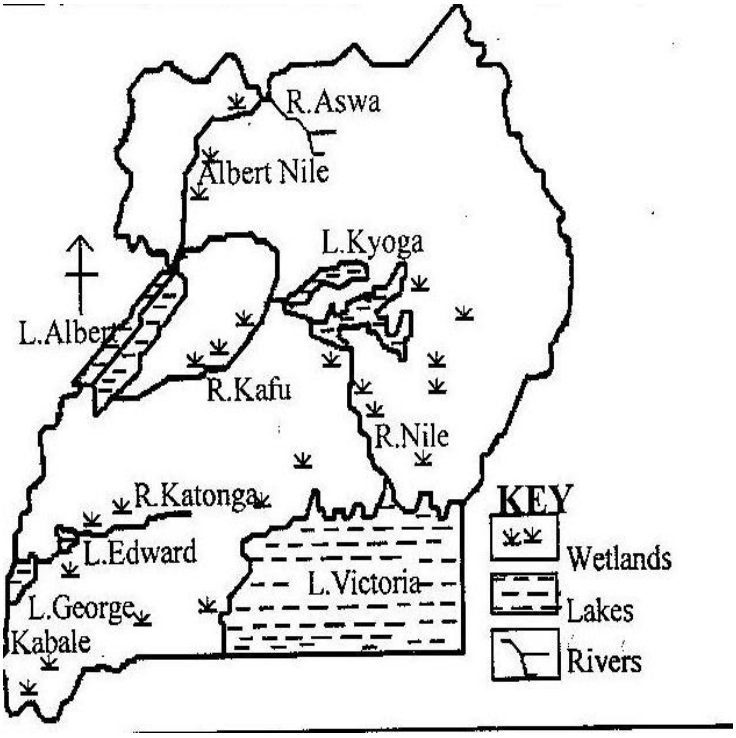
The drainage of Uganda

Drainage refers to water logged areas of rivers, lakes and swamps. It is the different water sources in a country.

Uganda has got different drainage systems of lakes such as Victoria, Kyoga, Albert, Bisiina, Wamala, etc rivers such as Nile, Katonga, Kagera, etc. and Swamps like along rivers and lakes, others like Rubigi, Nabajuzi, kirihili, etc.

Distribution of drainage system in Uganda



Lakes

A lake is a body of water contained in a hollow with in a basin. The size, depth and permanence of a lake depend largely on the nature of the basin on which it' s located. In Uganda, there are various lakes like Victoria, which is the largest, Kyoga, Wamala, Albert, George, Edward, Mburo, Bisiina and other volcanic lakes found in south western Uganda.

Lakes can be classified as;

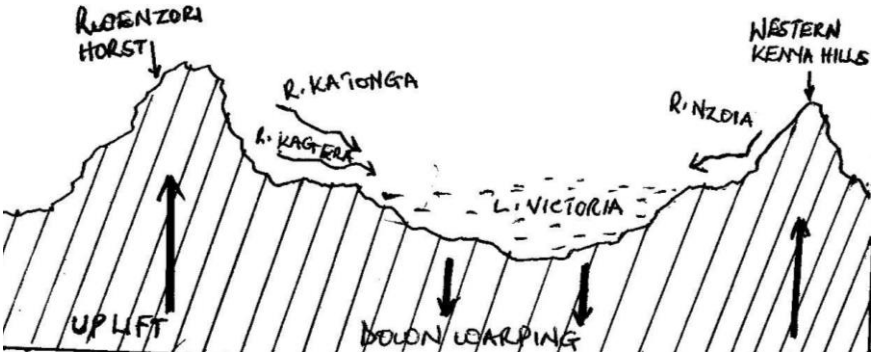
a. Depression/crustal warped lakes.

These include L. Victoria, Kyoga, Wamala and Bisiina.They are formed due to crustal warping in down warped basins.Such lakes are generally large and irregular in shape, shallow in depth, surrounded by swamps and their shorelines show influence of drowning inform of numerous inlets.

Formation of Lake Victoria

- Lake Victoria is a crustal warped lake located in a down warped basin in south eastern Uganda.
- Down warping and up-warping of the landscape in Uganda occurred due to an increase in the lateral compression force which affected the earth crust over a wide area.
- Down warping led to the formation of a great basin i.e. Victoria-Kyoga basin and the uplift led to the formation of uplands/plateau.
- Crustal warping also led to a general reversal in the drainage system of Uganda. Rivers such as Katonga, Kagera, Kafu, Mayanja which were originally flowing towards Atlantic Ocean reversed their water due to uplift of western Uganda to over flood the central basin. This led to formation of L. Victoria.
- Other rivers like Ruizi, Nzoia also reversed their flow due to uplift of the eastern Uganda to fill L. Victoria.

Illustration of crustal warping



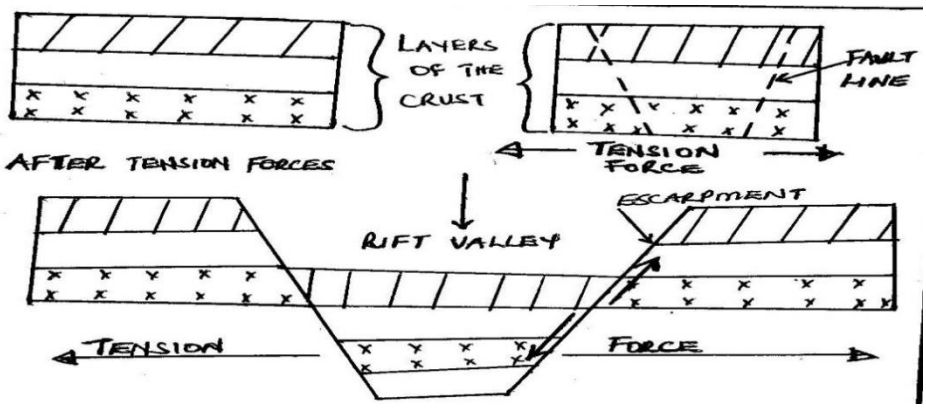
b. Tectonic lakes/ fault lakes.

- ✓ These are located in the rift valley occupying gradens formed by secondary faulting which was initially caused by tension and compression forces.
- ✓ Fault lakes are narrow and elongated in shape, boarded by steep sides or fault scarps, their waters are usually saline and inlets and outlets tend to be confined at their extreme end.
- ✓ Such lakes include Albert, George and Edward.

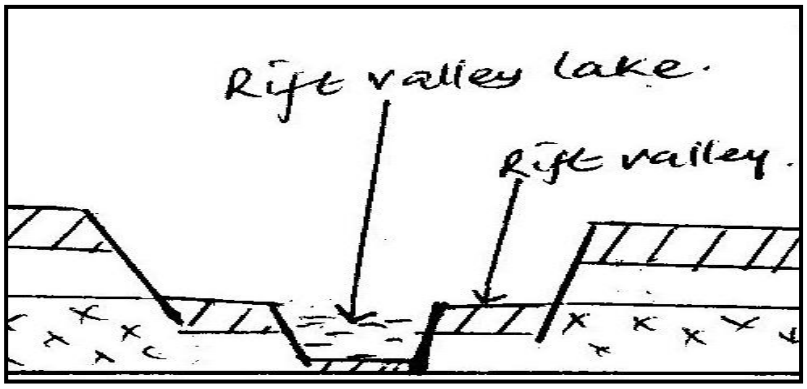
Formation of L. Albert

- ✓ L. Albert is a fault lake formed by faulting process due to tension and compression forces in the grabens within the rift valley.
- ✓ L. Albert found in western Uganda in the western rift valley is majorly believed to have been formed by compression forces due to its steep Butiaba escarpments.
- ✓ According to compression force theory, the existence of compression forces within the crust acted upon/pushed the adjacent blocks forming fault lines.
- ✓ The central block thrusted against the adjacent blocks forming an elongated depression/rift valley as illustrated.

Before faulting during faulting



- ✓ Later secondary faulting acted upon the rift valley forming a graben/ a more defied depression.
- ✓ When the graben was filled with water, it became a rift valley lake known as L. Albert.



c. Volcanic lakes.

These are formed by volcanicity and occupy craters and calderas formed as a result of eruption.

When the created craters or calderas are filled with water they form crater lakes or caldera lakes.

These include Lakes like Katwe, Nyungu, Nyamurangira, Nyamunuka, Kyamwoga, Munyanyange, and Nyamusingira all in south western Uganda.

Lava dammed lakes are formed where lava flow blocks the flowing river and floods a valley to form a lake such as Bunyonyi in Kabale, L.

Mutanda, Butera, Muhondo, Mulehe, Ndalaga, all in south western Uganda.

d. Glacial lakes.

These occupy cirques on high mountains of Rwenzori formed by glaciations process. The constant erosion caused by glaciers on this snow capped mountain of the moon, shallow steep sided depression are created known as cirques. When these are filled with water, glacial tarns are formed. Examples include Lac du Speke, Lac Catherine, Lac Noir and Lac Vert all on slopes of Mt. Rwenzori in western Uganda.

e. Weathered lakes.

Chemical weathering act on some rocks especially limestone and make them break. In such places large pits are created/formed, when the pits are filled with water small lakes known as solution lakes are formed like in Nyakasura south western Uganda.

f. Manmade lakes.

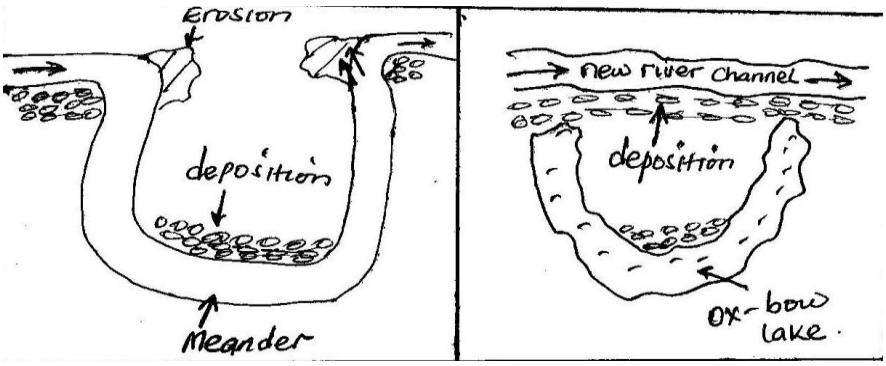
These are lakes made where man digs large depressions like Kabaka□s lake in Rubaga-Kampala and L. Kibimba in eastern Uganda.

Other lakes were formed through digging fishing ponds like in Mawogola and Kapchorwa in eastern Uganda. Others were formed as valley dams like in Nyabushozi, Kashari and Isingiro in south western Uganda.

g. Deposition lakes or ox-bow lakes.

These are formed as a result of erosion and subsequent deposition along the lower course of a river. Such lakes are usually shallow and small and sometimes temporary. Ox-bow lakes formation is guided by meandering of a river as illustrated;

Meandering river and deposition



Examples of ox-bow lakes in Uganda have been found on rivers such as Semulik near Rwenzori and on R. Ruizi near Mbarara town.

Economic valsue of lakes in Uganda

- ✓ Lakes in Uganda have got both positive and negative values to the economic development of Uganda and these include;
- ✓ Lakes such as Victoria modify the climate of the surrounding areas along its shores of Mukono, Buikwe, Jinja, etc. through the process of evaporation and its breezes it forms heavy and reliable convectional rainfall supporting tea growing at Kasaku and sugar at Kakira for foreign exchange.
- ✓ Lakes provide water for irrigation at Lugazi sugar estate from L. Victoria, water to cool machines in steel rolling in Mukono and as a raw-material in Uganda breweries at Luzira from L. Victoria. Such industries have been source of consumer goods to Uganda reducing on imports.
- ✓ The water provided by lakes like Mburo has been used for animal consumption by the pastoralists in Kiruhura and by Mburo National park animals. This has diversified Uganda' s economy through tourism and livestock farming. Also water from L. Victoria is used by Kampala and Masaka for domestic purpose.
- ✓ Lakes provide cheap water transport which has helped to promote trade and international relationship. Forexample L. Albert link Butiaba in Uganda to Muhanga in Congo, L. Victoria connects Jinja

and Port bell of Uganda to Mwanza in Tanzania and Kisumu of Kenya.

- ✓ Lakes makes it possible for the generation of HEP like L. Victoria act as a reservoir for R. Nile where Owen falls dam and Bujagali dam are built.
  HEP in turn has led to industrialization in Jinja and Kampala for jobs and government revenue.
- ✓ The papyrus vegetation and other swampy vegetation around lakes Kyoga and Victoria has led to the development of the craft industry were mats, roofing papyrus mats, etc are made. This has availed jobs to locals earning incomes for better living standards.
- ✓ The fresh water lakes of Kyoga and Victoria have provided fish such as Tilapia and Nile perch for proteins and development of the fishing industry. This has led to growth of fishing site like Lambu, Kasenyi, Jinja, Luzira, on Victoria and Lwampanga on Kyoga thus infrastructure development.
- ✓ Due to reliable rainfall provided by lakes such as L. Victoria, there has grown a dense forest within i.e. Karangara and Ssese islands forests and around the lake like Mabira. This has developed the forestry industry for job provision and economy diversification.
- ✓ Sand which is found at the shores of L. Victoria is used for construction purpose and glass making. Salt mining in L. Katwe, oil Prospects in Albert shores, clay mining in Kajjansi for ceramics on L. Victoria shores, all provide jobs to Ugandans, foreign exchange and infrastructure development.
- ✓ Lakes provide natural habitats for millions of plants, animals and birds. This promotes eco-system like at L. Mburo and George. The above coupled with the blue waters and beautiful scenery f lakes like Bunyonyi in Kabale, coastal features of beaches like Liddo, Nabugabo, on Victoria attract tourists for foreign exchange.

