlements hence leading to sparse population for example tsetse flies in parts of Busoga like Mayuge, Where areas with limited pests and diseases attract settlement leading to a dense population for example in Kampala, Jinja and Mbale.
5. The nature of relief. Areas with relatively flat relief tend to attract a dense population since it favours agriculture and settlement for example in Masaka, Jinja, Mukono, Kampala and Wakiso. Whereas areas with steep relief discourage settlement hence have a sparse population for example the steep slopes of mount Rwenzori in Kasese and Bundibugyo and Mt Elgon in Mbale and Manafwa.
6. Altitude. Population tends to concentrate in areas with moderate altitude because of warm temperatures leading to dense population for example in Masaka, Kampala, Jinja, Mukono and Wakiso. Whereas high altitude areas experience very cold temperatures and limited oxygen which is not favorable for settlement leading to very sparse or nil settlement for example on mountain Rwenzori in Kasese and Bundibugyo. low altitude areas also experience very hot temperatures and dry conditions which do not favour settlement leading to sparse population for example in Ntoroko, Kasese and Bulisa
7. Vegetation. Areas with vegetation cover which can easily be cleared for settlement are densely or moderately populated for example savanna grassland in Kumi, Gulu and Luweero. Whereas areas which are forested are associated with problems like pests and diseases, wild animals leading to sparse population like Mt.Elgon forests in parts of Mbale and Manafwa, Bwindi impenetrable forests in Kisoro, Kibale forests in Kabarole.
8. Government policy on population distribution. The government also influences population distribution by establishing settlement schemes like Nakivali, in Isingiro, Kyaka in Tororo, and Resettlement schemes like Kiryandongo leading to dense population in these areas. Whereas areas which are gazetted into national parks and game reserves are sparsely populated for example Kasese in Queen Elizabeth National Park, Mabira forest in Buikwe, Kaabong in Kidepo national park.

9. Urbanization, urban centres tend to attract a dense population due to availability of improved services and Employment opportunities for example Kampala, Jinja, Entebbe and Mbale, while most rural areas are sparsely populated for example Nakasongola.
10. Political atmosphere/security. Areas which are politically stable have attracted a dense population for example, Jinja, Kampala, Entebbe and Mukono. Whereas areas which are insecure have scared settlement leading to sparse population for example parts of Gulu, Kasese which were affected by LRA rebels.
11. Migrations. Areas where people are settled from other areas are densely populated for example in Kisoro where refugees from Democratic Republic of Congo settle.
12. Accessibility .Areas which are easily accessible attract a dense population for example Kampala. While areas which are remote have discouraged settlement leading to sparse population for example in Kaabong, Moroto and Kotido.
13. Historical factors .Areas which were initially settled in by the Europeans and those which were Kingdom headquarters attract a dense population for example Jinja, which was an industrial Centre, Kampala which was an administrative Centre during the colonial error. Whereas areas which were war zones are presently sparsely populated for example Katakwi, Moroto, Kotido, affected during Idi Amin.
14. Cultural factors/land tenure system. Areas which are occupied by the nomadic pastoralists have communal owner ship of land leading to sparse population for example in Kaabong and Moroto while areas which are occupied by the sedentary tribes have a dense population for example Jinja, Mukono and Masaka.
15. Agriculture. In some areas especially where there is commercial farming like Kakira and Lugazi with sugar estates have attracted a dense population in Jinja and Buikwe.
16. Mining. Areas where mining is taking place like Tororo, kasese with lime stone have attracted a dense population.
17. Industrialization. Areas with a dense industrial development attract a dense population as people move to look for jobs for example Kampala, Jinja.
18. Fishing activities. Landing sites and fishing ports attract a dense population because people go there to look for employment opportunities in the sector e.g. kasenyi fish landing site in Wakiso.
19. Trade and commerce. Areas with a large market potential attract a large number of businessmen leading to a dense population for example in Kampala, Jinja and Mbale.
20. Social Amenities like education, water, Banks and health centres. Areas with the above amenities have attracted a large population to acquire employment and enjoy these services leading to dense settlement for example areas around Makerere University, Mengo hospital and Mulago in Kampala.

POPULATION GROWTH.

Population growth refers to the increase in the number of people in a given place in a given period of time usually a year. Uganda is experiencing a high population growth rate of about 3.2% per annum.

Current status of population Growth.

- Uganda's population has been rapidly growing over the years.

- Uganda's population is growing at a high rate of between 2.5 and 3.9 per annum.
- Uganda has the third highest population growth rate in the world and highest than in the sub Saharan Africa.

Areas experiencing a high population growth rate in Uganda include.

- Kabale, Kisoro in western Uganda,
- Kampala, Masaka, Mukono, Entebbe in central Uganda.
- Mbale , Jinja, Tororo, Bududa in eastern Uganda,
- Gulu, Arua Nebbi, In Northern Uganda.

ASKETCH MAP OF UGANDA SHOWING AREAS WITH A HIGH POPULATION GROWTH.

Causes of a high population Growth.

1. High birth rates brought about by high values parents attach to children for example source of labour and source of wealth in terms of dowry among the Baganda of Mukono, Busoga in Jinja and Iganga, Bagishu of Mbale, Bududa and Bahima of Mbarara and Bushenyi.
2. Early marriages prolong the reproductive span for many women hence increasing the reproduction rate for example among the Baganda of Wakiso and Basoga of Iganga.
3. Limited family planning facilities and education extended to the rural population about family planning which increases birth rates leading to high population growth in Mukono, Jinja, Mbale and Bududa.
4. The influence of polygamy in many parts of Uganda brought about by religion for example the Muslims of Jinja and Culture for example among the Basoga of Kamuli and Iganga and Bugiri making them producing many children.
5. Religious beliefs in Uganda that discourage the use of contraceptives like condoms, birth pills making people produce many children for example among the pent costal, Catholics, Muslims of Kampala, Mukono, Mbale, Jinja, Kabale and Kisoro.
6. Increased immigration rates from the neighboring countries due to insecurity in countries like Somalia, South Sudan and Democratic Republic of Congo which has led to population increase in Kampala, Mukono and Jinja.
7. Improved political situations and security in Uganda which has attracted many settlers and intermarriages hence reducing death rates and increasing birth rates leading to population increase in Kampala, Mukono, Jinja.
8. Improved health services resulting from the construction of many health centres has reduced death rates leading to high population growth for example Mulago hospital, Rubaga hospital, Nsambya and Mengo hospital in Kampala.
9. The presence of more women than men in the country's population has encouraged polygamy leading to high birth rates and population growth in Kampala, Jinja, and Mukono etc.
10. Improved and increased food production resulting from improved methods of farming has reduced on the death rates resulting from malnutrition diseases like kwashiorkor among infants leading to high population growth in Masaka, Kayunga and Kisoro.
11. Low levels of education among Ugandans has increased the fertility rate among women and the uneducated are ignorant about birth control methods leading to high birth rates and population growth in Kabale, Mbale, Kisoro, Rukungiri, Kamuli and Iganga.
12. Low levels of urbanization has led to low cost of raising children and strong cultural beliefs are dominant in rural areas leading to high birth and population growth in Mbale and Kisoro.
13. High fertility rate among Ugandan women due to good feeding and improved medical services averaging to about 6.2 children has led to high birth rates and population growth in Masaka, Mukono, Mbale and Kabale.
14. The low status of women in most Ugandan societies which restricts women to house wife work and in most cases they are un educated for example among the Baganda of Mukono, Basoga in Iganga, Bagishu of Mbale, and the Bahima of Mbarara. This encourages them to give birth other than concentrating on any other work.

Effects of a high population growth in Uganda.

Positive effects;

1. A high population growth has increased on the country's labour force to be absorbed in the various sectors like agriculture and industrialization in Kampala, Jinja and Mukono.
2. A high population growth has increased on the market size for the products in the various sectors such as agriculture for example Bananas from Mbarara, industrial products from Jinja among others.
3. It has led to the effective exploitation of resources for example mineral resources such as salt from Lake Katwe, Lime stone at Hima, Fisheries resources from Lake Victoria to meet the current demand.
4. It has increased on the government tax revenue due to increased number of people and property to be taxed for example in Kampala, Jinja, and Mukono.
5. It has increased on the rate of urbanization with its associated benefits due to concentration of large population in a given area for example Kampala, Mukono, Mbale and Jinja.
6. It has stimulated the provision of social services by the government to serve the increasing population for example schools, hospitals, and roads in Kampala, Mukono, Jinja, Mbale and Mukono.
7. It has encouraged people to be creative, innovative and inventive due to competition for the available resources in Kampala, Jinja and Mbale.

Negative,

1. A high population growth has resulted into exhaustion of resources resulting from over exploitation by an increasing population for example fish from Lake Victoria to Kampala, Jinja, Forests like Mabira forest in Buikwe and Budongo forest in Masindi to areas like Jinja Kampala among others.
2. It strains and creates pressure on the existing social amenities like schools, hospitals e.t.c as a result of increasing number of users for example in Kampala, Mukono and Wakiso.
3. It has resulted into increased government expenditure to providing the social services like universal primary Education, and secondary Education in Luweero, Mukono, Masaka and Hospitals like Mulago hospitals in Kampala.
4. It has resulted into shortage of land for settlement and agriculture resulting from an increasing population leading to land fragmentation for example in Kampala, Mbale, Kabale and Kisoro.
5. It has led to shortage of food to meet the increasing population leading to poverty for example in Kampala, Jinja, Masaka, and Kabale.
6. It has led to unemployment and under employment due to high rate of population increase compared to job creation for example in Kampala, Jinja, Mbale, and Kabale.
7. It has led to destruction of vegetation to create room for settlement and agriculture for example Mabira forest in Buikwe, Namanve forest in Mukono Budongo forest in Masindi and south Bugala island forests in Kalangala.
8. It has led to overcrowding and congestion leading to delays especially in urban centres like Kampala, Jinja, Mbale and Wakiso.
9. It has led to pollution of air, water and land due to intensified human activities like industrialization in Kampala, Jinja, and Mukono among others.

