

Chapter 10

CLIMATE CHANGE IN EAST AFRICA AND THE WORLD.

Definition of climate change.

Climate change refers to the shift in global temperatures and precipitation overtime. It is a long term alteration in the weather patterns especially temperature and storm activity. In other words it is the man made or natural shift in average atmospheric conditions overtime.

The basic cause is the human activities that emit greenhouse gases (GHGs) into the atmosphere that then lead to global warming.

The common GHGs include

- carbon dioxide (CO₂)
- Nitrous oxide (N₂O)
- Methane (CH₄)
- Hydro Fluorocarbons (HCFs)
- Perfluorocarbons (PCFs)
- sulphur hexafluoride (SF₆),
- Chlorofluorocarbons (CFCs),
- Hydro chlorofluorocarbons (HCFCs) and
- Halons.

Indicators of climate change

- Unreliable (Irregular) and little rainfall being received.
- Changing seasons of rainfall.
- Increasing temperatures in originally cool regions.
- Frequent floods from heavy rain storms.

- Drying grass and stunted tree growth in formerly wet areas.
- Rising sea levels because of thermal expansion and deglaciation.
- Shrinking of glaciers or ice caps e.g. by 4.92 feet in 2006.

Activity 10.1 Understanding the meaning of climate change.

In groups, visit elders around your school or community. If possible farmers and fishermen. Find out from them what changes they have noticed in weather patterns and seasons in the recent year.

- a) Basing on the findings from the people around your school or community. Discuss the things which show that the climate has changed over the year*

Causes of climate change.

Man's environmentally unfriendly activities that cause climate change include the following:-

- Deforestation/devegetation i.e. increases CO₂ emission. Deforestation reduces the role of trees as carbon sinks.
- Bush burning of i.e. produces N₂O and CO₂.
- Burning of fossil fuels like petrol, diesel etc. in motor vehicle engines produces CO₂ in the exhaust fumes.
- Wet land destruction/reclamation – produces more CO₂ and CH₄.
- Industrial activity and transportation i.e. produces CO₂ etc.
- Poor agricultural practices produce CO₂ and N₂O.
- Land degradation produces CO₂.
- Poor waste management/disposal e.g. landfill with waste produces Methane and burning waste produces CO₂.
- Mining and quarrying i.e. destroys the vegetation.
- Borehole drilling – tends to reduce on the water table that is a source of water for the vegetation.
- Large numbers of livestock or animals release methane into the atmosphere through their dung.
- Use of chemical fertilizers that generally contain nitrogen. These release N₂O into the atmosphere.

- High rate of population increase leads to more deforestation, waste generation, more burning of fossil fuels etc.
- Paddy rice growing produces a lot of methane (CH₄).
- Wars/political strife or conflicts leads to destruction of vegetation etc.

Natural causes

These factors include such as solar energy output changes, earth revolution changes, and volcanic eruption and ocean currents.

Activity 10.2

- Explain how these two factors contribute to climate change.*
 - Solar energy output*
 - Volcanic eruption*
- Explain why climate change is taking place at a higher rate today than it did many years ago*
- Describe how human activities in your area cause climate change*

GLOBAL WARMING

This is the gradual increase in global temperature. Therefore it is a slow increase in the overall temperatures of the earth's atmosphere.

Activity 10.3.

- Explain what is shown in each photograph in figure 10.3*
- Explain how you would use figure 10.3 to define global warming"*
- What do you think are the possible causes of changes in temperature?*
- Briefly explain the causes of global warming.*

Green House Effects.

A green house is structure with walls and the roof made of transparent materials such as glass in which plant requiring regulated climate conditions are grown for example vegetable and tomatoes.

The warming of the earth's atmosphere by the sun's rays can be compared to what happens in a greenhouse.

Activity 10. 4

- a) *How does a greenhouse work?*
- b) *Explain the similarity between a green and the earth's atmosphere*
- c) *Scientists believes that climate change is a result of releasing many dangerous gases into the atmosphere through human activities. Identify these activities.*
- d) *More dangerous gases are being released in the atmosphere than ever before. Why do you think this is happening?*
- e) *What effects do the dangerous gases have in the atmosphere?*

Table 10.1 shows the percentage of greenhouse gases pushed into the atmosphere by different sectors (2004).

Sectors	Percentage
Forestry	17.4
Waste water	2.8
Energy supply	25.9
Transport	13.1
Residential and communication building.	7.9
Industry	19.4
Agriculture	13.5
TOTAL	100

- a) Draw a pie chart to show the contribution of the above activities to climate change.
- b) Identify the activity which contributes:
 - i Most to climate change
 - ii Least to climate change.

c) Explain how each sector contributes to climate change.

Effects of climate change in Uganda and east Africa.

- Water shortage due to drying of water sources.
- Famine and malnutrition due to failure and death of livestock.
- Displacement of people – migration and incursions due to floods, landslides, droughts.
- Frequent floods resulting into destruction of life and property.
- Increased storm activity and cyclones become more intense due to the fact that oceans become warmer and with humid atmosphere.
- Diseases e.g. Malaria in Kabale, Cholera due to floods and respiratory diseases due to dust storms in times of drought.
- Loss of biodiversity i.e. threat to wild life.
- Soil erosion and Land degradation e.g. at river banks.
- Lowering of water levels e.g. Lake Victoria resulting into H.E.P production problems.
- Encroachment on wetlands.
- Eutrophication – oxygen depletion resulting into loss of aquatic life like fish.
- Shrinking of ice caps/glaciers.
- Changing patterns of rainfall.
- Unreliable/little rainfall being received.
- Conflict over pasture land and water sources for the cattle as well as increases cases of cattle rustling.
- Conflict with neighboring countries over the reducing levels of Lake Victoria, the river Nile e.g. with Egypt and Sudan i.e. Potential Insecurity.
- Drying grass and stunted tree growth in formerly wet areas.
- Rise in ocean/sea levels due to thermal expansion and duplications resulting into floods in coastal areas.
- Pollution of water sources.

- Wild forest fires because of the hot weather conditions that make tree branches and leaves on the forest floor to become drier.

Salt-water intrusion or salinization at coastal areas due to rise in sea level

Ways of controlling climate changes in east Africa.

Actions or adjustments to cope with climate change effects in East Africa include the following:-

- Sensitization of the community on climate change and capacity building for resilience in schools, churches, communities etc.
- Tree planting/afforestation and forest or wildlife protection
- Construction of water reservoirs/dams and community ponds for irrigation.
- Conservation of the available water resources – behavioral change towards water use.
- Planting different crops and those that are tolerant to drought i.e. adaptation to agricultural production suited to changed weather patterns.
- Diversification of livelihoods for alternative incomes in case of disasters.
- Land degradation management.
- Enhanced disease and pests monitoring and control.
- Recycling and reusing water where possible/proper waste management.
- Adoption of energy saving technologies thru research.
- Use of indigenous knowledge e.g. in food preservation or grain storage.
- Establishment of demonstration farms to train farmers on improved farming techniques. Integration of climate change into research, development plans and budget.

Activity 10.

- a) Explain the effects of climate change experienced shown in the your local village*
- b) Explain how climate change is likely to cause food shortage in some areas.*

Climate change in Somalia

Agreement on controlling climate changes

MAJOR CLIMATIC ZONES OF THE WORLD.

The world climatic zones are classified according to the characteristics they show. Every climate zone is determined by its relative position to the sun.

These are major climatic zones of the world include:

- Polar zones
- Temperate climatic zone
- Tropical climate zones
- Equatorial climatic zone
- Semi desert climatic zone.
- Desert climate zone
- Mediterranean climatic zone

Polar zones

These are zones that are located or found near southern and northern poles. it covers area of Alaska, in United States of America, Norway, Iceland, and Denmark

Polar climate region is characterized by absence of warmer summers, low rainfall and low temperatures. Every month in a polar climate has an average temperature of less than 10°C. Regions of polar climate cover more than 20% of the earth's areas

At the poles, the sun strikes at low angles so they are always cold. They have cool summers with average temperatures between 15°C and below 5°C.

When the earth's axis is tilted. In June the northern hemisphere is tilted towards the sun and is hot. It is summer while as in December the southern hemisphere is tilted towards the sun and is hot, it is summer. The northern hemisphere is tilted away from the sun and is cool, it is winter season.

Therefore, when the earth tilted away from the sun, it is tilted so far away that places near the north or south poles do not see the sun at all and it is very cold as low as -40°C or 50°C

Temperate climatic zone

This is located between the tropics and polar region of the earth. It covers areas of Germany,, Italy , France, Russia.

Temperate climate is characterized by moderate temperature s and rain throughout the year,

Temperate zone lies roughly 30° and 60° north and south latitudes.

These temperate areas share characteristic of relatively mild weather, even in winter

Tropical climatic zones

Is found between the equator and the tropics, the largest savanna or tropical zone is found or locate in Africa. Nearly of half of the continent is covered by the grasslands

Moderate rainfall ranging between 750-1500, it has markable dry and wet seasons, temperatures are hot, low cloud cover and high annual temperature range.

Equatorial climatic zone.

This zone is near the equatorial. It is experienced in areas that are located 5° south or north of the equator. Such areas like Congo basin, shores of Lake Victoria, amazon basin etc.

Characteristics of Equatorial climatic zone.

- Heavy rainfall received throughout i.e. annual rainfall ranging from 1500-2000mm.
- Relatively Hot temperatures of between 25°C to 28°C
- High humidity of about 80% due to thick forests and high temperatures.
- There is dense cloud cover

Desert climatic zones

This is zone that lies between 15° and 35° north and south of the equator. This zone was created by the air that rises over the equator and comes down the tropic of cancer and tropic of Capricorn. All over the world may desert lie in these region

Characteristics of the Desert climatic zones.

- There are high temperature ranges with a mean of 28°C

- Temperature tend to be high, average temperature range from 35°C-38°C
- There is limited cloud cover that is to say they are generally clear skies partly due to the limited atmospheric moisture for cloud formation
- There is very low humidity of about 20% or less.
- There is low unreliable rainfall.

Mediterranean zones

It is located along the western sides of the continents. Between roughly 30° and 35° north or south of the equator.

Factors affecting the climate of the world.

Relief

This is the general appearance of the landscape.

Latitude.

Continentality

Prevailing winds

Ocean currents.

Rotation of the earth.

Water bodies.

Etc.

CHAPTER 12

MINING IN EAST AFRICA.

Minerals and mining

Mining is the extraction of natural resources from the earth's crust for economic use.

Classification of minerals

Minerals are categorized into 3 major classes

Metallic minerals: These include iron ore, gold cobalt, copper, tin, wolfram, tungsten, zinc, manganese e.t.c.

Non-metallic minerals: These include; petroleum, phosphates, soda ash, sand, clay, Gypsum, mica, water, coal, e.t.c

Mineral fuels. These include coal, oil and natural gas.

Activity 10.2 classifying minerals in east Africa.

- a) Do you think all minerals are valuable? Give reasons for your answer
- b) What is the difference between metallic and non-metallic minerals

Distribution of minerals in east Africa

Major minerals in East Africa, mining method used and products from the minerals

Minerals.	Count ry.	Area mined.	Mining methods.	Products
Diamond	Tanzania	Mwadui plug	Open cast	Jewellery and strong drilling equipment
Copper	Uganda	Kilembe	Open cast	Electric cables, coins/tokens, jewellery
	Kenya	Macalda	Adit	
Gold	Tanzania	Musoma and Geita	Open cast/ Adit	Jewellery
	Kenya	Kakamega	Open cast / Adit	
	Uganda	Bushenyi and Karamoja	Saucer placer and Open cast / Adit	
Soda ash (Trona)	Kenya	Lake Magadi	Dredging	Glass, soap, salt, aluminum, detergents
Lime stone	Uganda	Hima and Tororo	Open cast	Cement and lime for building
	Kenya	Bamburi and River Athi	Open cast	
	Tanzania	Tanga, Wazo hills	Open cast	
Salt	Uganda	Lake Katwe	Open cast	Salt
	Kenya	Lake Magadi	open cast	
Phosphate	Uganda	Tororo	Open cast	Fertilizers
Fluorspar	Kenya	Kakamega & Kerio valley	Open cast	Tooth paste, sulphuric acid, frying pans

Oil	Uganda	Lake Albert	Drilling	Petroleum, diesel, kerosene/paraffin plastics
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N.B. other minerals of importance in East Africa include;

- a) **Coal** for making of tar and fuel.
- b) **Iron ore** for the manufacture of steel products e.g. iron bars, iron sheets and wire mesh.
- c) **Cobalt** from Kasere is used in manufacture of jet engines and high speed cutting tools.
- d) **Mica** from Machakos and Embu is used in manufacture of paints.
- e) **Gypsum** from Garissa and Malindi is used in the manufacture of chalk and cement.

Methods of mining

Opencast mining: This is the cheapest method. It is employed when the minerals occur close to the surface of the earth. It involves removing off of the top soil layer lying over the mineral deposit and dumping it nearby. Opencast method is used to mine surface minerals e.g. diamond, coal, iron ore, copper and quarrying of rocks such as limestone, gravel and clay for brick making

Activity 12.4 Describing open cast method of mining.

- a) *Describe the method of mining being used in the photograph*
- b) *Using diagram in B, describe the stages involved in carrying out that activity in a flow diagram.*
- c) *Explain the advantages and disadvantage of this method of mining.*

Underground mining: This is used when the mineral is deep underground. It involves sinking vertical shafts, into the earth's crust to reach the mineral ore.

There are three (3) major types of underground mining methods namely;

Drift or Adit method: This involves digging horizontal tunnels along a hill to reach the mineral. It's the method which was used to extract copper from Kileleshwe mines in Uganda.

Shaft method: This is used when the mineral occurs in very steeply inclined rocks. It involves sinking vertical shafts. From the vertical shafts, horizontal tunnels are dug towards the direction of the minerals. Explosives are usually used to blast the mineral bearing rock and then transported along the tunnel to the shaft by light railway or conveyor belts. It is then brought to the surface in a type of lift called a Cage which moves up and down the shaft.

Solution method: This is used for minerals which can dissolve in water e.g. salt, potash or sulphur. Pipes with superheated steam or water are drilled down the mineral deposit. The mineral dissolves into the water and is then pumped out to the surface. At the surface, the water is evaporated and the mineral extracted.

Activity 12.5

- a) Describe the methods of mining being used in the photograph
- b) Using diagram in B, describe the stages involved in carrying out the activity in a flow diagram
- c) Explain the advantages and disadvantages of this method
- d) Explain why Kileleshwe copper mines stopped operation long time.
- e) Find out whether Kileleshwe mines is currently operating

Drilling method: This is used in the exploitation of petroleum and natural gas which are found in sedimentary rocks. The deposits are reached by boring wells. The petroleum or gas is then brought to the surface either under its own pressure or by pumping. It's the method which is to be used to extract petroleum from Lake Albert basin in Uganda.