- ✓ Lakes provide great opportunities for research and study purpose in relation to fisheries, forestry, navigation and soils. There is also a meteological department at Entebbe thus weather studies which all help Ugandans understand their environment and make proper planning especially in the farming sector.

The short comings of lakes to Uganda' s development include;

- ✓ Lakes are dumping grounds for industrial wastes like Uganda breweries factory at Port Bell in Luzira dump its wastes into Lake Victoria which pollutes its waters becoming un condusive for domestic use and fish existence.
- ✓ Navigation on lakes is associated by a number of accidents caused by strong winds like on L. Albert claiming a lot of important labor in form of people who would be productive for development.
- ✓ Lakes are barriers to construction of transport networks of roads and railway. Foristance L. Bunyonyi has made some parts of Kabale remote and backward. The low levels of infrastructure in such areas lead to low trade development and low Uganda' s development.
- ✓ The swampy vegetation on crescents of lakes like Kyoga are breeding grounds for dangerous pests like mosquitoes and tsetse flies. Such pests transmit human diseases such as malaria and sleeping sickness respectively to people in Lwampanga on Kyoga.
- ✓ Sometimes lakes over flood their shorelines and this leads to property destruction and loss of lives. Foristance L. Bisiina flooded in 2007 causing water borne diseases to people in the area.
- ✓ Lakes that are shared by different countries like Albert and Edward by Uganda and Congo, Victoria by Uganda, Kenya and Tanzania, cause conflicts especially during usage of the lake in fisheries, transport and mining as it was between Uganda and Kenya over Mijingo island and on Albert with Congo.

- ✓ The changes in water levels lead to submergence and emergence of water which leads to destruction of ports as it has been on L. Albert.
- ✓ Some lakes like Albert and George fault lakes have got saline water and fault scarps along their shoreline which discourage fishing activities hence low development of the fishing industry.
- ✓ Lakes also harbour dangerous wild animals such as snakes, crocodiles and hippos which destroy crops and claim people' s lives like in L. Albert and Edward.

QN. Discuss the formation of Kyoga basin and examine the economic viability of the lake to the region where it is located.

Approach

Define a lake.

Identify where Lake Kyoga is found and some of the landing site on the lake.

Locate the lake differently shaded on the map of Uganda with other lakes. Make sure you indicate its landing sites.

With aid of diagrams explain its formation.

Explain with examples the positive and negative importance of the lake MAJORY to the region where it is located.

Rivers

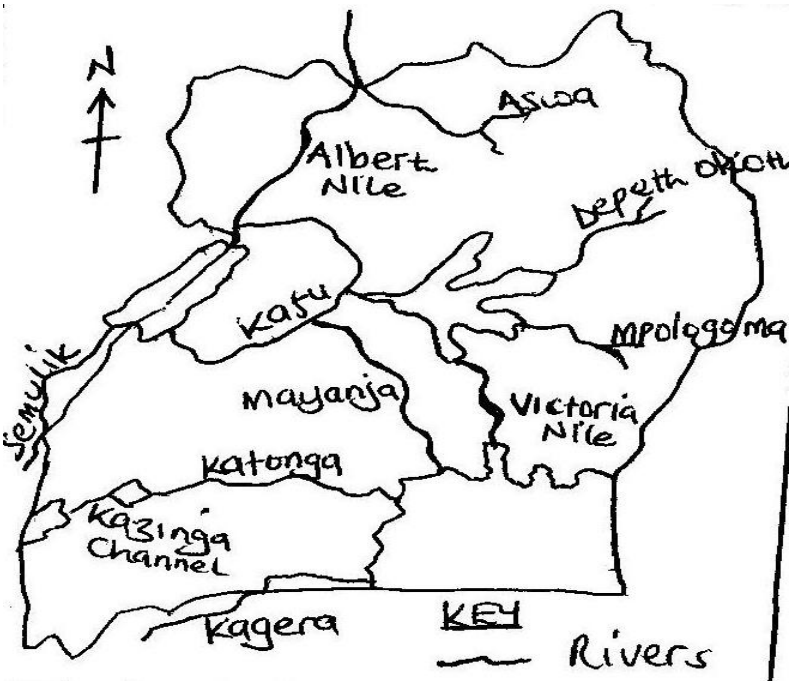
Uganda is drained by various rivers almost the entire landscape of the country. They are majorly nine rivers which include;

1. R. Nile which include Victoria Nile and Albert Nile. It has its source in L. Victoria and its mouth in Mediterranean Sea.
2. R. Katonga which flows from L. George to L. Victoria.
3. Mpologoma-Manafa River, which originates from Mt. Elgon to L. Kyoga.
4. Mayanja-Kato River, which has its source in L. Victoria and its mouth into Kafue.

5. Aswa-Moroto River, it originates from north eastern Karamoja areas to R. Nile.
6. R. kafue which originates from L. Kyoga to L. Albert.
7. R. Kagera, it originates from Rwanda hills to L. Victoria.
8. Depeth-Okoth which originates from Karamoja hills to Kyoga.
9. R. Semulik and Mubuku.

Other rivers in Uganda include R. Rwizi, R. Sezibwa, R. Okere, Birira River, Nyamwamba, etc.

Major rivers in Uganda



River profile

This refers to the measured slope along the bed or surface of the river from its catchment area to its mouth. A river profile is divided into three sections i.e.

- The youthful stage
- The mature stage
- The senile stage.

During the erosion and deposition of a river there are different features formed i.e.

Waterfalls such as Owen falls, Bujagali falls and Muchison falls on R. Nile, Sezibwa falls on R. Sezibwa, Kisiizi falls, etc are formed by river erosion.

River deposition especially in its lower stage form ox-bow lakes as at R. Rwizi, deltas, etc.

Drainage patterns

A drainage pattern is a lay out plan which is made by a river and its tributaries on the landscape. In Uganda, the different patterns can be identified;

- Dendritic drainage pattern
- Radial
- Trellis
- Centripetal
- Annular
- Barbed

N.B River rejuvenation refers to a renewed river capacity in a river valley. Rejuvenation can be caused by heavy rains and river capture. River capture or piracy refers to the diversion of part of a river course or whole of it into the system of another adjacent powerful river.

Economic value of rivers in Uganda

- ✓ Rivers are source of water for domestic, industrial and recreation purpose. Foristance Mbarara town get water for domestic use from R. Rwizi, Nile breweries use water from R. Nile as raw-material in making beer hence provision of jobs to Ugandans and government revenue.
- ✓ The water from rivers like Mubuku and Manafa is used to facilitate irrigation at Mubuku irrigation scheme in Kasese and Doho in eastern Uganda respectively. Such schemes have increased on food production and foreign exchange after rice and vegetable exports.

- ✓ Rivers facilitates generation of HEP like Owen falls dam and Bujagali dams on R. Nile, Mubuku power station on R. Mubuku, etc. HEP has lead to industrial development thus infrastructure development and jobs to Ugandans.
- ✓ Rivers provide cheap water transport by ferry means like on Victoria Nile. This has developed local trade, provided incomes to transporters hence improved living standards.
- ✓ The papyrus swamps which develop along river banks such as on R. Katonga and Mpologoma are potential raw-materials for paper, packing, cardboards, roofing materials and the general development of the craft industry thus employments to Ugandans.
- ✓ Rivers are tourist attraction especially waterfalls of Murchison, Bajagali, Sipi and Karuma falls. The meandering nature of R. Rwizi attracts tourists for foreign exchange in terms of invisible export which is used for further development.
- ✓ Rivers like Nile provide fishing grounds and fish caught for local consumption and for sale. The swampy areas along R. Katonga provide mud fish, which provide proteins and sold for better incomes to Ugandans.
- ✓ The swampy areas and wetlands along river channels are natural habitats for wild animals, birds and other marine life. Shoe bills and crested cranes survive in R. Nile wetlands attracting tourists for foreign exchange.
- ✓ There is clay mining along rivers like Katonga and Mpologoma for brick laying thus development of small scale industries for jobs to Ugandans.
- ✓ Rivers like Nakivubo channel help to regulate the environmental impurities that would directly enter L. Victoria leading to its pollution. Also rivers modify the climate where they exist like river

Manafa form reliable rainfall which supports rice and other crop growing in eastern Uganda.

- ✓ River banks like Albert Nile have got fertile soils in West Nile areas supporting tobacco and other crop growing. This also has attracted settlement in the areas of Nebbi, Arua, etc. the grown crops have contributed foreign exchange to Uganda through exportation.

The short comings of rivers include;

- ✓ Some rivers tend to over flood their valleys during rainy seasons as it was in 2007 in north eastern Uganda and in 2014 in Kasese by R. Nyamwamba. This cause property destruction, loss of lives and interfere with transport networks since floods wash away bridges.
- ✓ Most rivers contain waterfalls and rapids like along Nile at Karuma which make navigation impossible thus resulting into remoteness and inaccessibility of such areas.
- ✓ Most rivers like in northern Uganda make the construction of feeder roads hard like at Karuma Bridge which makes such areas remote and inaccessible especially during rainy seasons.
- ✓ The swampy vegetation along river channels like along Katonga harbour disease vectors such as mosquitoes and tsetse flies which cause diseases such as malaria and sleeping sickness respectively to human beings.

N.B The economic importance of the drainage system of Uganda includes;

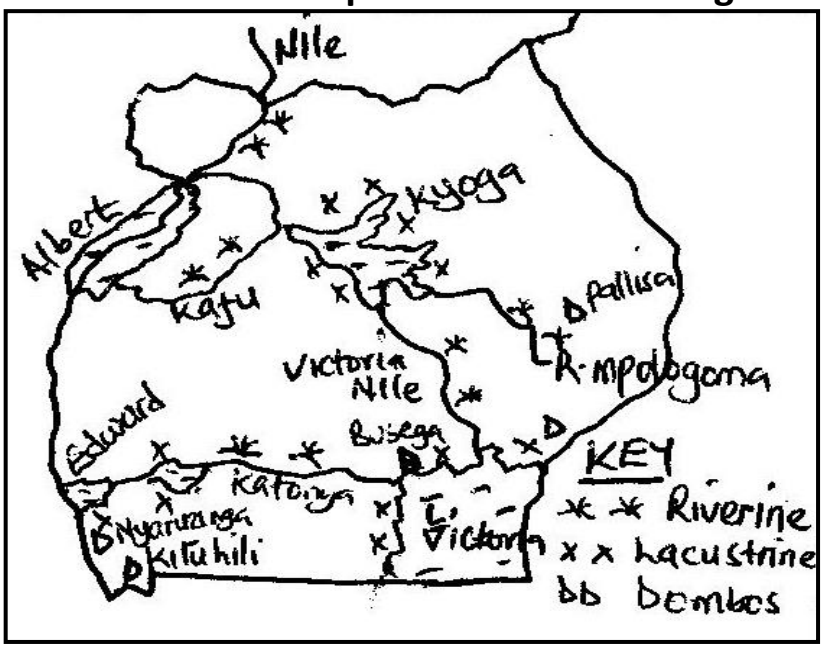
- Values <u>of lakes</u>
- <u>Values of rivers</u>
- <u>Values of swamps</u>

WETLANDS IN UGANDA

- ✓ Wetlands develop swampy vegetation in Uganda. Wetlands are water logged areas with plant life adapted to the environment.

- ✓ Wetlands are grouped as lacustrine i.e. those along lakes such as along L. Victoria like Lutembe, Nabugabo, Lambu, etc, along L. Kyoga like Galiraya, Kagwara and Lwampanga wetlands. Riverine wetlands i.e. those on river banks such as along R. Nile, Katonga, Kagera, Kafu, Mayanja, Sezibwa, Mpologoma, etc. and Dombos wetlands which exist in open valleys such as Busega in kampala, kiruhili in Kabale, nyaruzinga in Rukungiri, Lubigi in Kampala, etc.

The extent of swamps and wetlands in Uganda



It should be noted that;

Status of wetlands

- ✓ There is a reduction of wetlands to 10%.
- ✓ Wetland cover 13% of Uganda.
- ✓ The dominant type of soil in wetlands is clay and sand.
- ✓ Most wetlands have turned into industrial parks such as Namanve, Manafa and Kyambogo.
- ✓ NEMA is the body responsible for wetlands in Uganda; however it has done little to save Uganda□s wetlands from destruction.