10. It has resulted into a heavy dependence burden on the working population due to high birth rates hence discouraging saving and investments for development for example in Kampala, Jinja, Mukono etc.
11. It has led to easy spread of diseases and outbreak of epidemics and pandemics such as cholera, corona virus, Ebola, inof Kampala, Gulu, Luweero, Masaka, Rakai, etc.
12. It has resulted into insecurity and political instability resulting from increased competition for the available resources leading to armed thieves, and robbers in Kampala, Jinja and Mbale.
13. It has resulted into shortage of accommodation and growth of slums due to higher rate of population increase compared to housing facilities for example slums like Katanga, Kamwokya, Bwaise, Kisenyi and Kinawattaka in Kampala.
14. It has resulted into poor sanitation especially in urban areas due to poor garbage disposal for example in Kampala, Jinja and Mbale.
15. It has resulted into increased population migrations for example rural urban migrations with its associated problems due to increased land pressure in rural areas of Luweero, Wakiso, Mukono and Mbale to towns of Mbale Kampala and Jinja.
16. It has led to encroachment on marginal land for agriculture and settlement for example reclamation of swamps like Nsooba swamp Busega swamp and Kinawattaka Swamps in Kampala, Destruction of forests like Mabira forest in Buikwe, Kibale forest in Kabarole.
17. It has led to high costs of living due to increased demand for the commodities for example in Kampala, Jinja, Wakiso and Mbale.
18. It has led to high crime rates such as prostitution, robbery and rape due to unemployment of the increased population in Kampala, Jinja, and Mukono.

POPULATION MOVEMENTS /MIGRATIONS IN UGANDA.

Migration is the movement of people from their places of origin to live in other places of destination.

Major terms used in migration.

1. **Emigration.** This is where people leave their country of origin to live in other countries permanently or temporarily.
2. **Immigration.** This is where people come into the country from their country of origin permanently or temporarily
3. **Migration balance.** This is the difference between the number of emigrants and immigrants.
4. **Pull factors.** These are desired conditions which attract people to a new settlement e.g. better social services and employment opportunities.
5. **Push factors.** These are undesirable conditions which put pressure on the resident on an area of origin, making it uncomfortable to stay in such an area e.g. Poor medical facilities, unemployment among others.

Types of migrations in Uganda.

1. **Rural –urban migration.** Rural –urban migration is the movement of people from villages/ rural areas or country sides to live in urban centres and cities for example from Bukomansimbi to Kampala city.

2. **Urban- Rural migration.** Urban –rural migration is the movement of people from urban centers and cities to live in villages/ rural areas or country sides. For example from Kampala to Bukuya.
3. **Urban –urban migration.** Urban-urban migration is the movement of people from one urban Centre to live in another urban Centre/ city for example from Jinja city to Kampala city.
4. **Rural –rural migrations.** Rural- rural migration is the movement of people from one village/ rural areas or country side to live in another village/ rural area or country side. For example from Padibe to Morungole.

RURAL –URBAN MIGRATION IN UGANDA.

Rural –urban migration is the movement of people from villages/ rural areas or country sides to live in urban centres and cities. In Uganda, rural – urban migration is mainly due to pull factors in urban centres and push factors in rural areas for example people move from the rural areas of Luweero to Kampala, Rural areas of Masaka to Kampala, Rural areas of Mbarara to Mbarara city and rural areas of Bukedea to Mbale town, from rural areas of Katakwi, Kaberamaido and Lalle to Soroti town.

A SKETCH MAP OF UGANDA SHOWING RURAL –URBAN MIGRATIONS.

Causes of rural –urban migration in Uganda.

1. Economic opportunities like employment opportunities in urban areas of Uganda has forced people to move to urban centres and cities to get jobs for example from rural areas of Wakiso and Masaka to Kampala city.
2. Occurrence of natural calamities in some parts of Uganda forcing people to move to urban areas as refugees of disaster for example from rural areas of areas of Bududa and Bulamburi affected by land slide to Mbale town and Iganga town.
3. Land shortages in rural areas due to overpopulation forcing people to move to urban centres for example from rural areas of Luweero, Masaka and Wakiso to Kampala city.
4. political instability and insecurity in some rural areas of Uganda has forced people to take refuge in urban areas for example the LRA rebel activities to move from rural areas of Gulu like Atiak, Pabo to Gulu town and some to Kampala city.
5. Better infrastructure in urban centres for example better hospitals like Mulago in Kampala, Electricity, Recreational centres have attracted the young people to move from rural areas to urban centres for example from rural areas of Nakasongola and Masaka to Kampala city and from rural areas of Bukomansimbi to Kampala city.
6. Maintenance of family ties where some people living in urban areas have convinced their rural relatives to move to join them in urban centres making people move from rural areas of Jinja to Jinja city.
7. Hostile cultural practices in rural areas have forced people to leave these areas where such practices are very strong and hostile to urban centres with weak cultural practices for example circumcision among the Bagishu forces some people to move from rural areas of Manafwa to Jinja city, Iganga town and Kampala city.
8. Mining activities attract a large number of people from rural areas to acquire employment for example Tororo lime stone mining has attracted people from rural areas of Butaleja and Bugiri to Tororo town.
9. Fishing activities attract a large number of people from rural areas to landing sites to carry out fishing for example from rural areas of Luweero to Lwampanga and Tumba on Lake Kyoga or from rural areas of Bukakata, Gaba on Lake Victoria to Kampala city.
10. Social misfit of some people in their rural areas for example murderers, rapists e.t.c forces some people to live to their rural areas and move to urban centres where they are not known for such practices from example from rural areas of Masaka to Kampala town.
11. Social conflicts in rural areas for example land wrangles which force some people to leave rural areas for example from rural areas of Nakasongola, Nakaseke to Kampala city.
12. Bandwagon effect/ peer influence attracting people from rural areas for example from rural areas of Masaka to Kampala city.

EFFECTS OF RURAL URBAN MIGRATION.

To the area of Destination.

Positive effects.

1. It has increased the supply of cheap labour in urban centers to be absorbed in industries, road construction and building for example in towns of Kampala, Jinja and Mbale.

2. It has increased on the size of the market for products in urban centers due to increased population for example in towns of Jinja, Mbarara and Mbale.
3. It has promoted urbanization as a result of increased number of people moving from rural areas for example Kampala, Jinja and Mbale.
4. It has encouraged creativity and hardworking migrants due to hard ships experienced and competition for jobs in urbanization. For example in Kampala, Jinja and Mbarara.
5. It has increased on government tax revenue since the migrants engage in formal and informal activities in urban areas which are taxed for example in Mbarara, Mbale, Kampala and Jinja.
6. It stimulates the provision of social services by the government like water and electricity due to movement of people to urban areas like Mbale, Jinja and Mbarara.

Negative effects;

1. It has resulted into environmental degradation as a result of expansion of settlement and industries in the urban areas for example swamp reclamation such as Lubigi and Nsooba swamp in Kampala city.
2. It has led to un employment and under employment due to excessive competition for the few jobs in urban areas due to movement of people from towns of Kampala and Jinja.
3. It has increased government expenditure on provision of social and economic services like transport, medical care in urban areas like Kampala, Jinja and Mbale.
4. It has led to easy spread of diseases and outbreak of epidemics like Cholera and AIDs in Kampala as a result of movement of people to towns like Kampala, Mbale, Mbarara, and Jinja.
5. It has resulted into moral decay in urban areas due to overcrowding of people for example prostitution, Juvenile delinquency because of movement of people from rural areas to urban areas like Kampala, Jinja, Mbale and Mbarara.
6. It has led to shortage of accommodation and growth of slums in urban centres as a result of increase in population as compared to housing facilities for example in towns of Kampala, Jinja and Mbale.
7. It has increased pressure on the existing socio- economic infrastructures like roads, hospitals like Mulago hospital in Kampala due to massive movement of people from rural areas.
8. It has resulted into insecurity in urban areas as people struggle for survival for example thieves and armed robbers due to movement of people to urban areas like Kampala, Jinja and Arua.
9. It has led to shortage of food due to increased dependence ratio leading to malnutrition diseases like kwashiorkor among infants in poor families in urban centres like Kampala, Jinja and Mbarara.
10. It has led to congestion and traffic jam leading to delays thus hindering smooth running of business in towns like Karelwe and Bwaise in Kampala.
11. It has led to increased cost of living due to high demand for goods for example in towns of Kampala, Jinja and Mbale.

To the areas of origin.

Positive effects.

1. Rural urban migration has reduced pressure on land hence expanding land for agriculture and settlement due to movement of people from rural areas of Masaka, Luweero and Mbale.

2. Income received in urban areas by migrants is at times invested in their rural areas leading to rural development due to movement of people from rural areas of Masaka, Luweero and Mbale.
3. It reduces social conflicts in rural areas due to movement of some people from rural areas of Nakasongola, Luweero and Wakiso.
4. It has broken cultural backwardness among the migrants through cultural diversity in urban areas, which has led to cultural transformation of rural areas because of movement of people from rural areas of Wakiso, Mbale and Gulu.

Negative effects.

1. Rural urban migration has resulted into loss of capable labour force to be employed in agricultural sector hence limiting its development due to movement of people from rural areas of Jinja, Kayunga and Masaka.
2. It has disrupted social set up and family structure due to splitting of family members for example in rural areas of Masaka and Wakiso.
3. It has reduced market for goods and services in rural areas due to reduced rural population for example in rural areas of Kayunga, Kamuli and Mbale.

Steps being taken to reduce rural –urban migration in Uganda.

1. Establishing industries and other income generating activities in rural areas so as to create employment opportunities for example Kinyara sugar processing industry in Masindi to reduce movement of people from rural areas of Masindi to towns of Kampala, Jinja and Mbale.
2. Resettlement of displaced people by war and landslides for example the displaced Bagishu from rural areas Bududa being resettled in Kiryandongo to reduce the movement to Mbale town.
3. Promoting peace and stability so as to reduce the ADF rebels in Bundibugyo to reduce movements from rural areas of Bundibugyo to Fort portal and Kasese town, and LRA in Gulu using UPDF to reduce movement from rural areas of Gulu to Gulu town.
4. Improving on the social – economic infrastructure especially rural electrification, construction of roads and schools in rural areas to reduce movement from rural areas of Nakasongola to Kampala, and from rural areas of Jinja to Jinja town.
5. Fighting against hostile cultural practices in rural areas to reduce people trying to move from rural areas to urban centres to escape these practices for example female genital mutilation among the Sabin of Kapchorwa Kween and Bukwo to reduce movement from rural areas of Kapchorwa to Mbale town, Jinja town and Kampala city.
6. The government is encouraging modernization of agriculture through the program for modernization of Agriculture (PMA) to improve agricultural productivity and income hence reducing people migrating from rural areas of Nakasongola and Luweero to Kampala city.
7. Controlling the population growth by use of contraceptives and other family planning method and reduce pressure on land in rural areas which reduces movement of people from rural areas of Kabale and Mbale to Kampala city and Mbale town.
8. Land reform policies are being formulated and implemented for example land consolidation as opposed to land fragmentation to expand the size of cultivable land to reduce migration from rural areas of Kabale to Kampala city, and rural areas of Mbale to Jinja city.