Activity 12.6. Exploring the process of oil extraction in east Africa.

- a) In groups, name the areas in East Africa where oil extraction is done.
- b) Using the internet or library reference books, describe the stages involved in oil extraction and draw a flow diagram of these stages.
- c) Explain the problems that this activity may cause
- d) Suggest how these problems can be solved
- e) Discuss the problems of land ownership and compensation to land owners in the area where oil is found.

N.B. 1. Saucer placer mining method (alluvial mining) is used for minerals that occur in alluvial deposits such as gold, and tin e.g. in Karamoja, Busia and Pokot in Kenya.

2. Dredging: This is a much more advanced form of placer mining. This is applied to mine soda ash (Trona) from Lake Magadi in Kenya.

Factors Affecting Mining in East Africa.

- ✓ Presence of a variety of mineral deposits which are exploited for over 20 years e.g. limestone in Tororo and Hima in Kasese, Diamond in Mwadui plug at Shinyanga and Soda ash from Lake Magadi.
- ✓ Availability of adequate capital for investment in mining operations mainly provided by foreign investors e.g. Tullow oil. ✗ Presence of abundant skilled and unskilled labour force for working in the mineral processing firms.
- ✓ Presence of ready market which is both local and international e.g. Japan, China and USA.
- ✓ Availability of well-developed transport facilities linking the mineral zones to processing plants e.g. railways, roads etc.
- ✓ Supportive government policy to encourage mining operations e.g. through constructing transport and communication lines.
- ✓ Availability of cheap hydroelectric power and other energy sources like solar energy which is used for running machines in the sector.

- ✓ Adequate supply of food from the neighboring communities to ensure continuity of the activity.
- ✓ Most minerals in East Africa are found near the surface hence making it easy and cheap to exploit.
- ✓ Improved/relative political stability which has attracted foreign investors to invest in mining operations.

Problems facing the mining sector.

- ✓ Inadequate capital for the mining process which is very expensive.
- ✓ Minerals are non-renewable resources and will get exhausted with time e.g. copper was exhausted at Kilembe.
- ✓ Poor transport networks making mineral zones very difficult to reach.
- ✓ Political instabilities especially in Uganda e.g. ADF rebels who destabilized Kasese affected investment in copper mining.
- ✓ Some minerals are expensive to exploit because they are buried deep underground e.g. gold in Bushenyi.
- ✓ Shortage of skilled man power to undertake the mining activities leading to hiring of expatriates who are very expensive.
- ✓ Inadequate market for East Africa's minerals because they are of poor quality.
- ✓ There is limited research and exploration to discover new mineral zones.
- ✓ Some minerals are available in very small quantities and therefore not economically viable e.g. gold in Karamoja.
- ✓ Most of the mining companies are owned by foreigners who normally take profits back to their home countries.
- ✓ When the minerals are exhausted, the towns which had developed turn into ghost cities with problems of unemployment e.g. Kilembe.
- ✓ Many of the towns e.g. Kakamega which grew up because of mining are faced with problems of congestion and crimes e.t.c.
- ✓

Solution to the above problems

- ✓ Government should seek aid and grants from development countries to widen the capital base.
- ✓ Investments should be made in research and exploration to get new mineral zones.
- ✓ International advertisements should be done to widen market for local minerals.
- ✓ Government should improve transport facilities in the mining areas e.g. upgrading roads from murrum to tarmac.
- ✓ Political instability should be encouraged to attract more foreign investors.
- ✓ The government should encourage on-site mineral processing to produce high quality products.
- ✓ New courses should be introduced at different learning institutions to produce enough skilled labour force.
- ✓ Diversification of the economy to reduce dependence on mining.
- ✓ Government should carry out market research to get new markets for East Africa's minerals.

Importance of mining

- ✓ Governments earn foreign exchange used for national development through exportation of minerals to other countries.
- ✓ Governments earn revenue by taxing the workers within the mining sector used for development of infrastructure e.g. roads.
- ✓ It has led to the development of urban centres e.g. Tororo, Kasese, Mombasa and Kakamega hence promoting regional balance.
- ✓ Creation of employment opportunities for the people which boosts their standards of living e.g. engineers.
- ✓ It leads to development of infrastructures e.g. schools and hospitals which lead to urbanisation.
- ✓ Improvement of international relationship through trade which promotes

world peace e.g. between Japan and Uganda.

- ✓ Leads to diversification of the economy which increases government revenue and ensures constant capital inflow.
- ✓ It leads to development of industries that process the minerals leading to economic diversification e.g. Tororo cement industry.
- ✓ It leads to development of agriculture through provision of market for food from neighbouring communities e.g. in Kasese.
- ✓ Roads and railway lines are constructed which lead to easy movement of goods and services.

Activity 12.6. Discussing who benefits more from mining.

In groups do the following:

- a) *Hold a debate on the motion "it is foreign companies and not the local people who benefit more from mining activities in East Africa."*
- b) *In relation to your discussions in the debate, what do you think should be done to ensure that local people benefit more from the mining sector.*

Environmental problems due to mining

- ✓ It leads to soil erosion especially in highland areas where trees are cleared leading to soil infertility.
- ✓ Mining also leads to landslides in highland regions which destroy human property and life. It leads to air pollution during mineral processing especially limestone e.g. at Tororo.
- ✓ Mining also leads to deforestation especially when trees are cut to expose the minerals.
- ✓ Open cast mining leaves behind large depressions/pits which in turn become mosquito breeding grounds.
- ✓ Mining also leads to water pollution which destroys habitats for aquatic animals e.g. copper pyrites are deposited in the wetlands of Lake George and Lake Edward.

- ✓ Mining cause's noise pollution because of the explosives used to break rocks e.g. stone quarrying in muyenga.
- ✓ Mining also leads to destruction of land which could have been used for agriculture e.g. by depositing rock debris after rock blasts.
- ✓ Mining also leads to swamp reclamation hence destructing the water cycle e.g. quarrying of clay and sand. Also leads to silting of river valleys which causes floods.
- ✓ It leads to destruction of natural beauty by leaving behind large pits.
- ✓ It has led to loss of property through displacement of people near mining areas.
- ✓ Mining is risky it has involved suffocation of miners underground or burying them underground.
- ✓ It has led to neglect of agriculture which leads to outbreak of famine

Case study

Copper mining at Kilembe

Copper was the major mineral mined at Kilembe. It was found together with cobalt. Due to sharp decrease of world prices and decrease of copper deposits, the copper mine was closed down in 1975

Copper was mined using the Adit method and taken to Jinja by railway for smelting. From there, it was exported to many countries like Japan, Britain and France

Electricity to process the copper was obtained from the Owen Falls Dam at Jinja and Mobuku power station on R. Mobuku. Water used in the mines was chiefly obtained from River Nyamwanba and River Mobuku which originate from the Rwenzori Mountain.

Benefits of copper mining to the economy of Uganda

- It stimulated the growth and development of Kilembe and Kasese towns.
- The need to exploit copper from Kilembe led to the construction of Uganda railway which today promotes transport and trade.
- The copper mine employed over 5000 workers which improved their standards of living.
- A lot of foreign exchange was earned through its exports leading to national development.
- Facilitated the development of Mobuku power station which provided electricity to the mine and parts of Kilembe and Kasese town.
- Stimulated development of agriculture for example Mobuku irrigation scheme was established to supply foodstuff to miners.
- It stimulated the development of other activities in the area e.g. fishing on Lake George which diversified the economy.
- It promoted international relationships between Uganda and Japan which boosted peaceful co-existence.

N.B. Though there is no copper production at Kilembe at this moment, in 2000 the Kasese cobalt plant was opened. It's an investment owned by Uganda, France and Australia exploiting cobalt which is got from copper pyrites at Kilembe.

Diamond Mining In Tanzania (Mwadui)

Diamonds are mined at Williamson Diamond mines at Mwadui located 27km from Shinyanga town.

Formation of diamond:

The diamonds at Mwadui are found in a Kimberlite rock which was formed in an intrusive rock of Magma which solidified in a Vent or pipe to form a volcanic plug. Later, this intrusion was exposed by erosion.

Mining of diamond:

Opencast method is used because the mineral bearing rock is found just below the surface of the earth. Heavy excavators scrap off the surface of the earth hence exposing the ore bearing rocks. These rocks are then loaded on to waiting trucks and then taken to the factory where the rocks are crushed to small sizes.

Processing of diamond

- ✓ From the mining zone, the ore bearing rocks are taken by trucks to the crushing plant where the rocks are crushed to small sizes and then poured on a conveyor belt which transports it to the treatment plant.
- ✓ At the treatment plant, the ore is passed through separators. The diamond and some other heavy substances because of being dense, sink to the bottom while the remaining materials float as wastes.
- ✓ For further cleaning, the diamonds are further passed over belts covered with grease to which they stick. The wastes are removed electrically. ✖ The diamond is then cleaned to remove all the grease and it's then ready for use e.g. making jewellery.

Factors favouring the development of diamond mining at Mwadui

- ✓ The diamonds are found near the earth surface hence cheap to exploit using open cast method.
- ✓ Diamonds at Mwadui are found in large deposits hence economic to mine.
- ✓ Mwadui diamonds are of high quality and on high demand on the international market.
- ✓ The landscape is generally flat hence easy to extract the minerals.
- ✓ Easy accessibility due to the presence of transport network by the railway and roads.
- ✓ Availability of adequate capital for investment provided by both the

Williamson mining company and government.

- ✓ Nearness to agricultural land which provides foodstuffs to the workers.
- ✓ Availability of abundant skilled manpower both local and foreign expatriates to work in the mines.
- ✓ Presence of a variety of energy sources e.g. hydro electric power used in mining and processing minerals.
- ✓ Availability of modern technology used in the mining operations.
- ✓ Supportive government policy which encourages mining e.g. through investment and market research.

Importance of diamond mining at Mwadui

- ✓ The mine provides employment opportunities to many people hence improving their standards of living.
- ✓ It has led to the development of Mwadui town with accommodation, recreational and commercial facilities.
- ✓ The mining company constructed a dam which provides electricity to Shinyanga district.
- ✓ Facilitated development of infrastructures like roads, schools and hospitals which provide social services.
- ✓ The mining company trains its own labourers in mining related activities hence leading to skills acquisition.
- ✓ The mining company established reliable water supply to Mwadui town and neighbouring areas.
- ✓ Government earns revenue through taxes used for national development e.g. building roads.
- ✓ Through exports, government earns foreign exchange used for national development e.g. building hospitals.
- ✓ Facilitated development of industries which have led to economic

diversification.

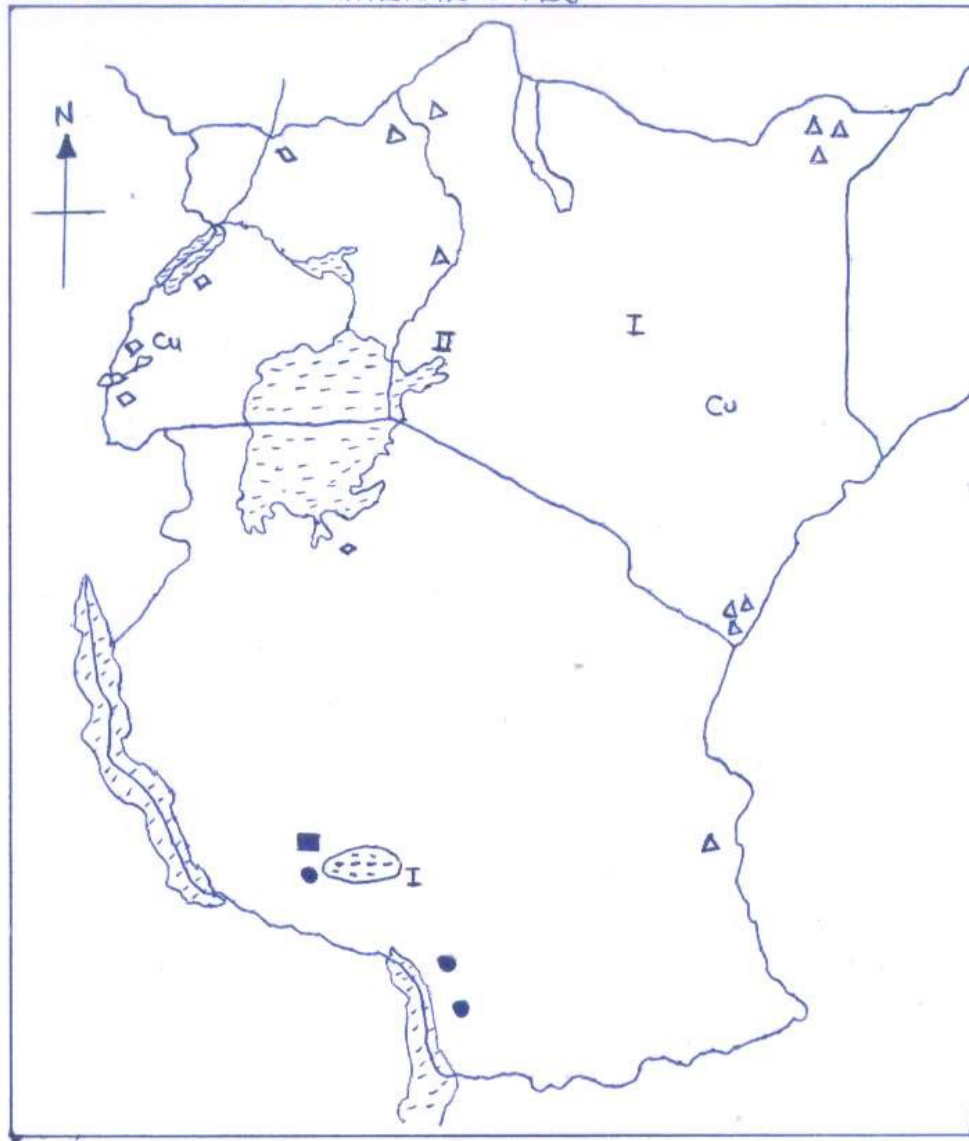
- ✓ Agriculture has been developed in the area due to demand from the miners.

ACTIVITY 12. 7

In groups visit an industry that processes minerals do the following

- a) Identify how minerals resources has led to the development of the industry*
- b) Identify the problems faced by the industry*
- c) What measures are being taken to solve the problems in (b) above?*

A SKETCHMAP OF EAST AFRICA SHOWING SELECTED MINERALS AND MINERAL SITES-



KEY

- ◇ - Diamond
- - Coal
- ▲ - Limestone
- I - Iron ore
- Cu - Copper
- - Coal

Chapter 13

Development of manufacturing industries in east Africa.

Industrialization is a process through which countries increasingly become involved in the production of manufactured goods.

Manufacturing is the processing and changing of raw materials into a new product.

