TOPICS: Population, Agriculture, Mining and Fishing.

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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.

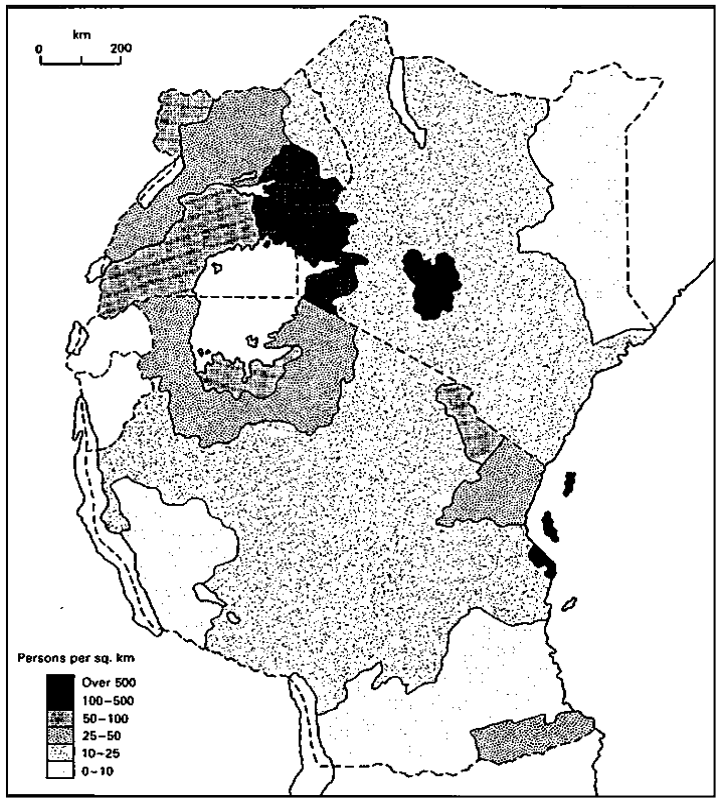
- Areas with **moderate population** density are between Kenya highlands and Nairobi and some parts of the rift valley in Kenya and Tanzania, northern Uganda in Gulu, Acholi land and Lira, western Uganda in areas of Hoima and Mubende.

- 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.

SKETCH MAP OF EAST AFRICA SHOWING POPULATION DISTRIBUTION



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 habour 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, Masai land 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;

- ***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.
- ***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 industrialization.

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 needed to develop economic activities.
- limited 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 due to low government revenue.

- It leads to under-utilization 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

Conditions that have led to high population density e.g. Shores of Lake Victoria, Kabale, Mbale and along the coast)

- Presence of 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-es-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 net work 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

Conditions that have led to low population density 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 $30^{o}C$ 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.

AGRICULTURE IN EAST AFRICA.

Agriculture is the practice of growing crops and rearing of animals. In East Africa, there are various systems of agriculture which are sub-divided into traditional systems and modern systems.

i. **Traditional/subsistence farming systems** mostly practiced in East Africa include nomadic pastoralism, shifting cultivation, bush fallowing and free range system.
ii. **Modern systems** include plantation farming, market gardening, irrigation farming, cattle ranching and poultry farming e.t.c.

a) SUBSISTANCE FARMING:

This refers to all systems of agriculture where farmers grow crops and rear animals for their own consumption and it is only when there is surplus, when selling can be done. It's subdivided into the following systems of agriculture;

1. SHIFTING CULTIVATION:

This system is sometimes referred to as **slash and burn** farming system. It is a system where farmers clear the vegetation, plant crops and upon realizing that the soil has lost its fertility, the land is abandoned and farmers go to another fresh area.

Characteristics of shifting cultivation

- Scientific methods of farming are not used.
- It employs only family labour because it's on small scale.
- Traditional tools like hoes, pangas, digging sticks, axes and fire are used.
- Food crops are mainly grown for home consumption e.g. potatoes, cassava, maize and sweet potatoes etc.
- Farming is carried out on a small scale hence low output.
- Farmers keep on moving from one place to another once soil has lost fertility and they don't come back.
- Farmers do not set up permanent houses because they keep on moving.
- Farming is practiced in sparsely populated areas with no permanent ownership of land.

Advantages of shifting cultivation.

- Provision of food especially for small families.
- The surplus can be exchanged on barter basis e.g. farmers obtain what they have not produced through exchange with their neighbours.
- Soil erosion is not serious because it's only a small piece of land which is cleared.
- Many crops are grown on the same piece of land which leads to high crop yields and reduced soil erosion.
- Farmers shift to better areas if there are more pests and diseases on the present land they occupy.
- Less capital is needed for investment.

Disadvantages

- Low output is realized due to operation on a small scale.
- Soil erosion is always experienced especially after bush burning and clearing.
- Areas where shifting cultivation is carried out are always underdeveloped.
- It can't be carried out in areas with dense population.
- It leads to deforestation which retards the growth of forestry industry.

2. BUSH FALLOWING:

This is another form of subsistence farming except that for bush fallowing, farmers stay in one place. Farmers leave the land under fallow (rest), to regain its fertility under the bush so that it can be re-used after some time. The length of the fallow period depends on population density. This practice is common in areas of Buganda, Teso and Kondoa district (Miombo woodlands among the Wagogo people).

Characteristics of Bush fallowing

- Farmers settle in one place but they keep on rotating fields around the same homestead.
- There is permanent ownership of land.
- Food crops are mainly grown but of recent some cash crops have been introduced e.g. vanilla, cocoa e.g. in Mukono.
- Traditional tools are used e.g. hoes, pangas, digging sticks e.t.c.
- There is construction of permanent houses because farmers don't move around.
- Some scientific methods are used e.g. application of fertilizers.
- The rotation of fields depends on the size of the land owned and the population density in that area.
- Family labour is mainly used.
- Little capital is invested by the cultivators.

Advantages of Bush fallowing.

- Provision of food capable of sustaining relatively big population.
- Reduces chances of soil erosion due to minimum application of scientific methods.
- Areas where bush fallowing is carried out are more developed than those where shifting cultivation is applied.
- It requires less capital since traditional tools are used.
- The surplus can be exchanged for income hence improving on the standards of living for farmers.
- Under bush fallowing, farmers can be able to grow perennial crops e.g. vanilla and coffee which is grown in Central Uganda e.g. Mukono.
- The soil under the fallow is left to regain its fertility which increases the crop yields.

Disadvantages of bush fallowing.

- It depends on nature and which results into low crop yields in case of low rainfall and hot temperatures.
- With the increasing population in East Africa, the demand for land has gone high and bush fallowing stands higher chances of drying out.
- It's a backward farming system which is not economically viable because it's mainly food crops which are grown.
- It encourages land fragmentation which causes land disputes, soil erosion and low output.

N.B due to population increase in East Africa, the traditional farming systems are slowly dying out/disappearing.

3. NOMADIC PASTORALISM:

This is another form of subsistence farming where farmers rear animals while moving from one place to another in search of water and pasture. Nomadic pastoralism is practiced by the ***Karamojong, Turkana, Bahima, Galla, Boran, Iteso and the Masai.***

N.B the Masai practice **Transhumance** which is another form of nomadism which involves moving from highland areas to low land areas in search of water and pasture. Transhumance is a form of subsistence farming where a farmer grazes his livestock down the slope and when the pastures are over, he grazes on the top slope and then down. It is practiced in highland areas especially around Mt. Kilimanjaro e.g. Machakos and near the Serengeti plains.

Characteristics of Nomadic pastoralism.

- It's practiced in sparsely populated areas e.g. North East Uganda and Northern Kenya.
- They occupy dry areas of East Africa which receive low rainfall of about 300 - 400mm per annum and temperatures are constantly hot e.g. over 30^{o}c.

- They keep on moving from one place to another in such for water and pasture.
- Land is owned communally i.e. there is no individual ownership of land.
- They set up temporary huts or settlements because they are always on the move e.g. the Manyattas of the Masai.
- They mostly keep local breeds of animals e.g. Ankole long-horned cattle, zebu, Boran etc.
- Cattle rustling i.e. stealing cattle from one another, is part of their culture.
- Crop growing isn't part of their culture but small scale farming is carried out and crops grown include millet, sorghum and cassava.
- Nomadic pastoralists keep large numbers of animals because they believe in quantity but not quality.
- The natural vegetation in areas occupied by nomads is always open grasslands and sometimes woodlands which is infested by tsetse flies.

Problems faced by nomadic Pastoralist in East Africa.