9. Sensitization of the public about the dangers of rural urban migration through local media, televisions, seminars to discourage people from moving from rural areas of Nakaseke to Kampala city, Rural areas of Jinja to Jinja town .
10. Encouraging rural –rural migration through resettlement schemes for example Basongora resettled from Queen Elizabeth national park to Mubuku prison farm and Muhokya to reduce their movement from rural areas of Kasese to Mbarara city.

REVISION QUESTIONS.

- 1. Assess the impact of a high population growth on the development of Uganda.**
 - Give the current status of population growth in Uganda, Identify the areas with a high population growth and draw a sketch map of Uganda showing areas with a high population growth.
 - Give the positive and negative impacts of a high population growth using population density terms and giving an example of an area on every point.
- 2. To what extent has climate influenced the variation in population density in Uganda**
 - Define population density, identify the areas of low, moderate and high population density and draw a sketch map of Uganda showing variation in population density(should have constant shading style but only differing in intensity.)
 - Explain the influence of climate on population density and then give other factors for variation using population density terms and giving examples of areas.
- 3. To what extent has climate influenced population distribution in Uganda?**
 - Define population distribution, identify the areas of low, moderate and high population density and draw a sketch map of Uganda showing variation in population density.
 - Explain the influence of climate on population density and then give other factors for variations Using population density terms and giving examples of areas.
- 4. Examine the causes and effects of rural urban migration in Uganda.**
 - Define rural –urban migration, draw a sketch map of Uganda showing rural –urban migrations.
 - Explain the causes and then the positive and negative effects of rural- urban migration giving examples of direction of movement (FROM WHICH RURAL AREAS TO WHICH URBAN CENTRES.)

Chapter 13.

AGRICULTURE IN UGANDA.

Current status of Agricultural sector in Uganda.

- The agricultural sector is developing as a result of privatization and liberalization of the economy.
- Agriculture is the largest contributor to Uganda's GDP (GROSS DOMESTIC PRODUCT.)
- It employs the largest population both directly and indirectly in Uganda.
- The agricultural sector in Uganda is mainly subsistent in nature.
- Most of the large scale plantations and farm lands are owned by foreigners.
- Agriculture in Uganda is highly dependent on nature e.g. soil, climate among others.
- Most of the farmers are still using rudimentary tools for agriculture in Uganda.
- The main traditional cash crops of Uganda include; coffee, tea, cotton and Tobacco.
- Coffee is the major agricultural export of Uganda.
- Coffee is the major source of revenue for Uganda since it dominates the exports in terms of value.
- The government is encouraging agricultural modernization through (PMA) plan for modernization of agriculture.
- Many Government support institutions are being established to enhance development in agriculture e.g. (NAADs), (NARO) among others.

AGRARIAN SYSTEMS/ FARMING SYSTEMS/AGRICULTURAL SYSTEMS IN UGANDA.

The major agrarian systems in Uganda include;

- **Intensive banana-coffee system.** Here, perennial crops like bananas and coffee are the dominant crops grown due to heavy rainfall received and fertile soils for example in Masaka, Mukono, Buikwe and Wakiso.
- **Western banana-coffee cattle system.** Here perennial crops like bananas and coffee are the dominant crops due to heavy rainfall received and fertile soils, and cattle rearing is part of culture for example in Mbarara and Bushenyi.
- **Afro-montane system.** This is practiced in mountainous areas and the major crops grown are Arabica coffee and Bananas due to heavy rainfall received for example in Mbale and Sironko on mountain Elgon, Bundibugyo and Kasese on Mount Rwenzori.
- **Teso system.** Here ,mainly cereal crops like millet, sorghum and simsim are grown together with rearing of Zebu cattle due to moderate rainfall received for example in Kumi, Soroti and Kaberamaido.
- **Northern cereal-cotton- cattle system,** Here , the major crops grown include tobacco, cassava ,millet and sorghum due to moderate rainfall received and soils of medium productivity for example in Arua, koboko and Nebbi.
- **Pastoral system.** Here, the major activity carried out is nomadic pastoralism with very minimal crop cultivation due to dry conditions and dusty soils for example in Kaabong, Kotido, Kiruhura, Rakai, Ssembabule, and Moroto.

A SKETCHMAP OF UGANDA SHOWING AGRARIAN SYSTEMS.

Factors influencing agrarian systems in Uganda.

1. Climate.

- Areas with equatorial type of climate receive heavy rainfall of over 1500mm per annum which is well distributed throughout the year leading to the growth of perennial crops like bananas and coffee which explains the existence of banana –coffee system in Masaka, Mukono, Wakiso and Kayunga district.
- Areas with tropical climate receive moderate rainfall of between 750mm and 1500mm per annum leading to the growth of seasonal crops like sorghum, millet alongside rearing of cattle leading to the Teso system in Kumi, Soroti and Kaberamaido and northern cereal- cattle system in Gulu, Lira and Kitgum.
- Areas with montane climate receive heavy rainfall throughout the year which encourages the growth of Arabica coffee and Bananas leading to afro- montane system in Mbale and Bulamburi on mountain Elgon and Bundibugyo on Mountain Rwenzori.
- Areas with semi desert climate receive low rainfall of less than 500mm per annum with hot temperatures of about 30 which encourage nomadic pastoralism leading to the pastoral system in Kaabong, Kotido and Moroto.

2. Soils.

- Soils of high productivity for example tropical loam soils have encouraged the growth of crops such as coffee and bananas leading to intensive banana-coffee system in Mukono, Masaka, and Wakiso and Western Banana –coffee – cattle system in Mbarara and Bushenyi.
- Soils of medium productivity have encouraged the growth of seasonal crops like millet, simsim and sorghum leading to Teso system in Soroti, Kumi and Kaberamaido and northern cereal- cotton – cattle system in Gulu, Lira and Kitgum.
- Soils of low productivity have encouraged the growth of dry bush savanna which encourages nomadic pastoralism encouraging pastoral system in Kaabong, Moroto and Kotido.

3. Drainage.

- Poorly drained soils with impended drainage especially swampy soils have promoted the growth of cereal crops like rice and millet leading to Teso system in Kumi and Soroti.
- Well drained soils have encouraged the growth of crops like coffee and bananas leading to intensive banana- coffee system in Masaka and Wakiso.

4. Relief.

- Mountainous areas receive heavy relief rainfall on their wind ward sides leading to the growth of crops like bananas and Arabica coffee leading to Afro- montane system in Mbale –Manafwa.
- Plateau lands receive moderate rainfall which has promoted the growth of seasonal crops like millet and sorghum leading to Teso system in Kumi, Soroti and Kaberamaido.
- Lowland areas in the rift valley region receive low amounts of rainfall with hot temperatures leading to the growth of dry bush savanna which supports nomadic pastoralism leading to pastoral system in Kasese and Ntoroko.

5. Nature of vegetation.

- Areas with tropical rainforests receive heavy rainfall leading to the growth of perennial crops like coffee and bananas leading to intensive banana –coffee system in Mukono, Masaka and Wakiso.

- Areas with savanna grassland support the growth of seasonal crops and animal rearing leading to Teso system in Soroti and Kumi.
 - Areas with dry bush savanna have encouraged pastoralism leading to pastoral system in Kaabong, Kotido and Moroto.
6. Land tenure system. Areas where land is communally owned have provided a large grazing land leading to the pastoral system in Kaabong, Kotido and Moroto.
 7. The population density. Sparsely populated areas of Uganda have encouraged communal ownership of land encouraging the pastoral system in Kotido, Moroto and Kaabong while areas with a dense population, land is intensively cultivated on small holdings leading to intensive banana- coffee system in Masaka, Buikwe, Mukono and Wakiso.
 8. Availability of market. Remote areas with limited market have encouraged subsistence agriculture leading to pastoral system in Moroto and Kotido and the Teso system in Kumi and Soroti, while areas with large market have promoted the growth of coffee and banana leading to intensive banana- coffee in Mukono, Wakiso, and Masaka.
 9. Availability of labour. Areas with adequate labour supply have encouraged the growth of perennial crops like coffee and bananas leading to intensive banana- coffee system in Masaka, Mukono and Wakiso while areas with limited labour supply have encouraged the pastoral system in Kotido, Moroto and Kaabong.
 10. Availability of Capital. Areas where people have large capital base have encouraged investment in the growth of perennial crops like coffee and bananas leading to intensive banana- coffee cattle system in Mbarara and Bushenyi while areas with people who have a low capital base have encouraged subsistence agriculture leading to the Teso system in Soroti and Kumi.
 11. Government policy. Sometimes the government of Uganda has influenced the agrarian system through dictating a particular agricultural practice in a given region for example colonial government allocated cotton growing to northern Uganda and Teso region leading to the northern cereal- cotton-cattle system in Gulu and Lira and Teso system in Kumi and Soroti, while coffee was given to central Uganda leading to Intensive –Banana- coffee system in Masaka, Mukono and Wakiso.
 12. Culture and Tradition. Certain groups of farmers practice particular agricultural system according to their culture for example the pastoral system is practiced in Moroto, Kaabong and Kotido because cattle is traditionally kept by karamajongs while intensive banana- coffee system is practiced in Masaka, Mukono and Wakiso because Bananas and coffee are grown as part of culture of the Baganda.
 13. Availability of transport network. Areas which are poorly served with infrastructure have encouraged subsistence agriculture leading to the pastoral system in Moroto, Kaabong and Kotido, while areas which are well served with transport network have encouraged commercial agriculture leading to intensive banana- coffee system in Masaka, Mukono and Wakiso.
 14. Political climate. Political stability encourages commercial agriculture leading to intensive, banana system in Masaka, Mukono and Wakiso, western banana-coffee – cattle system in Mbarara and Bushenyi.