Economic importance of wetlands

- ✓ There is subsistence fishing carried out from swamps i.e. mud fish for consumption. This is majorly done along R. katonga swamps. Such fish provides proteins and is sold for cash thus improved living standards.
- ✓ Swamps through the process of evaporation leads to rainfall formation which modify the climate in areas of Lubigi, Nakayiba in Masaka, Lumansi in Bombo etc.this develops crop growing thus constant food supply in such areas.
- ✓ Swamps provide water for animal watering and also animal grazing during dry seasons like those along L. Kyoga shores to Baluli of Nakasongola.this has supported livestock thus incomes to farmers.
- ✓ Swamps provide grounds for crop growing such as yams in Busega, sugar canes, vegetables in kiruhili in Kabale. This has increased on farmers' income improving on their standards of living.
- ✓ Swamps act as filters to protect lakes and rivers from pollution like Nakivubo swamp which protects L. Victoria from Kampala city sewerage. This ensures conservation of aquatic animals.
- ✓ Swamps provide natural habitat for thousands of marine animals and plants. They also protect rare bird species such as crested cranes and shoe bills. This has developed the tourist industry for foreign exchange.
- ✓ Wetlands like those around L. Victoria provide raw-materials for the making of crafts, mats and baskets. This has availed Ugandans jobs, earned incomes to the locals and development of the craft industry.
- ✓ Swamps are source f clay which has developed the making of tiles, bricks, pottery,etc like in Kajjansi-Wakiso district.
- ✓ Swamps provide water for domestic purpose like Nabajjuzi swamp which supply water to Masaka town. Lubigi swamp as well is source of water to Bwaise, kawala, Masanafu locals in Kampala reducing on city cost of living.
- ✓ Wetlands like Kasambya provide plants of medicinal value like aloevera which improves peoples' health.

- ✓ Wetlands acts as boundaries for different districts like Kyoga wetland separates Bushenyi from Mbarara.
- ✓ Wetlands supports navigation like Lwampanga swamp which promotes trade.
- ✓ Wetlands act as hunting grounds for antelopes like along Kalinga

The short comings of wetlands in Uganda include.

- ✓ Swamps are breeding grounds of disease vectors of mosquitoes and tsetse flies which cause malaria and sleeping sickness respectively to human beings. This explains why many people in Bwaise, Kawala near Rubigi swamp suffer from malaria fever.
- ✓ Swamps like those along R. Katonga and Kazinga channel harbour dangerous animals such as snakes, crocodiles, hippos which claim people' s lives and destroy crops.
- ✓ Wetlands are usually over flooded during rainy seasons blocking roads like along R. Mpologoma and Manafa in Eastern Uganda.
- ✓ Swamps claim people' s lives as they drown from there. For instance many people have drowned in Rubigi swamp in the out skirts of Kampala.
- ✓ Navigable swamps like along Nile and Katonga have led to water accidents.
- ✓ Wetlands are affected by siltation and sedimentation which affect fishing and navigation like Lubigi and Lumbuye.
- ✓ Wetlands limit land uses such as settlement and agriculture due the floody nature like Nakayiba and Kyogya of Masaka which affect development.
- ✓ Many wetlands act as hiding places for anti government elements like robbers in Lwera-Masaka.
- ✓ Soils in most wetlands are acidic and un-productive and eaily lose fertility affecting crop growing and incomes like Nabajjuzi swamp in Masaka.

QN. Examine the view that the wetlands areas of Uganda are wasted lands.

Swamp reclamation in Uganda.

This refers to clearing of wetlands for man□s survival. This is happening to many swampy areas in Uganda such as Nabajuzi swamp in Masaka, Mutai

swamp in jinja, Doho swamp, Kibimba swamp in eastern uganda, Nalukolongo, Kalerwe-Bwaise wetlands, Lumbuye wetland, Lwampanga wetland along Kyoga, mpologoma wetland along R. Mpologoma, Nakayiba in Masaka, Kiruruma in Kabale, etc it should be noted that wetlands in Jinja and Kampala are the most degraded.

Causes of swamp reclamation

- ✓ Crop growing purpose like Kakira sugar estate in jinja reclaimed Mutai swamp, Doho and Kibimba wetlands for rice growing in eastern Uganda and Kashambya swamps in Kabale reclaimed for vegetable gardens.
- ✓ Animal rearing especially during dry seasons like in Kitgum and parts of R. Mayanja, Mpologoma and Lwampanga wetlands have been encroached by the Baluli-Nakasongola pastralists and Kiruruma swamp in Kabale were leased to dairy farmers.
- ✓ Urbanization effect like in Bwaise, Kalerwe, Natete, Busega , New tax park areas have replaced wetlands where they exist in abit to extend Kampala city.
- ✓ Collection of craft materials and clay and sand excavation like in Kajjansi swamp by Uganda clays, the Lwera and Lutembe swamps have been threatened by sand mining.
- ✓ Industrialization like coca cola plant in Mbarara, bell factory in Luzira Port bell, Nalukolongo wetland claimed for Sembule steel rolling mills, Bwaise swamp for Avis cosmetics factory and many others in Nakawa and kyambogo in Kampala occupied Kyambogo-Mbuya wetlands.
- ✓ Settlement were many swamps hava been cleared for purposes of home construction like in Kisenyi and Kalerwe swamps in Kampala.
- ✓ Roads and infrastructure construction like the northern by-pass in kampala destroyed much of Lubigi swamp, kampala-Masaka road cleared part of katonga and Busega swamps, Jinja-Iganga-Tororo road destroyed parts of Walugogo, Lumbuye, Naigombya and Tirinyi swamps.

- ✓ Fire out breaks by farmers and hunters have degraded Katonga, Lwera, Tirinyi and other swamps.
- ✓ The practice of garbage disposal in wetlands by Kampala dwellers like in Kitezi wetlands, Luzira wetlands, Wakaliga, etc. Also Masese swamp in Jinja and Walugogo valley has suffered the same.
- ✓ The industrial discharge and pollution by the mining sector have degraded swamps like Njeru wetland Polluted by NYTIL and Nile breweries in Jinja and Kazinga and George wetlands have been degraded by cobalt wastes in Kasese.

Effects/problems associated with swamp reclamation in Uganda.

It has led to drying up of water wells and streams and lowering of the water table like in Butaleja, Pallisa and Iganga were Naigombya, Lumbuye and Mpologoma swamps have been reclaimed. This in turn is leading to the spread of the negative environmental phenomenon of desertification.

- ✓ It has led to a change in water quality of such swamps and wetlands. Also since wetlands act as a filter to lakes, their reclamation increases water pollution into lakes like Victoria affecting aquatic life.
- ✓ It has led to change in climatic regimes since swamp reclamation reduces rainfall received like in Pallisa and Iganga. This has discouraged crop growing and famine and drought are beginning to hit such places.
- ✓ Reclamation of swamps affects the life of thousands of marine animals and plants whose habitat has been removed. Foristance reclaiming of Kachido and upper Murchison bay wetlands, Lutembe wetland has affected crested cranes and migrant birds from Europe hindering tourism.
- ✓ The practice has led to floods in areas of Bwaise and Kalerwe, Kyambogo and Nakawa, etc. this has resulted into water borne

diseases like dysentery, bilharzia and cholera in such areas of Kampala.

- ✓ Reclamation affects the source of building materials such as papyrus, sand and clay. This has resulted into high costs of building materials and construction like clay bricks from Kajjansi, Lweza and Kawempe are expensive.
- ✓ Swamp reclamation increases the rate of siltation of rivers and streams like in Walukuba, Makenke, and Magamag. Also the reclamation of Doho and Kibimba swamps has led to siltation of R. Manafa thus floods and loss of aquatic life.
- ✓ It leads to reduction in fishing grounds.
- ✓ Lowering of the water table which leads to drying up of streams and wells.
- ✓ Leads to easy spread of diseases since it causes pests invasion.

Measures to conserve wetlands in Uganda

- ✓ Practicing of family planning in order to control high population growth rate. This reduces on high demand for land thus reduced reclamation.
- ✓ NEMA has been set up to monitor wetlands and minimizes encroachment on wetlands. This helped to conserve Kyambogo, Bugolobi, Tirinyi and Naigombwa wetlands.
- ✓ Strict laws have been set up by the government against wetland encroachers. Evicting squatters in wetlands like from Bugolobi, Rufuha in Ntugamo, Agu wetland in Kumi has been done by government.
- ✓ Voluntary migrations have been encouraged i.e. from densely populated areas to sparsely populated areas. This has helped swamps to remain in their natural state.
- ✓ Massive education among the masses has been encouraged on the importance of swamps and their dangers especially to people of

Busega, Kawoya wetlands in Banda, through public rallies, over radios and televisions.

- ✓ Encouragement of vertical expansion of Kampala city in Nalukolongo, Nakawa,Bwaise and Bugolobi has been done by KCCA.
- ✓ The UWA and NEMA have put a ban on hunting of wild animals and birds. This has minimized bush fires on Lumbuye, Naigombwa, Lubigi wetlands which were initially started by hunters.
- ✓ The government has gazette specific industrial areas like Kawempe, Namanve, Nakawa, Nalukolongo which has reduced on encroachment on wetlands.
- ✓ The national water and sewerage corporation is treating sewage at Bugolobi before it is released into Luzira swamps. Also KCCA has started proper garbage disposal in Kitezi saving Wakaliga swamp.
- ✓ NEMA is encouraging the covering pits left behind after sand and clay mining in Kasenyi, Kajjansi, Seeta and Luzira. Also the ministry of agriculture has introduced upland rice to discourage rice cultivation in Doho, Kibimba, Tirinyi swamps which claim wetlands.

The climate of Uganda

Climate refers to average weather conditions of a place which is measured and recorded for a very long time usually between 35 and 40 years.

Climate is determined when weather elements are measured and recorded. Such elements include;

- Rainfall measured by a rain gauge.
- Temperature by the sixth thermometer
- Humidity by hygrometer
- Atmospheric pressure by a barometer
- Sun shine by a Campbell stock
- Cloud cover by hydrogen filled baloons
- Wind strength by anemometer
- Wind direction by wind vane.

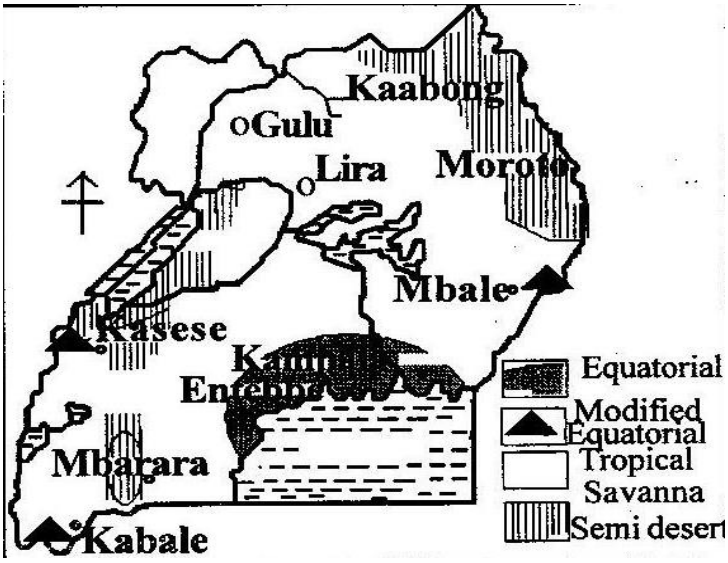
These elements of weather are measure at a weather station at Entebbe-Wakiso district.

Climatic belts of Uganda.

Uganda is supposed to have an equatorial climate by virtue of its location astride the equator, but because of its relief and other factors it experiences;

- Equatorial climate
- Modified equatorial climate
- Tropical climate
- Mountain climate
- Semi-desert climate

The climatic regions of Uganda



Equatorial climate

This is experienced around Victoria shores i.e. Kampala, Kalangara, Entebbe, etc. It has got the below characteristics;

- Heavy rainfall over 1250mm per annum. This rainfall is reliable and well distributed throughout the year because of breezes.
- Hot and humid temperatures ranging between 22^0C-30^0C due to thick cloud cover in the region
- High humidity throughout the year due to high evaporation rates in the region.
- Small annual temperature range between 0^0C-3^0C due to hot and humid temperatures received throughout the year.
- There is little or no dry season with one rainfall peak, although areas away from L. Victoria can experience two distinctive rainfall peaks, this is due to high humidity received throughout the year.
- The climate is warm and wet and leads to growth of equatorial rain forests of Mabira and Ssese.

Modified equatorial climate

This is experienced in West Nile, Kigezi highlands and some parts of central Uganda, with the below characteristics;

- Relatively heavy rainfall between 1000mm and 1500mm per annum mainly relief rainfall.
- There is alternating dry and wet seasons
- High humidity during the wet season and low humidity during dry season.
- High temperatures are experienced above 25^0C throughout the year
- Rainfall received is of two rainfall peaks
- Mostly the climate leads to growth of savannah woodlands.

Tropical climate

This covers the most parts of Uganda more especially in the northern region with the following characteristics;

- It has a clear distinct wet and dry seasons
- Moderate rainfall is received between 750mm-1000mm per year due to moderate humidity received in the region.
- High temperatures are experienced ranging between 25^0C-32^0C throughout the year.
- High humidity during the wet season and low humidity during the dry season.
- The climate leads to growth of savannah vegetation dominated by grasslands.

Semi-desert

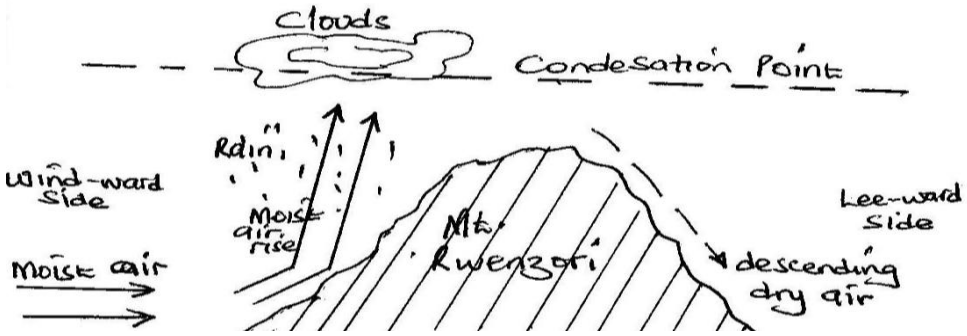
This is experienced in north eastern Uganda i.e. Moroto, Kotido, Kaabong and in Albert eastern shores i.e. Kabalega park and in Ankole-Masaka corridor. It has the following characteristics;

- Very low rainfall is received between 325mm-620mm per year due to low humidity in the region. It has one rainfall peak
- Very hot temperatures are experienced over 35^0C due to cloudless skies.