There are three types of industries in East Africa:

Primary industries: These are also called extractive industries. They include: Quarrying, Fishing, Lumbering, Mining, Agriculture e.t.c. They are the most dominant industries in East Africa. They mainly provide raw materials.

Secondary industries: These are industries that turn raw materials into consumer or finished goods. They include: sawmilling, textiles, Steel rolling mills, chemical industries e.t.c.

Tertiary industries: These are industries involved in providing services. These include: Transport and communication, Health, Education, Banking, Insurance and Tourism.

NB: Most of industries in East Africa are located in towns or cities.

A site of a town is the land on which a town stands.

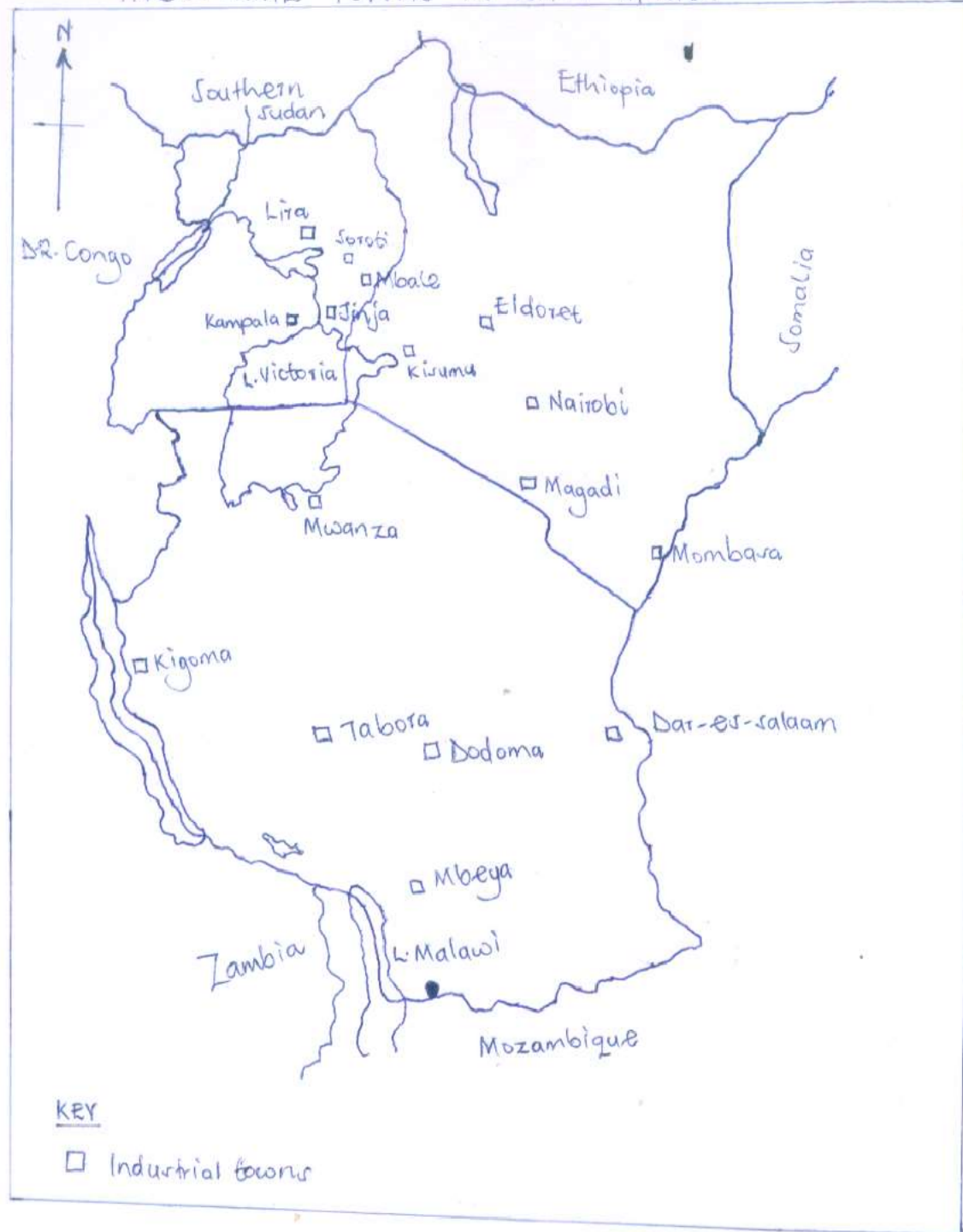
The situation of a town or city shows its wider position and links with other places.

Characteristics of Industries In East Africa

- ✓ They mainly use Hydro Electric Power as the source of energy.
- ✓ They are mainly set up near the power source e.g. Jinja, Kampala and Nairobi.
- ✓ They are mainly owned by foreigners e.g. Madhvani industries.
- ✓ Most industries are labour intensive i.e. use more of human labour force than machines.

- ✓ They produce low quality goods which are less demanded internationally.
- ✓ They are on small scale because of low market base.
- ✓ They use outdated machinery which leads to poor quality products.
- ✓ Most industries are extractive (primary) and hence produce raw materials.
- ✓ They mainly produce for the local market and very little is exported.

INDUSTRIAL TOWNS IN EAST AFRICA



Industrial cities in East Africa

Industrial Town		Industries
1.	Kampala	Grain milling, breweries, beverages, steel rolling, cigarette making, fish processing, textile, motor engineering, plastics, printing and publishing, chemical industries and pharmaceutical.
2	Jinja	Grain milling, textile, motor engineering, printing and publishing, food processing, soft drinks and beverages, breweries, paper making, sugar refining and fish processing.
3.	Mukono	Breweries, fish processing, Printing and publishing, tea processing, saw milling and food processing.
4.	Mbale	Beverages, pulp and paper, printing and publishing, leather tanning, coffee processing, confectionaries.
5	Nairobi	Pharmaceuticals, car assembly, chemicals and plastics, foot wear, cigarette making, breweries, food processing, grain milling, printing and publishing and grain milling.
6	Mombasa	Cement factory (Bamburi), car assembly, oil refining, ship building and repair, food processing, soft drinks and beverages.
7	Dar es salaam	Printing and publishing, ship building and repair, oil refining, grain milling, soft drinks and beverages, food processing and motor engineering.
8	Port Mtwara	Chemical industries, salt works, saw milling, ship repairs, food processing and printing and publishing.
9 .	Kisumu	Cement making, textiles, food processing, motor engineering and printing and publishing.

10	Kasese	Chemical industries, cement making, food processing, lime works and mattress manufacture.
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N.B. other industrial towns in East Africa are: Arusha, Nakuru, Thika, Moshi, Mbeya, Tabora, Mwanza, Kigoma, Mbarara, Tororo, Tanga and Eldoret.

Factors/conditions that have influenced the development of industries in East Africa

- ✓ Presence of a variety of agricultural and mineral raw materials for processing into finished products e.g. limestone and coffee.
- ✓ Presence of enough skilled and unskilled labour force to work in the industries e.g. engineers.
- ✓ Efficient transport network by road, rail and water for transporting raw materials to industries and manufactured goods to markets.
- ✓ Presence of abundant supply of power for running machines e.g. thermal, solar and Hydro electricity.
- ✓ Availability of ready market for the manufactured goods which is both local and international e.g. Southern Sudan.
- ✓ Availability of abundant water used as a raw material or for washing and cooling machines e.g. in breweries and soft drinks factories.
- ✓ Industrial inertia where industries are concentrated in areas where others exist so as to share mechanics, roads, security and electricity.
- ✓ Supportive government policy that encourages investment in industries e.g. allocating certain areas for industrial development e.g. at Namanve.
- ✓ Wide publicity due to effective advertisement for industrial products which has created high demand e.g. through television and radio adverts.
- ✓ Availability of modern technology used in the manufacturing industries e.g. use

of computers.

- ✓ Availability of adequate capital to invest in industrial development from local and international sources.
- ✓ Improved political stability which has attracted foreign investors to set up industries in East Africa.
- ✓ Presence of adequate and extensively flat land for industrial establishment e.g. at Namanve, Kyambogo and Nakawa.

Benefits of industrial development

- ✓ Created employment opportunities to workers hence improving their standards of living e.g. engineers.
- ✓ Provided cheap manufactured goods which are essential to the people e.g. furniture, cement and plastics.
- ✓ Industries are a source of government revenue through taxation used for development of infrastructures e.g. roads.
- ✓ Industrial goods are exported to earn government foreign exchange used for national development e.g. setting up hospitals.
- ✓ Facilitates development of infrastructures like roads, schools and hospitals which provide social services to the people e.g. education and health.
- ✓ Industries lead to economic diversification for an increased income in flow for government and reduces dependence on agriculture.
- ✓ Industries lead to exploitation of natural resources like agriculture and minerals which leads to self-sufficiency.
- ✓ Industries promote international relationship between East Africa and her trade partners which promotes world peace.
- ✓ Infrastructures developed in industrial cities have led to growth of urban centers e.g. Kampala, Nairobi and Dar-es-salaam.
- ✓ Industries have stimulated agricultural development by providing market for farm raw materials e.g. milk, wheat, cotton and tea.

- ✓ Industries are used as research and study centers for students on field work which widens the scope of knowledge.
- ✓ People have acquired skills through job training in industries which they use for survival e.g. operating machines.

Limitations to industrial development in East Africa

- ✓ Low market for domestic industrial goods due to competition with high quality and low priced goods from developed countries like Britain, Japan and U.S.A.
- ✓ Inadequate capital for investment in establishing and managing industries. ☒ Shortage of skilled labour force to work in industries like Technicians and Engineers.
- ✓ Political instabilities especially in Uganda which led to closure of some industries e.g. Gulu foam for making mattresses.
- ✓ Poor transport facilities which hinder quick transportation of raw materials and manufactured goods.
- ✓ Irregular electricity supply to run industries due to frequent load shedding which brings activities to a standstill.
- ✓ Unfavourable government policies which discourage industrial development e.g. heavy taxes imposed on industries.
- ✓ East Africa lacks some raw materials for heavy industries which leads to dependence on importation e.g. iron ore and petroleum.
- ✓ Most industries are owned by foreigners who don't re-invest their profits within East Africa leading to slow growth of industries.

Solutions to the above problems

- ✓ Government should seek aid and grants from development countries to widen the capital base for industrial development.
- ✓ Investments should be made in research and exploration to get new sources of raw materials.
- ✓ International advertisements should be done to widen market for locally

manufactured goods.

- ✓ Government should improve transport facilities in the industrial areas to ensure high output e.g. upgrading roads from murrum to tarmac.
- ✓ Enforcing security to ensure political stability which attracts more foreign investors.
- ✓ The government should encourage research to produce high quality products that have market demand.
- ✓ New courses should be introduced at different learning institutions to produce enough skilled labour force to work in industries.
- ✓ Diversification of the economy to reduce dependence on manufacturing industries e.g. tourism.
- ✓ Government should carry out extensive market research to get new markets for East Africa manufactured products.

Effects of industrial development on environment in East Africa

- ✓ Atmospheric pollution through industrial fumes and dust especially by the cigarette making, cement making and textile industries.
- ✓ Noise pollution by industrial machines.
- ✓ Water pollution through disposal of industrial wastes in water bodies e.g. Lake Victoria.
- ✓ Encroachment on swamps which distorts the water cycle because swamps help in filtering water.
- ✓ Clearing of forests like at Namanve and Mabira for industrial space which leads to desertification.
- ✓ Destruction of habitat for wild animals and birds through deforestation and swamp reclamation.
- ✓ Led to increase in value of land which has limited land for expansion of settlements. ☒ Development of slums with their associated evils like prostitution e.g. in Kibera near Nairobi and Katwe near Kampala.

- ✓ Construction of many buildings and tarmac roads has led to increase in world temperatures which leads to global warming.
- ✓ They have promoted rural-urban migration which has reduced food production in villages leading to food insecurity.
- ✓ Industrial fumes have led to formation of acid rains near towns which don't support crop growing.
- ✓ Through deforestation, rainfall totals have greatly reduced which has led to long dry spells and drought.

Case study.

Tororo Cement limited.

It is largest and oldest cement industry in Uganda. It is private owned company that manufacture construction materials. It was founded in 1952 in tororo Uganda. B.M Gagrani is the executive director.

Items produced include cement, galvanized iron, steel bar and nails. It employs 8000 above.

Activity 13.12

Basing on the above case study, carry out a library or internet search on one of the following companies

- a) Grain milling industry
- b) Coffee or tea factory.
- c) Textile industry
- d) Milk processing plant.

Find out:

- a) *What type of industry it is*
- b) *The factors that have favoured its establishment*

- c) The products manufactured*
- d) The raw materials, labour and capital used and the ownership*
- e) Where the products are sold*
- f) The challenges faced by the industry*
- g) Advantages and problems brought about by the industry*
- h) Suggest the solution to the problems*

Chapter 14.

SUSTAINABLE USE OF FISHERIES RESOURCES IN EAST AFRICA.

Definition of fishing.

Fishing is the extraction of aquatic life. It involves catching fish and other aquatic life like shrimps, lobsters and crabs e.t.c.

Fishing grounds in East Africa:

Fishing is carried out in fresh water and marine water bodies.

Fresh water bodies include rivers, lakes, ponds and swamps.

Marine fishing is done in salty water grounds like the Indian Ocean and the Mangrove swamps.

Types/species of fish caught in East Africa

- a) There are those that are found close to the surface (pelagic fish) of the lake or ocean. These include Tilapia, Nile perch, Dagaa, Haplochromis in fresh water and Mackerel, Sardines, Anchovy in marine fisheries.

- b) There are those that are found deep in the water (demersal fish) or at the bottom (crustacean fish) e.g. shrimps, crabs and lobsters in marine fisheries.

A SKETCH MAP OF EAST AFRICA SHOWING FISHING GROUNDS.



KEY

	Fishing grounds
	Marine fishing grounds
	Major towns

Fishing methods used in East Africa

Activity 14.3. Exploring modern methods used in east Africa using fieldwork

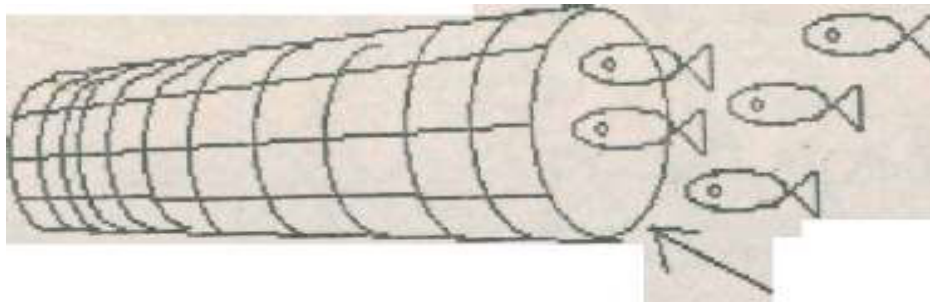
In groups, carryout a fieldwork study on a nearby fish landing site and do the tasks that follows.