ARABLE FARMING IN UGANDA.

Arable farming is the growing of crops either for subsistence or commercial purposes.

Subsistence Arable farming is divided into shifting cultivation, bush fallowing and small holding farming and commercial arable farming is divided into Plantation farming, irrigation farming and market gardening.

CASH CROP GROWING IN UGANDA

- The main traditional cash crops of Uganda include, coffee, Tea, Cotton, Tobacco.
- Coffee forms a major source of revenue for the country since it dominates the exports in term of value.

ASKETCH MAP OF UGANDA SHOWING MAJOR TRADITIONAL CASH CROPS.

COFFEE GROWING IN UGANDA.

Current status of coffee growing in Uganda.

- Uganda majorly produces two kinds of coffee that is .Robusta and Arabica coffee also known as Mountain coffee.
- Over the years, Robusta coffee has been produced in much more quantities compared to Arabica coffee.
- Robusta coffee is grown in lowland areas which receive heavy rainfall of above 1000mm per annum such as Mukono, Buikwe, Masaka, Luweero, Wakiso, Mityana and Mubende.
- Arabica coffee is grown in highland areas like Mbale, Manafwa, Sironko and Bududa on mountain Elgon and Kasese and Bundibugyo on Mountain Rwenzori.
- The Uganda coffee Development Authority has been formed to manage the production and marketing of Coffee.
- Many factories have been established to process coffee.
- Coffee is mainly dominated by private farmers, buyers and processing companies like KAWACOM.
- Coffee is mainly produced in Uganda for export.
- Coffee growing in Uganda has improved due to economic privatization and liberalization of the economy.

The areas where coffee is grown include;

- Mukono, Buikwe, Wakiso. Masaka, Mubende, Mityana, Kayunga, Nakaseke and Luweero for Robusta coffee.
- Mbale, Manafwa, Bududa, Sironko, Kasese and Bundibugyo for Arabica coffee.

A SKETCH MAP OF UGANDA SHOWING COFFEE GROWING AREAS.

Conditions /factors which have favoured coffee growing in Uganda.

1. The presence of deep, fertile well- drained soils have encouraged the growth of Robusta coffee in Mukono and Wakiso and Arabica coffee in Mbale and Bundibugyo.
2. The presence of heavy rainfall of above 1000mm per annum has encouraged the growth of Robusta coffee in Buikwe and Masaka and Arabica coffee in Bududa and Kasese.
3. The presence of tropical rainforest trees which provides shade to coffee seedlings and protect the coffee plants against strong winds for example Robusta coffee in Mukono.
4. The presence of extensive land to promote extensive growing of Robusta coffee in Mukono, Buikwe, Masaka, Wakiso and Mubende and Arabica coffee in Mbale and Bududa.
5. Availability of adequate capital invested in buying land, cultivation and harvesting of Robusta coffee in Mukono, Buikwe and Arabica coffee in Mbale and Bududa.
6. Availability of skilled and semi-skilled labour in weeding and harvesting and marketing of Robusta coffee in Mukono, Wakiso and Mubende and Arabica coffee in Mbale.

7. The presence of large market both locally and a broad in Japan for Robusta coffee in Masaka, Wakiso and Mubende and Arabica coffee in Mbale.
8. The relatively stable political climate that has encouraged investment in growing of Robusta coffee in Masaka, Wakiso and Mubende and Arabica coffee in Mbale.
9. Favorable government policy for example in construction of supportive infrastructure like roads and market research for Robusta coffee in Mukono, Buikwe and Wakiso.
10. Availability of improved transport network like Kampala- Masaka road for distribution of coffee to market centres has promoted growing of Robusta coffee in Masaka and Wakiso.
11. Intensive research conducted by the Uganda coffee Development Authority (UCDA) concerning improved quality production and marketing of Robusta coffee in Masaka.

Contributions of coffee growing in Uganda.

1. Source of employment opportunities for people who are employed in weeding, harvesting and marketing of Robusta coffee in Masaka and Mubende and Arabica coffee in Mbale.
2. Source of foreign exchange through exportation of coffee to foreign countries for example Robusta coffee from Wakiso and Mubende and Arabica coffee in Mbale exported to Japan.
3. Source of government revenue through taxes charged on coffee farmers and exporters for Robusta coffee in Mukono and Mubende and Arabica coffee in Bududa.
4. It has led to the development of coffee processing industries for example Kyagalanyi and Zigoti coffee factory in Mityana for Robusta coffee from Mityana.
5. It has led to urbanization of areas where coffee is processed for example Kyagalanyi and Zigoti coffee in Mityana processing Robusta Coffee from Mityana.
6. It has created international relation between Uganda and countries where coffee is exported for example Robusta coffee from Masaka and Mubende and Arabica coffee in Mbale exported to Japan.
7. It has led to diversification of the economy and reduce over dependence on one sector like mining for example Robusta coffee Wakiso and Arabica coffee in Mbale.
8. It is a source of food to the people in form of beverage coffee and dried boiled Robusta coffee in Masaka and Mubende and Arabica coffee in Mbale and Bududa.
9. Coffee is used for cultural purposes among the Baganda for cementing the relationships by sharing Robusta coffee in Mukono, Buikwe, Masaka, Wakiso and Mubende.
10. Coffee growing has helped in soil conservation for example Arabica coffee in Mbale and Bududa secure the soil against soil erosion and add humus to the soil
11. It has led to the development of transport infrastructure to support the distribution of coffee to market centres for example Kampala –Masaka road for Robusta coffee in Masaka.
12. It has led to the development of power and energy in form of fire wood used for domestic and industrial use for example Robusta coffee in Mukono and Arabica coffee in Bududa.

Negative contribution.

1. It has led to industrial pollution from coffee processing industries for example at Zigoti and Mbale for Coffee Mityana and Mubende.
2. It has led to urban related problems in urban areas which have developed from coffee growing like high crime rates and un employment for example in Mityana for Robusta coffee and Mbale with Arabica coffee.

3. Coffee growing has led to neglect of the growth of food crops like maize and cassava since large tracts of land is occupied by Robusta coffee in Mukono and Arabica coffee in Mbale.
4. Coffee growing is highly affected by price fluctuation leading to instability in farmer's income and government revenue for example Robusta coffee in Mukono and Wakiso.
5. Coffee growing is highly affected by natural factors like drought, pests and diseases which attack the plants leading to losses for example Robusta coffee in Mukono and Wakiso.
6. It has led to soil exhaustion due to monoculture for example Robusta coffee in Mukono and Wakiso and Arabica coffee in Kasese and Bundibugyo.
7. It has led to competition for labour from other sectors like fishing and forestry affecting their growth for example Robusta Coffee in Mukono and Wakiso and Mubende and Arabica coffee in Mbale.
8. It has led to destruction of vegetation to establish coffee gardens hence affecting the micro-climate of the areas for example Robusta coffee in Mubende and Arabica coffee in Mbale.

Problems facing coffee growing in Uganda.

1. Pests and diseases which affects the growth of coffee plants for example coffee wilt which destroys Robusta coffee in Wakiso and Mubende and Arabica coffee in Bududa.
2. Soil exhaustion due to monoculture has led to low yields of Robusta coffee in Mukono and Buikwe and Arabica coffee in Kasese and Bundibugyo.
3. Unfavorable climatic conditions like prolonged droughts which lead to low yields for example Robusta coffee in Mukono, Buikwe, Masaka, Wakiso and Mubende.
4. The rugged relief of mountainous areas discourage mechanization of coffee growing for example Arabica coffee in Mbale and Bundibugyo.
5. Shortage of land due to increased population leading to land fragmentation hence discouraging large scale growing of Robusta coffee in Mukono and Mubende.
6. Price fluctuation on the world market due to completion with foreign countries for example Brazilian coffee out competes Robusta coffee in Masaka and Arabica coffee n Bududa.
7. Poorly developed transport network system for distribution of coffee to the marketing centres for example Robusta coffee in Wakiso and Mubende and Arabica coffee in Kasese.
8. Inadequate skilled labour to ensure quality coffee production for example in the production OF Robusta coffee in Mubende and Wakiso, Arabica coffee in Mbale.
9. Inadequate capital to be invested in buying land and establishing processing plants for Robusta coffee in Mubende and Arabica coffee in Bududa.
10. Insecurity has discouraged investment in the growing, production and processing of coffee in Kasese, Bundibugyo.
11. Limited research conducted regarding improved quality production of Arabica coffee in Mbale and Robusta coffee in Masaka.
12. Unfavorable government policy like charging high taxes on coffee exporters and coffee processing industries for Arabica coffee in Mbale and Robusta coffee in Mukono

Measures being taken to improve on coffee growing in Uganda.

1. Conducting research for example regarding the improvement of coffee varieties and market for example by UCDA for Robusta coffee in Mukono, Buikwe, Masaka and Mubende.

2. Liberalization of coffee growing which has led to private coffee processing and exporting companies like UGACOF, KAWACOM for Robusta coffee in Mukono and Luweero.
3. Construction of transport routes like roads to link the coffee growing areas to the marketing centres for example Kampala-Masaka road for Robusta coffee in Masaka.
4. Establishment of institutions to ensure high quality and quantity of coffee produced for example Uganda coffee development Authority (UCDA) FOR Robusta coffee in Masaka.
5. Providing soft loans to farmers through financial institutions for example banks like centenary bank to act as capital for the growth of Robusta coffee in Masaka and Mubende and Arabica coffee in Mbale.
6. Improving on security by using the national army UPDF so as to encourage investment in coffee growing for example Robusta coffee in Buikwe and Arabica coffee in Bundibugyo.
7. Establishing coffee processing plants in many parts of Uganda to increase the demand for Robusta coffee in Mukono and Mubende and Arabica coffee in Mbale and Bududa.
8. Education and training of coffee farmers concerning improvement in quality of coffee to promote the growth of Robusta coffee in Wakiso and Arabica coffee in Mbale.
9. Application of fertilizers and manure to improve soil fertility for Robusta coffee in Mityana and Arabica coffee in Mbale and Bundibugyo.
10. Spraying with chemicals to control pests and diseases for Robusta coffee in Mukono, Buikwe, Masaka and Arabica coffee in Mbale, kasese and Bundibugyo.
11. Expanding the size of the market for coffee through regional economic integration like EAC and COMESA for Robusta coffee in Masaka and Arabica coffee in Mbale.