- Very low humidity in such areas and the skies are cloudless thus hot days and clold nights.
- The climate leads to the growth of shrub and thickets due to low rainfall.

Factors which influence the climate of Uganda

Relief, highland areas like Mt. Rwenzori block moving moist air masses resulting into the formation of relief rainfall on the wind ward side of the mountain while little or no rain is received on the lee ward side due to descending dry winds as illustrated.

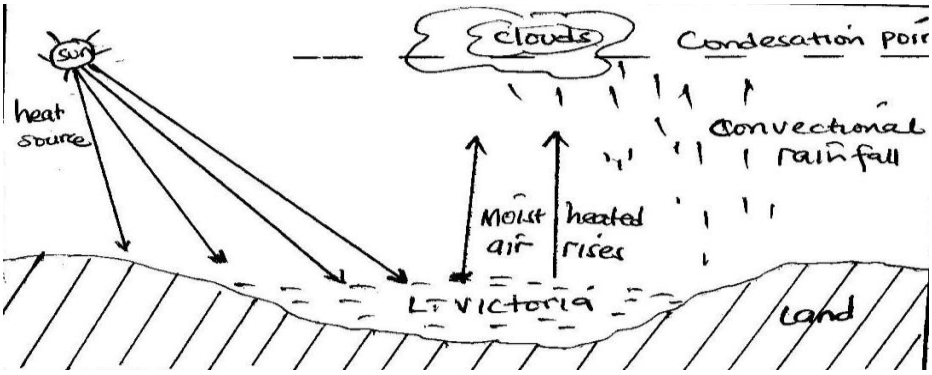


This explains why some parts of Kasese receive little rainfall well as Semulik valley receives heavy rainfall.

Flat areas like Karmoja receive little rainfall because of lack of obstacles to make the winds rise.

Altitude has an effect on temperature in Uganda. Places of high altitudes like Rwenzori peak, Elgon, experiences low temperatures while lower altitudes of Albert shores and rift valley areas experiences high temperature. This is because the higher you go upslope, the cooler it becomes.

Water body effect, large lakes such as Victoria and Kyoga are source of water vapour in atmosphere through the high rates of evaporation. This results into high humidity content in atmosphere thus convectional rainfall as illustrated.



Such lakes also influence rainfall formation on their crescent due to land and sea breeze.

Latitudinal effect, Uganda is located astride the equator and this makes it to receive high temperature throughout the year. The high temperature received warm up air masses on the ground causing them to rise, condense and form convectional rainfall. This is experienced around l. Victoria, western and south western and northern parts of Uganda.

Nature of vegetation cover, areas covered by forests like Mabira, Kalinju influence convectional rainfall formation due to the process of evapo-transpiration. On the other hand areas with shrubs and thickets vegetation such as Karamoja and Ankole-Masaka dry corridor receive very low rainfall since such vegetation provide limited water vapour in the atmosphere for rain formation.

The prevailing wind system effect, Uganda is affected by two main wind systems i.e. the north east trade winds and the south east trade winds. These winds are caused by the apparent movement of the sun north and south of the equator.

When the sun moves to the tropic of Capricorn, the north east trades blow with a lot of emphasis over Karamoja and make it dry due to no obstacle to make them rise. They pick moist air from L. Kyoga and cause rainfall at the foothills of Mt. Rwenzori in Fort Portal.

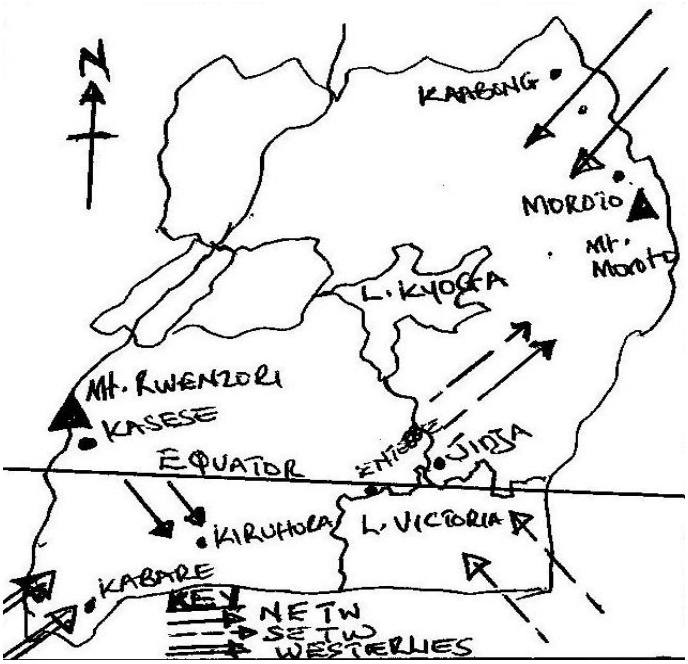
As they reach the equator, are deflected to the left and help to dry up Ankole-Masaka corridor as it also lack physical obstacle to make them rise.

When the sun moves to the tropic of Cancer, the south east trades blow and pick moist air from Victoria and cause rainfall on the northern shores of L. Victoria. They also blow over Ankole-Masaka corridor and dry it further and cause rainfall in western Uganda.

As they reach the equator, are deflected to the right, moves through L. Kyoga and help to dry up Karamoja again.However a section of these winds bring about rainfall formation on Mt. Elgon and Moroto in eastern Uganda.

When the sun is on the equator, the winds i.e. NE and SE trades converge and cause cyclonic rainfall.

Map of Uganda showing wind systems.



The effect of westerlies, these winds blow from Congo basin towards Kasese, Bundibugyo, Kabalore, Kisoro and Bushenyi. These warm and moist winds are blocked by the highlands of south western Uganda, rise, condense and form relief rainfall.

Position of the sun overhead, since Uganda is located astride the equator, it experiences the periods of equinoxes i.e. March and May and also September to October. Throughout these periods the country experiences heavy rainfall due to inter-tropical convergence zone (ITCZ).

Man's activities, which effect climate positively and negatively i.e. activities such as deforestation, monoculture, swamp reclamation, settlement, overgrazing, tend to affect vegetation thus less water vapour in the atmosphere and less rainfall.

Man has tried to improve on the climate of the area by programs such as aforestation and reforestation as in Kabale, Ntugamo and Mbarara. This Increases the chances of rainfall formation and climatic modification.

Rainfall patterns in Uganda.

Rainfall refers to tiny droplets falling on the earth's surface from the atmosphere under the influence of gravity. There are mainly two rainfall types received in Uganda i.e.

Relief or orographic rainfall characterized in mountainous or hilly areas of Uganda like Rwenzori.

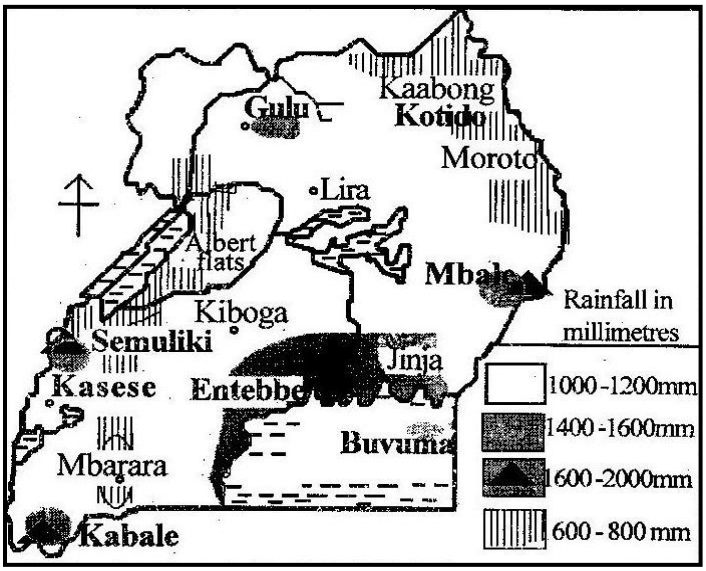
Convectional rainfall commonly received in areas of water bodies of Victoria and Kyoga and dense forests like Mabira and Kalangala forests.

Rainfall distribution in Uganda

The rainfall received in Uganda is generally grouped as;

Rainfall above 2000mm experienced in equatorial climatic regions like on L. Victoria crescent.
Rainfall ranging between 1500mm-2000mm (heavy) experienced in modified climatic regions of Uganda.
Rainfall ranging from 1000mm-1500mm (medium) experienced in tropical climatic regions like in northern Uganda.
Rainfall ranging between 750mm-1000mm (low) experienced in semi-arid climatic regions like in Lyantonde, Kiruhura, Lwengo, etc.
Rainfall ranging below 750mm per annum experienced in dry climatic regions like in Karamoja districts of Kaabong, Kotido Kitgum, etc

The distribution of rainfall in Uganda



Factors for the variation in rainfall distribution in Uganda

- ✓ Relief, in mountainous areas like Rwennzori in Kabarole, Bundibugyo receive heavy rainfall of about 1500mm per annum. This is because mountains block moist winds on the wind ward sides which rise, condense and form rainfall.

- ✓ The areas with dense forests like Mabira in Buikwe receive heavy rainfall due to high evapotranspiration levels resulting into convectional rainfall.
- ✓ Areas near large water bodies like the shores of L. Victoria in Kampala, Wakiso, receive heavy rainfall over 1500mm per annum due to lake and land breezes.
- ✓ Latitudinal influence/I.T .C.Z, this is a low pressure belt where various winds meet resulting into heavey thunder stoms and rainfall around lake Victoria region in districts of kamuli, Iganga Kampala where heavy rainfall of about 1500mm p.a is received.
- ✓ Wind system, the northeast trade winds bring dry conditions because they originate from the dry desert. This has resulted into dry conditions (less than 750mm) in kotido and moroto. The south east trade winds from the Indian ocean carry moist winds which they drop on the slopes of mountain Elgon resulting into heavy rainfall(1500mm) in sironko and Manafwa.
- ✓ Destruction of vegetation cover, in areas where vegetation has been destroyed the rainfall amounts have reduced eg Nakasongola with less than 750mm pa.
- ✓ Afforestation and re-afforestation in areas where trees have been planted the rainfall amounts have been increased such as Kabale(mafuga forest), bugamba in Mbarara etc.
- ✓ Swamp drainage / reclamation in areas where swamps have been reclaimed.The rainfall amounts have been reduced because of evaporation e.g in Kumi, Soroti, Bugiri etc.
- ✓ Mam made lakes/ valleys dams/ ponds, when these are constructed they increase on evaporation levels and therefore results into increased rainfall amounts such as kibimba.

✓ Government policy of conservation

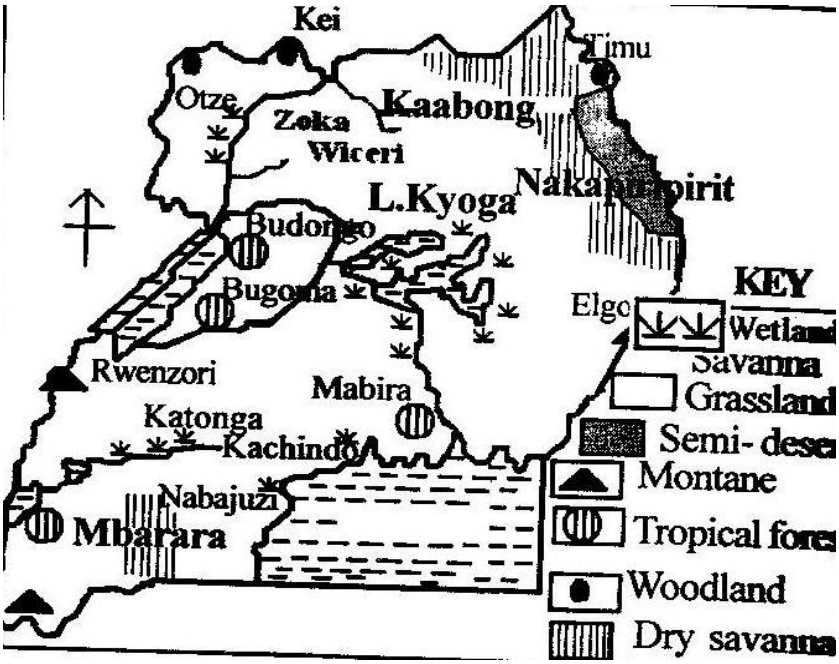
Vegetation of Ug anda.

Natural vegetation is the total sum of all plants that have grown naturally on the earth□s surface. The natural vegetation that grows in an area mainly depends on the climate of such a region.

Types of natural vegetation in Uganda.

- Equatorial rain forests/ tropical rain forests.
- Savannah vegetation
- Dry region vegetation
- Montane vegetation/ highland heath and moorland
- Swampy vegetation.