- a) Identify the fishing methods used*
- b) Identify the type of type fish caught using the fishing methods identified in (a) above*
- c) Draw sketches of the fishing methods above an label them*
- d) Explain the advantages and disadvantages of each of the methods named in (a) above.*

These are either traditional or modern methods;

Traditional Methods are mainly used for small scale fishing mainly for home consumption and a little surplus for sale e.g. Hooks, Basket traps, Spears, use of arrows.

E.g. through the **use of a basket trap**, a fisherman gets into a boat/canoe that is stationed in the water. He uses a cone shaped basket which is placed in swiftly moving water e.g. along rivers or streams. When the fish enters the basket, it's trapped and then scooped out of the water into the boat.



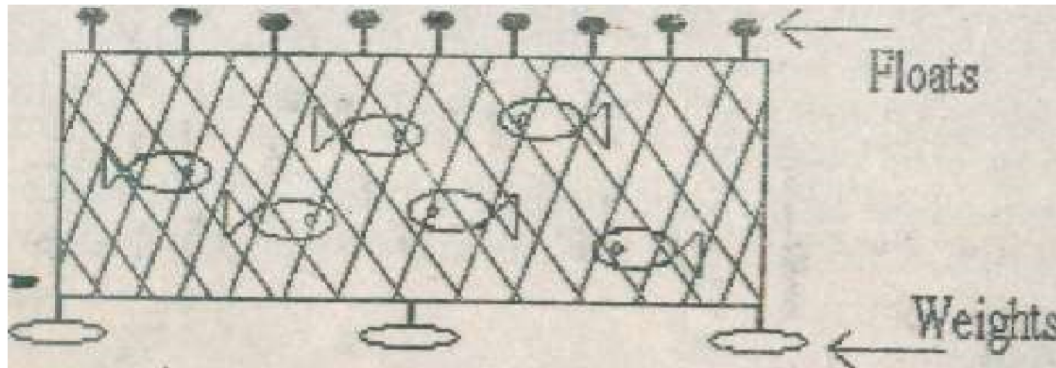
Modern Methods are mainly used for large scale or commercial fishing.

1. Gill Netting: This is the most used method for commercial fishing in East Africa. It involves laying a net vertically in the water. The Net is held vertically by floats on top and

weights at the bottom.

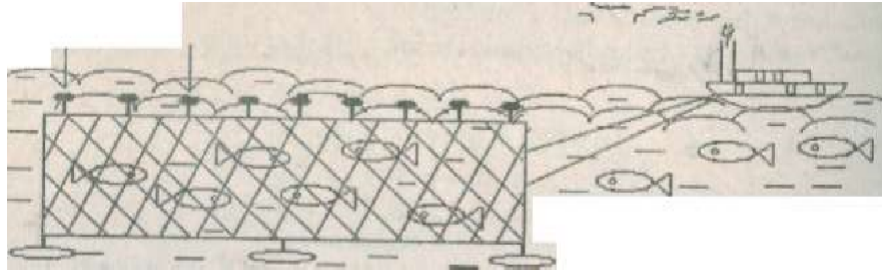
The nets are left in the water for some time and when the fish try to swim through the net, they are caught by their gills and fins in the net.

The Net is then pulled out of the water.



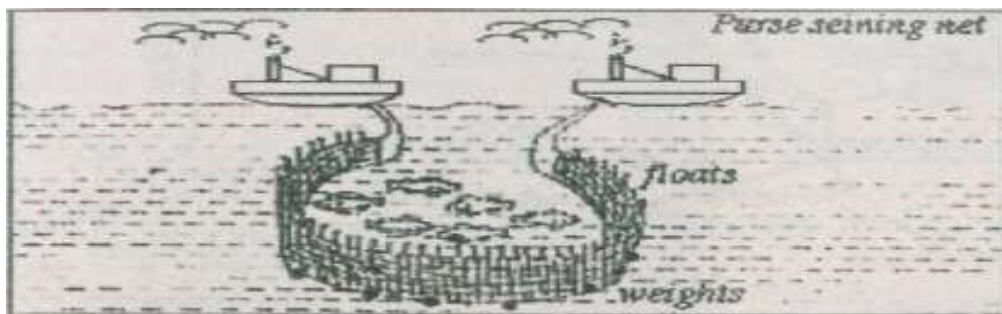
Gill netting is commonly used on Lake Victoria to catch Tilapia. It's divided into two methods which are;

- a) **Beach seining:** this method involves nets being operated from the shore/beach. A fisherman in a canoe/boat stretches the net into the water to encircle a shoal of fish near the shoreline. The nets have weights at the bottom and floats on top to keep them vertical in the water. The fishermen pull the net from both sides and the fish catch is poured at the beach. Used to catch tilapia, cat fish and silver fish.
- b) **Drift netting:** This involves use of a much bigger net which is connected to a moving boat called a drifter. The net is held vertically in water by floats on top and weights down. The fish try to swim through the net and are trapped by their gills as a motor boat slowly moves the net. It is used to catch anchovy and sardines on the Indian Ocean.

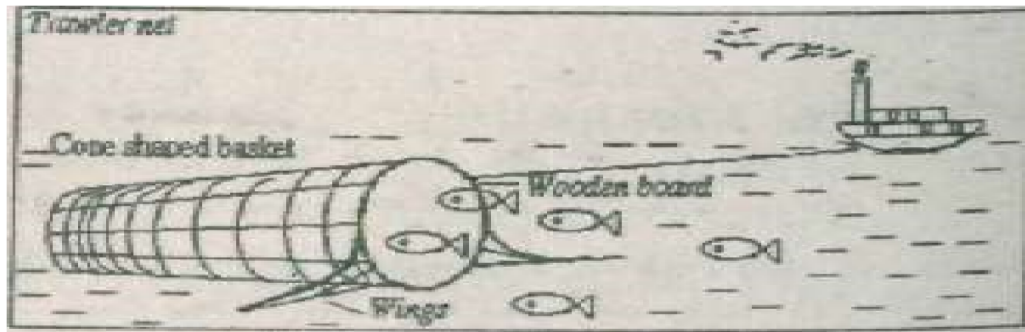


2. Purse seining net method: This involves the use of two boats called seine boats. The net is laid out in a circle to surround a shoal of fish attracted by an echo sounder. At the bottom of the net there are rings attached through which the ropes pass.

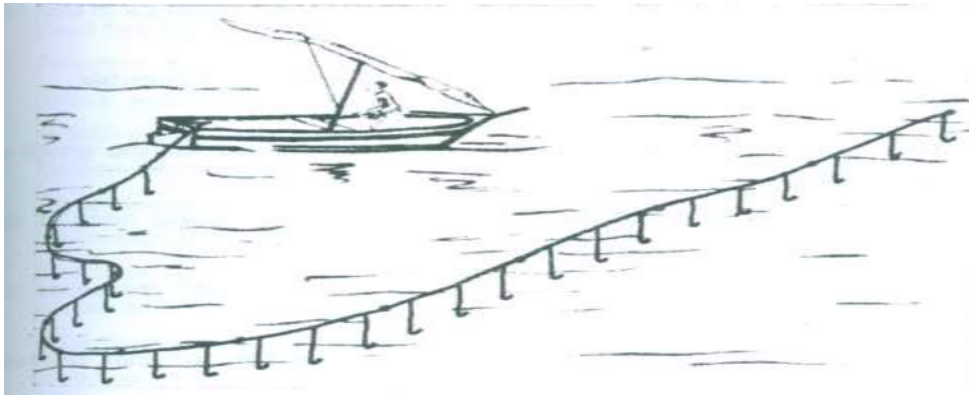
Once the net has been laid in a circular pattern, the ropes are pulled so as to close the bottom of the net to make it bag shaped to trap all the fish it has surrounded. The net is then drawn into a boat and the fish is removed. It is used to catch sardines, anchovy, mackerel, tilapia and bagrus.



3. Trawler method: This involves use of a trawl net dragged by a boat called a trawler. The net forms a wide cone shaped bag whose mouth is kept open by wooden otter boards. The Trawl is pulled along the sea bed by a boat and fish is trapped inside the bag along its way. The net is dragged in water with smooth sea beds. It's used to catch fish such as cod, sardines, mackerel and anchovy.



4. Long Lining: In this method, a long rope which has floats and hundreds of baited hooks is set vertically in the water. The rope is pulled by a boat and it's sunk deep in rocky waters where the nets can be damaged. The fish is caught as it struggles to eat the bait on the hook. Fish species caught with this method include Nile perch (fresh water) and cod (marine fisheries).



5. Lampara method/ lamp attraction method: It is where bright lights (Lamps) are used to attract fish at dark nights and then trapped. The lamp is held over a floating object e.g. a rock. Fish is attracted to the light and a scoop net is used to trap a shoal of fish. This method is used to catch small fish like Dagaa from Lake Tanganyika, haplochromis from Lake Kyoga, Silver fish from Lake Victoria and sardines in the Indian Ocean.

Fish preservation methods used in East Africa

Most fish caught is consumed when it is still fresh. However some preservation methods are employed that include:

Simple/traditional methods for small scale like smoking (most common), sun drying (Cheapest), salting, dip frying and cooking.

Modern methods for large scale companies like refrigeration (icing) and fish canning/tinning.

In Uganda, such methods are applied by fish processing industries like Masese fisheries, Samaki fisheries, Ngege Uganda Ltd and Gomba fisheries. Most of the fish processing industries are developed near Lake Victoria.

Marketing of fish in East Africa

Some fish is consumed locally but some is exported to Asian and European countries e.g. Japan, China, India, Germany, Britain, France, Netherlands and Belgium.

Factors favouring fishing in east Africa.

Factors favouring development of the fishing industry in East Africa

Qn: Describe the factors favouring the development of the fishing industry in East Africa.

- ✓ Availability of numerous fishing grounds such as Lakes Victoria, Kyoga, Tanganyika and Indian Ocean where fish is caught.
- ✓ Availability of high value fish species such as Tilapia and Nile perch with high market demand.
- ✓ Introduction of better and effective fishing methods such as the use of gill nets.
- ✓ Introduction of better fishing vessels such motor boats fitted with engines which are used for fishing.
- ✓ Presence of abundant plankton (food for fish) which has led to fish multiplication in large numbers.
- ✓ Improved transport network linking fishing grounds to market centers.
- ✓ Availability of ready market for fish which is both local and international e.g. fish processing industries, local people and neighboring D.R.C.
- ✓ Indented nature of fishing grounds which are favorable for development of fish landing sites e.g. Kasenyi and Majanji on Lake Victoria.
- ✓ Introduction of fish corporations which teach better the fishermen new and modern fishing skills.
- ✓ Relative political stability especially along Lake Victoria which has attracted foreign investors e.g. Japanese and Indians.
- ✓ Availability of adequate capital for investment e.g. buying boats and engines.
- ✓ Supportive government policy which encourages investment in fishing activities e.g. through market research and road construction.

Benefits of the Fishing Industry to East Africa

- ✓ Provision of employment opportunities to fishermen to earn incomes hence improving their standards of living.
- ✓ Source of food rich in proteins to the population hence improving their health standards.

- ✓ Source of foreign exchange through fish exports used for infrastructural development e.g. roads.
- ✓ Promotes economic diversification thereby increasing income flow and reduces dependence on agriculture.
- ✓ Facilitates development of fish processing industries which provide more jobs e.g. Masese and Gomba fisheries.
- ✓ Source of government revenue through taxation used for development of schools and hospitals.
- ✓ Stimulates development of other sectors like poultry through providing feeds e.g. silver fish (Mukene).
- ✓ Facilitates development of infrastructures such as roads, markets and training institutions which leads to provision of social services.
- ✓ Has facilitated growth of towns leading to regional balance e.g. Dar-es-salaam, Kisumu and Bukoba.
- ✓ Promotes tourism through game fishing e.g. at Malindi.

Problems Facing Fishing in East Africa

- ✓ Limited capital to modernize the fishing industry.
- ✓ Most of the fishing grounds like Lake Albert and Turkana are in remote areas which are inaccessible.
- ✓ Limited market for fish due to low income or cultural norms e.g. among the Bahima.
- ✓ Limited fish species of commercial value which reduces international demand.
- ✓ Over fishing and indiscriminate fishing through use of beach seining method which leads to catching of young fish.
- ✓ Excessive high temperature creates preservation difficulties.
- ✓ Political instability especially in Uganda which has scared away foreign investors.

- ✓ Threat of crocodiles especially on Lake Kyoga which scare away fishermen.
- ✓ Poor transport network linking to fishing grounds which leads to delays in delivery. ☒ Water hyacinth especially on Lakes Victoria and Kyoga chokes/suffocates fish to death.
- ✓ Competition with other fish producing countries like Norway, Peru and Japan which leads to inadequate market.
- ✓ Un-desirable fishing methods like fish poisoning which causes health risks/hazards to the local people.
- ✓ Inter-territory conflict since some of the fishing grounds are found at borders e.g. Lake Albert, Lake Victoria, Tanganyika and Lake Malawi. ☒ Reduction of Tilapia due to presence of Nile perch which eats them away.
- ✓ Some fishing grounds are too deep and hence don't favour fish multiplication.
- ✓ Water pollution by industries e.g. Nile breweries which causes death of the fish.
- ✓ Post fishing losses e.g. theft of their nets and fish catch.

Steps That Have Been Taken To Solve Problems Facing Fishing

- ✓ Formation of ministry of fisheries to control fishing activities in the country.
- ✓ Formation of fishing cooperatives for advice, loans and easy marketing.
- ✓ Educating the public about the value of the fish as a source of proteins and vitamins to increase its market.
- ✓ Removal of the water hyacinth by using chemicals to provide enough oxygen for the fish.
- ✓ There is construction and rehabilitation of road networks linking to fish grounds to improve fish deliveries.
- ✓ Treatment of sewage and industrial wastes to reduce water pollution.
- ✓ Setting strict laws prohibiting illegal fishing methods like poisoning and indiscriminate nets to protect the young fish.
- ✓ Introduction of modern fish preservation methods like freezing and canning by

extending power to rural areas.

- ✓ Regular police patrols to reduce theft on water bodies.
- ✓ Introduction of commercial and high value fish species e.g. Nile Perch which have large market.
- ✓ Increased importation of fishing facilities such as motor boats and motor engines to increase efficiency.
- ✓ Construction of on-site fish processing plants e.g. Masese in Jinja and at Ggaba near Kampala to prevent fish from going bad.
- ✓ Artificial rearing of fish in ponds to reduce depletion of some species e.g. at Kajjansi and Entebbe. Cage fishing has also been introduced on lakes.