- Cattle rustling which leads to insecurity, loss of lives of the nomads and animals and destruction of property.
- They graze their animals communally which accelerates easy spread of diseases e.g. Nagana, sleeping sickness, East coast fever, foot and mouth disease etc.
- They always burn the vegetation in anticipation of better pasture during the wet season but when the rain comes, the bare soil is eroded.
- Nomads over graze the land for years which exposes it to agents of soil erosion and hence soil exhaustion.
- Low rainfall which leads to shortage of drinking water especially during the dry season.
- There is a problem of tsetse flies which spread Nagana and sleeping sickness to animals and people respectively.
- Shortage of storage facilities like refrigerators to store milk and houses for milk collecting centres and processing milk.
- Animals are fed on natural pastures which are of low quality leading to unhealthy conditions for the animals hence low quality output.
- Cultural rigidity or conservativeness, whereby the farmers do not attain any changes regarding to better farming methods.
- Areas occupied by nomads are neglected by governments hence leaving pastoral areas to lag behind in terms of development.
- There is frequent occurrence of famine due to inadequate food supply.
- Wild animals e.g. lions and leopards attack their animals e.g. the Karamojong near Kidepo valley national park.
- Land disputes are becoming common especially with crop growers whose farms are destroyed by the wandering animals.
- Nomads walk for very long distances in their bid to search for water and pasture for their animals.
- Population increase and land ownership have led to reduction grazing areas for nomads.
- Remoteness or inaccessibility due to poor transport has led to limited market for the animals and their products.
- Government neglect has led to limited veterinary services hence increased disease outbreaks.

Solutions to the problems facing Nomadic pastoralists.

- Emphasizing massive education to teach the pastoralists about the values of modern farming and living a settled life.
- Encouraging individual land ownership to reduce on overgrazing and its effects e.g. soil erosion.

- Construction of boreholes and valley dams to provide water to pastoralists during the dry season to reduce on their movements.
- Infrastructural development e.g. roads, hospitals to reduce remoteness of pastoral areas.
- Establishing of markets and milk processing plants near the pastoral areas to enable them sell their animal products.
- Extending the veterinary services e.g. cattle dipping to pastoral areas to fight pests and diseases.
- Encouraging pastoralists to grow some crops to diversify their economy and also fight famine.
- Encouraging free and accessible education to fight illiteracy and hence change their beliefs for modern farming.
- Formation of co-operatives so that they can acquire loans and market for their products.
- Practicing ranching and paddocking to control over grazing.
- Setting up anti-theft units to improve security hence reducing cattle rustling.
- Diversification of the economy e.g. through tourism to ensure constant capital inflow for government.
- Practicing cross-breeding to improve on animal breeds for better yields.
- Using quarantine or restricting animal movements to reduce the spread of animal diseases.
- Carrying out scientific research to introduce quality pasture for animals to improve on output.
- Setting up anti-stock units to reduce over stocking and number of animals kept hence reducing soil erosion.

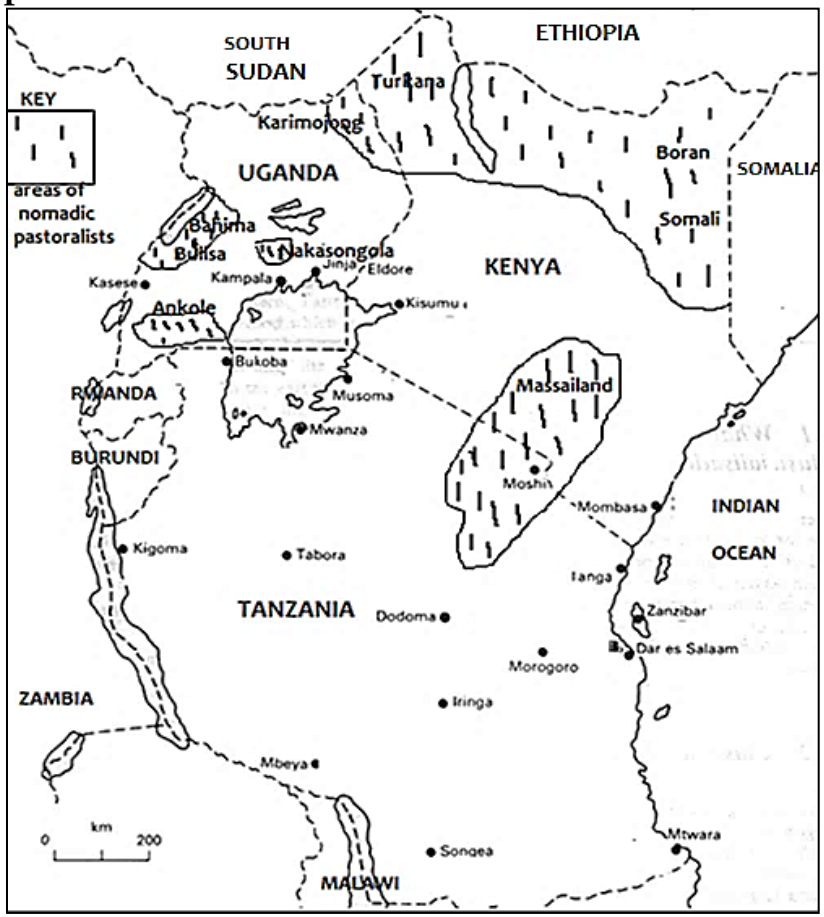
Importance / Benefits/ Contributions of nomadic pastoralism to the economy of East Africa.

- Source of human food with valuable proteins e.g. milk, meat/beef and blood.
- It's a source of income to the pastoralists by selling farm products hence improving on their standards of living.
- It's a source of employment e.g. through trade hence providing a livelihood for many people.
- It's a source of government revenue for setting up roads through taxing livestock transporters and dairy factories.
- The government earns foreign exchange used for setting up hospitals by exporting animal products e.g. hides and skins.
- It has helped to diversify the economy of East Africa hence ensuring constant capital inflow and reduced dependency on crop growing.
- Nomadic pastoralism has provided raw materials for industries which provide jobs e.g. meat packers and leather tanning industry.
- It has helped to put idle land into use hence reducing resource wastage e.g. Karamoja region.
- Animals are used for transport and for pulling ox-ploughs hence promoting farming.
- Animal wastes are used as a source of fuel e.g. cow dung is used for bio-gas hence offering alternative source of energy.
- Source of wealth for social and economic status e.g. bride wealth hence promoting cultural conservation.

Conditions that have led to persisted practice of Nomadic pastoralism in East Africa.

- Areas occupied by nomads are sparsely populated hence providing enough land for communal grazing.
- The areas are remote and located far away from centers of modernity leading to sparse population.
- The areas receive low and unreliable rainfall which can't support crops but can sustain pastoralism.
- Governments have deliberately ignored development in pastoral areas hence leaving them in their ways of life.
- The infertile sandy soils in these areas discourage crop growing but can support growth of pastures hence pastoralism.
- Cultural rigidity of the nomads makes them argue that it is the best way to live their lives.
- Low levels of education and ignorance has made nomads reject new methods of animal rearing.
- Presence of short savanna vegetation/grass lands which is open and favours movement of pastoralists without much forest vegetation.
- The gently sloping relief of the areas they occupy, makes it easy to move with their animals from one place to another.

A sketch map of East Africa showing areas occupied by pastoralists.



RANCHING IN EAST AFRICA.

It's the rearing of animals purposely for the production of meat. Ranching schemes are set up by government to act as demonstration farms to the nomadic pastoralists.

Examples in East Africa include;

- Kaputiel ranching scheme in Masai land.
- Ankole – Masaka ranching scheme among the Bahima.
- Aswa ranching scheme in Acholi.
- Agago ranching scheme in Karamoja.
- Singo and Buruuli ranching scheme for Peasants in Luweero and Nakasongola.
- Kongwa ranching scheme in Gogoland (Central Tanzania in Kondoa region).

1. ANKOLE – MASAKA RANCHING SCHEME:

- It's located in Mbarara, Masaka, Rakai, Sembabule and Lyantonde districts.
- The Bahima pastoralists are the beneficiaries of the scheme.
- This area receives unreliable rainfall and the dry seasons are longer than the wet seasons.
- Work on the scheme began in 1960 when rinder pest killed over 90% of the animals owned by the Bahima.
- Wild animals were also killed because they acted as hosts of tsetse flies.
- In 1963, spraying using insecticides began and bushes along the Mbarara – Masaka road were cleared.
- A research station was set up at Ruhenge to cater for cross-breeding between Red Poll, Angus, Zebu, Ankole long-horned cattle and Boran.
- A pasture station was set up at Muko to improve on the grass for feeding the animals.
- A market was set up at Sangu along the Ankole-Masaka highway to encourage the Bahima to sell their animal products.

Benefits of the ranching scheme.

- ✓ Weed killers have been applied to remove the unwanted plants.
- ✓ Leguminous grass has been planted which is nutritious for the animals to replace the unwanted spear grass from the ranches.
- ✓ Meat and milk collecting centres have been set up to encourage Bahima to sell the animal products.
- ✓ Veterinary services have been brought nearer to the pastoralists.
- ✓ Farmers have been encouraged to sell off some of their animals to control spread of diseases.
- ✓ Efficient transport systems have been developed to enable the farm products reach the urban market.