The distribution of natural vegetation in Uganda



Tropical rain forests

This is found in Mabira-Mukono, Budongo-Masindi, Kalinju-Bushenyi, etc and has the following characteristics;

- The forest is thick and luxuriant with much foliage due to heavy and reliable rainfall received in the region throughout the year.

- The forest contains a variety of tree species like Mvule, Msizi, Mahogany, Ebony, etc. therefore do not grow in pure stand.
- Trees have got broad leaves and the forest is ever green because they receive reliable well distributed heavy rainfall throughout the year.
- Trees form canopies and have no under growth due to less lights penetrating through the forest because of the dense canopies.
- Trees have buttress roots to support the heavy tree stems and many climbers which move from one tree to another.
- Forests have hard wood trees with a long gestation period and such trees grow up to 50metres high due to competition for light and fertile soils in such regions.

NB. Lumbering, forest exploitation, growing of subsistence crops, wildlife conservation, tourism development, settlement, are the major land use types in tropical rain forests.

Problems of land use types in the tropical rain forests of Uganda.

- Heavy rains cause pest multiplication such as mosquitoes and tsetse flies which transmit human diseases. This affects settlement in areas of Mabira, Ssese, Etc.
- Impassable roads caused by heavy rains which destroy roads creating potholes. This affects lumbering like in Kibale forest since logs and timber transportation is limited.
- The humid conditions within the forests and dangerous animals such as snakes limit forest exploitation as it is in Budongo forest.
- Trees do not grow in pure stand which hinder their selection, felling and transportation of logs.
- These forests experience fire out breaks during dry seasons and uncontrolled farming has cleared much of the tropical rain forests.
- Animals from such forests like Ssese forests destroy crops grown near the forests thus hindering crop growing.

Savannah vegetation

Savannah covers much of Uganda's total land area. It is divided into savannah grassland and woodland. Also dry savannah sometimes known as range lands.

Savannah woodlands

This is found mainly in Kei, Otze, Timu, in northern Uganda, West Nile and some parts of central region.

Savannah grasslands

These are well developed in the fringes of savannah woodlands. It exists in Nakasongola, Luwero, Hoima, Sembabule and in the rift valley areas of western Uganda.

The dry savannah or rangelands are found in Albert flats, Semulik zones, Kotido, Moroto, Kaabong and in Ankole Masaka dry corridor.

Savannah vegetation has got the following characteristics.

- Combination of trees and grasses but the trees are not so close like in forests.
- Trees are umbrella shaped and shed off their leaves during the dry season.
- The grasses are very tall up to 1metre like elephant grass due to moderate rains received in the area.
- It should be noted that different forms of savannah have got different characteristics.

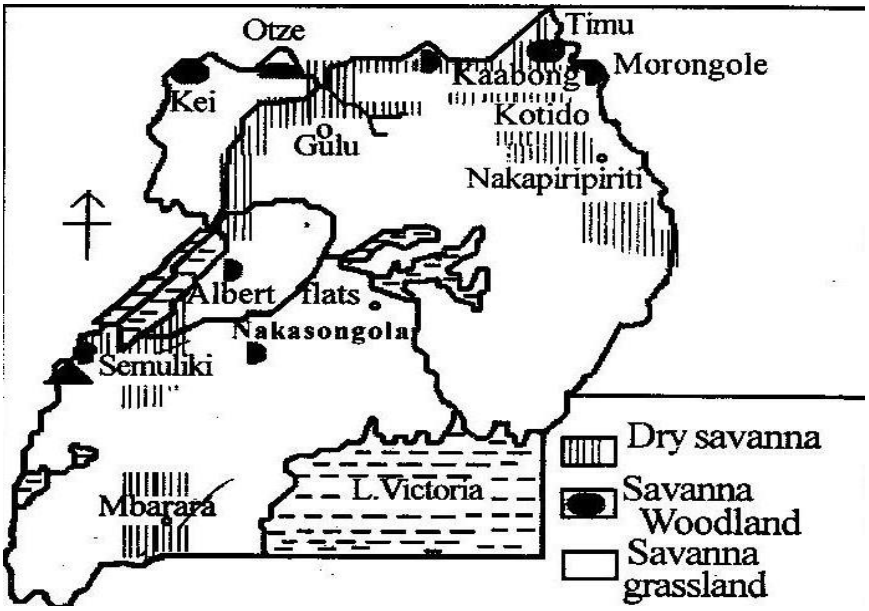
NB. Crop growing, animal rearing, settlement, wildlife conservation in National Parks like Queen Elizabeth, Kabalega, wood collection, hunting are some of the land use types in savannah.

Rangelands / dry savannah

These are dry savannah rangelands which receive 750mm of rainfall and below. In Uganda they include;

- North eastern Uganda in Karamoja regon of Kaabong, Moroto, Kotido, etc.
- North Acholi in Maracha district
- Western rift valley in Albert flats
- Around L. Edward and L. George in Queen Elizabeth national park
- Ankole-Masaka dry corridor
- Bululi-Nakasonglo areas.

Distribution of dry savanna vegetation in Uganda



Characteristics of rangelands in Uganda

- Low and unreliable rainfall of less than 750mm per year which leads to growth of short grass, scrub and thorny thickets.
- High daily temperature throughout the year of over 30^0C which has led to growth of thorny trees with thick barks and needle shaped leaves to store enough water for use during drought seasons.

- Low temperatures at night and high during day which has discouraged settlement in the region and the areas have been left for national parks like Kidepo in north east, Kabalega in Albert flats and Queen Elizabeth in western rift valley.
- There is low humidity, cloud less skies and rains received is erratic.

Conditions for the growth of dry savannah in Uganda

- ✓ High temperatures of over 26^0C like in Nakapiripiriti have led to growth of dry savannah vegetation. This facilitates the growth of trees with small twisted leaves so as to avoid loss of moisture through rapid respiration and evaporation.
- ✓ Low humidity content in the atmosphere in the areas like Kotido leads to scarcity of luxurious vegetation except drought resistant vegetation such as thickets.
- ✓ Low and unreliable rainfall between 250-500mm favours growth of dry savannah vegetation in Moroto and Kaabong. This supports growth of acacia, baobab and cactus trees which are drought resistant.
- ✓ The low lying relief in the Albert flats and Kotido district experience high temperatures and low rainfall thus growth of drought resistant vegetation.
- ✓ On the lee-ward side of Mt. Rwenzori there is scarce rains due to descending dry winds thus dry savannah vegetation growth.
- ✓ Poor and sandy soils with limited retention capacity like in Kotido and Kaabong and Albert flats which can only support poor plant life growth thus dry savannah vegetation.
- ✓ Overgrazing like in Karamoja region and in Kiruhura in south western Uganda leads to depletion of vegetation thus encouraging dry savannah vegetation.
- ✓ Wildlife conservation in game parks of Kidepo, Queen Elizabeth and Murchison fall park with animals such as buffaloes, giraffe which eat up vegetation and create dry savannah vegetation.

- ✓ Bush fires by farmers like Basongola and Karamajong has led to growth of stunted grass with short trees which are scattered.
- ✓ Deforestation for farming, lumbering and tsetse fly control like as it was in Albert flats, led to growth of dry savannah vegetation.

Economic activities in rangelands

- ✓ Subsistence farming like nomadic pastoralism in Karamoja and Bululi, production of cereals like maize, millet and cotton like in Kasese.
- ✓ Wildlife conservation through gazettng national parks like Kidepo, L. Mburo, game reserves like Ajai in north western Uganda, etc.
- ✓ Ranglands provide vast land for settlement like in Hoima, Nakasongola, etc
- ✓ Mining like oil from Albertine shores, gold in Karamoja, etc.
- ✓ Rangelands provide a great potential for tourism due to fauna and flora in Kidepo, Queen Elizabeth, etc.
- ✓ Hunting like in Karamoja hunting zone, Bamunanika royal hunting zone in Luwero, etc.
- ✓ Local herbs collection and fruit gathering like in Lwera in Masaka and Nakasongola.

Problems faced in rangeland areas.

- ✓ Water shortage for watering animals and domestic use especially during drought seasons, this leads to death of animals like in Karamoja.
- ✓ Harsh climatic conditions of low rainfall totals and very high temperature during day and very low temperature at night has caused water shortage, famine, poor pasture, fire outbreaks, etc.
- ✓ Tropical pests and diseases which attack animals like nagana, crops and human beings like sleeping sickness hindering settlement and animal rearing.

- ✓ Limited important infrastructure of valley dams, veterinary services, market centres, health centres and roads like in Kaabong which has made the areas remote and inaccessible.
- ✓ Poor land tenure system of communal land ownership which has led to frequent degradation and abuse of rangelands.
- ✓ Unfavourable government policies of utilizing the rangelands like the government of Uganda has neglected such areas of Ankole-Masaka dry corridor and Bululi thus limited infrastructure.
- ✓ Sometimes floods caused by erratic rains in rangeland areas destroy crops and property and also claim human lives like as it was in Teso north eastern Uganda in 2007
- ✓ Some of the rangeland areas have got porous soils which do not favour crop growing. There is also the practice of poor farming methods like overgrazing which cause soil erosion.

Steps taken to over ride these problems

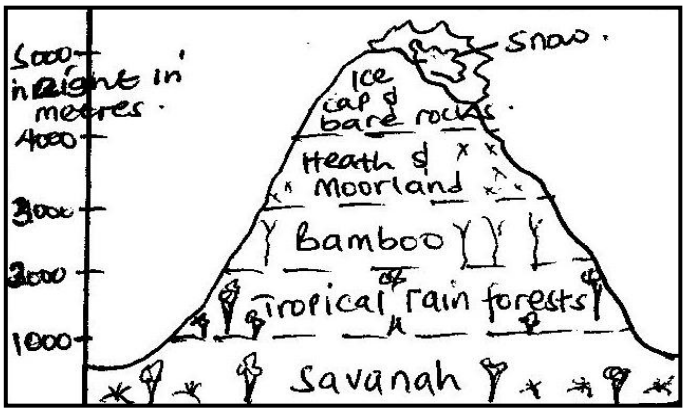
- ✓ Construction of boreholes and valley dam to fight the prolonged drought and water the animals in the region.
- ✓ Cultivation of profitable crops using scientific methods of planting of high breed seeds of cereals with short gestation periods. This has been done in Kitugm and Kotido.
- ✓ Farmers have been encouraged to apply fertilizers and organic manure where soils are poor. The use of irrigation like in Kibimba has increased on food production.
- ✓ Co-operative farming has been encouraged. Also cotton has been grown as a cash crop to increase on food supply like in Bululi and around L. Edward and George.
- ✓ There has been introduction of ranching schemes to provide veterinary services, scientific animal rearing methods, water sources mainly in Ankole-Masaka dry corridor and Bululi-Nakasongola.

- ✓ The government has set up milk collecting centres to enable marketing of cattle products of milk. Also beef markets have been established like in Sanga in Kiruhura district.
- ✓ Activities such as mining have been empowered like the extraction of oil at Albert, gold in Karamoja and tin in Ankole-Masaka corridor.
- ✓ There are aforestation programs to diversify the environment through formation rainfall and protection of land against erosion.
- ✓ Rangelands have been gazatted into national parks and game reserves like Kidepo and Ajai respectively. This has developed the tourist industry and helped to extend social infrastructure like heath services, roads and water to rangelands.
- ✓ The communal land ownership is being checked in favour of individual land ownership as the case in Ankole-Masaka corridor. Also paddocking of grazing land has been encouraged.

Montane vegetation

Vegetation on mountains varies according to the altitude. The higher the altitude, the cooler the temperature. Such temperature favour the growth of different vegetation types as illustrated below.

Vegetation zonation on Mt. Rwenzori



From the above vegetation zonation on Mt. Rwenzori, we realize that vegetation zones reflect changes in climatic conditions i.e.

- Savannah vegetation reflect tropical climate

- Tropical rain forest reflect equatorial climate
- Bamboo and alpine vegetation reflect temperate climate
- The moorland, heath and bare ice cap reflects polar climate.

NB. Different economic activities are carried out in different zones e.g.

- In savannah, crop cultivation, mining and quarrying like in Kilembe – Kasese, etc.
- In equatorial zone, perennial crops growing like tea and coffee in Bujjuku in Kasese, lumbering, etc.
- In bamboo, the tree poles are exported especially to Germany. There is also fishing from R. Sebwe and Mubuku, etc.
- The alpine pasture give potential ground for grazing animals especially exotic type.
- The moorland and ice cap are source of rivers like Mubuku and Nyamwamba. The region also attracts tourists thus foreign exchange.

Factors influencing vegetation cover in Uganda.

- ✓ Climatic factor of rainfall and temperature i.e. areas with abundant, heavy and reliable rainfall over 1500mm per annum have forest cover like Ssese in L. Victoria, well as areas with low and unreliable rainfall below 500mm per annum like Kaabong in Karamoja, there is dry savannah vegetation.
- ✓ Regions with high temperature experiences luxuriant forest growth like Mabira while those with low emperature like on the peak of Rwenzori in western Uganda, vegetation is reduced to alpine, moorland and sometimes bare rocks.
- ✓ The soil nutrients, texture, depth, moisture, content, acidity and alkalinity affect vegetation. Well drained moisture fertile soils leads to growth of dense forests well as poor soils lead to growth of grass vegetation.
- ✓ Altitude, as already illustrated, different altitude levels have different vegetation types. This is because different altitude levels have

different temperature and this is clearly seen on Mt. Rwenzori in western Uganda.