Effects of fishing on the environment

- ✓ Smoking of fish and construction of boats requires timber which leads to deforestation.
- ✓ Fishing exposes fishermen to Tsetse flies and Bilharzia disease.
- ✓ Smoking of fish leads to atmospheric pollution which spreads human diseases like flue.
- ✓ Fishing leads to growth of towns which leads to high crime rates, unemployment and poor sanitation.
- ✓ Fishermen are exposed to dangerous water animals e.g. crocodiles on Lake Kyoga.
- ✓ Some fish which were introduced such as the Nile perch eat away other species like Tilapia.
- ✓ Poor fishing methods like use of poison may lead to health problems for humans.
- ✓ Processing industries that are constructed near water bodies have led to pollution due to dumping of wastes in the water bodies.

Fishing in Uganda.

In Uganda, fishing is developed on Lakes, rivers and swamps. Lake Victoria is the most important fishing ground, followed by Lake Kyoga and Albert, Edward and George. The most common fish caught are Tilapia, Nile perch and Haplochromis.

Fishing on Lake Victoria:

A number of fishing Villages / ports developed on the Lake including Gomba, Bukakata, Kasenyi, Luzira, Kibanga, Kasensero, Majanji, and Masese. Major fish species caught include tilapia, Nile perch and silver fish.

Fishing on Lake Kyoga:

This is the second important fishing ground. It's too shallow. Haplochromis, Tilapia and Nile perch are the most common fish caught. Others are Mud fish and Cat fish e.t.c. The lake is characterized by floating Islands of water Hyacinth and a big number of crocodiles which limit fishing.

A number of fishing villages/ports developed including Lwampanga, Kachunga, Namasale and Nabyeso. Salting, smoking, sun drying and freezing are used in preserving fish.

Fishing on Lake Albert:

This is the third most important fishing ground. Tilapia, Nile perch are the most important fish caught.

Fishing villages/ports on Lake Albert are:- Butiaba, Kasenyi, Wanseko, Biseruka, Buliisa, Buhuka, Ntoroko, Ndaiga and Panyimur. Salting and smoking are mainly used to preserve fish.

Fishing on lakes Edward and George:

Fish caught include, Tilapia, Clarias, Bagrus, protopterus e.t.c. The presence of salt from Lake Katwe facilitates the use of salt to preserve fish though smoking is also applied.

One of the problems facing fishing here is that Lake Edward is too deep, the area is infested with Tsetse flies, remoteness, poor transport facilities and fish smuggling to

Democratic Republic of Congo. Major fishing ports are Katunguru and Rwenshama on Lake Edward and Magyo and Kasenyi on Lake George.

Fishing is also carried out in swamps e.g. lung fish and mud fish got from swamps along rivers like Katonga and Kagera.

Fishing in Kenya

Fresh water fishing grounds in Kenya include; - Lake Victoria, Lake Baringo, Lake Turkana, River Athi(Galana) and Tana, fish ponds at Nyanza, in the central and western provinces at Homa bay.

Marine fishing grounds are centered only at the coast. These include: - Malindi fisheries, Lamu, Mombasa and the South Coast fisheries. Today, Kenya is the leading exporter of fish products in East Africa. Such products include:- Fresh or Frozen fish, Fish meal, Fish oil, Canned fish, Salted, smoked and dried fish.

Some lakes in East Africa are too salty to contain fish. Such Lakes are barren, they include: - Magadi, Elmenteita and Natron e.t.c.

FISHING IN TANZANIA

Fresh water (Inland fisheries) include:

Lake Victoria, Lake Tanganyika, Lake Rukwa and Rivers like Rufigi, Pangani, Malagarasi and Ruvuma. Fish caught are Tilapia, and Nile perch from Lake Victoria. Others are Bagrus, Haplochromis. Bukoba, Mwanza and Musoma on Lake Victoria are the major fishing ports.

Lake Tanganyika is the second important fishing ground. Its popularly known for a small kind of fish called Dagaa which are caught by use of bright lights at night (Lampara method). The fish are attracted to fish traps by artificial light and then scooped out. Other fish caught are Bagrus and Clarias. Kigoma is the major fishing port along the lake.

Marine fishing is confined to the coast along the Indian Ocean, Mangrove Swamps and river estuaries. A lot of marine creatures like Shrimps, Oysters, Crabs, Lobsters,

Sardines and Herrings are caught. However, Marine fishing is not fully developed due to inadequate capital and poor fishing equipment. Important fishing ports along the coast are: Mtwara, Lindi, Tanga and Dar-es-salaam.

Uses of fish

- ✓ Provision of food rich in proteins to better people's health.
- ✓ Fish bones can be used for making buttons.
- ✓ Used for making cosmetics and soap.
- ✓ Used for making animal feeds like chicken feeds.
- ✓ Fish fats can be used for making edible cooking oil.
- ✓ Fish bones and scales can be crushed to make fertilizers.
- ✓ Used in the making of drugs/medicine.
- ✓ Fish skin can be used as a leather material for making shoes, bags and belts.

Fish farming.

Fish Farming involves the artificial rearing of fish in a controlled environment such as tanks, ponds or cages for food or for sale.

The types commonly reared in east Africa include tilapia, Nile perch, silver fish and cat fish. Fish farming is very important due to the following reasons

- ✓ It can be practiced on the limited area
- ✓ It increases on the fish stocks
- ✓ It reduces danger associated with fishing in lakes and rivers. Etc.

Activity 14.9 Carry out the library or internet research and the do the following tasks.

- a) *Identify the fish species that are commonly reared in east Africa.*
- b) *What are the advantages of fish farming?*
- c) *A member of your community would like to start fish farming. Write an essay to advise him on what to do.*

Chapter 15

WILDLIFE CONSERVATION & TOURISM IN EAST AFRICA.

Definition of key terms

Wildlife is the animal and plants whose growth is not influenced by humans.

Wildlife reserve is a place set aside for safeguarding, preserving wild animals and plants.

Tourism. This is the practice for travelling for purposes of leisure, curiosity or study.

Tourism is the leading invisible export of East Africa and it's one of the major foreign exchange earners for the governments.

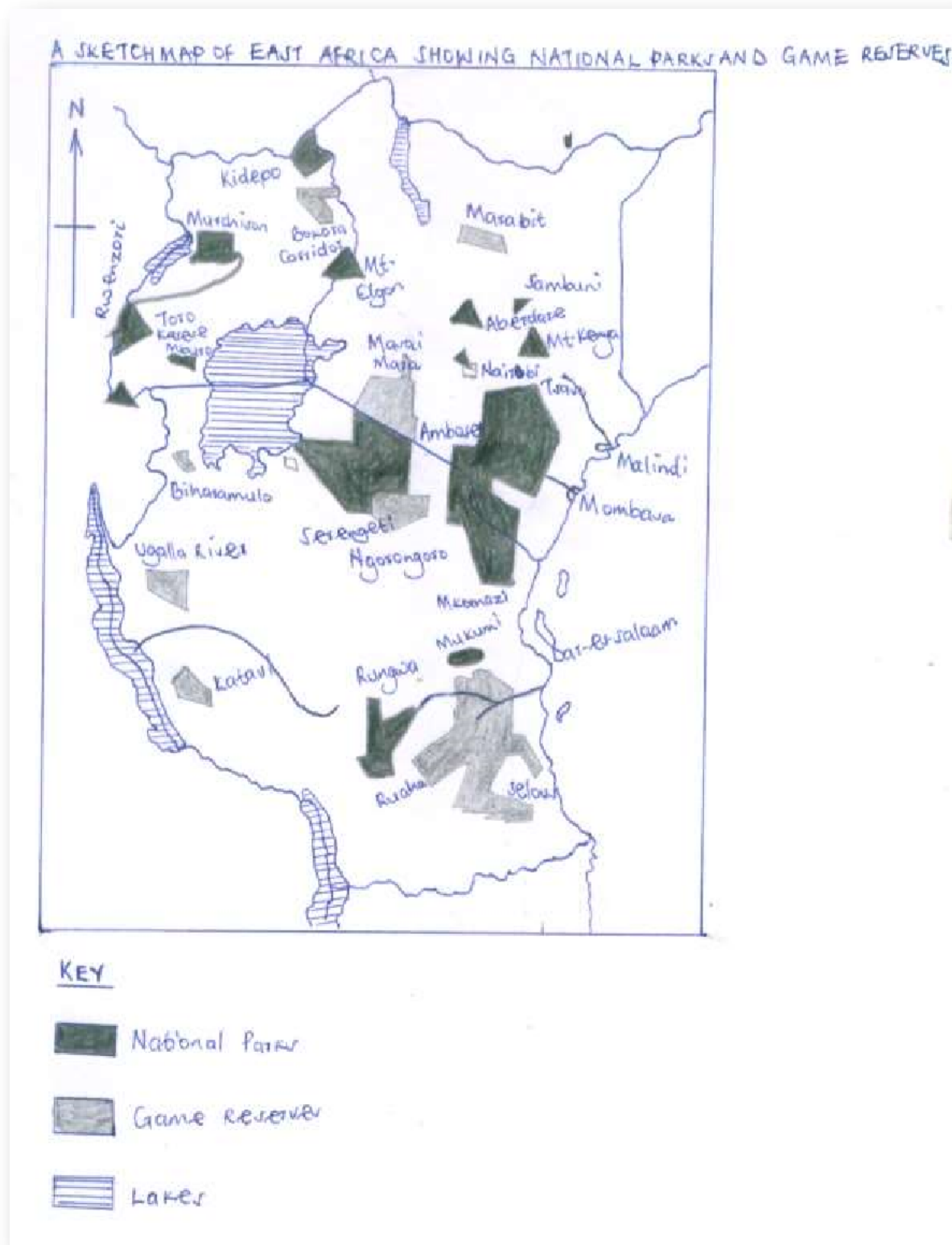
Tourist attractions/tourism potentials in East Africa include:

- a) **Wildlife:** this includes animals, vegetation and birds i.e. flora and fauna e.g. zebras, hippos, lions, flamingos, crocodiles, savannah vegetation, and tropical forests e.t.c. these are conserved in national parks, game parks, game reserves like Queen Elizabeth, Serengeti, Kidepo Valley, Masai Mara, Mkomanzi and Tsavo.

N.B wild life is the most important tourist attraction for East Africa.

- b) Climate and other resources attached to it e.g. sports, sunbathing, conducive situations of swimming e.t.c. East Africa has got a number of climate types e.g. savannah, equatorial, Semiarid, Swamp and Montane climate.
- c) Relief features like high mountains e.g. Kilimanjaro, Kenya, and Rwenzori with snow at the top, and the rift valley plains.
- d) Historical sites e.g. Nyero rock paintings in Kumi, Kasubi tombs, Olduvai Gorge, and Fort Jesus at Mombasa e.t.c.
- e) Culture e.g. East Africa has got a number of cultures based on the different tribes e.g. the Masai, kiganda culture where people exhibit their cultures in different ways of dressing, eating.
- f) Drainage systems e.g. East Africa has got a number of drainage systems ranging

from lakes like Victoria and rivers e.g. Rufiji, Nile and Tana.



Wildlife conservation

This is an activity in which people make conscious efforts to protect the earth's biological diversity. This is the process of safeguarding, preserving wild animals and plants.

Activity 15.2

a) Discuss what you understand by the following terms.

- ✓ *Wildlife*
- ✓ *National park*
- ✓ *Game reserve*
- ✓ *Wildlife conservation*

b) Suggest ways through which wildlife can be conserved

c) What do you think will happen if wildlife in your is not conserved?

Tourism

This refers to the practice of traveling for leisure, recreational, study, holiday or curiosity.

Origin of tourist.

A lot of tourists to east Africa come from industrialized countries with no wildlife habitation found in east Africa. Many come from Europe which is traditionally linked and close to east Africa.

Others come from North America, China, Japan and South Korea etc.

Activity 15.5. Identifying the origin of tourists

In groups, study table 15.1 showing the number of visitors arriving to Uganda on the short term basis in 2019. They are from the following countries and do the following tasks that follow.

TABLE 15.1 number of visitors	
Country	Number in thousands
1.china	160000
2.Rwanda	8000
3.Tanzania	1500
4.Burundi	300
5.Dr Congo	40000
6. united kingdom	800
7. south Sudan	15000
8.india	17000

a) *Identify the country with the*

i. Highest origin of visitors

ii. Lowest origin of visitor

b) *Draw a bar graph showing arrivals and origins of tourist's visits to Uganda.*

c) *Do you think all visitors coming to Uganda are tourists? Give reasons to support your view.*

Factors favoring the development of tourism industry in East Africa

- ✓ The region is endowed with a variety of tourist attractions such as wild life, drainage features, historical sites and coastal landforms which all attract foreign tourists.
- ✓ Peace and stability especially in Kenya and Tanzania and some parts of Uganda which has ensured that the tourists are sure of their safety. ☐ Improvement in the transport network system especially roads, water ways and air transport has facilitated easy movement of tourists to their areas of interest.
- ✓ Increased level of advertisement to outside countries is being done through embassies abroad through international Television channels, magazines,

radios which have made tourists aware of what is in East Africa.

- ✓ Local people of East Africa provide good hospitality for the tourists which also attract foreign visitors because they are assured of good care and warm welcome.
- ✓ Improvement in the accommodation facilities e.g. hotels, lodges, and guest houses which have provided residential services to tourists.
- ✓ Increased level of education given to the local people has created more awareness and appreciations for the tourism industries e.g. courses related to tourism have been introduced at different institutions within East Africa e.g. Bachelor of Leisure and Hospitality Management.
- ✓ Presence of adequate capital from local and foreign individuals to invest in the sector e.g. for construction of hotels.
- ✓ Favorable government policy which encourages investment in tourism e.g. liberalization of the tourist sector, low taxation and increased subsidization of investors in the tourism sector.
- ✓ Availability of enough skilled and unskilled labour force to work in the industry e.g. hotel managers and game ranger

Contribution of tourism to the development in East African countries.

In groups.

- a) Discuss how tourism benefited east African countries*
- b) How can tourism benefit the youth in East African.*

- ✓ Tourism is an invisible export which earns the government foreign exchange used for development of infrastructures e.g. roads.
- ✓ Tourism leads to development of international relationships which help in promoting world peace and establishing world unity.
- ✓ Tourism helps to conserve environment and protect natural beauty which is

important for the present and future generations.

- ✓ It has created employment opportunities to the people of East Africa leading to improved standards of living e.g. game rangers, tour guides, travel agents e.t.c.
- ✓ It has facilitated the development of infrastructures like roads which help in the movement of goods and services in East Africa.
- ✓ Government earns revenue through taxation of people who work in the tourism industry used in the development of roads.
- ✓ It has led to the development of art and craft industry because the locally made items like drums, baskets mats are sold to foreign visitors. ☐ It helps to diversify the economy hence reducing dependence on agriculture ensuring constant capital flow.
- ✓ It helps to put idle land to good use hence reducing resource wastage e.g. Kidepo valley national park.