2. KONGWA CATTLE RANCH: - (central Tanzania) Kondoa region

- This was formerly a **ground nut scheme** occupied by the Wagogo people in the Gogoland.
- The area had very hard dry soils during the dry season and very wet soils in the wet season.
- Bushes were only cleared in the wet seasons because that is when all the roots could be uprooted.
- Today, the Kongwa ranching scheme is under the National Agricultural Company Limited with eight big ranches on 340,000 hectares with over 70,000 heads of cattle.

3. KAPUTIEL RANCHING SCHEME:

- It is a developed scheme within Masailand South East of Nairobi bordering river Athi.
- The Masai occupy a dry Savanna stretch from the Narok district of south-west Kenya to the Masai steppe of North East Tanzania.
- The ranches are not fenced but surrounded by ditches separating the different clans.

Benefits of the Scheme to the Masai cattle keepers.

- Cross-breeding has led to improved animal breeds which give off a lot of milk.
- Dipping of animals has also helped to control pests and diseases.
- There is improved water supply for the Masai animals through the construction of valley dams.
- Extension veterinary services are provided to provide assistance to the Masai against animal diseases.
- Schools were built and a few Masai children go to school.
- In Tanzania, a project called Masai development plan was introduced to improve the life of the Masai by putting in place ranches.
- Wheat growing, sheep and goat rearing have been introduced in Nandi districts to encourage them to grow some crops.
- Aerial spraying and bush clearing have been introduced in major lands to control tsetse flies and create more land for farming.
- The Masai cultivators are given incentives by the Kenya government to fence and cultivate their land.
- Roads, banks and hospital facilities have been introduced to improve their standard of living.

PLANTATION AGRICULTURE IN EAST AFRICA.

- It refers to the commercial farming where cash crops are grown on a large scale specifically for sale.
- Crops that are grown under plantation agriculture include; sugarcane, tea, sisal, coffee, pyrethrum, cloves, bananas and oil palm.
- The major plantations in East Africa include Kakira in Jinja for sugarcane, Lugazi (SCOUL) for sugarcane, Kasaku tea estate near Lugazi, Kericho tea estate, Mwea-Tebere for rice, Mumias for sugar, Kibimba (Tilda Uganda Limited) for rice, Kilombero for sugarcane and Morogoro sisal estate and Zanzibar clove estate.

Characteristics of plantation farming

- Cash crops are grown on a large scale e.g. range from 105-1000km^2 of land.
- It involves use of machines e.g. combined harvesters, collecting trucks, ploughs and tractors.
- Monoculture is mainly practiced i.e. growing a single crop on a large area.
- It involves use of abundant skilled and unskilled labour force.
- It involves use of scientific methods e.g. spraying and irrigation.
- It requires large capital input for buying large chunks of land, machines and paying workers.
- The land must be flat or gently sloping to favor the establishment of plantation farms and mechanization.
- Crops grown are mainly for sale and export.
- They provide social services to workers e.g. schools, hospitals, recreational facilities and houses to ensure high productivity.

Benefits of plantation agriculture to the people of East Africa.

- It has led to development of infrastructure e.g. roads, schools, hospitals leading to urbanisation.
- They employ many workers leading to improved standards of living.
- They increase on the tax base for government hence increased revenue used for developing roads.
- Foreign exchange is obtained from the exportation of the products used for developing hospitals.
- Leads to industrial growth through provision of raw materials especially to agro-based industries e.g. Kakira sugar works.
- Plantation farms provide market for the out growers' produce hence ensuring constant flow of income.
- Plantation farms encourage research leading to improved and better quality crops.
- Acquisition of skills by workers which helps them to ensure continuity on the job.

Disadvantages of plantation agriculture to the people of East Africa.

- It encourages rural-urban migration and its effects like unemployment, high crime rate and slum development.
- It leads to displacement of people from their own land hence leaving many people landless.
- It has reduced on the vegetation cover in East Africa leading to desertification e.g. clearing of Mabira forest by SCOUL.
- Monoculture practiced by farmers on plantation leads to soil exhaustion and erosion hence loss of soil fertility.
- They require large capital (capital intensive) yet majority of people in East Africa are poor leading to foreign ownership.
- There is increased multiplication of pests and diseases due to monoculture on these plantations.
- Profit repatriation as most for the plantation farms are owned by foreigners leading to less local development.

Note:
Out growers are farmers adjacent to plantations who grow similar crops as those grown on plantations and they therefore sell their crops to the plantation owners.

IRRIGATION FARMING IN EAST AFRICA.

- Irrigation is the artificial adding of water to the soil.
- Irrigation schemes in East Africa are both small and on large scale.
- They are found in both dry and wet areas in East Africa.
-

Reasons why irrigation is carried out in East Africa.

- In many parts of East Africa, rainfall is inadequate hence the need for adding water artificially e.g. in Kasese.
- There is need to increase food production through irrigation to sustain the ever increasing population.
- Some crops need too much water which can be easily provided through irrigation e.g. rice, sugarcane, yams etc.
- Irrigation is carried out to maintain moisture in the soil in order to help in the maintenance of soil fertility.
- Some areas receive very hot temperatures and they lose a lot of water through evaporation in the dry season hence the need for irrigation e.g. Kasese and Mobuku valleys.
- The government policy of opening up remote areas and improvement of agricultural productivity has also led to irrigation.

- Existence of extensive free land due to sparse population in dry areas has also led to use of irrigation.
- Presence of rivers that provide permanent sources of water for irrigation e.g. river Malaba for Doho irrigation scheme.
- Availability of adequate capital to buy the machines e.g. water pumps and to extend social infrastructures e.g. railway lines e.t.c.
- Existence of gently sloping land which favours irrigation by gravity flow of water e.g. at Mwea-Tebere.
- Existence of modern technology which ensures use of irrigation e.g. overhead sprinkling at Kilombero.

Examples of irrigation schemes in East Africa include;

Country	Irrigation scheme	Source of water for irrigation	Crops grown
Uganda	1. Doho (Manafwa district)	River Manafwa	Rice (major)
	2. Kibimba (Bugiri district)	River Kibimba	Rice (cassava)
	3. Mobuku (Kasese district)	River Mobuku & Sebwe	Maize and cotton
Kenya	1. Ahero pilot scheme(Kano plains in Western Kenya)	River Nyando	Rice
	2. Galole pilot scheme	River Tana	Cotton
	3. Mwea-Tebere	River Thiba, Tana & Nyamindi	Rice
Tanzania	4. Mumias	River Nzoia and River Khaleba	Sugarcane
	1. Kilombero	River Kilombero and Ruaha	Sugarcane

KILOMBERO VALLEY IRRIGATION SCHEME.

- The scheme started in 1960 and it became a government parastatal called Sugar Development co-operation in 1968.
- Today, it employs over 46,000 workers and it contributes 40% of the total sugar production in Tanzania.
- It has mainly encouraged the development of out- growers' schemes.

Aims of Kilombero valley irrigation scheme.

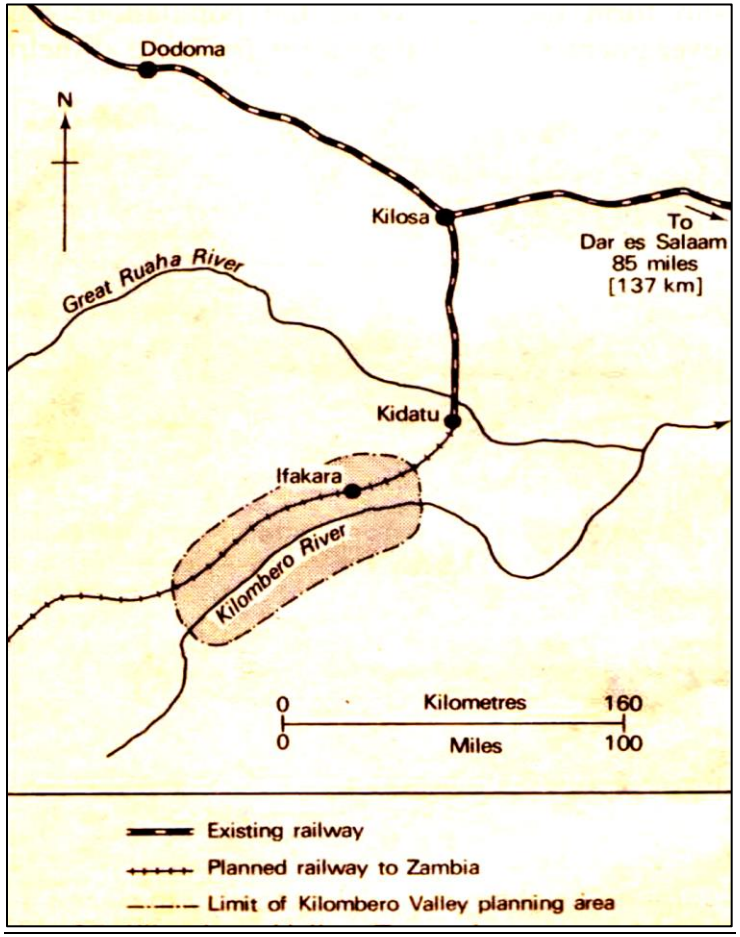
- To control flooding of river Kilombero and Ruaha in the area.
- To reclaim the fertile land for farming along River Kilombero.
- To open up the remote and poor areas of southern Tanzania economically.
- To diversify the economy of the area especially the out growers to ensure constant flow of income.