- ✓ Latitude, dense vegetation cover like Mabira forest in Mukono grows along the equator due to availability of reliable rainfall, high humidity and hot temperature. With an increase in latitude, there is reduction in growth of vegetation in a dense form.
- ✓ Biotic factor i.e. Animals and birds act as seed carriers (dispersal) and lead to growth of vegetation in many areas. Pests like locusts on the other hand destroy vegetation.
- ✓ Presence of light, this is required for photosynthesis process. Where light is abundant like in Budongo, vegetation growth is luxuriant while limited light cause limited vegetation growth.
- ✓ Winds, these affect the rate of evaporation. Fairy strong winds increase the rate of transpiration resulting into strong growth of vegetation like in Bwindi southwestern Uganda.
- ✓ Human activities such as burning, overgrazing, deforestation, cultivation destroy the existing natural vegetation. However through afforestation and reforestation, reservation, etc, it leads to vegetation growth as it has been in Mbarara, Kabale, Ntungamo in south western Uganda.
- ✓ Government policy, through policies of forest reservation, wetland protection, etc there is vegetation growth. Wars and wildlife conservation leads to destruction of the available vegetation type turning it into another type. This explain why parts of Karamoja in Kidepo valley which were experiencing savannah vegetation has turned in semi-arid vegetation due to wildlife conservation by Ugandan government.

The forestry industry in Uganda

A forest is a close stand of trees that form a canopy or canopies on top.

Forestry refers to the management and harvesting of forest resource.

The forests in Uganda play a major role in protecting the environment and in the economic development of the country.

Uganda has got two types of forests i.e. **natural** and **artificial** forests.

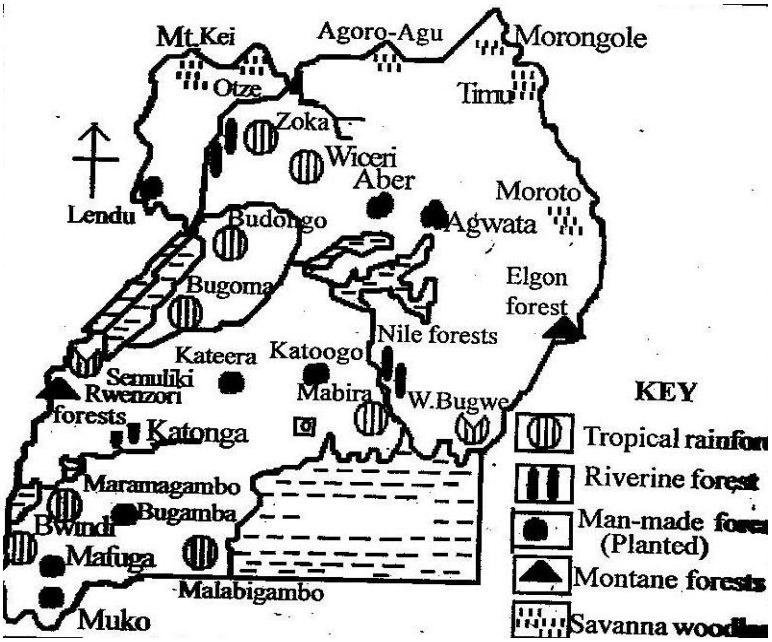
The natural forests in Uganda are sub-divided into; **tropical rainforests**, **mountain forests, woodlands** and **riverine forests.**

The natural forests include; Mabira in Mukono district, Bugoma and Budongo in Masindi and Hoima, Kibale, Kalinju, Kitomi, Maramagambo, Mgahinga, Bwindi impenetrable, all in south and western Uganda, Zoka, Wiceri, Mt. Elgon forests, Mt. Rwenzori forests, etc.

Artificial forests include; Lendu in Nebbi, Kateera in Kiboga, Muko in Kabale, Ayere in Gulu, Rwomo in Ntugamo, Mafuga, Agwata, Abera, etc.

There also savannah woodlands especially in northern Uganda.

Distribution of forests in Uganda



Status of the forestry industry

- ✓ Most of the country's forest cover comprises natural forests.
- ✓ Savannah woodland forests are the most widespread forest types in the country.
- ✓ Most Uganda's forests exist outside protected areas and on private land.
- ✓ There is high rate of deforestation of the natural forests like in Kyenjojo district.
- ✓ Some forests have been de-gazatted up to 23.6% like Namanve.
- ✓ The common planted tree species are pine and eucalyptus trees.
- ✓ All protected forests in the country are managed by National Forestry Authority (NFA) and Uganda Wildlife Authority (UWA).
- ✓ The most deforested areas are those which are heavily settled and cultivated.
- ✓ Uganda loses her forest cover at a rate of 1.8% per year.
- ✓ Much of the deforestation occur in well stocked high forests and woodland forests at a rate of 2% per annum.
- ✓ The country's forest cover now covers 7.4 million hectares, down from 50 million hectares in 1900 only 9% down from 11% in 1995.
- ✓ Government encouraging afforestation under Agro-forestry.

Importance of forests in Uganda

The importance of forests in Uganda can be categorized into two i.e. productive importance and protective importance.

- ✓ Forests protect against erosion i.e. the leaves of the trees break the force of rain drops before they reach the ground. Also the fallen leaves help to mulch the soil hence protecting it from erosion like those on Elgon slopes.
- ✓ Tree roots bind the soil particles together making them less liable to erosion. Also tree branches act as wind breakers hence reduce the

strength of wind that would have carried the top soil like on Mt. Rwenzori.

- ✓ Forests facilitate the formation of rainfall through the process of evapo-transpiration. This has led to rainfall in areas where forests are found like in Mabira-Mukono. Such rainfall has facilitated the growth of sugar canes at Lugazi sugar estate.
- ✓ Forests provide a habitat for wild animal and birds, protecting the rare species of animals such as gorillas in Bwindi that has boosted tourism industry for jobs to Ugandans.
- ✓ Forests help to prevent desertification through modification of the climate as they form rainfall in the process of evapo-transpiration like in Mabira-Mukono which in turn has favored tea growing at Kasaku.
- ✓ Trees provide oxygen in atmosphere and absorb carbon dioxide which reduces global warming. Forests like Mabira have absorbed pollutions from Namanve and Jinja industries.
- ✓ Forests like Budongo and Kalinju provide fuel in form of biomass in terms of fire wood and charcoal used for both industrial and domestic purpose. Industries like bakeries, brick laying factories like in Kajjansi use fire wood from Ssese forests.
- ✓ Timber derived from the forests such as Ssese and Mabira is used for a variety of purposes. Foristance making furniture, paper and pulp, matches, construction purpose, all of economic importance to Uganda through job provision and revenue to the government.
- ✓ Forests like Aber and Agwata provide poles for telephone and rural electrification. Eucalyptus tree poles are usually used, and also for construction purpose. This has led to increased industrialization in Uganda.
- ✓ Tropical rain forests of Mabira, Mgahinga and Bwindi act as tourist attraction potentials and this promotes the tourism industry thus earning foreign exchange for further development.

- ✓ Provision of employment opportunities as lumbermen in saw mills, forest rangers, officials in the tourist industry, furniture makers, etc. such Ugandans earn a lot of incomes improving on their standards of living.
- ✓ Forests contributes to the clean environment by reducing pollution of all types especially Mabira in Namanve industrial area i.e. absorbing carbon dioxide and producing oxygen. This increases the quality of life of Ugandans.
- ✓ Forests like mabira and Wiceri provide medicine in form of herbs that help to cure several diseases like moringa tree products, cinchona and aloe Vera which all cure diseases. This has improved on the life span of Ugandans.
- ✓ Forests like Kibale and Bugoma are source of food products such as fruits, honey, mashrooms, bee wax and gum. Also wild coffee is harvested mainly in Kibale forests and sold for cash. This improves on the incomes of Ugandans.
- ✓ Forests like Mabira and Ssese are used for research and study purpose by scholars of higher institutions. Foristance Makerere University uses forests for research.
- ✓ Forests are catchment areas for rivers as well as contributing rainfall into river channels. Forinstance Mt. Elgon forests Support River Manafa and Masaba. This helps to support aquatic life hence development of the fishing industry.
- ✓ Forests provide a good environment for recreation through picnics, hunting and beach games like at Botanical beach forests in Entebbe. This support tourism for foreign exchange.
- ✓ Forests are source of government revenue as well as foreign exchange from exportation of bamboo poles to Germany. The exchange is used for further development.

- ✓ Summary of positive importance i.e. Contributes gross domestic products, source of energy, provides valuable timber, yields valuable medicine, raw materials for art and craft industry, source of food (fruits), employment opportunities, income, revenue, urban growth around saw mills, promotes industrialization, foreign exchange, habitat for game/wildlife, tourist attraction, research promotion, catchment areas for rivers, positive modification of climate, protect soils from erosion, diversify the economy, promotes environmental purification, soil conservation through agro-forestry, act as wind breakers, promotes infrastructural development.

Short comings of forests include;

- ✓ Most forests like Malabigambo in southern Uganda do not appear in pure stand due to a variety of tree species they posses thus making their exploitation, felling and selection of logs difficult.
- ✓ Forests do habour dangerous pests and diseases like mosquitoes and tsetse flies. Also snakes and lions are a threat to forest exploitators.
- ✓ Thick forests like Bwindi impenetrable act as a barrier to communication especially in construction and maintenance of roads through the forest. This explains why some parts of Kisoro are remote.
- ✓ Summary: promotes remoteness, habit dangerous animals, habit pests and diseases, hide out for wrong doers, promotes drying of wetlands, hinder road construction, accidents are common during exploitation, etc.

Factors that have limited the exploitation of natural forests in Uganda

- ✓ Some forests like Marabigambo and Mafuga are located in remote and inaccessible areas especially during rainy seasons. This makes transportation and labor mobility for exploitation of the forest hard.

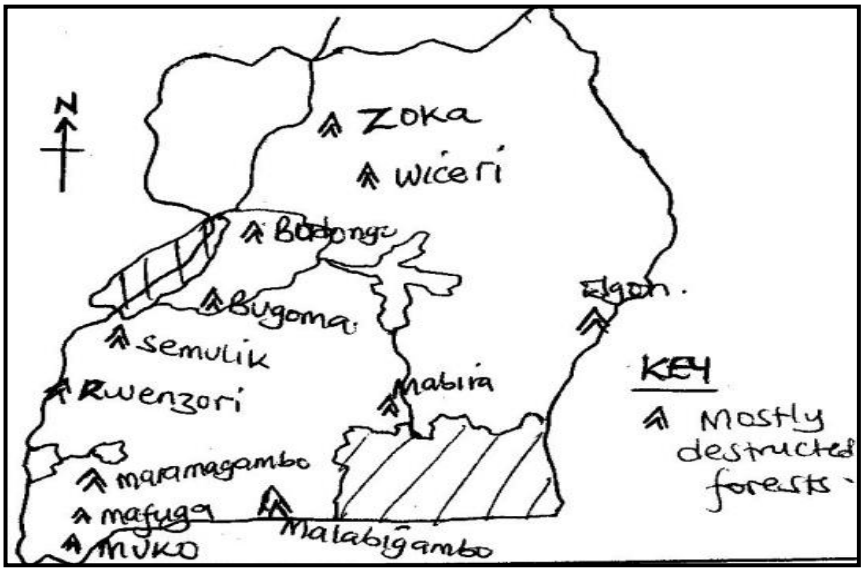
- ✓ The heavy rains received in such forests of Mabira and Budongo contribute to the outbreak of pests and diseases like mosquitoes and tsetse flies which are a threat to lumbermen.
- ✓ Tropical rain forests grow buttress roots which hinder effective felling of trees. Also trees are inter-connected by strong creepers and tree climbers. This makes tree felling difficult like in Ssese forests.
- ✓ The valuable tree species in forests like Maramagambo, Budongo and Mabira do not appear in pure stand. This makes it difficult in selection and felling of valuable tree species such as mahogany, ebony and mvule.
- ✓ Inefficient handling facilities after the logs have been felled. Lumbermen use manual rifting of logs to the nearest transportation centre like in Budongo forest.
- ✓ Shortage of capital to invest in the forestry industry for purchasing modern machines like electric saws, tractors to exploit big forests like Budongo and Bugoma. Few investors today have invested in the forestry industry since the business is less profitable.
- ✓ Limited market of Uganda' s timber since it is hard wood timber. These face a lot of competition from foreign countries with soft wood products.
- ✓ Inefficient transport networks to transport forestry products to market centres. Roads are destroyed by heavy rains within the forested areas.
- ✓ Shortage of skilled labour and managerial skills in the forestry industry to exploit forests like Kalinju and Bwindi. The unskilled labourers lead to felling of young trees.
- ✓ Floods especially during rainy seasons like by river Sezibwe in Mabira forest make its utilization difficult.
- ✓ The increasing population like in kibale has encroached on forest reserves for settlement and agricultural purpose. This is evident in kibale forest reserve.

- ✓ Political instabilities has affected exploitation of forests like the ADF affected Rwenzori forests and Mt. Kei and Otze in the north affected by LRA rebels.
- ✓ Steep slopes on mountains like Elgon and Rwenzori limit access to such forests for exploitation.also forests like maramagambo located in lowlands with soft soils limit transport facilities for exploitation.
- ✓ Inadequate research to identify and exploit trees of commercial value in Budongo, Bugoma and other forests. There is also limited modern technology to exploit forests and the use of primitive tools like axes cannot support commercial exploitation.