TEA GROWING IN UGANDA.

Tea is the third foreign exchange in Uganda.

It is grown on plantations like Kasaku tea estate in Buikwe, Finlay's tea estate in Bushenyi and kabarole, Rwenzori products tea estate in kabarole, and many other tea estates in Hoima, Mubende and Rukungiri.

A SKETCH MAP OF UGANDA SHOWING TEA GROWING AREAS.

TOBACCO GROWING IN UGANDA.

Tobacco growing is supervised by British American Tobacco (BAT) in areas like Arua, Moyo, and Gulu. Kitgum, Hoima, Masindi, Mubende and Rukungiri.

A SKETCH MAP OF UGANDA SHOWING TOBACCO GROWING AREAS.

COTTON GROWING IN UGANDA.

Current status of cotton growing in Uganda.

- Cotton production has been fluctuating over the years despite the fact that the government has put in place many programs to revive the sector.

- The government has liberalized and privatized growing, buying and selling of cotton in Uganda.
- New cotton varieties have been introduced by National Agricultural Research Organization (NARO).
- Uganda cotton development organization (CDO) is responsible for the management of cotton production and marketing.
- Cotton ginneries are being rehabilitated e.g. Rhino camp in Arua by Core cot Company, Nyakatonzi in Kasese, Iki-Iki in Budaka, and Lukhonge in Manafwa etc.

The major cotton growing areas in Uganda include.

- Katakwi, Amuria, Soroti, Kaberamaido and Kumi (Teso region).
- Budaka, Pallisa and Tororo (Bukedi region)
- Kamuli, Bugiri and Jinja (Busoga region.)
- Lira, Oyam, Dokolo, Apac (Lango region.)
- Gulu, Kitgum and Pader (Acholi region.)
- Masindi, Hoima and Kibaale (Bunyoro region.)
- Arua, Nebbi, Moyo, Adjumani and Yumbe (West Nile region.)
- Kasese (western region.)

A SKETCH MAP OF UGANDA SHOWING COTTON GROWING AREAS.

Factors for the low level of cotton production in Uganda.

1. Competition for land with other lucrative traditional crops like maize, flowers, fruits etc. for example in Soroti, Lira, Apac and Kamuli.
2. Low levels of technology for example use of hand hoes and pangas which are highly inefficient leading to poor quality output for example in Jinja, Kamuli and Lira.
3. Constant price fluctuations in both domestic and international markets which discourage cotton farmers in Arua, Kasese and Masindi.
4. The collapse of the co-operative movements which used to provide market for cotton for example Lint marketing board discouraging cotton farmers in Gulu, Lira and Apac.
5. Limited capital to invest in cotton growing among the farmers in Kamuli, Jinja and Kaberamaido
6. Limited skilled labour to work in cotton production and marketing for example in Gulu, Lira and Masindi.
7. Soil exhaustion due to over cultivation leading to low cotton output for example in Kamuli, Jinja and Kaberamaido.
8. Limited research conducted by the cotton farmers in terms of market research and biological research for example in Kamuli, Jinja and Gulu.
9. Pests and diseases for example cotton weevil which destroys cotton affecting the Quantity and quality of cotton for example in Gulu, Jinja and Apac.
10. Insecurity in some parts of Uganda discouraging investment in cotton for example in Lira and Gulu.
11. Climatic changes for example prolonged drought which affects the growth of cotton in Arua, Kamuli and Apac and heavy rainfall in Jinja which affects the harvesting of cotton.
12. Poorly developed transport network has limited the distribution of cotton to market centres for example in Kamuli, Jinja and Apac.
13. Poor storage facilities leading to post harvests and losses for example in Jinja, Kamuli and Gulu.
14. Limited power supply which limits cotton processing for example in Lira, Kamuli and Arua.
15. Unfavorable government policy for example implementing the closure of ginnery in Lira and Soroti.
16. Corruption and embezzlement of funds meant to develop the cotton growing sub-sector in Jinja, Kamuli and Iganga.

Measures being taken to improve cotton production in Uganda.

1. Introduction of government reform programmes for example agricultural rehabilitation projects and establishment of the cotton Development Organization (CDO) for cotton growing in Jinja, Kamuli and Apac.
2. Conducting research for example by NARO and individual farmers regarding markets for cotton and improvement in quality of output for example in Jinja, Kamuli and Kaberamaido.
3. Formation of cotton export associations like the Uganda cotton ginners and exporters association for cotton from Jinja, Kamuli and Kaberamaido.
4. Privatization and liberalization of cotton growing which has led to establishment of private cotton processors for cotton in Apac, Lira and Gulu.
5. Establishment and rehabilitation of cotton ginneries Rhino camp in Arua by Corecot Company, Nyakatonzi in Kasese, Iki-Iki in Budaka, and Lukhonge in Manafwa.

6. Ensuring education and awareness programmes for cotton producers regarding improved quality production of cotton for example in Kamuli, Jinja and Gulu.
7. Re- introduction of the use of ox-ploughs to increase the Acreage of cotton farms for example in Soroti and Kaberamaido.
8. Provision of extension services through NAADS programmes to teach farmers modern methods of farming for example in Jinja, Kamuli and Gulu.
9. Extension of power to rural areas through the rural electrification programme to allow processing of cotton for example in Kasese, Lira and Gulu.
10. Construction and rehabilitation of feeder roads to encourage marketing of cotton for example in Lira, Gulu and Apac.
11. Use of scientific methods for example pesticides to fight pests and ensure quality cotton production for example in Lira, Arua and Kitgum.
12. Improving security through deployment of soldiers encouraging investment in cotton growing for example in Gulu and Lira.

PLANTATION AGRICULTURE IN UGANDA.

Plantation agriculture is the growing of one or two perennial crops like tea, sugar canes and coffee on a large scale using scientific methods of farming and mainly for commercial purposes.

Examples in Uganda include, Kasaku tea estate in Buikwe, Lugazi sugar cane plantation in Buikwe, Kakira sugarcane plantation in Jinja, Kinyara sugar cane plantation in MASINDI, Finlay's tea estate in Bushenyi, Rwenzori product tea estate in Kabarole and Kaweeri coffee plantation in Mubende.

A SKETCH MAP OF UGANDA SHOWING AREAS WHERE PLANTATION AGRICULTURE IS PRACTISED.

Characteristics of plantation agriculture.

- Mainly one or two perennial crops like tea, sugar cane and coffee are grown.
- Crops are grown mainly for commercial purposes.
- Most of the estates are owned by foreigners.
- There is use of modern methods of farming like application of fertilizers and use of tractors.
- Plantations are both labour intensive and capital intensive.
- Plantations are self-sustaining in that they have their own infrastructures like roads, Schools and hospitals.
- They carry out intensive research regarding improvement in crop variety and markets.
- They are located in areas where there are large tracts of land since they operate on a large scale.
- It is characterized by out growers who grow and supply the related crop grown on the plantation.

Contributions of Plantational Agriculture in Uganda.

Positive contributions;

1. Source of foreign exchange through exportation of agricultural products to foreign countries for example sugar from Kakira sugar cane plantation in Jinja exported to south Sudan.
2. Source of government revenue through taxing people employed on plantations such as Kasaku tea estate in Buikwe and Lugazi sugar cane plantation in Buikwe.
3. Source of employment opportunities to the people in planting, harvesting and processing and therefore earning income for example workers at Kasaku tea estate in Buikwe.
4. Plantation agriculture has led to urbanization with its associated advantages due to increased population of workers for example Lugazi town near Lugazi sugar cane plantation.
5. Plantation agriculture has promoted the development of transport infrastructures to link farms to market centres for example roads in kakira Sugar plantations.
6. Plantation agriculture has promoted industrialization by providing raw materials used in industries like tea processing industry at Kasaku tea estate.
7. Plantation agriculture has promoted international relationships between Uganda and countries where agricultural products are exported for example south Sudan where sugar from Kakira sugar cane planation in Jinja is exported.
8. Plantation agriculture has encouraged diversification of the economy which has reduced overdependence on one sector like fishing by generating alternative income from plantations like Kasaku tea estate in Buikwe and kakira sugar cane plantation in Jinja.
9. Plantation agriculture has boosted research and education/ tourism by students pursuing Agricultural related courses for example tea from Kasaku tea estate in Buikwe.
10. Plantation agriculture has led to the development of power and energy used in running machines hence promoting industrialization for example electricity from Bagasse from the sugar mills at Kinyara, Lugazi and Kakira sugar cane plantations.

Negative contributions.

1. Plantation agriculture has led to industrial pollution from agro- based industries caused by industrial wastes and fumes for example Kasaku tea factory due to Kasaku tea estate in Buikwe.

2. Plantation agriculture has led to urban related problems like high rates of crime, shortage of accommodation in Areas like Kinyara sugar cane planation in Masindi.
3. Plantation agriculture has led to destruction of forests to acquire land for large scale agriculture for example Mabira destroyed by Lugazi sugar cane plantation in Buikwe.
4. Plantation agriculture has led to land degradation due to monoculture for example tea from Kasaku tea estate in Buikwe and sugarcanes from Lugazi sugar cane plantation in Buikwe.
5. Plantation agriculture has led to profit repatriation by foreigners owning farms and plantations in Uganda for example Kakira sugar cane plantation Jinja owned by Madhvan group of companies.
6. Plantation agriculture has led to land conflicts with other land use types like Wild life conservation for example Lugazi sugar cane plantation in Buikwe with Mabira forest.
7. Plantation agriculture has led to competition for labour with other sectors of the economy like mining hence affecting their growth for example tea from Kasaku tea estate in Buikwe.
8. Plantation agriculture has led to instability in Farmers income since it is highly affected by price fluctuations of product prices for example the growers of tea at Kasaku tea estate in Buikwe.

IRRIGATION FARMING IN UGANDA.