Reasons why Kenya's tourism industry is more developed than that of other east African countries

- ✓ Kenya is endowed with a variety of beautiful scenery in form of coastal land forms, volcanic features as well as coastal towns like Mombasa which attracts many tourists.
- ✓ Kenya has had a longer period of political stability which has attracted more tourists than Uganda and Tanzania.
- ✓ Kenya has various National parks and game reserves like Tsavo National Park that are well distributed throughout the country hence attracting a large number of tourists.
- ✓ Kenya's national parks are blessed with many well trained guides who encourage more tourists to go to Kenya.
- ✓ Kenya has a well-established Hotel industry that is well managed and services are of high standards than in other East African countries.
- ✓ The government of Kenya through the Kenya Tourist Development Co-operation

ensures strict wild life preservation programs and laws which ensures continuity of the activity.

- ✓ Kenya has a well-developed transport system in terms of roads, railways and air transport making it easy for the tourists to move within the country.
- ✓ A lot of research is carried out by the Kenya Tourism Development Co-operation in terms of checking the population of animals and birds in National parks and Game reserves as well as improving the management of the entire tourism industry.
- ✓ Kenya lies along the coast of East Africa which is easily accessible by the tourists from Europe, Asia and U.S.A.
- ✓ Kenya introduced a new system of travel known as package holiday since 1970 which ensures that tourists are given subsidized rates hence attracting many more.

Problems facing tourism industry in east Africa

- ✓ Poaching of wildlife has reduced the number of animals in National parks and Game reserves yet they are East Africa's major attractions.
- ✓ Inadequate supply of skilled man power to handle wildlife and hotel management which therefore makes service provision very poor hence chasing away tourists.
- ✓ Inadequate capital for investment to set up roads, good accommodation facilities and to carry out research.
- ✓ Hostile tribes in East Africa e.g. the Masai and Karamojong scare away some of the tourists which limits the number of tourists that flow into East Africa.
- ✓ Low levels of advertisement which has made people unaware of the existence of tourist attractions in the countries hence reducing on the number of intending visitors and tourists.
- ✓ The high population growth rate which has resulted into increased demand for land leading to deforestation hence destruction of habitats for wildlife.
- ✓ Political instabilities in some parts of the East African countries have scared

away tourists.

- ✓ Pests and diseases e.g. tsetse flies, mosquitoes which carry diseases like sleeping sickness, malaria for humans hence scaring away tourists and also reducing on the animal population.

Solutions to the problems

- ✓ Eviction of encroachers and reduction of human settlement within the surroundings of the game reserves and National parks to reduce poaching.
- ✓ Setting up of anti-poaching squads to reduce on poaching to increase the animal population.
- ✓ Regular patrols and supervision should be done to protect the animals from poachers.
- ✓ Increased advertisement should be done through radio programs, TVs, Newspapers, magazines both within and abroad to increase on the level of awareness about tourism potentials within the region.
- ✓ The government should improve on the accessibility of tourist potentials e.g.
- ✓ Rehabilitation of roads for better transport.
- ✓ Educating the local people about the values of wild life and environmental conservation to reduce on the level of poaching and deforestation.
- ✓ Encouraging the local people to use family planning methods so as to control population growth and reduce the negative effects like deforestation.
- ✓ The government should fight corruption so that the resources allocated to the tourism industry are put into proper use.

POPULATION AND URBANIZATION IN EAST AFRICA.

POPULATION IN EAST AFRICA

Population refers to the number of people living in an area at a given time. Over 80% of the total population in East Africa depend on farming either directly or indirectly.

Rainfall distribution and temperature as climatic factors play a big role in population distribution within East Africa because areas with heavy rainfall can support agriculture and therefore attract many people.

On the other hand, areas with low and unreliable rainfall cannot support agriculture and these attract sparse population.

Areas with **dense population** include shores of Lake Victoria, Kenya Highlands, Kigezi highlands, Slopes of Mountain Elgon and Rwenzori, Southern Tanzania highlands such as Usambara ranges and areas around Lake Malawi, islands of Zanzibar and Pemba along the East African coast.

The major towns and cities like Kampala, Nairobi, Dodoma, Dar-es-salaam, Mombasa, Kilwa, Tanga, Mtwara, Mbale, Kisumu, Eldoret and Nakuru have got dense population totals.

Areas with **moderate population** density are between Kenya highlands and Nairobi and some parts of the rift valley in Kenya and Tanzania, northern Uganda in Gulu, Acholi land and Lira, western Uganda in areas of Hoima and Mubende.

Areas with **sparse population** include North-Eastern Uganda covering areas of Kotido, Kitgum, Moyo and other areas of game reserves and forest reserves. Northern Kenya including Turkana, southern Tanzania, West and central Tanzania i.e. Miombo woodlands.

Concepts used in population studies

Over population: This is a situation where the number of people in a given area exceeds the available resources.

Under population: This is a situation where the number of people in a given area/country is less than the available resources.

Optimum population: This is where the available resources are equivalent to the population for maximum resource exploitation.

Population density: It refers to the number of people per square kilometer.

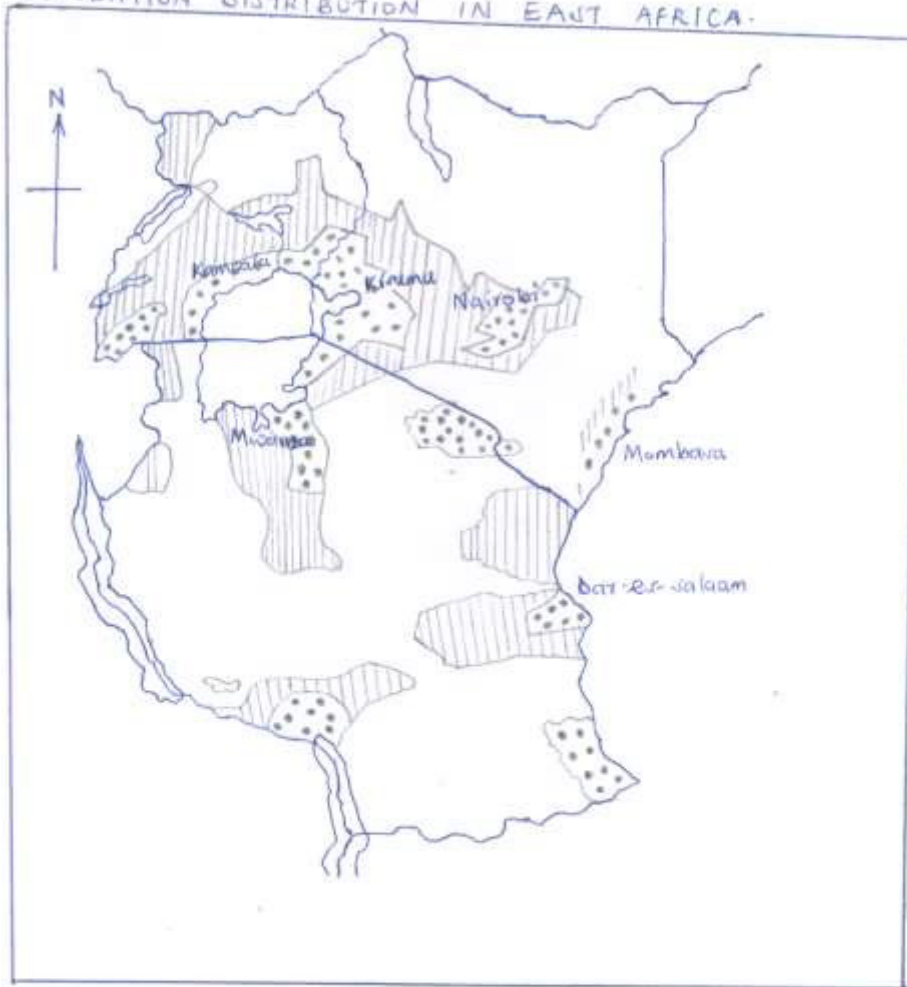
Life expectancy: This refers to the average age at which most people die in a country. In East Africa, the life expectancy is 50years for women and 45years for men.

Population distribution: This refers to the way people are spread out on the earth surface in a given area.

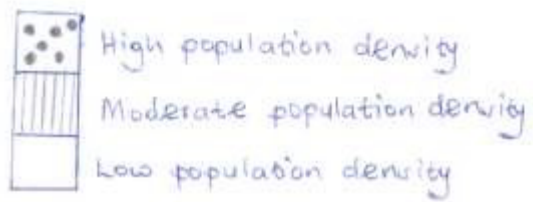
Population census: This is the process of counting the number of people in the country or region. It's usually done after every 10years. The major purpose for population census is for government to plan and provide services for its people.

Fertility rate: This refers to the average number of children per woman in her productive life. The fertility rate in East Africa is seven children per woman.

POPULATION DISTRIBUTION IN EAST AFRICA.



KEY



Factors influencing population distribution in East Africa.

Climate:

Areas which receive heavy and reliable rainfall which support the growth of crops have attracted people in large numbers e.g. shores of Lake Victoria, Kenya highlands, slopes of Mt. Elgon and Kigezi highlands while areas which receive low and unreliable rainfall attract very few people e.g. Karamoja, Turkana land and Miombo woodlands.

Soils:

Areas with deep and well drained fertile soils that support agriculture have attracted dense settlements e.g. Mbale, Kabale, shores of Lake Victoria while areas with infertile soils have sparse population e.g. Nyika plains, North Eastern Kenya and Masai land.

Altitude/relief:

Areas with very high altitude e.g. top of Mt. Elgon and Rwenzori, Bundibugyo have sparse population because of the high pressure, difficulty in constructing houses and roads. However low altitude areas have attracted large settlements due to ease in constructing settlements and roads.

However, areas in broad valleys occupied by swamps have sparse population due to presence of disease vectors like mosquitoes. Also, lowland areas are subjected to floods and therefore are always avoided.

Vegetation:

Dense forests, bush lands and swamps are unfavorable areas for settlement because it's hard and expensive to clear the vegetation.

They also harbour wild animals and disease carrying vectors like tsetse flies which scare away settlements. Areas with savannah vegetation are easy to clear for agriculture and

settlement hence attracting dense population e.g. Masaka, Mpigi and Mukono.

Natural water resources:

The existence of natural water resources can attract dense population e.g. shores of Lake Kyoga and Victoria. Also, in areas of low rainfall many people are attracted near water courses or rivers e.g. along river Athi, Nile because the dense population utilizes the rivers for small scale irrigation, livestock rearing and domestic use.

However, areas without surface water bodies have scared away settlements leading to sparse population e.g. in Karamoja and Turkana land.

Drainage:

Poorly drained areas e.g. coastal margins of Kenya and Tanzania are full of mangrove swamps which are unproductive in terms of agriculture, therefore leading to sparse population while areas which are well drained have high population densities like central Uganda, slopes of Mt. Kenya and Elgon.

Economic Activities:

Areas that have activities like mining, trading and manufacturing industries especially towns like Dar-es-salaam, Nairobi, Kisumu, Kampala, Jinja attract large population than areas where they are few economic activities e.g. Karamoja. This because people are more attracted to areas that have enough job opportunities than areas with less employment opportunities.

Government policy:

The government may determine settlement in an area e.g. the creation of national park and game reserves discourages settlement e.g. Kidepo valley game park and on other hand, the setting up of resettlement schemes and refugee camps has attracted. Settlement in large number e.g. in Kiryandongo and Internally Displaced Peoples' (I.D.P) camps in Gulu.

Political stability: Areas that are unstable and insecure have got low population e.g.

Karamoja where there is a lot of cattle rustling compared to areas which are generally politically stable and secure hence attracting dense settlements e.g. towns like Kampala and Mombasa.

Culture: some areas have got low population density because of their culture of e.g. Ankole, Karamoja, Masailand areas are sparsely populated because of their practice of nomadic pastoralism which keeps them on the move always. Within central Uganda, dense settlements exist because of the settled ways of life that encourage family development e.g. in Mukono and Wakiso districts.

Population growth:

This refers to the natural increase in population. Uganda's population growth rate is 3% per annum/year. East Africa's population has been increasing over the years and this increase is due to the following factors;

(a) Natural increase/ high birth rate: in most areas of East Africa, the number of births in the year exceeds the number of deaths and such a difference has caused high population growth.

(b) Improved medical services: this has led to low infant mortality rate and death rates causing population growth.

Early marriages: people tend to marry/get married at a tender age and this has led to a longer period of the child production cycle.

High fertility rate: this refers to the number of children a woman can produce during her child bearing age. On average, African women give birth to 5 to 7 children and this has led to high rate of population growth.

Value attached to children: many families value children especially girls as a source of wealth or boys as a source of labour and security. Others look at children as a source of insurance and help at an old age. They thus end up producing many hence leading to population growth.

Polygamy: it refers to the act of marrying more than one wife. Polygamy is common because it is looked at as a sign of prestige in society and as a traditional obligation

which has led to high population growth.

Low levels of education: many people do not know the value of a small family. Besides, most people drop out of school early and end up into early marriages leading to production of many children.

Religion: Some religions encourage polygamy which has resulted into high birth rates especially among Moslems, while others religions are opposed to family planning methods e.g. Catholics.

Poverty: many families can't afford to buy pills, condoms for family planning and this has led to many families producing children without birth control measures.

Improved nutrition levels: this has ensured balanced diet and steady supply of food which encourages people to have large families.

Increased immigrations: many people have entered East Africa from other regions e.g. Asians, Europeans, Sudanese and Congolese and this has led to population increase.

Advantages of high/large population size.

High population provides enough labour force for the economic development of the country.

- ✓ It can be a source of a large amount of taxes that avails the country with enough revenue for development.
- ✓ It is easy and economical to provide social services in a situation where many people are concentrated in the same area.
- ✓ In case of security, a large population can easily provide enough man power for the army/defense of a country.
- ✓ It is a source of cheap labour since many people are willing to work at a low wage rate.
- ✓ A high population encourages the exploitation of idle resources.
- ✓ A high population also provides a large market for goods and services within a given country.
- ✓ It also encourages a high level of innovation and invention as people try to look

for survival in a competitive environment.

- ✓ It encourages increased agricultural output as people try to produce enough food for their own survival.

Disadvantages of large population size.

- ✓ Shortage of land for settlement and farming leading to land fragmentation.
- ✓ Shortage of social services e.g. schools and hospitals.
- ✓ High government expenditure to provide social services for the people.
- ✓ High dependency ratio since much of the population is made up of children hence reducing investments and future savings.
- ✓ High rates of unemployment because of the less available jobs.
- ✓ Unemployment leads to high rates of crime and social unrest especially among the youths. Exhaustion of resources due to over exploitation.
- ✓ It encourages rural-urban migration and its evils like high crime rate, unemployment and drug abuse.
- ✓ Shortage of accommodation leading to development of slums.
- ✓ Shortage of food which results to famine and starvation.
- ✓ Overcrowding which results into congestion and poor hygiene hence easy spread of diseases.
- ✓ High cost of living due to competition for scarce resources.
- ✓ Poverty as a result of high dependency ratio.
- ✓ Environmental degradation through pollution, soil erosion, swamp reclamation and deforestation.
- ✓ Desertification/global warming due to pollution, deforestation and industrialisation.