Factors that favored location of the scheme.

- Presence of rivers such as Kilombero and Ruaha that provide constant supply of water for irrigating sugarcane.
- The gently sloping land which favors use of machines for large scale farming e.g. ploughs and tractors.
- The flat nature of the area which favors irrigation by use of gravity flow of water.
- Extensive land due to sparse population also provided enough land for the large scale irrigation scheme.
- Availability of deep and well drained fertile alluvial soils deposited by R. Kilombero for the growing of sugarcane.
- Hot temperatures of about 23^{o}C and above which favor the growth, ripening and harvesting of sugarcane.
- The rainfall is unreliable hence leading to the use of irrigation to supplement the rainfall.
- Presence of ready market for the sugar which is both local and international e.g. Zambia.
- Supportive government policy to open up remote areas in southern Tanzania also led to the setting up of the scheme.

- Opening up of the Tanzam-Tazara railway in 1975, also increased accessibility to the area hence providing cheap transport.
- Availability of adequate capital from Kilombero Company for investment e.g. Buying machines, land and paying workers.
- Availability of abundant and cheap labour to work on the scheme e.g. from the surrounding communities.

A Sketch map showing the site of Kilombero irrigation scheme.



Benefits of Kilombero irrigation scheme.

- It has provided employment opportunities for the Tanzanian population hence improving their standards of living.
- It has led to the development of roads and railways e.g. the extension of Tanzam-Tazara railway which has made transport easier.
- It has diversified the agricultural activities within the area which helps to fight food insecurity.
- It has put idle land into good use hence ensuring resource utilization and reducing resource wastage.
- Sugar is exported and this brings in foreign exchange used for developing infrastructures e.g. roads.
- International relationship has been created between Tanzania and other countries e.g. Zambia leading to peaceful co-existence.
- It is a source of government revenue through taxation which is used for developing infrastructures e.g. hospitals.
- Source of sugar which is a vital commodity for the people in the area.
- It has helped to control the diverse effects of flooding in the area hence reducing on destruction of property.
- Infrastructure has been developed e.g. roads, schools, hospitals and markets leading to urbanisation e.g. Kidatu, Ifakara and Kilosa towns.
- Has led to development of research in sugarcane varieties hence boosting people's knowledge.
- It has led to establishment of processing industries which have provided employment opportunities to the people in the area.
- The scheme has helped resettle people who were formerly landless and jobless hence reducing on land wrangles and crime in the area.

Problems facing the farmers on the irrigation scheme.

- Diseases e.g. yellow wilt that destroys the sugarcane leading to reduced output.
- Soil exhaustion due to monoculture leading to low output hence low export potential.
- Leaching of soil due to the excessive water which leads to poor soils hence low productivity.
- Pests e.g. snails which destroy the sugarcane hence leading to poor quality output.
- Price fluctuation due to over production and competition with other sugar producing countries e.g. Uganda leading to low morale of farmers.
- Shortage of labour especially during the harvesting period due to low population in the area.
- Fire out breaks which destroy large parts of the farms leading to losses for the scheme.
- Dangerous animals like snakes which scare away the farmers leading to labour shortage.
- Presence of weeds which compete with sugarcane for water and soil nutrients leading to poor quality output.
- Silting of the canals by floods which calls for regular dredging yet it's very expensive.
- It requires high capital investment to operate the scheme yet capital is not readily available.
- Salinity of the soils due to excessive evaporation as a result of hot temperatures in the area.
- Inefficient transport within the scheme which makes the delivery of sugar to the markets very difficult.
- Natural hazards e.g. hailstorms and strong winds also destroy large parts of the scheme leading to losses.

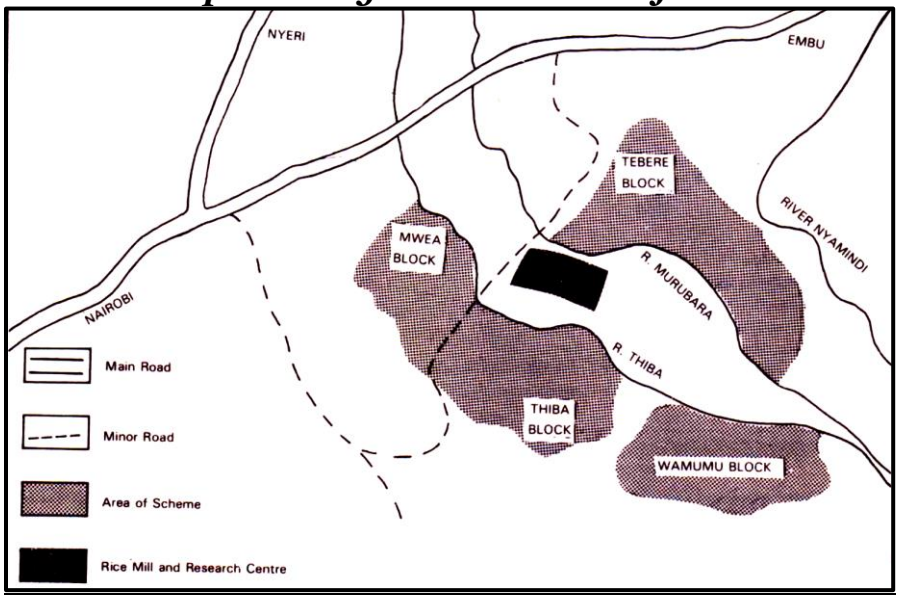
Steps being taken to solve the problems.

- Spraying of crops by using pesticides to avoid pests and diseases.
- Price control by government and production by quota system to avoid price fluctuation at the world market.
- Research on better sugarcane varieties to increase production and quality.
- Applying fertilizers and manure to increase soil fertility and ensure high productivity.
- Use of herbicides to control weeds and reduce competition for soil nutrients.
- Controlling fire outbreaks by living bare land between plots (patching) to stop fire from spreading.
- Diversification of agriculture to reduce over reliance on sugarcane growing e.g. introduction of ranching.
- Encouraging mechanization to solve the problem of labour shortage especially during harvesting.
- Acquiring loans from banks to provide large capital base for farm operations.
- De-silting and dredging of canals to control floods and ensure proper flow of water.
- Construction of feeder roads and railways within the scheme to improve accessibility to markets.

MWEA-TEBERE IRRIGATION SCHEME.

– It's the largest irrigation scheme in East Africa.
– Water is got from River Thiba, River Nyamindi and River Tana.

A sketch map showing site and extent of Mwea-Tebere.



Aims of the scheme of Mwea-Tebere.

– To provide employment to the political detainees.
– To resettle the land less people.
– To produce rice and other food crops on large scale.
– To develop the area of North East Kenya.

Conditions which have favored the location of Mwea-Tebere project.

– Availability of permanent water sources e.g. River Nyamindi, Thiba and Tana to provide water for irrigation.
– The gently sloping landscape i.e. the piedmont plain on the lower slopes of mountain Kenya allowing irrigation by gravity flow.
– The presence of fertile black volcanic soils for cotton and red clay soils which support rice growing.
– Availability of extensive tracts of land which was sparsely populated hence providing free land for the project.
– The area receives low and unreliable rainfall of 750mm per annum which favors irrigation.
– Supportive government policy of setting up irrigation schemes to develop remote areas of Mwea-Tebere.
– Availability of adequate capital for investment e.g. to purchase farm inputs and tools to be used for farming.
– Availability of ready market both local and international for the farm produce.
– Availability of well-developed transport lines e.g. Nairobi-Nyeri railway line for delivering rice to markets.
– Presence of landless people who were ready to be recruited and provide cheap labour to work on the scheme.

Benefits of Mwea–Tebere irrigation scheme.

– Source of food especially rice for human consumption.
– Provided employment opportunities to the farmers hence improving their standards of living.
– The project has helped to re-settle people who were formally landless.
– The project has led to improvement in the infrastructure e.g. roads which has improved transport in the area.
– Flooding of the rivers has been controlled hence improving the safety of lives of the people around.
– It's a source of government revenue through taxes used to develop infrastructures e.g. roads.
– It has led to improvement in research hence resulting into high crop yielding varieties.
– The project led to effective utilization of the land which could have remained idle hence reducing resource wastage.

- It has led to development of processing industries which have led to urbanisation e.g. the rice mill at Mwea-Tebere.
- Infrastructural development has led to urbanisation e.g. Thiba and Embu towns.
- It has led to large scale output hence encouraging exports leading to acquisition of foreign exchange by government.

Problems faced by farmers on the scheme.