Irrigation farming is the artificial application of water to crops majorly in semi- arid areas to supplement to the natural rain water.

Examples, of irrigation schemes in Uganda include; Doho in Butaleja and Kibimba Tilda in Bugiri for rice, Mubuku irrigation scheme for vegetables like onions and cabbages, Kakira sugar plantation in Jinja and Lugazi sugarcane plantation in Buikwe for sugar canes, Olwenyi in Lira, Agoro in Kitgum, Atera in Apac and Odina in Soroti.

A SKETCH MAP OF UGANDA SHOWING IRRIGATION SCHEMES.

Factors which have favoured irrigation farming in Uganda.

1. The presence of large quantity of water for irrigation for example from Lake Victoria for irrigation at Kakira sugar cane plantation and River Sebwe for Mubuku irrigation scheme.
2. The presence of fertile well drained soils have encouraged the growth of crops like rice at Doho irrigation scheme in Butaleja and Mubuku irrigation scheme for vegetables.
3. The presence of low amounts of rainfall of less than 750mm has necessitated irrigation farming for example at Doho in Butaleja and Kibimba Tilda in Bugiri for rice.
4. The presence of gently sloping land scape which encourages the construction of irrigation channels and gentle flow of water under gravity for example at Doho irrigation scheme in Butaleja.

5. The presence of extensive land to promote extensive growing of crops for example at Doho in Butaleja and Kibimba Tilda in Bujiri for rice Mubuku irrigation in Kasese for vegetables.
6. Availability of adequate capital invested in buying land, for cultivation and harvesting at Doho in Butaleja and Kibimba Tilda in Bugiri for rice and Mubuku irrigation scheme.
7. Availability of skilled and semi-skilled labour in weeding, harvesting and construction of irrigation channels at Doho in butaleja and Kakira sugar plantation in Jinja.
8. The relatively stable political atmosphere has encouraged investment in irrigation farming at Doho in Butaleja for rice and Kakira sugar plantation in Jinja.
9. The presence of large market both locally and abroad for agricultural products like rice from Doho in Buteleja and Kakira sugar plantation in Jinja.
10. Favorable government policy for example in construction of supportive infrastructure like roads and market research for products from Kakira sugar plantation in Jinja.
11. Availability of improved transport network like Kampala- Jinja road for distribution of rice from Sugar from Kakira sugar plantation in Jinja to market centres.
12. Intensive research conducted by the Uganda concerning improved quality production and marketing at Doho in Buteleja for rice Kakira sugar plantation in Jinja and Lugazi sugarcane plantation in Buikwe for sugar canes.

MARKET GARDENING.

Market gardening is the intensive growing of crops such as Fruits, Flowers and vegetables near market centres such as urban areas, Industrial centres and mining areas.

Market gardening in Uganda is practiced in Areas like Kampala with tomatoes and Mangoes, Entebbe with flowers, Kabale with cabbages, Apples and Oranges, Mbale with tomatoes, Oranges and cabbages.

ASKETCH MAP OF UGANDA SHOWING AREAS WHERE MARKET GARDENING IS PRACTISED.

Characteristics of market gardening.

- It is carried out with in the vicinity of urban areas, industrial centres or mining areas.
- The type of crops grown are perishable crops such as onions, cabbages and tomatoes.
- There is artificial application of scientific methods such as crop rotation, application of fertilizers, herbicides and pesticides.
- The farms are usually small.
- The market gardens are labour intensive.
- The land is intensively utilized throughout the year.
- The yields per unit are high.
- Farms are located near quick means of transport.
- Most of the farms are privately owned.
- The crops grown fetch high prices.

Problems facing market gardening in Uganda.

1. Soil exhaustion due to intensive cultivation of the land leading to low productivity for example tomatoes and mangoes in Kampala, Flowers in Entebbe and cabbage in Mbale.
2. The presence of pests and diseases which attack and destroy crops for example tomatoes and mangoes in Kampala, Flowers in Entebbe, Cabbages, Apples and oranges in Kabale.
3. Poor storage facilities and limited proper preservation facilities leading to losses for example in tomatoes and mangoes in Kampala, Flowers in Entebbe and Oranges in Kabale.
4. Competition for market from the foreign countries engaged in market gardening like USA, and The Netherlands limits demand for flowers in Entebbe, Apples and oranges in Kabale.
5. Low levels of technology used which is inefficient and leads to low yields for tomatoes and mangoes in Kampala, Flowers in Entebbe, Cabbages, apples and oranges in Kabale.
6. Limited land for expansion of farms due to dense population in urban areas for tomatoes and mangoes in Kampala, Flowers in Entebbe, Cabbages, Apples and oranges in Kabale.
7. Inadequate capital to invest in paying labour and purchasing, machinery for tomatoes and mangoes in Kampala, Flowers in Entebbe, Cabbages, apples and oranges in Kabale.
8. Inadequate supply of both skilled and semi-skilled labour to carry out weeding, harvesting and research in growing tomatoes in Kampala and Flowers in Entebbe.
9. Inadequate government support in form of extension services for the growth of tomatoes and mangoes in Kampala, Flowers in Entebbe, cabbages, apples and oranges in Kabale.
10. Poorly developed transport network leading to high transport costs and wastage of crops like tomatoes and mangoes in Kampala, flowers in Entebbe and oranges in Kabale.
11. Unreliable weather conditions such as prolonged drought affects the growth of crops like tomatoes and mangoes in Kampala, Flowers in Entebbe and Oranges in Kabale.
12. Insecurity in peri urban areas of Uganda discourages investment in growing of crops like tomatoes and mangoes in Kampala, flowers in Entebbe and oranges in Kabale.
13. Profit repatriation by foreign owned farms leading to low levels of re- investment affects the growth of tomatoes and mangoes in Kampala flowers in Entebbe and Apples in Kabale.

LIVESTOCK FARMING IN UGANDA.

Livestock farming is the rearing of animals such as cattle, goats, pigs, rabbits and chicken for subsistence or commercial purposes.

The major forms of livestock farming in Uganda include;

- Dairy farming in Kabale, Mbarara, Kampala Jinja and Mbale.
- Nomadic pastoralism in Kotido, Kaabong, Nakapiripiriti and Moroto
- Zero grazing in Kabale, Kampala and Mbale.
- Ranching in Nakasongola, Masindi, Mbarara and Bushenyi.
- Piggery in Soroti, Gulu, Jinja and Mukono.
- Poultry in Kasese, Masindi, Soroti, Lira, Gulu and Kampala.

A SKETCH MAP OF UGANDA SHOWING MAJOR FORMS OF LIVESTOCK FARMING.

Nomadic pastoralism.

Nomadic pastoralism is a form of rearing animals like cattle, sheep and goats which involves constant movement of farmers from place to place with their herds in search of water and pasture for their animals.

In Uganda, the system is practiced by the Kalamajongs of Moroto, Kaabong and Kotido, the Bahima of Mbarara, Lyantonde and Kiruhura, the Basongora of Kasese and some Iteso of Kumi and Ngora.

Characteristics of nomadic pastoralism

- Pastoralists keep on moving from place to place and therefore there is no permanent settlements.
- The system is practiced in areas with sparse population of less than 50 people per square kilometer.
- Pastoralists keep local breeds of cattle like the long- horned cattle and short horned Zebu.
- Pastoralists keep large number of animals for prestige.
- Animals feed on natural pasture especially dry bush savanna.
- The system is practiced in arid areas and semi – arid areas of Uganda.
- There is communal ownership of land.
- Livestock is mainly kept for subsistence purposes for example milk, meat and blood.
- Bush burning during dry season is a common phenomenon.
- Pastoralists employ rudimentary methods of rearing animals.
- Some pastoralists grow some crops especially seasonal crops like millet and sorghum.

Ranching in Uganda.

Ranching is the keeping of animals mainly cattle on a large scale for beef or milk production and for commercial purposes using modern animal husbandry techniques.

The most important ranching schemes in Uganda include; Aswa cattle ranch in Gulu, Maruzi ranch in Apac, Singo ranch in Kiboga, Nyabushozi in Mbarara, Kisozi ranch in Gomba, Kajara cattle ranch in Mbarara, Lubboombo and Ekitangala ranch in Nakasongola.

Zero Grazing.

This is a method of farming in which few cattle are fed in a small area on food supplements like Banana peelings, Cotton seeds, Cotton cakes etc. It is mainly practiced in densely populated areas like Mpigi, Jinja, Kisoro, Kabale, Kampala and Mbale.

Contributions of livestock farming in Uganda.

Positive contributions;

1. Source of food in form of meat and milk rich in proteins hence reducing malnutrition diseases for example pastoralism in Kaabong, rearing goats in Nakasongola and Piggery in Soroti.
2. Source of foreign exchange through exportation of livestock products to foreign countries like Kenya South Sudan for example cattle in Kaabong goats in Nakasongola.

3. Source of government revenue through taxing people employed on the livestock rearing for example pastoralism in Kaabong, rearing goats in Nakasongola and piggery in Soroti.
4. Source of employment opportunities where people are employed as herd's men and researchers for example by rearing cattle in Kaabong and Mbarara goats in Nakasongola.
5. Livestock farming has led to urbanization with its associated advantages for example ranching in Mbarara and Nakasongola and poultry farming in Wakiso.
6. Livestock farming has promoted development of transport infrastructures to link farms to market centres for example rearing of cattle in Mbarara and Nakasongola.
7. It has promoted industrialization by providing raw materials used in industries for example milk, hides and skins from cattle in Kaabong , Goats in Nakasongola and sheep in Moroto.
8. It has promoted international relationship between Uganda and countries where livestock products are exported like south Sudan for cattle from Nakasongola and Mbarara.
9. It has encouraged diversification of the economy which has reduced over dependence on one sector like fishing by generating alternative income from cattle in Mbarara.
10. Livestock farming has boosted research and education/ tourism by students pursuing Agricultural Related courses for example cattle rearing in Mbarara and Nakasongola.
11. It has led to the development of power and energy sector through generation of Biogas energy used for domestic purposes for example Biogas from Cattle in Nakasongola.
12. Source of manure in form of decomposed cow dung and chicken droppings hence favouring arable farming for example cattle in Mbarara Poultry in Wakiso and Pigs in Soroti.
13. Animals are used for ploughing hence encouraging large scale arable agriculture for example cattle in Soroti, Kumi and Pallisa.
14. Animals are used to full fill cultural obligations such as dowry during marriage and sacrifices by offering cattle in Mbarara, Kaabong and Nakasongola.
15. Livestock provides building materials in form of hides and skins and cow dung hence providing shelter to the pastoralists for example cattle in Mbarara and Kaabong.
16. Livestock farming encourages resource utilization for example the effective use of the rangelands which would not be productive for other land use types for example pastoralism in Kaabong and Moroto.