Steps being taken to solve such problems

- ✓ Encouraging family planning methods to reduce on the birth rates involving the use of pills, condoms and other contraceptives.
- ✓ Encouraging outward migration from the densely populated region to the sparsely populated areas.
- ✓ Setting up resettlement schemes for people from densely populated regions.
- ✓ Low enforcement policies are being emphasized to reduce the level of crime rates.
- ✓ Agriculture modernization has also been emphasized through the use of high yielding food varieties to increase food production and combat the problem of famine.
- ✓ Vertical expansion of towns and cities through building of storied buildings has been embraced to solve the problem of congestion in most African cities.
- ✓ Land reform policies like land consolidation are being emphasized to solve the problem of land fragmentation.
- ✓ Industrialization is also being encouraged in most African countries to reduce over dependence on the land and reduce the level of u employment.
- ✓ The governments are also trying very hard to establish enough social services such as health centres, schools and transport to contain the problem of congestion over these services.
- ✓ Encouraging monogamy to reduce polygamy.
- ✓ Rising the marriage age for girls to reduce early marriages.

LOW/UNDER POPULATION

It refers to a situation where the number of people is less than the available resources within a given area.

Advantages of low/under population

- ✓ It avails enough land for agriculture and settlement.
- ✓ It minimizes the problem of congestion and overcrowding.

- ✓ Dependency ratio is low and this may encourage savings and investments.
- ✓ Less possibility of slum development since people are few.
- ✓ Less government expenditure on the provision of social services.
- ✓ Social conflicts over land are not likely to come up due to a low population.
- ✓ It avails people with enough food hence reducing the possibility of famine.

Disadvantages of low/under population

- ✓ Limited supply of labour.
- ✓ Small market size for goods and services due to low demand.
- ✓ It is expensive for the government to provide social services to a few users.
- ✓ It leads to low tax base hence low government revenue.
- ✓ It leads to underutilization of resources such as minerals and land.
- ✓ It leads to slow economic growth which leads to dependency on other countries for skilled labour and market.
- ✓ It limits the level of innovation and invention since most of the resources are not put to use.

POPULATION DENSITY:

It refers to the number of people living in an area per square km. In East Africa, some places have got high population density while others have got low population density.

Causes of high population density

(Why some areas have high population e.g. Shores of Lake Victoria, Kabale, Mbale and along the coast)

- ✓ Hot and wet climatic conditions that favour the growth of various crops to support high population e.g. shores of Lake Victoria.
- ✓ Presence of deep and well drained fertile soils which support farming also attract a large number of people e.g. Kabale and Mbale.
- ✓ Availability of abundant supply water for both domestic and commercial use e.g. Kampala and Nairobi.

- ✓ Presence of many industries that attract a large labour force e.g. in Jinja and Dar-salaam.
- ✓ Availability of a variety of minerals such as Diamonds in Shinyanga and limestone in Tororo.
- ✓ Urbanization attracts many migrants into large cities for social amenities e.g. in Dodoma, Kampala and Mombasa.
- ✓ Easy accessibility due to well-developed transport and communication network for easy movement.
- ✓ Availability of a relatively flat landscape which make settlement and development of infrastructures relatively easy hence attracting large settlements

Causes of low population density

(Why some areas have low population e.g. Karamoja, Ankole-Masaka corridor, Masai land and Turkana land)

- ✓ Low and unreliable rainfall that cannot favour agriculture e.g. the desert region of Chalbi in northern Kenya.
- ✓ Hot temperatures of 30⁰C and above that make it impossible for many people to live in such areas e.g. in Karamoja.
- ✓ Absence of surface water that is essential for human life e.g. in Masai land.
- ✓ Poor quality soils that can't support agriculture tend to scare away settlements e.g. Miombo woodlands.
- ✓ Pests and diseases such as tsetse flies and mosquitoes in some parts of central Tanzania scare away man due to fear of loss his life.
- ✓ Remoteness of the area that hinders accessibility due to poor transport and communication lines.
- ✓ Limited economic activities which means that jobs are not existent.
- ✓ Limited social services which scares away people.

URBANISATION IN EAST AFRICA

About 30% of East Africa's population lives in urban centers.

The rapid growth and development of these ports and towns in the recent years has been as a result of rural-urban migrations where capital cities have become primary destinations for majority migrants.

The major urban centers in East Africa are Kampala, Nairobi and Dodoma which are capital cities.

Port cities that have developed into urban centers are Kisumu, Mwanza, Bukoba, Musoma, Jinja, Mombasa, Dar-es-salaam, Kigoma, Tanga and Mtwara.

Other urban centers in East Africa include: in Uganda there is Mbale, Kasese, Mbarara, Tororo, Gulu, Soroti, Lira, Masaka, in Kenya there is Thika, Eldoret, Nakuru, Kitale, and in Tanzania there is Mbeya, Songea, Tabora, Shinyanga, Makumbako, Kilosa, Ifakara, Arusha and Moshi.

Factors that have favoured the development of urban centers in East Africa

- ✓ The abundant supply of clean and fresh water for domestic and industrial use e.g. Kampala, Nairobi and Mbale.
- ✓ Availability of large tracts and vast land for the establishment of the urban center.
- ✓ Relatively flat and gently sloping land for establishment of the urban center e.g. Kampala and Nairobi.
- ✓ Historical factor whereby most towns developed as a result of early contacts with colonialists and Arabs for trade e.g. Mombasa, Nairobi and Kampala.
- ✓ Presence of a rich and productive agricultural hinterland for industrial development e.g. Mbale, Soroti, Nairobi and Kampala.
- ✓ Supportive government policy for developing the urban center e.g. in Tanzania, the capital city was transferred to Dodoma from Dar-es-salaam.
- ✓ The presence of many industries which provide jobs that have attracted many

people into the cities e.g. Jinja, Nairobi, Mombasa and Kampala.

- ✓ Cool and conducive climate which is favorable for human survival e.g. Nairobi, Mbale and Kampala.
- ✓ Presence of improved and better security which attracts large population e.g. Nairobi, Kampala, Gulu and Mbale.
- ✓ Presence of well developed and modern transport network which eases movement of goods and services e.g. roads and railways.
- ✓ The large population size has provided cheap labour and large market hence boosting industrialisation.
- ✓ Availability of large sums of capital for investment e.g. buying land and putting up infrastructure e.g. roads.
- ✓ Constant supply of cheap and abundant power for use in the urban centers e.g. in industries and homes.
- ✓ Presence of a variety of better amenities which attract large population size e.g. schools, hospital, theaters and tall buildings.
- ✓ Central location which makes the towns accessible from all parts of the country e.g.
- ✓ Kampala, Nairobi and Dodoma.

Functions of urban centers

- ✓ They serve as administrative centers e.g. with government offices like Parliament, Ministries and Non-Governmental Organizations.
- ✓ They provide educational services to people e.g. in schools, universities and colleges.
- ✓ They provide recreational and leisure services to people e.g. in theaters, cinemas, stadiums and concert halls.
- ✓ They serve as tourist centers which earn government foreign exchange e.g. Kasubi tombs in Kampala and Fort Jesus at Mombasa.

- ✓ They serve as commercial and trading centers with many businesses e.g. in shopping malls, supermarkets and forex bureaus.
- ✓ They provide residential services to the people for accommodation e.g. in the tall buildings found in these towns.
- ✓ They are industrial centers which provide jobs to the people e.g. Dar-es-salaam, Kampala, Mombasa, Nairobi and Jinja.
- ✓ They provide financial and banking services which boost trade e.g. credit micro-finance institutions, central banks and ware houses.
- ✓ They provide transport service by having major transport terminals e.g. railway and road terminals in Kampala, Nairobi and Dodoma.

Effects of urbanization on the environment

- ✓ Destruction of vegetation due to increased competition for land for industrial development and settlement.
- ✓ Loss of vegetation cover has accelerated soil erosion and siltation of water bodies.
- ✓ Loss of vegetation has led to changes in micro climate e.g. reduced rainfall totals. ☐ Loss of vegetation cover has also increased flooding e.g. in Kampala.
- ✓ Loss of habitats for wildlife e.g. crested cranes, snakes and birds due to destruction of vegetation.
- ✓ Loss of bio-diversity e.g. death of wild animals like frogs through destruction of swamps and forests.
- ✓ Water table is lowered due to loss of vegetation leading to water crisis.
- ✓ Increased human settlement has brought about increased waste which leads to poor sanitation and easy spread of diseases.
- ✓ Domestic and industrial wastes have led to increased air, water and land pollution.
- ✓ Swamp reclamation due to shortage of land for settlement and industrial development e.g. Kampala.

- ✓ Increased demand for building materials has led to destruction of vegetation and environmental degradation e.g. blasting of rocks.
- ✓ Concentration of buildings and concrete surfaces has led to increased heat hence global warming.
- ✓ Presence of too much dust and smoke in urban centers increase the formation of acid rains which don't support farming.
- ✓ Creation of green belts has created good scenic beauty of the environment e.g. constitutional square in Kampala.
- ✓ Quarrying for sands and concrete rocks creates pits and depressions which act as breeding grounds for mosquitoes and snails.
- ✓ Noise pollution from vehicles and recreational facilities e.g. concert halls.
- ✓ Increased surface run-off in times of heavy rains which leads to soil erosion.

Steps being taken to solve the environmental effects above

- ✓ Setting anti-pollution laws to reduce pollution e.g. treating industrial wastes.
- ✓ Attracting many Non-Governmental Organizations to teach people about environmental conservation.
- ✓ Encouraging urban planning efforts to streamline land use and reduce destruction of vegetation e.g. avoid settlements in swamps.
- ✓ Constructing high-rise or storied buildings to utilize available space and reduce competition for land.
- ✓ Introducing urban-rural strategies to stop rural-urban migration e.g. construction of roads, hospitals and schools in villages.
- ✓ Improvement of drainage channels within urban centers to reduce poor sewage disposal and water pollution.
- ✓ Encouraging the use of less pollutant energy e.g. Hydro electricity and bio-gas to reduce demand for wood fuel and charcoal.

- ✓ Planting greenbelts to improve on the climate of the towns e.g. lowering heat levels. ✕ filling in pits and depressions after quarrying to destroy breeding grounds for mosquitoes.
- ✓ Mass sensitization of people in the city about environmental conservation.
- ✓ Setting strict laws to ensure urban hygiene e.g. heavy fines for dropping litter and rubbish anyhow.
- ✓ Using alternative building materials to reduce demand for timber e.g. glass and metal.

Problems

- ✓ Shortage of food which results to famine and starvation.
- ✓ Overcrowding which results into congestion and poor hygiene hence easy spread of diseases.
- ✓ High cost of living due to competition for scarce resources.
- ✓ Poverty as a result of high dependency ratio.
- ✓ Environmental degradation through pollution, soil erosion, swamp reclamation and deforestation.
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- ✓ Industrialization is also being encouraged in most African countries to reduce over dependence on the land and reduce the level of unemployment.
- ✓ The governments are also trying very hard to establish enough social services such as health centres, schools and transport to contain the problem of congestion over these services.
- ✓ Encouraging monogamy to reduce polygamy.
- ✓ Raising the marriage age for girls to reduce early marriages.

TRANSPORT & COMMUNICATION IN EAST AFRICA

TRANSPORT IN EAST AFRICA

Transport is the movement of people and goods and services from one place to another.

There are four types of transport systems in East Africa.

- ✓ Land transport where people use; roads, railways, human portage & animals.
- ✓ Air transport
- ✓ Water transport
- ✓ Pipeline transport

Railway transport

This is mainly developed for the purpose of transporting bulky commodities. In east Africa, there are 3 major railway lines;

- i) Kenya-Uganda railway
- ii) Tanzam-Tazara railway.
- iii) Central Tanzania railway (Dar-es-salaam-Kigoma railway)

Advantages of Railway transport

- ✓ It's cheaper compared to road transport.
- ✓ Cheapest means to transport bulky commodities over long distances.
- ✓ It's not affected by traffic congestion.
- ✓ It's very convenient since it has specific time schedules.

Disadvantages of Railway transport

- ✓ It's generally slow compared to air and road transport.
- ✓ Rails are expensive to build and maintain.
- ✓ It's not flexible because it cannot be used where rails don't exist.

- ✓ Rails are almost restricted to generally flat land surfaces.

Role of railway transport to economic development of east Africa

- ✓ Promotes cross border trade between the East African countries hence increasing revenue.
- ✓ Promotes regional co-operation amongst the East African countries which promotes peace.
- ✓ Provides government with revenue through custom duties for national development.
- ✓ Provides employment opportunities e.g. engineers, police officials hence improved standards of living.
- ✓ Promotes industrial growth through the distribution of industrial goods to market centers.
- ✓ Promotes agriculture through linking farms to market centres.
- ✓ Open up remote areas for development leading to regional balance e.g. southern Tanzania.
- ✓ Facilitates movement of labour force through passenger transportation.

N.B. railway transport has greatly declined in Uganda due to vandalism/theft of rails especially the route from Kampala to Kasese.

2. Road transport It's the most common means of transport.

Advantages of Road transport

- ✓ It's the most flexible means i.e. can connect to all areas and offers a wide range of alternatives e.g. bicycles, cars, Lorries e.t.c.
- ✓ It's faster than railway transport.
- ✓ It's the best to transport bulky commodities over short distances.
- ✓ Roads are cheaper to construct than airports and railways.

Disadvantages of Road transport

- ✓ Relief features like hills and swamps make road construction very difficult.
- ✓ Traffic congestion is very common on roads leading to delays.
- ✓ Accidents are more common on roads than any other means of transport leading to loss of lives.
- ✓ Poor road surfaces due to poor workmanship is the major problem faced by roads.
- ✓ The roads require constant maintenance which is expensive.
- ✓ It is affected by insecurity in terms of highway robbers leading to losses.
- ✓ Dry weather roads are affected by heavy rainfall making them impassable.

Role of road transport to economic development

- ✓ It has helped in development of fishing by linking landing sites to market centers.
 - ☒ Promotes agriculture by linking rural areas to urban markets.
- ✓ Promotes cross border trade between the East African countries hence increasing revenue.
- ✓ Promotes regional co-operation amongst the East African countries which promotes peace.
- ✓ Provides government with revenue through custom duties, road licenses and driving permits for national development.
- ✓ Provides employment opportunities e.g. engineers, police officials hence improved standards of living.
- ✓ Promotes industrial growth through the distribution of industrial goods to market centers and transportation of raw materials.
- ✓ Promotes tourism by connecting to all tourist sites in the remote areas.
- ✓ Facilitates easy exchange of ideas necessary for national development.