Deforestation in Uganda

Deforestation is the increased extinction of the forest resource. In Uganda the forests are on a decrease. About 100 years ago, the land of Uganda was having 12% covered by forests but now is estimated at 5%. It should be noted that currently 21% of the original forests is remaining and 79% cleared. Most of the cleared forests are found in central region and in the west.

Map of Uganda showing mostly destructed forests.



Factors/causes of deforestation in Uganda

- ✓ Rapid population growth, Uganda experiences a high population of 34.4 million people and the increasing population in areas such as kigezi, Mbale, Bugishu has led to high demand for land for settlement thus destroying forests like Mabira, Kibale, mt. Elgon forests, etc.
- ✓ Forests are major sources of biomass in form of fire wood and charcoal especially in rural areas. This has led to cutting down forests like Mabira, Bugongo and Maramagambo.
- ✓ The increasing demand for timber for furniture, building and construction has led to clearing parts of Kibale forest, Kalinju and Budongo which are accessible.
- ✓ Burning of forests especially by hunters, farmers and grazers has destroyed Mwenge forest reserve, mt. Rwenzori forests and Luwero forests. Also many hectares of forests of Aber and Opit in Gulu were burnt in 1982 by locals.
- ✓ Ignorance of the people especially in the rural areas like in Kibale and Kigezi, who have inadequate knowledge about the value of forests. Such simply destroy forests because they look at them as obstacles to more meaningful land use.
- ✓ Corruption in the forest department in form of bribes, illegal sale of timber, illegal lumbering, thus clearing mostly soft wood trees like Mafuga.
- ✓ Political insecurity where forests have been cleared to check on insecurity like in 1980s Luwero forests were cut down, Nyamityobora forest in Mbarara, etc for security reasons.
- ✓ Limited resources invested in the forest department leading to inefficient equipments used, limited rangers, wardens and other staff to monitor forests and reduce on encroachment on forests like Mabira, Budongo and others.

- ✓ Pests and diseases which have led to clearing forests to destroy tsetse flies like in southern Busoga, Bunya forest in Mayuge and kibale forests.
- ✓ Over grazing of both domestic and wild animals like kadama forest reserves, Timu and Morongole in Karamoja area. Also Aber and Agwata forests are facing illegal grazing by the Iteso pastoralists.
- ✓ The use of traditional and rudimentary tools in felling trees like axes and pangas has caused deforestation. Foristance Mafuga and Muko forest reserve have been destroyed by felling immature trees.
- ✓ The need for more land for cultivation like Bugala forest was cut down by BIDCO to plant palm oil trees, and Kakira and Lugazi sugar estates cleared part of Mabira forest for sugar cane plantations.
- ✓ Industrial establishment where forests are cut down to provide land for industrial set up like in Namanve and to get fire wood for tea processing in Ankole tea estate, firing bricks in Butende and Uganda clays in Kajjansi.
- ✓ Mining activities foristance gold mining in kitaka-kamwenge, Buhweju-Bushenyi has led to clearing of forests in such areas for the activity.

Effects of deforestation in Uganda

- ✓ Deforestation has led to the decreased amount of rainfall and also became unreliable. Foristance the area around Mt. Elgon have had their rain seasons changed simply because of forest destruction.
- ✓ It increases the amount of carbon dioxide in the atmosphere especially in urban centres of Kampala and Jinja and this is responsible for increased temperatures and global warming.
- ✓ Deforestation especially on steep slopes of Mt. Elgon and Kigezi hills has led to increased soil erosion and mass wasting. This has reduced soil productivity hence low crop yields.

- ✓ The uncontrolled cutting down of trees has led to scarcity of wood and its products in many parts of Uganda especially in Masaka, Bushenyi, and Kigezi south western Uganda.
- ✓ Forests act as habitats for wildlife therefore their destruction means destruction of wildlife. For example the white rhinos are now extinct just because its habitant was destroyed.
- ✓ Man depend on forest for survival directly or indirectly therefore forest destruction means that such people like lumbers and herbalists in Mukono and Ssese islands will lose a base for their livelihood.
- ✓ It has affected water supply in rivers and lakes since forest destruction lowers the water table and rainfall received in areas of kigezi, Hoima and Manafa.

Measures to conserve forests in Uganda

- ✓ The government of Uganda has established the ministry in charge of environment protection. This ministry has put special emphasis on the conservation of wildlife, wetlands and forests. There are now policies that are being followed by forest exploiters.
- ✓ The forest department has evicted many encroachers on the forest reserves like on Mabira and Kibale. Foristance the people who were occupaing 200ha had been evicted in Kibale.
- ✓ Education concerning the vitalness of forests has been carried out through mass media and other local authorities.
- ✓ Re-forestation programs are being carried out in various parts of the country. Foristance in Mbarara, Kabale, Arua, Mbale and Tororo.
- ✓ Afforestation programs are carried out, like planting of eucalyptus trees have been practiced in Ruhama, Mbarara, Ibuje in Apac, etc.
- ✓ Developments of other sources of energy like bio-gas, HEP, etc. in addition energy saving stoves which use less charcoal and fire wood have been introduced.

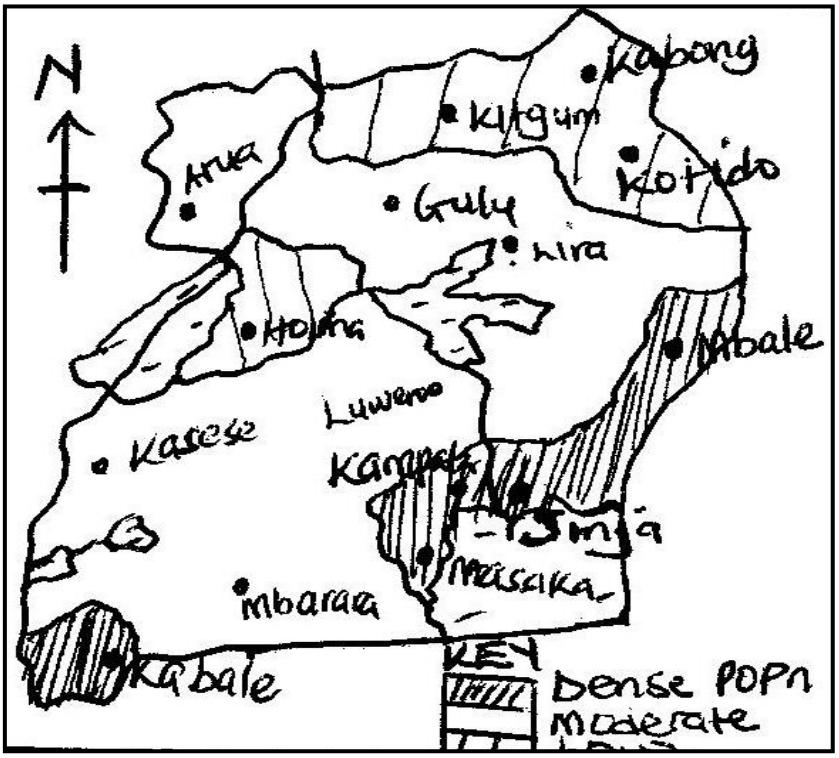
- ✓ The forest department through National Forestry Authority (NFA) has set up and maintained nursery beds to provide trees to farmers for planting and all this is intended to encourage people plant trees.
- ✓ Regular patrols by forest rangers to curb down illegal cutting of forests. This is limited in Uganda due to limited resources in the forest department.
- ✓ Forest boundaries have been planted with fire wood tree species in densely populated areas.
- ✓ Since 1986 the security situation in Uganda has been greatly improved. This improvement has helped to preserve the forests especially in eastern, central, western and southern Uganda.
- ✓ Family planning programs especially in rural areas have been encouraged to reduce on the rapid population growth rate which has cleared forests for other land use.
- ✓ Agro-forestry is being encouraged by farmers.

Population in Uganda

- ✓ Population refers to the total number of inhabitants in an area over a given period of time. Uganda□s population has been increasing over the years i.e.
- ✓ In 1959 Uganda had 6.5 million people, 1969 with 9.5 million people, 1980 with 12.6 million people, 1991 with 16.7 million people, 2002 with 24.6 million people and in 2015, 34.8 million people. The annual population growth rate is 3.4%and this rate varies from one district another.
- ✓ The **densely populated districts** of Uganda include Kampala, Jinja, Masaka, Wakiso, Mbale, Kabale, Kisoro, Tororo, Mpigi, Bushenyi, etc. The **sparsely populated districts** in Uganda

include Moyo, Kitgum, Kotido, Kaabong, Masindi, Hoima, Kiruhura, etc. the districts with moderate population in Uganda include Luwero, Gulu, Arua, Iganga, Kumi, Kasese, Kabalore, etc.

Map of Uganda showing population distribution.



Factors responsible for the population distribution in Uganda

The distribution of population in Uganda vary from one district to another due to physically, economical, historical and environmental factors, these include;

- ✓ **Climate**, there is a close relationship between population distribution and climate. Areas which receive heavy and reliable rainfall support successful agriculture and therefore attract dense settlement like L. Victoria crescent, Bugishu highlands, etc.

On the other hand the little rains in N.Eastern Uganda of Moroto, Kaabong, Nakapiripiriti, discourages crop growing and settlement thus sparse population.

- ✓ **Soils**, areas with fertile soils which are well drained support flourishing cultivation like in Mt. Elgon slopes and the shores of L. Victoria support high population densities. On the other hand the poor soils in north eastern Uganda Copt with low rainfall received are responsible for the low population.
- ✓ **Altitude**, this control human settlement, usually settlement stops at 2000 meters above sea level and beyond this level there is severe soil erosion and reduced oxygen with increased coldness thus low population like on slopes of Mt. Rwenzori.
- ✓ **Relief**, the nature of land does influence population distribution in Uganda. The gentle slopping land is easily settled than steep slopes. For instance there more people on the gentle slopes of Mt. Elgon than on the steep slopes of Mt. Rwenzori. Flat lands and valleys usually floods during rainy seasons thus discourage settlements.
- ✓ **Vegetation**, the dense forested areas are difficult to clear for settlement and as a result they remain sparsely populated likewise the swampy areas are water logged therefore donot attract settlement. Populations tend to concentrate in areas which are easily cleared and well drained like in Luwero and Gulu.
- ✓ **Pests and diseases**, areas occupied by tsetse flies like parts of Busoga and western rift valley has got low population. In addition some parts of Bugerere remained un-occupied for some time just because of pests and diseases.
- ✓ **Water resource**, areas with permanent water source like Kampala encourages dense population well as Ankole-Masaka dry corridor and Karamoja with semi-permanent water have got low population.

- ✓ **Mineral resource factor**, mining of minerals like copper and cobalt in Kilembe-Kasese, cement at Tororo, has attracted dense population.
- ✓ **Economic activities**, man' s activities such as mining, industry and trade has contributed to the inflow of population from other areas to the central and eastern Uganda regions of Kampala, Jinja, Tororo, Mukono, Masaka, etc. on the other hand areas like Karamoja with little economic activities have attracted less population.
- ✓ **Cultural factor**, the pastoral economy of cattle keeping among the Karamajongs and Hima of Ankole demand large areas of land where this activity can be carried out (transhumance). This explains why such areas are sparsely populated.
- ✓ **The no man' s land** created by worrying tribes in the past like between Iteso and Japadhola, Baganda and Banyoro, japadhola and Banyole, until now have low population although it is relatively increasing.
- ✓ **Tribal location,** areas where traditional leaders head quarters where, tend to attract a lot of population and still has maintained such high population density like Mengo in Kampala.
- ✓ **Political climate,** in stable areas there is population increase well as unstable political climate in an area like as it was in Gulu which encouraged out migration which resulted into low populations.
- ✓ **Urbanization,** towns tend to attract settlement due to better living standards of better schools, health centers, electricity, etc. This explains why Kampala, Jinja, Masaka are densely settled.

Population growth and structure

- **Population growth** refers to the increase in number of people of a given area while **population structure** refers to the characteristics of the population. The structure is in terms of sex, age, education, etc.

- Both population growth and structure affect economic activities of Uganda. Uganda experiences a high population growth rate of an average of about 3.4% per annum.
- **Infant mortality** is defined as the death of children less than one year of age per 1000 live birth during the same year.
- **Birth rate** refers to the annual number of children born per 1000 people of the population of the country.
- **Death rate** refers to the annual number of people who die per 1000 of the total population of a country.
- **Population growth rate** refers to the percentage ratio of birth rate to death rate per 1000 people.

Causes of high population growth rate in Uganda.

✓ Very high birth rate which exceeds the death rate. The death rate is declining today because of improved medical services which has reduced infant mortality rate.

✓ The high infant mortality rate often forces people to frequently produces to ensure survival of at least a few, therefore there is a close relationship between survival and high birth rate.

✓ Values attached to children in many societies of Uganda. Parents look at children as source of labor in Kiga, wealth in Banyankole, security during old age in Baganda thus favour large families.

✓ Polygamy which is the act of a man marrying many wives which results into large families. This is seen mainly in Busoga, it is also reported that 33% of women in Uganda report that their husbands have got other wives.

✓ Early marriages, about 54% of women in Uganda marry before the age of 18 years they therefore have a long production period in which they bare many children like in Kabale.