Negative contributions.

1. Livestock farming has led to industrial pollution from industrial wastes and fumes for example milk processing and Abattoirs for cattle in Mbarara and Nakasongola.
2. It has led to urban related problems like high rates of crime, Shortage of accommodation in areas and towns that emerged as a result of rearing cattle in Mbarara and Nakasongola.
3. It has led to destruction of forests to acquire land for large scale livestock farming and due to over grazing of cattle in Kaabong and Nakasongola and Sheep in Moroto.
4. It has led to land degradation due to over grazing which has accelerated soil erosion in Areas with animals like cattle in Kaabong and Nakasongola and Sheep in Moroto.
5. It has led to profit repatriation by foreigners owning farms and livestock processing industries getting their raw material from animal products through ranching in Nakasongola, Dairy farming in Mbarara.
6. It has led to land conflicts with other land use types like wildlife conservation and cattle rearing in Kaabong and Kiruhura.

7. It has led to withdraw of labour from other sectors of the economy like mining leading to their under development for example Pastoralism in Kaabong Ranching in Nakasongola.
8. It has led to regional imbalances due to progressive development in areas carrying out livestock rearing e.g. Mbarara, Nakasongola for ranching, and Bushenyi for Dairy farming as compared to other areas.
9. Livestock farming has led to sectorial imbalance where ranching in Nakasongola, Dairy farming in Bushenyi have led to the development of agriculture as compared to other sectors like mining among others.

Problems facing the livestock Industry in Uganda.

1. Pests and diseases which affects the quality of animals for example foot and mouth disease for cattle in Nakasongola and Kiruhura and Swine fever for pigs in Soroti.
2. Climate changes for example prolonged drought leads to loss of livestock hence affecting nomadic pastoralism in Kotido and Moroto and goats in Soroti.
3. Poor pasture due to harsh climatic conditions affects the growth of livestock for example nomadic pastoralism in Kotido and Kiruhura ranching in Mbarara.
4. Shortage of water for animals affects the growth of livestock like cattle in Kaabong, Goats in Nakasongola, and Pigs in Soroti and sheep in Moroto.
5. Livestock theft and cattle rustling has led to losses in rearing cattle in Kaabong, Kotido and Sheep in Moroto.
6. Inadequate capital to be invested in purchasing farm machinery and paying labour for rearing cattle in Kaabong, goats in Nakasongola, pigs in Soroti and sheep in Moroto.
7. Inadequate market for livestock products because of competition from other countries discourages rearing of cattle in Kaabong, Goats in Nakasongola and Pigs in Soroti.
8. Poorly developed transport network hinders distribution of livestock products to market centres cattle in Kaabong, goats in Nakasongola, Pigs in Soroti and sheep in Moroto.
9. Limited skilled labour in form of veterinary services has led to poor quality production of livestock for example cattle in Kaabong and Nakasongola, Pigs in Soroti.
10. Limited government support in form of heavy taxation of activities related to live stock for example the rearing of cattle in Kaabong, goats in Nakasongola, Pigs in Soroti.
11. Limited research conducted regarding markets and improvement in the quality of livestock products discourages rearing of cattle in Kaabong, goats in Nakasongola and pigs in Soroti.
12. Poor breeds of animas which produce low quality and quantity products from cattle in Kaabong, Goats in Nakasongola, Pigs in Soroti and Sheep in Moroto.
13. The presence of dangerous wild animals which attack and kill animals and farmers affecting the rearing of cattle in Kaabong, Goats in Nakasongola, Pigs in Soroti and sheep in Moroto.
14. Limited land due to competition with other land use types like wild life conservation discourages large scale rearing of cattle in Kaabong and Kiruhura
15. Conservatism of the animal rearing communities where by farmers are not willing to change from their traditional way of rearing animals like cattle in Kaabong and Kiruhura.

Steps being taken to modernize livestock industry in Uganda.

1. Constructing water sources to provide water for livestock for example bore holes valley dams, water reservoirs for cattle in Kaabong and Nakasongola and sheep in Moroto.

2. Controlling the carrying capacity and planting fodder crops to improve on pasture for cattle in Kaabong, goats in Nakasongola and pigs in Soroti and sheep in Moroto.
3. Cross breeding is being practiced to improve on the quality of animals for example cattle in Mbarara and Nakasongola, and pigs in Mukono.
4. Livestock research is being practiced regarding improvement in markets and quality of livestock for cattle in Mbarara and Nakasongola, Pigs in Soroti and sheep in Moroto.
5. Setting up demonstration farms to teach farmers modern methods of livestock farming for cattle in Kaabong, goats in Nakasongola, pigs in Soroti and sheep in Moroto.
6. Spraying, dipping and putting quarantine to control pests and diseases for cattle in Kaabong, goats in Nakasongola, Pigs in Soroti and sheep in Moroto.
7. Market for livestock products like milk and meat is being expanded through regional integration like EAC for cattle in Mbarara and Nakasongola, Pigs in Soroti.
8. Promoting peace and stability by the national army UPDF and encouraging investment in the rearing of cattle in Kaabong, goats in Nakasongola, Pigs in Soroti and sheep in Moroto.
9. Developing transport infrastructures to facilitate the distribution of livestock products like milk and meat to market centres for cattle in Kaabong, Goats in Nakasongola and pigs in Soroti.
10. Liberalizing the livestock industry to increase private investment in rearing animals like cattle in Kaabong, goats in Nakasongola, and pigs in Soroti and sheep in Moroto.
11. Training of manpower to work in the livestock industry for example veterinary doctors to support rearing of cattle in Mbarara and Nakasongola, pigs in Soroti and sheep in Moroto.
12. Setting up of industries processing livestock products like GBK dairies in Mbarara and JESA. Dairy in Busunju for milk and Abattoirs for cattle in Mbarara and Nakasongola.
13. Intensive advertising of livestock products to increase on the size of the market for products from cattle in Mbarara and Nakasongola, Pigs in Soroti and sheep in Moroto.
14. Providing capital to the farmers through microfinance institutions and banks in form of loans for promoting the rearing of cattle in and Nakasongola, Pigs in Soroti.
15. Encouraging foreign investors to invest in the livestock industry since they have the necessary capital and technology for rearing of cattle in Nakasongola.
16. Restocking of areas that lost live stock during periods of insecurity for example cattle in Amolatar, Pallisa, Kaberamaido, Luweero and Nakasongola.
17. Setting up support institutions to ensure improvement in livestock rearing for example Uganda, Dairy, and Development Authority (UDDA) for cattle in Mbarara and Kiruhura.
18. Encouraging land reforms policies to encourage farmers to own land and improve livestock farming like cattle in Nakasongola, Pigs in Soroti and Poultry in Wakiso
19. Subsidizing farm inputs so as to encourage farmers acquire them to improve livestock farming for example tractors, milking machines and medicines for cattle in Mbarara.
20. Improving on storage and preservation methods for milk and meat to reduce on wastage of products from cattle in Mbarara and Nakasongola, pigs in Soroti.

GENERAL PROBLEMS FACING AGRICULTURE IN UGANDA.

Physical factors.

1. Pests and diseases which lead to death of animals and affects the growth of crops for example Nagana and foot and mouth disease for cattle in Nakasongola and Kiruhura, Swine fever for pigs in Soroti, Jinja and Mukono, cotton wilt for cotton in Mubende, cassava mosaic for cassava in Mukono.
2. Climatic changes for example prolonged drought and heavy rainfall lead to loss of livestock and affects the growth of crops hence affecting nomadic pastoralism in Kotido and Moroto, Goats in Soroti and Nakasongola, Cotton in Lira, Coffee in Mubende.
3. Poorly Drained soils like highly leached soils of Buganda limits the growth of coffee in Mukono and Kayunga, thin sandy soils discourage the growth of sorghum in Napak, Kaabong and Moroto.
4. The rugged relief in the mountainous areas discourage mechanization of agriculture limiting the growth of bananas and coffee in Mbale, Vegetables in Kabale and Coffee in Bundibugyo.
5. Poor pastures due to harsh climatic conditions affects the growth of livestock for example nomadic pastoralism in Kotido and Kiruhura, ranching in Mbarara.
6. Shortage of water for animals affects the growth of livestock like cattle in Kaabong, Goats in Nakasongola, and Pigs in Soroti and sheep in Moroto.
7. Natural hazards like landslides affects the growth of coffee and bananas in Bududa and Bulamburi, Hailstorm affects the growth of bananas in Mbarara leading to losses.
8. Poor quality varieties of crops like coffee in Masaka, Bananas in Mubende and breeds of animals which produce low quality and quantity products from cattle in Kaabong, goats in Nakasongola, Pigs in Soroti and sheep in Moroto.

Other factors.

9. Insecurity and livestock theft in form of cattle rustling has led to losses in rearing cattle in Kaabong, Goats in Nakasongola, and Pigs in Soroti and sheep in Moroto.
10. Inadequate capital to be invested in purchasing farm machinery and paying labour for growing crops like coffee in Masaka, bananas in Mubende and rearing cattle in Kaabong, goats in Nakasongola, pigs in Soroti and sheep in Moroto.
11. Inadequate market for agricultural products because of competition from other agricultural countries discourages growing of bananas in Mubende, coffee in Masaka and rearing of cattle in Kaabong, Goats in Nakasongola, and pigs in Soroti and sheep in Moroto.
12. Poorly developed transport network to facilitate distribution of agricultural products hence discouraging large scale growing of coffee in Masaka, Bananas in Bushenyi and rearing of cattle in Kiruhura, Pigs in Soroti and sheep in Moroto.
13. Limited skilled labour in form of veterinary services has led to poor quality production of agricultural products like coffee in Masaka, rearing of cattle in Kaabong, Goats in Nakasongola, Pigs in Soroti and sheep in Moroto,
14. Limited government support in form of heavy taxation of activities related to livestock and crop growing for example the growing of coffee in Masaka, cattle rearing in Bushenyi.