- Pests which destroy stored crops leading to losses e.g. rice weevils.
- Diseases also destroy crops leading to low output e.g. rice blast and rice rust.
- Price fluctuations due to over production which discourage the farmers from further production.
- Weather changes which affect the output e.g. cool temperatures and heavy storms which destroy the crops.
- Reduction in soil fertility due to monoculture leading to low output.
- Weeds which compete with crops for soil nutrients leading to low quality output.
- Limited capital for further investment which also leads to reduced output.
- Soil salination due to high evaporation rates in the area leading to low output.
- Inadequate labour force especially during the harvesting period which brings activities to a standstill.
- Silting of canals which cause floods leading to destruction of farmlands.

Steps being taken to solve the problems.

- Spraying of crops by using pesticides to avoid pests and diseases.
- Price control by government and production by quota system to avoid price fluctuation at the world market.
- Research on better rice varieties to increase production and quality.
- Applying fertilizers and manure to increase soil fertility and ensure high productivity.
- Use of herbicides to control weeds and reduce competition for soil nutrients.
- Weather studies are emphasized to reduce effects of weather destruction.
- Diversification of agriculture to reduce over reliance on rice growing e.g. introduction of cotton and peas.
- Encouraging mechanization to solve the problem of labour shortage especially during harvesting.
- Acquiring loans from banks to provide large capital base for farm operations.
- De-silting and dredging of canals to control floods and ensure proper flow of water.

TYPES OF CROPS GROWN IN EAST AFRICA.

a) *Perennial crops:*

These are crops that take more than 1 year from the time of planting to the time of the first harvest e.g. coffee, tea, tobacco, sugarcane. Most of these crops require heavy rainfall throughout the year.

b) *Annual crops:*

These are crops which are grown and harvested in one season or harvested within a year e.g. beans, peas, cereals. Such crops require alternate wet and dry seasons.

1. *Sugarcane growing in East Africa.*

Sugarcanes are widely grown around Lake Victoria shores at Lugazi, Kakira in Jinja, Mumias in Nyanza province, Bukoba and along river Kagera, in Rakai (Sango bay), at

Kinyara (Masindi) and Kilombero valley irrigation scheme.

Conditions for the growth of Sugarcane.

- High levels of humidity which ensures heavy rainfall for proper growth.
- Average temperatures of about 20^{o}C and above especially during the harvesting season.
- Low altitude between 0-150m below sea levels to ensure warm temperatures for proper growth.
- Heavy rainfall of about 1500mm spread over 9months or with use of irrigation especially during the planting period.
- Deep and well drained fertile alluvial soils for the growing of the sugarcanes.
- Abundant and cheap labour force especially during the planting, weeding and harvesting periods.
- Gently sloping landscape for easy drainage of water in the soil.

*2.**Pyrethrum growing in East Africa.***

This is a white flowering plant which contains a chemical substance used in insecticides. Mainly grown in high altitude areas e.g. in Kenya along the slopes of Mt. Kenya, Aberdares ranges, Kikuyu land, and slopes of Mt. Kilimanjaro, Arusha, Mt. Meru, Mbeya and Usambara ranges and Southern highlands in Tanzania.

Conditions for its growth pyrethrum.

- Fairly cool and moist conditions for plant growth.
- High altitude of about 1000m to 1800m above sea level to ensure cool conditions.
- Well drained and fertile loam soils for proper plant growth and high yields.
- Heavy and reliable rainfall of about 1500mm per annum for high yields of the crop.
- Cheap and abundant labour especially during the harvesting period.
- Well-developed transport routes linking to industries since it's grown in highland areas.
- Extensive land for large scale growing to ensure high output.
- High humidity all year round for luxuriant growth of the crop.
- Abundant sunshine for ripening and harvesting of the crop.
- Supportive government policy to encourage plantation agriculture.
- Gently sloping landscape for easy movement of the workers.
- Ready market for the crop which is both local and international e.g. in China.

*3. **Coffee growing in East Africa.***

This is the chief exchange earner crop of Uganda but Kenya is the biggest producer in East Africa. There are two types of coffee;

- **Arabica coffee**:
  Mainly grown on the slopes of mountain Elgon, Rukungiri, Kabarole, Kabale, Aberdares ranges, Mt. Kenya, Kilimanjaro slopes, Mt. Usambara and Mt. Meru near Arusha and Moshi.
- **Robusta coffee:**
  Mainly grown along Lake Victoria basin covering districts like Mukono, Mityana, Masaka and Rakai in Uganda. Its also grown in Bushenyi, Nebbi, Kapchorwa, Masindi, Hoima, Busia and Fort Portal. In Tanzania, it's grown around Bukoba and in the southern highlands.

Conditions for the growth of coffee.

- Fertile and well drained soils i.e. alluvial for Robusta and Volcanic for Arabica for growing the crop.
- High altitude of about 1500 – 2300m for Arabica and low altitude of about 1000-1500m for Robusta.
- Generally, average/moderate temps not exceeding $25^{o}C$ for proper maturity of coffee.
- Heavy rainfall between 1000mm – 1500mm of rainfall needed during the planting season.
- Protection from strong winds by practicing agro-forestry.
- Alternate spraying to control pests and diseases e.g. the coffee berry.
- Cheap and abundant labour needed especially during the harvesting season.
- Adequate capital needed for buying fertilizers, pesticides and farm implements.
- Very hot temperatures of about $27^{o}C$ for drying of the coffee.
- High humidity which ensures heavy rainfall total for proper growth.
- Presence of extensive and gently sloping land for the growing of the crop.
- Availability of ready market both local and international.

Uses of coffee.

- Used as a beverage for drinking after processing.
- Coffee husks are a good source of manure used to improve soil fertility.
- Coffee husks and wood are used as fuel for cooking in rural areas.
- Coffee husks are also used as litter in poultry shelters.
- Coffee stems are used as building materials e.g. in mud houses.
- Used as a herbal medicine especially in Buganda and Bunyoro.
- Coffee is also used in the manufacture of gun powder for making bullets.

Problems facing coffee production in East Africa

- Pests which destroy large parts of farms leading to losses e.g. termites.
- Diseases which lead to poor quality output such as coffee wilt disease and coffee berry disease.
- Limited land for coffee plantations due to ever increasing population.
- Soil exhaustion due to monoculture leading to low and poor quality yields.
- Competition with other coffee producing countries like Brazil and Ivory Coast leading to inadequate market.
- Low prices and unstable coffee prices leading to price fluctuation on the world market which demoralizes the farmers.
- Prolonged drought and hailstorms which destroy coffee flowers leading to low output.
- Competition with other beverages e.g. tea, cocoa and vanilla which reduces demand.
- Dangerous animals e.g. snakes, wasps and bees which attack the workers hence scaring them away.
- Inadequate storage facilities which leads to losses due to rotting of the coffee and destruction by pests.
- Coffee has a long gestation period of about $3^{1}/_{2}$ years until the first harvest which also demoralizes the farmers.
- Shortage of extension workers to train people on how to attend to coffee properly.
- Post-harvest losses also demoralize the farmers e.g. theft

which leads to losses for the farmers.
- Remoteness / underdeveloped road and water transport to link up to market centers which delays in delivery.

4. TEA:

- It's obtained by plucking, drying and curing the young leaves of the shrub tree.
- In Kenya, it's grown around Kericho and Limuru.
- In Tanzania, its grown around Iringa and Mbeya, Southern highlands and on slopes of Mt. Kilimanjaro.
- In Uganda, it's grown around Lake Victoria regions in Lugazi at Kasaku Tea estates, Mityana, Bushenyi, Fort Portal and Kigezi.
- Harvesting takes about 3-4years after planting.

Conditions that favour the growth of tea in East Africa.

- Warm but not exceedingly hot climate for proper maturity of the crop.
- Fairly heavy rainfall of about 1500m which is well distributed over the growing period.
- Deep, acidic and well drained fertile alluvial Soil for the growing of the crop.
- Protection from strong winds by practicing agro-forestry.
- Alternate spraying to control pests and diseases e.g. leaf rust.
- Cheap and abundant labour needed especially during the harvesting season.
- Adequate capital needed for buying fertilizers, pesticides and farm implements.
- Careful pruning and regular hoeing to kill weeds**.**
- Availability of ready market both local and international to buy the crop.

Problems faced by Tea growers in East Africa.

- Competition with unwanted weeds for plant nutrients leading to poor quality produce e.g. couch grass.
- Pests e.g. yellow tea termites and aphids which destroy the crop leaves leading to losses.
- Diseases e.g. root fungus disease which leads to poor quality output.
- Inadequate capital yet expensive machinery is used in tea processing.
- Scarcity of labour to do plucking during the harvesting period.
- Competition with other beverages such as Coffee, Vanilla and Cocoa which reduces market for tea.
- Limited land for tea plantations due to ever increasing population.
- Soil exhaustion due to monoculture leading to low and poor quality yields.
- Competition with other tea producing countries like Brazil and Malaysia leading to inadequate market.
- Unstable tea prices leading to price fluctuation on the world market which demoralizes the farmers.
- Natural hazards e.g. hailstorms which destroy large parts of plantations leading to low output e.g. at Kericho.
- Dangerous animals e.g. snakes, which attack the workers hence scaring them away.
- Inadequate storage facilities which leads to losses due to rotting of the tea and destruction by pests.
- Tea has a long gestation period of about 3 to 4 years until the first harvest which also demoralizes the farmers.