- ✓ Helps to diversify the economy by promoting several activities e.g. lumbering and fishing which ensures high capital inflow.
- ✓ Promotes linear settlement pattern along roads which leads to urbanization and its advantages e.g. setting up of schools.

3. **Air transport** most important airports in East Africa are;

- i) Entebbe international airport in Uganda.
- ii) Jomo Kenyatta/Embakasi in Nairobi and Mombasa airport in Kenya.
- iii) Dar-es-salaam, Arusha and Moshi in Tanzania.

N.B. Jomo Kenyatta/Embakasi airport in Nairobi is the most important and has got the most connections and busiest schedules in East Africa.

Advantages of Air transport.

- ✓ It's the fastest over long distances especially across borders.
- ✓ It's very comfortable and less tire some.
- ✓ It's suitable for carrying high value commodities e.g. drugs, army weapons, computers and optical items e.g. watches.
- ✓ It's the best for transporting perishable goods/commodities e.g. flowers, fish and vegetables.
- ✓ It's not affected by traffic congestion.
- ✓ It's always on strict time schedule hence reducing delays.
- ✓ Doesn't require construction of the path ways/routes for aero planes.

Disadvantages of Air transport

- ✓ It's the most expensive.
- ✓ In case of an accident, chances of survival are very minimal.
- ✓ It's not flexible because it's not readily available in all areas.
- ✓ It's not effective in transporting bulky goods/ commodities.

- ✓ It's affected by poor weather e.g. fog leading to accidents.

Role of air transport in economic development

- ✓ It helps to promote tourism by transporting foreign tourists.
- ✓ It promotes international relationships which ensures world peace.
- ✓ It promotes international trade which increases government revenue for national development.
- ✓ Through international trade, it helps to promote agriculture which is the major activity in East Africa.

4. Water transport

This is the cheapest means of transport. It takes place on inland lakes and rivers and on the Indian Ocean.

N.B: River Nile is not used for water transport in Uganda because it's not navigable due to many waterfalls and rapids e.g. Bujagali, Owen falls, Rippon falls and Karuma falls.

N.B: A number of ports have been developed on major water bodies to ease water transport e.g. of inland ports include;

- a) Lake Victoria has got several ports which include: Musoma, Kisumu, Port bell (Luzira), Mwanza, Bukoba, Majanji and Kasensero.
- b) Lake Albert has got: Butiaba, Wanseko, Buliisa, Ndaiga, Panyimur and Ntoroko.
- c) Lake Edward has got Rwenshama.
- c) Lake Kyoga has got Kachung, Lwampanga and Nabyeso.
- d) Lake George has got Magyo.
- e) Lake Tanganyika has got Kigoma.
- f) Coastal Ports include: Mombasa, Dar-essalaam, Tanga, Malindi, Lamu, Mtwara and Lindi.

Advantages of water transport

- ✓ It's the cheapest.

- ✓ It's not affected by traffic congestion.
- ✓ Water ways are naturally available hence saving costs of construction.
- ✓ It can be used to transport bulky commodities e.g. timber.
- ✓ It connects distant areas e.g. islands.

Disadvantages of water transport

- ✓ It's only restricted to areas with only lakes and rivers i.e. not flexible.
- ✓ Accidents in water due to strong waves and poor visibility claim many lives.
- ✓ The water hyacinth and papyrus hinder navigation.
- ✓ Some rivers are seasonal and can't be used during the dry period e.g. river Mayanja.
- ✓ Water transport is very slow compared to road transport.
- ✓ Many rivers are not navigable because of waterfalls and rapids e.g. river Nile.

Role of water transport in economic development

- ✓ Promotes fishing due to easy movement on water bodies.
- ✓ Promotes agriculture by linking agricultural islands to market areas e.g. Kalangala.
- ✓ Promotes lumbering by helping in the distribution of timber products.
- ✓ Promotes cross border trade between the East African countries hence increasing revenue.
- ✓ Promotes regional co-operation amongst the East African countries which promotes peace.
- ✓ Provides government with revenue through custom duties for national development.
- ✓ Provides employment opportunities e.g. engineers, patrol officials hence improved standards of living.
- ✓ Promotes industrial growth through the distribution of industrial goods to

international market centers.

- ✓ Promotes tourism by connecting to all tourist sites in the island areas e.g. Kalangala.

5. Pipeline transport

This involves the transportation of gases, water and oil using pipes. It is highly used in urban centres for transporting domestics and industrial water through pipes e.g. water used in Kampala is mostly transported by pipelines from Ggaba on the shores of Lake Victoria.

Pipelines are also used in transporting oil (petroleum) from Mombasa to Eldoret via Nairobi.

Another pipeline was constructed from Dares-salaam to Kapiri-Mposhi in the Zambia copper belt to transport oil.

Advantages of pipeline transport

- ✓ It is a cheaper means of transporting liquids and gasses.
- ✓ It can be used to transport large volume of liquids and gasses at a single time.
- ✓ It is more reliable since it can even be used in politically unstable regions.
- ✓ It does not pollute the environment unlike roads and railways.

Factors influencing the distribution of major transport networks in east Africa

- ✓ Government policy whereby it can be for political or economic reasons. Areas that are economically viable will encourage government to construct roads and railways to exploit the resources.
- ✓ Regions with abundant economic potential e.g. mining centers tend to have more roads and railway lines compared to unproductive areas.
- ✓ Areas which are urbanized and are densely populated always have more transport routes than sparsely populated areas.
- ✓ Climate whereby areas with heavy rainfall tend to have better roads since they are affected by floods than in areas with dry conditions. However, areas which

receive heavy rainfall will also make road construction very difficult due to soft ground.

- ✓ Relief whereby steep areas make road and railway construction very difficult compared to low lands and flat areas which make road construction very easy.
- ✓ Drainage whereby areas with poor drainage e.g. swamps are avoided during road construction while well drained areas e.g. gentle slopes make it easy for road and railway construction.
- ✓ Areas with dense vegetation cover e.g. tropical rain forests will discourage road and railway construction while areas with savannah vegetation will attract road and railway construction. However government will always construct roads leading to forests so as to develop lumbering activities.
- ✓ Areas with water bodies like lakes and rivers will discourage road construction but instead lead to development of water transport. ☒ Flat areas also attract construction of airports compared to hilly areas which discourage construction of airports and airfields.
- ✓ Areas with fertile soils will attract large population which leads to construction of roads and railways unlike areas with infertile soils.
- ✓ Areas with tourist attractions will attract roads and airfields to ease movement of tourists unlike areas without major tourist attractions. ☒ Availability of capital: where there is enough capital for construction of transport means, government will always develop them than when there is inadequate capital for road construction.

Effects of transport on the environment

- ✓ Pollution from vehicles emitting fumes and oil spills from ships into water bodies.
- ✓ Smoke and smog have caused poor visibility.
- ✓ Creation of barren lands where rocks have been excavated e.g. along river channels.

- ✓ Increased temperatures/Global warming due to gas emissions.
- ✓ Loss of bio-diversity i.e. migration of water animals and bird species due to pollution.
- ✓ Destruction of forests and swamp reclamation to create land for roads and railways.
- ✓ Displacement of many people due to the need to expand roads and railway lines.
 - ✗ Encroachment on land for other land uses like fishing, forestry and agriculture.
- ✓ Destruction of scenic beauty of landscape by removing vegetation and rocks.

Problems facing the transport sector in East Africa

- ✓ Inadequate capital to establish and improve the transport and communication networks.
- ✓ Inadequate skilled manpower to help in the construction of transport and communication networks.
- ✓ Low levels of technology used to construct transport and communication lines.
- ✓ Steep relief in mountainous regions which makes it expensive to construct roads and railways.
- ✓ Physical barriers e.g. rivers, forests and deserts make the construction of transport lines very difficult.
- ✓ Harsh climatic conditions e.g. heavy rains lead to floods hence making roads impassable while mist and fog hinder air and water transport.
- ✓ Political instability e.g. wars make road construction very difficult and also during the wars, roads and railway lines are destroyed.
- ✓ Corruption and embezzlement of funds by ministry of transport and communication officials hence leading to poor roads.
- ✓ Poor government policies whereby roads, waterways and airfields are only constructed in areas where prominent politicians come from and other areas are neglected.
- ✓ Differences in political ideology whereby countries impose strict restrictions and

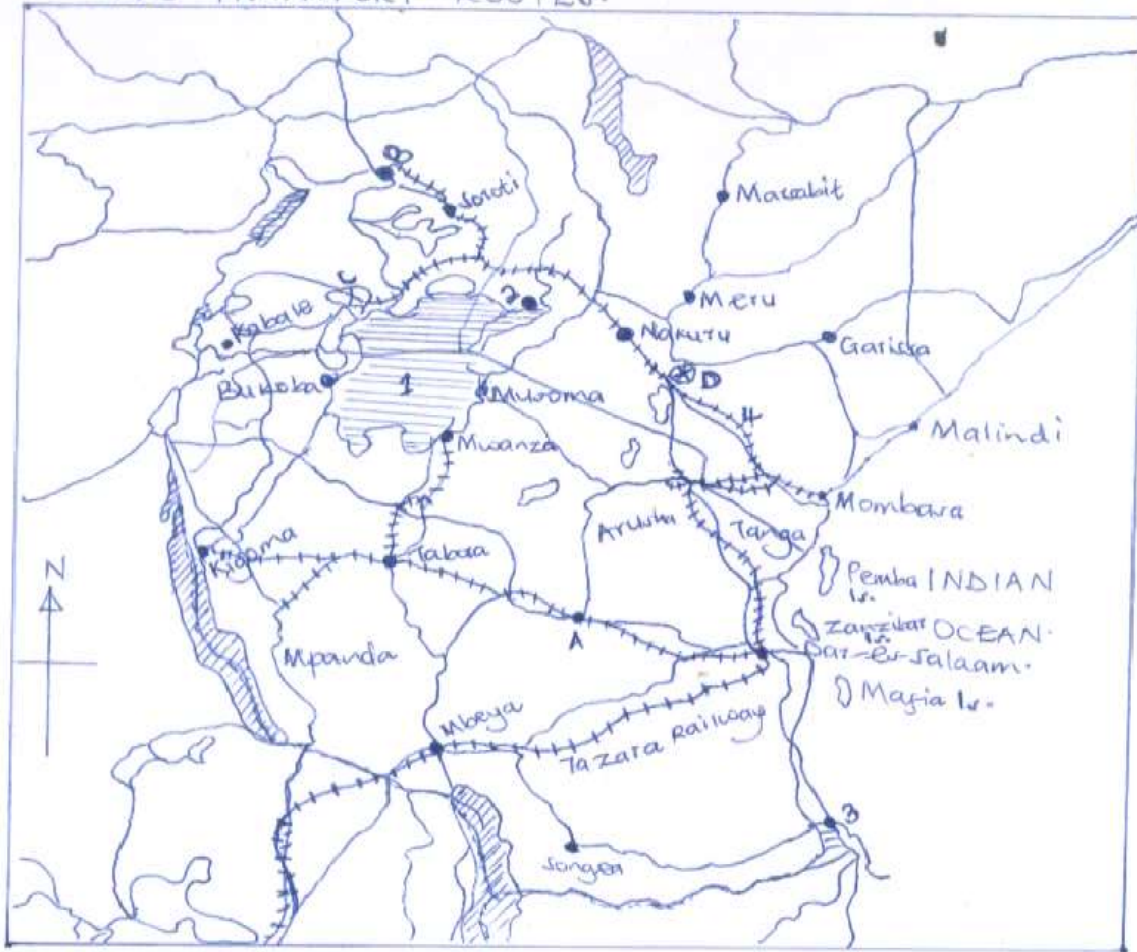
deny easy access to sea ports by land locked countries e.g. Uganda.

- ✓ Areas with clay soils have made road construction very difficult and expensive.
- ✓ It's very expensive to compensate people incase their land is to be taken by government to expand existing roads.

Solutions to the above problems

- ✓ Securing loans and grants from World Bank and developed countries to provide more capital for investment in transport development.
- ✓ Hiring expatriates who can construct modern and better roads and railways.
- ✓ Encourage training of local personnel to ensure enough skilled labour.
- ✓ Importation of modern tools and technology for constructing of modern roads and railways
- ✓ Construction of tunnels and use of cable cars to be used in areas with steep relief.
- ✓ Flushing out rebels and strengthening security to create peace which attracts investment in the transport sector.
- ✓ Fighting corruption by strengthening government organs e.g. police, parliament and Inspector General of Government (I.G.G).
- ✓ Ensuring balanced regional development and encourage equal resource exploitation for national development.
- ✓ Formation of regional blocks e.g. East African Community (E.A.C) to remove borders restrictions.

A SKETCH MAP OF EAST AFRICA SHOWING COMMUNICATION AND TRANSPORT ROUTES.



KEY

1	Lake Victoria
2	Kisumu Port
3	Mtwara Port
A	Dodoma town
B	Gulu town
C	Entebbe Airport
D	Nairobi Airport
4	Uganda Railway

	Roads
	Railways
	International Airport
	Towns
	Shipping Routes

Communication in east Africa.

Communication involves sending and receiving of knowledge and information from one place to another. It involves the person sending the information, the information itself, the medium through which the information is transferred and then the receiver of the information

Information or knowledge transferred from one place to another can be about business, education or health.

Activity 17.9 finding out the meaning of communication

In groups, move around your community and do the following tasks

- a) Interview people on the main traditional forms of communication in your community.*
- b) Are these traditional communication forms still commonly used? If not why?*
- c) Using your finding in a) and b), what do you understand by the term communication?*

Traditional forms of communication.

People used to communicate using traditional forms of communication such as

- ✓ Oral communication.
- ✓ Clapping
- ✓ Use of different instruments such as drums,

These form of communication were cheap and easy to use however, hose forms of communication were slow in providing the feedback.

Modern forms of communication.

The improvement in technology has led to use of better means of communication these include use of internet, smartphones, computer, and smart television etc. these are faster, efficient and carry more information than those that were used before.

Activity 17.7

- a) *Identify the forms of communication that were used;*
 - i. *Before digitalization*
 - ii. *After digitalization*
- b) *Explain the advantages and disadvantages of digital communication*
- c) *Describe the means you use to communicate with the people.*
 - i. *Close to you*
 - ii. *Far away from you.*
- d) *In relation to the 2020 covid 19 pandemic, discuss how communication has changed with the times and how people conduct business.*

Difference between transport and communication.

Transport is the movement of people and goods from one place to another while communication is the sending and receiving of knowledge and information from one place to another

The major transport types include road, air, railway, water and pipeline while the major type of transport include traditional and modern