15. Limited research conducted regarding improvement in the quality of agricultural products discourages improvement in growing of bananas in Masaka, and rearing of cattle in Bushenyi, Kaabong pigs in Soroti and sheep in Moroto.
16. the presence of dangerous wild animals which attack and kill animals and farmers affecting the rearing of cattle in Kaabong, goats in Nakasongola, pigs in Soroti and sheep in Moroto.
17. Limited land due to competition with other land use types discourages large scale growing of crops like coffee in Masaka, Bananas in Mubende, and rearing of cattle in Nakasongola, goats in Nakasongola, pigs in Soroti and sheep in Moroto.
18. Conservatism of the farmers whereby they are not willing to change from their traditional way of rearing animals like growing of coffee in Masaka, bananas in Bushenyi and pig rearing in Soroti.

AGRICULTURAL PRODUCTIVITY AND MODERNISATION IN UGANDA.

Agricultural productivity refers to the quantity of agricultural output per unit area.

Agricultural modernization refers to the transformation of agriculture from traditional subsistence agriculture to modern commercial agriculture.

Modernization in Agriculture in Uganda is carried out by the Ministry of Agriculture, Animal Industry and Fisheries (MAAF) under the Plan for Modernization of Agriculture. (PMA)

Methods or Ways of increasing agricultural productivity/ modernization in Uganda.

1. Providing water through irrigation to crops like sugar canes at Kakira sugar cane plantation and constructing water sources to provide water for livestock for example boreholes , valley dams water reservoirs for cattle in Kaabong, goats in Nakasongola, Pigs in Soroti and sheep in Moroto.
2. Controlling the carrying capacity of livestock and planting fodder crops to improve on pasture for cattle in Kaabong, Goats in Nakasongola, and Pigs in Soroti and sheep in Moroto.
3. Provision of genetically modified seeds like maize in Iganga and coffee in Wakiso and cross breeding of livestock is being practiced to improve on the quality of agricultural output for example cattle in Kaabong, Goats in Nakasongola, Pigs in Soroti and sheep in Moroto.
4. Conducting intensive research in agriculture regarding improvement in the quality of crops and livestock and technological advancement for coffee in Mubende, tea in Kasaku tea estate, cattle in Kaabong and goats in Nakasongola.
5. Setting up of demonstration farms to teach farmers modern methods of agriculture for coffee in Mubende, cotton in Lira and Cattle in Kaabong, goats in Nakasongola, PIGS IN Soroti and Sheep in Moroto.
6. Spraying, dipping and putting quarantine to control pests and diseases for tomatoes in Kabale, cabbages in Wakiso and cattle in Kaabong, goats in Nakasongola, Pigs in Soroti and sheep in Moroto.
7. Expanding the size of the market for agricultural products like milk and meat through regional integration like EAC for maize in Kiryandongo, coffee in Mubende and cattle in Kaabong, Goats in Nakasongola, and Pigs in Soroti etc.
8. Promoting peace and stability by the national army UPDF and encourage investment in Agriculture for example growing of maize in Iganga, coffee in Mubende and rearing of cattle in Kaabong, goats in Nakasongola, pigs in Soroti and sheep in Mukono.

9. Developing transport infrastructures to facilitate the distribution of agricultural products like milk and meat to market centres promoting the rearing of cattle in Kaabong, goats in Nakasongola, Pigs in Soroti and sheep in Moroto.
10. Liberalizing the livestock industry and crop husbandry to increase private investment in growing of maize in Iganga, coffee and rearing of animals like cattle in Kaabong, goats in Nakasongola, pigs in Soroti and sheep in Moroto.
11. Training of man power to work in the agricultural farms for example as extension workers in growing of Maize in Iganga, coffee and support rearing of cattle in Kaabong, Goats in Nakasongola, Pigs in Soroti and sheep in Moroto.
12. Setting up of industries processing agricultural products like Kakira sugar processing industry for sugar canes at Kakira, GBK and JESA dairy for milk and abattoirs for cattle in Nakasongola, pigs in Soroti and sheep in Moroto.
13. Intensive advertising of agricultural products to increase on the size of market for products for example rice from Kibimba Tilda in Bugiri, Cattle in Kaabong, goats in Nakasongola, Pigs in Soroti and sheep in Moroto.
14. Providing capital to the farmers through microfinance institutions and banks in form of loans for promoting the growing of maize in Iganga, coffee growing in Masaka, cattle rearing in Kiruhura and goat rearing in Nakasongola.
15. Encouraging foreign investors to invest in the livestock industry since they have the necessary capital and technology for example Madhvan for Kakira sugar cane plantation, Mehta for Lugazi sugar cane plantation.
16. Restocking of areas that lost livestock during periods of insecurity and due to natural calamities for example cattle in Amolatar, Pallisa, Kaberamaido Luweero and Nakasongola.
17. Setting up of support institutions to ensure improvement in agriculture for example cotton Development Organization (CDO) for cotton in Lira, Coffee development Authority (CDA) for coffee in Mubende and Uganda Dairy Development Authority (UDDA) for cattle in Mbarara.
18. Encouraging land reform policies to encourage farmers to own land to improve on growing of maize in Iganga, coffee and rearing o cattle in Kaabong, Goats in Nakasongola, PIGS IN Soroti and sheep in Moroto.
19. Subsidizing farm inputs like hoes, tractors and chemicals so as to encourage farmers acquire them to improve agriculture in growing of maize in Iganga, coffee and rearing of cattle in Kaabong, Goats in Nakasongola, and Pigs in Soroti and sheep in Moroto.
20. Improving on storage and preservation methods for milk and meat to reduce on wastages in products from cattle in Kaabong, goats in Nakasongola, Pigs in Soroti and sheep in Moroto.

REVISION QUESTIONS.

1. **Assess the contribution of agriculture to the development of Uganda.**
 - Give the current status of the agricultural sector in Uganda, identify the agricultural systems in Uganda and draw a sketch map of Uganda showing agrarian systems.
 - Explain the positive and negative contributions of agriculture, giving an example of agrarian system / type /crop and place name on every point.
2. **Examine the factors influencing agrarian systems in Uganda.**
 - Give the current status of the agricultural sector in Uganda, identify the agricultural systems in Uganda and Draw a sketch map of Uganda showing Agrarian systems.

- Explain the factors influencing agrarian system, giving an example of Agrarian system and place names on every point.

3. To what extent has climate influenced agrarian systems in Uganda?

- Give the current status of the agricultural sector in Uganda, identify the agricultural systems in Uganda and draw a sketch map of Uganda showing agrarian systems.
- Explain the role of climate on the agrarian systems in Uganda e.g. Equatorial climate, tropical, semi desert and montane and give other factors giving an example of agrarian system.

4. Explain the factors limiting coffee growing in Uganda.

- Give the current status of coffee growing in Uganda, identify the types of coffee grown in Uganda and draw a sketch map to show types of coffee grown and place names.
- Explain the problems facing coffee growing, giving an example of the type of coffee and where it is grown on every point.

(b).What measures are being taken to improve on coffee growing in Uganda.

- Explain the measures in present tense giving an example of a type of coffee and where it is grown.

5. Assess the contribution of plantation agriculture to the development of Uganda.

- Define plantation agriculture, give the areas where it is practiced in Uganda and draw a sketch map of Uganda showing areas where plantation agriculture is practiced.
- Explain the positive and negative contribution of plantation agriculture giving examples of names of plantation, crop and district in every point.

6. Examine the factors which have favoured irrigation farming in Uganda.

- Define irrigation farming, identify irrigation schemes in Uganda and draw a sketch map of Uganda showing irrigation schemes in Uganda.
- Explain the factors favouring irrigation farming, giving an example of the irrigation scheme on every point.

7. (a) Describe the characteristics of market gardening

- Define market gardening, identify areas where market gardening is practiced inform of crop and place names and draw a sketch map of Uganda showing areas where market gardening is practiced.
- Outline the characteristics in a complete sentence form with an example of an area and crop grown under market gardening on each point.

(b). Explain the factors limiting the development of market gardening in Uganda.

- Explain the factors giving an example of crop and place name on every point.

8. (a) Examine the problems facing livestock farming in Uganda.

- Define livestock farming, identify the forms of livestock farming in Uganda and draw a sketch map of Uganda showing forms of livestock farming.
- Explain the problems giving an example of a form of livestock farming/ type of livestock and place name on every point.

(b). Assess the contribution of livestock farming to the development of Uganda.

- Explain the positive and negative contribution giving an example form of livestock farming/ type of livestock and place name on every point.

9. Outline the characteristics of nomadic pastoralism.

- Define the term nomadic pastoralism, identify the areas in Uganda where it is practiced and draw a sketch map of Uganda showing areas where it is practiced.
- Outline characteristics in complete sentences showing areas where it is practiced.

(c) Explain the problems facing nomadic pastoralists in Uganda.

- Explain the problems facing nomadic pastoralism, giving an example of a place where it is practiced.

10. Account for the low levels of agricultural productivity Uganda.

- Define agricultural productivity as output per unit areas of production, identify the agrarian systems in Uganda and draw a sketch map of Uganda showing agrarian systems.
- Explain the factors for the low level of agricultural productivity, giving an example of a farming system/ crop/ type of animal and place name on every point.

Chapter 14.

FISHING IN UGANDA.

Current status of fishing in Uganda.

- Fishing contributes about 2.2% of the GDP.
- 60% of fish caught in Uganda is sold while fresh and only about 40% is processed.
- The biggest percentage of the fish is from Lake Victoria followed by Lake Kyoga.
- The methods of catching fish and preservation are still both traditional and modern.
- About 1.2 million people depend on the fish sector both directly and indirectly.
- Most of the fish processing companies in Uganda are owned by foreigners.
- Total fish catch has been declining over the years due to over fishing.
- There is increased fish farming in different areas like Kajansi, Mbale etc.
- Restocking of fishing grounds is being done by the government to increase fish catch.
- The major fish species caught in Uganda include; Nile perch, Tilapia etc.
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