5. ***Sisal growing in East Africa.***

- Is a fiber crop that can be grown in most parts of East Africa including those with dry and unreliable rainfall and infertile sandy soils.
- Tanzania is the major producer and it's grown mainly along the coast near Tanga, Lindi and Dar-es-salaam.
- In Kenya, its grown along the coast in near Mombasa, Masai land and near Nakuru.
- Sisal is a fiber crop used for making sacks and ropes.

***Conditions that have favoured growing sisal* in East Africa.**

- Needs constantly hot temperatures above 20°C to grow well.
- Grows well at an altitude of about 900-1500m above sea level.
- Requires an annual rainfall of about 650mm needed during the planting season and can also tolerate drought.
- A long dry season for harvesting the crop.
- Requires moderately fertile sandy-loamy soils for growing the crop.
- A large labour force needed especially during the planting and harvesting season.
- Extensive and flat landscape because the crop can't be grown alongside other crops and needs a lot of spacing.
- Availability of ready market both local and international to but the crop.

Problems faced by sisal growers in East Africa.

- It's affected by diseases such as Honey dew and leaf blight which lead to poor quality output.
- Weather changes e.g. heavy rains lead to rotting of the stems hence losses for farmers.
- The crop is thorny which makes it difficult to harvest.
- Requires a lot of capital investment to buy farm equipment e.g. gum boots and gloves.
- Competition from synthetic fibres e.g. nylon and polythenes which reduces market for sisal products.
- Soil exhaustion due to monoculture leading to low quality yields.
- Scarcity of labour especially during the harvesting period.

6. ***Tobacco growing in East Africa.***

- It's a commercial non-food plant which is consumed by smoking and by chewing.
- It's used in the manufacturing of cigarettes.
- It's widely grown in the west Nile region of Uganda e.g. Arua, Adjumani, Nebbi, Yumbe and Moyo.
- Other areas where its grown in Uganda include; Kiryandongo, Nakasongola, Kigezi, Bushenyi, Wakiso, Mubende, Masindi, Oyam and in Soroti.
- In Tanzania, it's grown around Urambo area within the Miombo woodlands, Tabora, Songea and Iringa.
- In Kenya, it's grown in Kikuyu land e.g. Nyeri and Nyahururu and also near Eldoret, Kitale, Nakuru and Limuru.

Conditions that favour the growing of Tobacco in East Africa.

- Warm temperatures of between 13-27°C for proper maturity of the crop.
- An average altitude of between 900-1500m above sea level for proper growth.
- Light and well-drained fertile sandy-loamy soils for the growing of the crop.

- Moderate rainfall of about 380-500mm needed in the first $3^1/_2$ months for the growing of the crop.
- Warm and moist conditions during the ripening and harvesting period.
- Gently sloping and extensive land for growing the crop.
- Abundant and cheap labour force needed for planting, weeding, spraying and harvesting of the crop.
  - Protection from strong winds by practicing agro-forestry.
  - Alternate spraying to control pests and diseases e.g. aphids and leaf rust.
  - Adequate capital needed for buying fertilizers, pesticides and farm implements.
  - Presence of ready market which is both local and international to buy the crop.

Problems facing Tobacco growers in East Africa.

- Competition with unwanted weeds for plant nutrients leading to low quality yields produced.
- Pests e.g. aphids which destroy the crop leaves leading to losses.
- Diseases e.g. root fungus disease which leads to poor quality output.
- Inadequate capital yet expensive machinery is used in tobacco processing.
- Scarcity of labour to do the plucking during the harvesting period.
- Competition with other countries producing cigarettes e.g. Marlboro and Rex from USA.
- Limited land for tobacco plantations due to ever increasing population.
- Soil exhaustion due to monoculture leading to low and poor quality yields.
- Unstable prices leading to price fluctuation on the world market which demoralizes the farmers.
- Natural hazards e.g. hailstorms which destroy large parts of plantations leading to low output.
- Dangerous animals e.g. snakes, which attack the workers hence scaring them away.
- Inadequate storage facilities which leads to losses due to rotting and destruction by pests.

7. Rice growing in East Africa.

- In Uganda, it's grown in Pallisa, Namutumba, Bugiri, Manafwa and Iganga in eastern Uganda.
- Upland rice does not require a lot of water and so it's grown in Wakiso, Kayunga and Mukono districts.
- It's also grown at Kibimba rice scheme, Doho rice scheme, and Olwenyi rice scheme near Lake Kyoga.
- **In Kenya,** it's grown in the Nyanza Province e.g. Bungoma and near Mumias in western Kenya.
- Rice growing is also supervised on irrigation schemes e.g. Mwea-Tebere, Ahero and also grown by peasants on banks of River Tana.

- **In Tanzania,** rice is grown at Kilombero irrigation scheme, southern shores of Lake Victoria e.g. at Bukoba, southern shores of Lake Malawi, along river banks e.g. river Rufiji, river Pangani and river Wami.

Conditions that favour the growth rice in East Africa.

- Heavy rainfall of about 1500mm per annum needed during the planting season for proper growth.
- Flooded conditions with a soil depth of over 25m and the water should not be always stagnant.

- Hot temperatures of over 20°C especially during the planting and harvesting season.
- Heavy clay-loamy soils with a high moisture and water retention capacity.
- Fertilizers particularly nitrogen, phosphorous and potassium to ensure soil fertility due to monoculture.
- Level ground surface to easily allow flooding during the growing period. It grows so well in deltas.
- Requires a lot of cheap labour to cultivate and harvest the crop.
- High capital investment to buy fertilizers, land and farm equipment e.g. combined harvesters.
- Proper storage facilities should be availed to reduce destruction by pests e.g. rice weevils.
- Extensive landscape because the crop can't be grown alongside other crops.
- Well-developed transport routes linking to stores and industries because the crop is grown in swampy areas.

Problems experienced by rice growers in East Africa.

- Pests e.g. rice weevils destroy the stored rice leading to losses for the farmers.
- Diseases e.g. rice blast attack the crop leading to poor quality output.
- Loss of soil fertility due to practice of monoculture.
- Threat of snakes that attack and kill the farmers.
- Weather failure such as drought which leads to stunted growth of the crop.
- Gazetting of wetlands for ecological reasons e.g. tourism has reduced land for rice growing.
- Water borne diseases e.g. bilharzia and cholera attack the farmers hence reducing labour force.
- Competition from other rice producing countries e.g. Pakistan and Vietnam which reduces market for local rice.
- Poor transport facilities leading to markets, stores and industries hence delaying deliveries for processing.
- Inadequate capital for buying farm implements and fertilizers.
- Poor storage and packaging facilities which leads to attacks from pests e.g. rice weevils.
- Birds are a common threat because they destroy rice fields leading to losses.

*8. **Cotton growing in East Africa.***

- Cotton is a fiber grown in well drained soils in areas with unreliable rainfall mainly savanna climate and grasslands.
- In Uganda. It's grown in districts of: Gulu, Lira, Soroti, Tororo, Oyam, Dokolo, Amolatar, Kaberamaido, Iganga, Kasese, Apac and Kamuli.
- In Kenya, it's grown in the Nyanza province near Kisumu and Bungoma.
- In Tanzania, it's grown near Tabora, Kondoa region and in Sukuma land.

Conditions that favour the growing of cotton in East Africa.

- Alternating wet and dry season for growing and harvesting respectively.
- Relatively flat or undulating landscape for mechanized farming.
- Warm or Hot temperatures above 20°C for ripening and harvesting of the crop.
- Fairly deep and fertile black loamy soils for the growing

of the crop.
- Moderate to light rainfall of about 510mm needed during the planting season.
- Large supplies of labour for planting and picking/harvesting of the cotton.
- Large amounts fertilizers to enrich the soil with favourable nutrients.
- Proper storage facilities in form of ginneries to reduce losses due to cotton stainers.
- Adequate capital used for buying farm implements e.g. hoes and fertilizers.
- Well sheltered from strong winds by practicing agro-forestry.

Problems facing cotton farmers / growing in East Africa.

- Pest e.g. cotton boll weevils and cotton strainers which destroy large parts of farms leading to losses.
- Cotton diseases e.g. leaf rust also lead to poor quality output.
- Political instability especially in northern Uganda that disrupted cotton cultivation for a very long time.
- Climatic hazards like flooding due to heavy rains or hailstorms that destroy large parts of farm lands.
- Collapse of cotton ginneries and factories which reduces market for cotton.
- Inadequate storage facilities hence loss of cotton.
- Poor transport facilities linking to market centres.
- Competition with synthetic fibers like silk and polyester which reduces cotton demand.
- Inadequate labour force especially during the harvesting period.