- ✓ Education levels, there is a relationship between education and family size. The more advanced the level of education, the fewer children a couple is likely to have and vice verser.
- ✓ Income levels, poor people with less ambitions and property normally have many children well as the rich with a lot of over whelming ambitions to acquire more wealth attach little value to have children.
- ✓ Religion, some religions like Catholics encourages family development and opposes birth controls and abortion. Likewise the Muslims have a religious dogma of marrying many wives, such beliefs are characterized with many children.
- ✓ Limited family planning education and facilities especially in rural areas. Ignorance in some areas makes people to look at family planning contraceptives with a lot of fear that can prevent them from having children in future, thus more birth rates.

Problems resulting from high population growth rate

- ✓ Un-employment especially in urban areas which leads to out crop of high crime rate due to poverty, such crimes includes robbery, prostitution and theft.
- ✓ It contributes to the youthful structure of Uganda’ s population. For instance the proportion of children aged from 0-17 years is estimated at 54% and this implies that there is high dependency syndrome.
- ✓ It exerts pressure on provision of basic facilities such as housing in urban centres, health, education, social transport facilities, etc and this costs a lot of money to the government.
- ✓ It results into little land per person hence land fragmentation. This results in over utilization of land leading to soil erosion and exhaustion. The low productivity of land results into absolute poverty like in Kigezi.

- ✓ Land fragmentation due to increasing population limits mechanization, reduces opportunities for employments in addition to famine.
- ✓ The increased pressure to feed the increasing population has resulted in settlement of people in marginal land, wildlife reserves and forested areas. Forests such as Mabira, Elgon forests have been encroached on leading to erosion, landslides, reduced rainfall and the general environmental degradation.
- ✓ It has resulted into rural urban migration especially by the landless and youth. This has led to rapid growth of urban centres with their associated problems such as slum growth, high crime rate, limited social services, etc.

Measures to control population growth rate

These measures are designed to control birth rate and those designed to manage the high number of people.

Birth rate measures

- ✓ Education through UPE and USE is emphasized to increase literacy especially among women. This is to break customs and traditions that favour large families. Also educated families tend to have fewer children than the un-educated.
- ✓ Encouraging of education among women and awareness in men as away of encouraging the use of modern methods of family planning birth control like use of condoms, pills, etc.
- ✓ Improvement in general standards of living by raising people out of poverty so as the use of children as an asset is stopped. It should be noted that poor people has a lot of time to produce.

Measures to manage high population

- ✓ Setting up settlement schemes, this involves the transfer of people from densely populated areas to un-settled areas like as it was in resettlement of Bakiga to Kibale.

- ✓ Eradicating of tsetse flies in some areas which are infested such that people are encouraged to go and settle there like it was in Bugerere and Busoga in eastern Uganda.
- ✓ Reduction on rural urban migration to reduce on rapid population growth especially in major towns of Kampala, Masaka and Mbarara. This can be done by providing related service of urban to rural areas.
- ✓ Developing other sectors such as industry, mining, tourism, which can absorb excess population on land
- ✓ Land reclamation especially swamps so as to create room for settlement; however this should be done with care so as to avoid environmental degradation.

Merits of high population

- ✓ It creates high potential for labour both skilled and un-skilled which can be used for economic growth.
- ✓ It stimulates industrial and agricultural development through increased labor supply and demand for goods and services.
- ✓ It leads to utilization of idle resources since there is plenty of labour.
- ✓ It makes it economical to produce power, health, water supply, education and other social facilities.
- ✓ It increases the tax base of a country used for further economic development through construction of important infrastructure.
- ✓ It provides a lot of potential for defense and security of a country.

Demerits of having low population

- ✓ It leads to under utilization of resources like land, water, minerals, forestry, etc.
- ✓ It limits the supply of labour force necessary for economic development.
- ✓ It results into market shortage and this does not provide incentives for invention and innovation.

- ✓ It results into limited development of social services like health, education, water supply, since it becomes un-economical to provide them in low population areas.
- ✓ It leads to low tax base thus less capital available for development.
- ✓ The area remains remote and inaccessible and this is a disincentive for agricultural and industrial development.
- ✓ Social and economic dependency on other countries for market, labour and other essential supplies.
- ✓ The country is liable to insecurity since the population provide less labour in the security department.

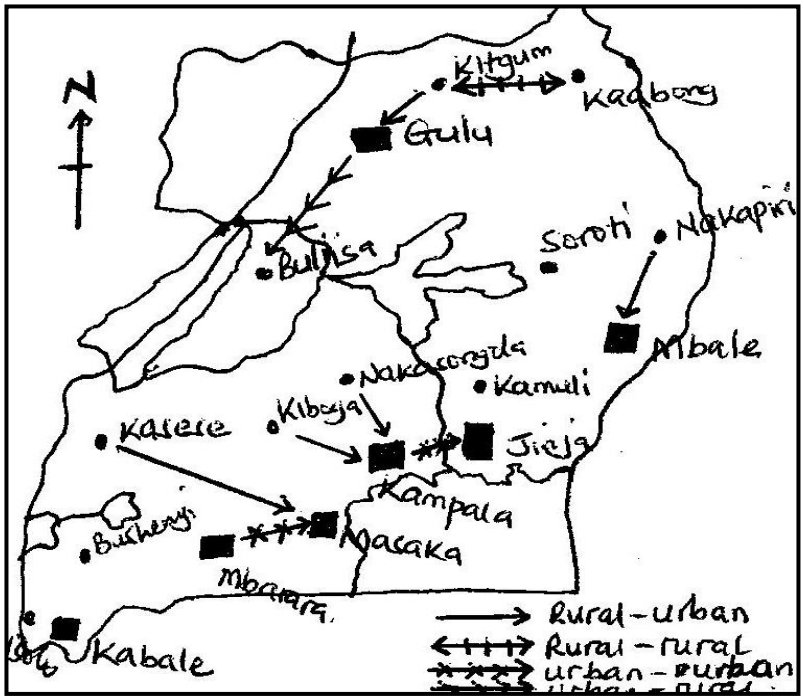
Population migration

This refers to the movement of people from one region to another. Migration can be internal or international.

- **Internal migration** refers to the frequent movement of people from one area to another within the same country. This is categorized as;
- **Rural urban migration,** this involves the movement of people from villages to towns. Like from rural areas of Rakai to Masaka town.
- **Rural-rural migration,** this involves the movement of people from one village area to another village area usually from densely populated areas to sparsely populated. Like Bakiga from Kabale to Kibale.
- **Urban-urban migration**, this involves the movement of people from one town to another town like from Masaka to Kampala.
- **Urban-rural migration,** this involves the movement of people from towns to villages like from Masaka to Rakai.
- **International migration** is the movement of people from one country to another. This is sub divided as;

- **Immigration,** this refers to the act of people entering a country from other countries. These can be refugees, tourists, officials, etc. like people from S. Sudan to Uganda. Such people are called immigrants.
- **Emigration,** this refers to the movement of people out of the country. Such people are called emigrants

Map of Uganda showing population migration.

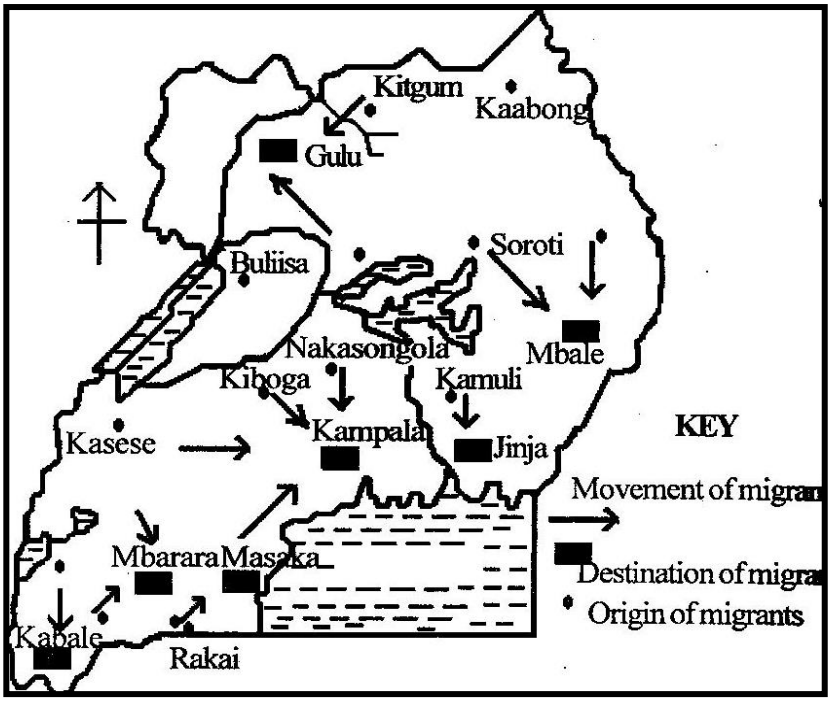


Rural urban migration

This is the most common migration in Uganda and the major destinations of migrants is Kampala, Mbarara, Jinja, Gulu, Mbale, Kasese, Kabale, Masaka, etc.

The migrants come from villages of Moroto, Kitgum, Kaabong, Nakapiripiriti to Gulu, Bundibugyo, Sheema to Kasese, Rakai, Kalungu, Kalangala to Masaka, Bududa, Bulambuli, Bukedia, Budaka to Mbale, etc.

Map of Uganda showing rural urban migration.



Causes of rural urban migrations

There are both ?pull? and ?push? factors responsible for the movement of people from rural areas to urban areas. Pull factors are the attractive conditions in urban areas well as push factors are the un suitable conditions in rural areas from which people want to run-out or away. These include;

- ✓ Limited employment opportunities in rural areas, administrative, commercial and industrial activities are found in Kampala, Masaka, etc therefore attracting the youth for jobs
- ✓ Urban areas have better education, health, and other social facilities which pull people into towns like Mbarara and Mbale to enjoy a better life.
- ✓ Political security in towns like Gulu town which attracted many people affected by Kony war in the region.
- ✓ Most youth from Kisoro are attracted to Kabale town due to urban excitements of cinema, films, recreation like Bunyonyi sites, etc.

- ✓ Social amenities in Kampala such as electricity, communication, entertainment of radio Simba and capital, T.vs like Ntv, all attract majorly the youth from Kiboga, Buikwe, etc.
- ✓ The development of mining activity in an area provides a pull factor in relation to population migration into such area. For instance in 1960s many migrant workers used to move from Kigezi region to Kasese where copper mining was being carried out seeking for jobs.
- ✓ Some people move to urban areas like Jinja after committing crimes in rural areas such as rape and defilement, child sacrifice, etc.
- ✓ The landless people in rural areas move to town to seek for alternative way of settlement. This explains why towns like Kasese, Kabale and Mbale are densely populated.
- ✓ Natural factors such as drought, epidemic diseases which are harmful to human beings force people to leave rural areas to towns. Recently people have been forced to move out of Rakai and Lyantonde due to aids epidemic.
- ✓ Social factors such as male circumcision in Bugishu and female mutilation in Sebai cause the youth to run away to Jinja, Mbale, Gulu and Kampala.
- ✓ Excessive population in rural areas like in Kisoro, Sironko, Kabale, Mbale, has led to population explosion on land causing the disadvantaged to migrate to towns.

Effects/consequences of rural urban migration

Rural urban migration has got both positive and negative effects on both rural areas and urban areas. These include;

- ✓ It has resulted into depopulation of rural areas of Kiboga, Sembabule causing a negative effect on agricultural development since movement includes escaping of energetic men and women.
- ✓ It has resulted into rapid growth of urban areas; however this has got problems such as slum growth, un-employment, high crime rate, poor

sanitation like in Kampala suburbs of Katanga, Kisenyi, Kamwokya, etc.

- ✓ It has resulted into racial ethnicity diversity which leads to racial conflicts and tension like in central region. This is because movement involves all kinds of citizens.
- ✓ It has resulted into intermarriages between tribes which has led to loss of traditional values and culture. This has increased on immoralities and sexual abuse like in Wakiso and Kampala.
- ✓ Since rural urban migration increases population in towns, this puts government to task to provide social infrastructure like water, health, education, security, which may drain government budget.
- ✓ Rural urban migration may lead to famine due to the decline in agriculture since the energetic men and women who would have facilitated agricultural development in rural areas moved to towns.
- ✓ It increases encroachment on wetlands and swamps in cities like Kampala in search for land for settlement. This later result into floods and disease outbreak like in Bwaise, Lubigi, Lugogo, etc.
- ✓ Rural urban migration leads to traffic and human congestion in urban areas of Kampala, Jinja and this causes delays especially during rush hours and easy disease spread.
- ✓ Positively, rural urban migration is an important source of labour especially unskilled in urban centres. Such labour is used for industrial development like in Mbale and Jinja.
- ✓ Rural urban migration leads to land consolidation in rural areas and useful utilization of the available resources by the remaining people in villages.

Solution to rural urban migration

- ✓ Addressing the issue of regional economic imbalance through creating employment opportunities and industries in rural areas.

- ✓ Agricultural modernization to help to increase on the rate of employment generation in rural areas.
- ✓ Controlling the rate of population growth so as to match the number of people to the available resources through family planning.
- ✓ Encouraging rural to rural migrations through allowing voluntary migrations from densely populated areas of rural to sparsely populated rural areas.
- ✓ Establishing large scale resettlement schemes to help check on this negative phenomena.
- ✓ Setting up of social amenities in rural areas like health, education, water, recreation, electricity, etc.
- ✓ Fighting against such cultural and traditional practices like forced marriages, circumcision, mutilation, polygamy, etc.