Steps taken to improve cotton growing in East Africa.

- Establishment of cotton ginneries to create market for cotton.
- Development of transport routes linking to market centres.
- Application of fertilizers to increase land productivity.
- Improved political stability to ensure that farmers are settled down to cultivate cotton.
- Application of irrigation farming to control weather failures e.g. prolonged drought during the planting season.
- Research to develop improved cotton varieties which give off high yields.
- Spraying to control pests and diseases.

Uses of cotton.

- Used to make animal feeds e.g. cattle cake.
- Cotton seeds are used for extraction of oil for cooking.
- Used for manufacture of textiles and garments.
- Cotton wool is used for dressing wounds in hospitals.
- Cotton seeds are crushed and used to make soap.

9. Oil palm growing in East Africa.

- This is a tree crop grown extensively in coastal areas e.g. the Lake Victoria islands such as Kalangala and Bugala islands by the BIDCO oil company.
- From oil palm, edible oil is extracted and used for cooking purposes.

Conditions that have favoured the growing of oil palm in East Africa.

- Heavy and well distributed rainfall of about 2030mm per annum for proper growth.

- Constantly hot temperatures of over 20°C and plenty of sunlight for proper maturity.
- Deep and well drained alluvial soils for growing the crop.
- Cheap and abundant skilled and semi-skilled labour for growing and harvesting the crop.
- Develop quick transport network linking to processing factories.
- Relatively low altitude with warm conditions for proper growth.
- Large sums of capital for buying farm implements and fertilizers.
- Constant application of fertilizers to maintain soil fertility.
- Gently sloping landscape which favours use of machines.
- Presence of ready market which is both local and international.

Problems faced by oil palm growers in East Africa.

- Diseases e.g. freckle and blast which lead to poor quality output.
- Climatic hazards like prolonged drought which leads to delayed growth of the crop.
- Inadequate storage facilities hence destruction of the seeds.
- Poor transport facilities linking to market centres.
- Competition with other sources of oil e.g. simsim, cotton and sun flower which reduces market for palm oil.
- Inadequate labour force especially during the harvesting period.
- Low level of technology e.g. climbing trees with pangas to harvest the crop.
- Soil exhaustion due to monoculture leading to low output.
- Fluctuation of world prices which demoralizes farmers hence loss of interest.

Effects of oil palm growing on environment.

- They have led to deforestation when vegetation is cleared to create farmland which results into desertification.
- There has been displacement of people to establish big plantations leading to land disputes.
- Deforestation has hindered development of tourism by destroying habitats of wildlife which reduces government revenue.
- Deforestation has also affected the water cycle by reducing the rainfall amounts.
- Plantations have led to easy multiplication of pests which lead to poor quality output.
- Soil has been compacted together especially where machines have been used making it hard to plough such land.
- Monoculture has led to soil exhaustion hence leading to soil erosion and loss of soil fertility.
- Pesticides and insecticides have led to air pollution and some are washed down to water sources e.g. rivers hence destroying aquatic life like fish.
- There has been loss of bio-diversity by destroying habitats for bees, monkeys, birds and snakes.
- Plantations have attracted large population which has resulted into land fragmentation, high crime rates and pollution.
- There has been swamp reclamation as a result of establishing farms e.g. rice and sugarcane farms.
- Organic materials for soil formation e.g. leaves are destroyed by clearing vegetation.
- There has been destruction of the scenic beauty of the landscape by clearing vegetation.

- Wind speed increases when trees are cut leading to wind erosion and destruction of farms by strong winds.

Importance of Oil palm growing to the economic development of EA.

- Have led to industrial development hence diversifying the economy.
- They have provided employment opportunities hence improving peoples' standards of living.
- Government earns revenue through taxes used for developing infrastructures like roads.
- Government also earns foreign exchange through exportation of the by-products e.g. cotton lint.
- Roads have been developed which has improved on transport in the areas.
- These crops have put idle land to good use e.g. swamps and hills.
- Plantations are used for research and study purposes by students on field work.

MARKET GARDENING.

- This is the production of vegetables, fruits and flowers for sale in nearby towns and cities.
- It's mainly carried out near towns due to readily available market in towns.
- Crops grown include: tomatoes, Onions, carrots, apples, pineapples, cabbages, oranges, beans etc...
- In East Africa, it is highly developed in Kenya and particularly in Nairobi.
- Most of the market garden centers supplying Nairobi are found in Limuru, Kiambu and Kinango plateau.
- Other areas where market gardens are found are Machakos, Baringo district, Kakamega, Eldoret, Kitale, Mombasa and around Kisumu.
- It's also important around Arusha, Moshi, Bukoba, Dodoma and Dar-es-salaam in Tanzania.
- In Uganda, it's common around Kampala in places like Mukono, Entebbe, Wakiso, Kayunga, Mpigi and also in Jinja.

Factors favouring the practice of market gardening.

- Moderately cool climate for the growing of vegetables, flowers and fruits.
- Fertile and well drained soils for the growing of the crops.
- Large and ready market for the produce provided by the people in the city.
- Availability of adequate capital to invest in buying farm equipment.
- Presence of well-developed transport network like airports and roads for delivering goods since they are perishables.
- Advancement in science and bio-chemical technology for better yields e.g. application of fertilizers.
- Presence of abundant skilled labour force to works on the farms.

Importance of market gardening to the people of East Africa.

- Source of food to the non-agricultural urban and industrial population.
- Source of foreign exchange through crop exports to

Germany, United Kingdom and France etc. for provision of social services to people.

- Provides employment to many people hence improving their standards of living.
- Provides flowers required for house decorations and functions e.g. Nsimbe Estates in Mpigi and Rose Bud at Entebbe.
- Source of raw materials for industries producing food stuffs, cosmetics and perfumes from aromatic herbs.
- Leads to development of infrastructures e.g. schools and roads for transportation of goods and social services to people.
- Helps in economic diversification which ensures constant capital flow for government reducing overdependence on one sector.
- Government earns revenue through taxes which is used for developing infrastructures like roads and hospitals.
- Leads to development of research facilities which boosts agricultural sector e.g. at Kawanda Research Station.
- Leads to development of transport routes e.g. feeder roads leading to easy movement of goods and services.

N.B. ***East Africa's exports are mainly dominated by agricultural commodities e.g. coffee, tea, tobacco, sugar cane, oil palm, cotton, pyrethrum, flowers and fruits.***

Dangers of over depending on the exportation of agricultural products

- Agricultural products are prone to climatic hazards e.g. hailstorms and long drought cause fluctuation of products for export.
- Pests attack the crops leading to reduction in quantity for export which reduces foreign exchange earnings.
- Disease outbreaks also attack the crops leading to poor quality output which reduces market demand.
- They are perishable and therefore require air transport which is expensive to transport to foreign markets for export.
- Agricultural products are bulky and therefore difficult to handle for export.
- Price fluctuations on the world market cause unstable export earnings hence reducing government earnings.
- Agricultural products fetch low prices on the world market which discourages farmers from growing crops for export.
- Losses due to poor storage facilities which reduce on the quality and quantity for export.
- Agricultural products are seasonal and therefore can't be relied on for constant supply for export.
- Most farmers are reluctant or have inadequate capital to adopt modern agricultural methods for export production.
- Most agricultural areas are inaccessible which limits quick delivery for exportation.

Steps taken to solve the problems of over dependence on agricultural products for exportation

- ✓ Encouraging government to promote economic diversification to offer an alternative to the agro-based economy.
- Liberalization of the economy to encourage private investment in the economy to foster economic development.

- Diversification of the export sector and encourage exportation of other commodities e.g. timber, fish and minerals.
- Developing export promotion industries to export manufactured goods with high market demand.
- Promotion of tourism as an invisible export to bring in more foreign exchange for national development.
- Promotion of exportation of services e.g. banking, transport, labour, education to widen tax base for government.
- Educating and sensitizing the masses about the dangers of over reliance on agriculture and offer alternatives for survival.
- Widening the export market base by investing in market research and creation of new trade partners.
- Reviving co-operative societies to improve on marketing of agricultural products for export.
- Encouraging scientific research to improve on the quality and quantity of agricultural exports.
- Improving handling and packaging of perishable agricultural export crops through reviving marketing boards and co-operatives.
- Using pesticides and herbicides to control pests and diseases to improve on quality and quantity of export crops.
- Exporting art and craft products to offer an alternative export item.

MINING IN EAST AFRICA.

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

Types of minerals.

- **Metallic minerals*:*** These include iron ore, gold cobalt, copper, tin, wolfram, tungsten, zinc, manganese etc.
- **Non-metallic minerals:** These include; petroleum, phosphates, soda ash, sand, clay, Gypsum, mica, water, coal, etc.

Factors that have favoured the development of mining industry 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 e.t.c.
- 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 political stability which has attracted foreign investors to invest in mining operations.

Importance of mining industry to the development of East Africa.

- 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.

Problems resulting from mining sector on the Environmental.

- 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.
- 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 causes 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.
- Mining 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.

Methods of mining.

1. **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.

2. **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 four (4) major types of underground mining methods namely;

(a) **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 Kilernbe mines in Uganda.

(b) **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.

(c) **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.

(d) **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.

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.

Major minerals in East Africa, mining method used and their products

Minerals.	Country.	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, aluminium, detergents
Lime stone	Uganda	Hima and Tororo	Open cast	Cement and lime for building
	Kenya	Bamburi and River Athi	Open cast	
	Tanzania	Tanga and Wazo hills	Open cast	
Salt	Uganda	Lake Katwe	dredging	Salt
	Kenya	Lake Magadi	dredging	
Phosphate	Uganda	Tororo	Open cast	Fertilizers
	Tanzania	Manjingu hills	Open cast	
Flourspar	Kenya	Kakamega & Kerio valley	Open cast	Tooth paste, sulphuric acid, frying pans
Oil	Uganda	Lake Albert	Drilling	Petroleum, diesel, kerosene/paraffin and plastics

Problems facing the mining sector in East Africa.

- 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 etc.

Solution to problems resulting from mining sector in East Africa.

- 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 murram 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.

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
- Government should carry out market research to get new markets for East Africa's minerals.
- 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. hydroelectric 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.

Importances 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.

FISHING IN EAST AFRICA.

- 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.

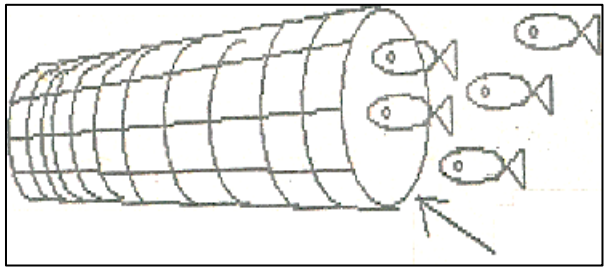
Types/species of fish caught in East Africa.

- 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.
- 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.

Fishing methods used in East Africa.

These are either traditional or modern methods;

(1) **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.

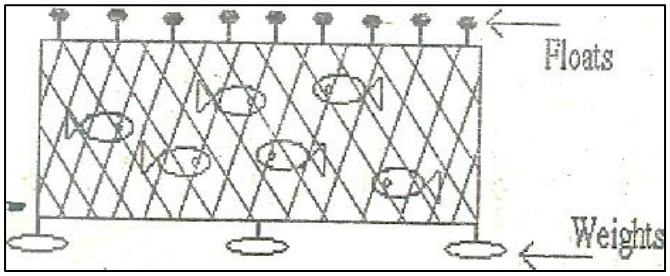


E.g. **used of a basket trap**: A fisherman gets into a boat/canoe that is stationed in the water. He uses a cone shaped basket which is placed in swiftly moving water e.g. along rivers or a stream. When the fish enters the basket, its trapped and then scooped out of the water into the boat.

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

a) 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.



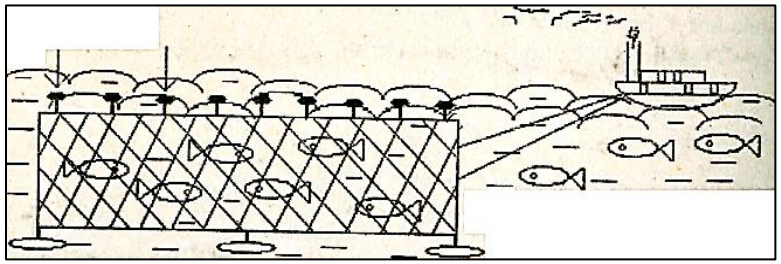
Gill netting is commonly used on Lake Victoria to catch Tilapia.

(ii) 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.

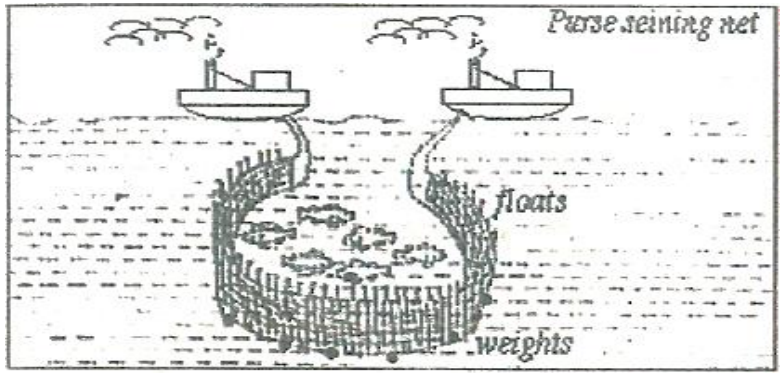
(iii) Drift netting:

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. Used to catch anchovy and sardines on the Indian Ocean.



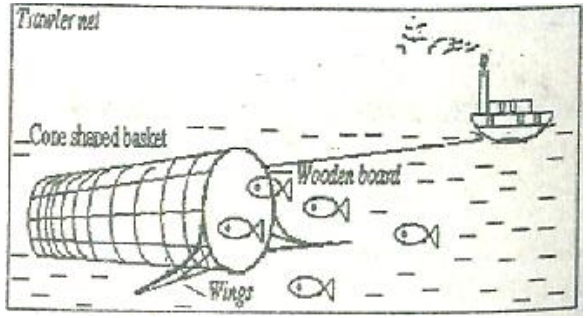
b) Purse seining net method:

This involve 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. Used to catch sardines, anchovy, mackerel, tilapia and bagrus.



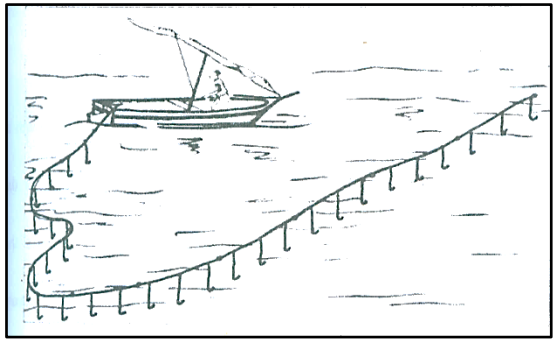
c) Trawler method:

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.



d) 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).



e) 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.

f) Lobster trap:

a metallic cage is put in water. Inside the cage, there is bait which attracts the fish. The fish enters the cage to eat the bait and once it enters the cage, it can't come out. The trapped fish is then removed from the cage by divers. Cages are used in rocky water to trap sea animals that near the sea bed e.g. lobsters, oysters, shrimps and crabs.

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, sun drying (most common), salting, frying and cooking.
- Modern methods for large scale companies such as; **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 that have favoured the development of the fishing industry in East Africa.

- Availability of enough fishing grounds such as Lake Victoria, Kyoga, Tanganyika and Indian Ocean.
- 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 neighbouring D.R.C.
- Indented nature of fishing grounds which are favourable 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.
- 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.

Importance of the fishing industry to development of East Africa.

- Provision of employment opportunities to fishermen hence improving their standards of living.
- Source of food rich in proteins to the population.
- 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 sector 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 Lake Victoria and Kyoga chokes fish to death.
- Competition with other fish producing countries like Norway Japan which leads to inadequate market.
- Un-desirable fishing methods like fish poisoning which causes health risks 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 doe to presence of Nile perch which eats them away.
- Some fishing grounds are too deep and hence doesn'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.

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**:
  Fishing Villages / ports developed on the Lake Victoria include;
  Gomba, Bukakata, Kasenyi, Luzira, Kibanga, Kasensero, Jinja, 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 etc.
  The lake is characterized by floating Islands of water Hyacinth and a big number of crocodiles which limit fishing.

Fishing villages/ports on L. Kyoga:
Lwampanga, Kachung 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, Wanseko, Biseruka, Buliisa, Buhuka, Ntoroko, Ndaiga and Panyimur. Salting and smoking are mainly used to preserve fish.

FISHING ON L AKE EDWARD AND GEORGE:
Fish caught include, Tilapia, Clarias, Bagrus protopterus e.t.c.
The of presence of salt from Lake Katwe facilitates the use of salt to preserve fish though smoking is also applied.
Problems facing fishing here include:

- Lake Edward is too deep, the area is infested with Tsetse flies, remoteness,
- remoteness / under developed transport facilities.
- fish smuggling to Democratic Republic of Congo.

Major fishing ports are:
Rwenshama on Lake Edward and Magyo on Lake George.

Note that:
Fishing is also carried out in swamps and species caught in swamps are:

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, Tana and Galana, 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 etc.

FISHING IN TANZANIA .

Fresh water (Inland fisheries) include:

1. 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.

   Fishing ports include: Bukoba, Mwanza and Musoma on Lake Victoria are the major fishing ports.

2. Lake Tanganyika is the second important fishing ground. Its popularity 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.

3. ***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 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.
- 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