Topic 1: HUMAN ACTIVITIES

Human activities refers to the sum of all things that human beings do to modify the environment, as well as the exploitation of the environment for the resources needed to survive or to achieve certain goals. Human activities contribute to climate change by causing changes in Earth's atmosphere in the amounts of greenhouse gases, aerosols (small particles), and cloudiness. The largest known contribution comes from the burning of fossil fuels, which releases carbon dioxide gas to the atmosphere. Therefore human activities are carried out with certain goals or purposes; these purposes can either be:

• Production of food crops.
• Production of cash crops.
• Construction of infrastructure that facilitate movement of goods, services and people; cleaning the area to avoid pollution and outbreak of diseases like cholera, amoebic dysentery, etc.
• Human activities use up resources to produce products and services.

Major Types of Human Activities

Human activities may be classified into four types namely:

1. Primary activities
2. Secondary activities
3. Tertiary activities
4. Quaternary activities

PRIMARY ACTIVITIES

Primary activities involve exploitation of nature in the production of materials. Production in this kind of activities largely depends on the earth's natural resources. Examples of primary activities include:

- Farming (Agriculture)
- Mining and Quarrying
- Fishing
- Forestry (Lumbering)
- Hunting, gathering and livestock keeping

SECONDARY ACTIVITIES

These are human activities that involve a process of manufacturing raw materials into useful products. Secondary activities are of great importance as they lead to fast economic development since they produce products that have immediate demands in the society. They also accelerate development of primary activities by providing a market for raw materials produced through lumbering, agriculture and mining.

TERTIARY ACTIVITIES

These are the activities that involve the provision of services that are needed in the society. Examples of tertiary activities include:

1. Trade (restaurants, hotels, lodges, supermarkets)
2. Schools (Teachers)
3. Hospitals (Doctors)
4. Transportation (Driving) Others include plumbing, mechanics, entertainment, water supply, waste management, advertising, legal services, in court clerical services or religious services.

QUATERNARY ACTIVITIES

These are activities that involve provision of intellectual services and information. These activities were formally included in the tertiary activities. Quaternary activities include high-tech industries with information technology, scientific research, consultancies and library services. Computer based activities like making software are part and parcel of quaternary activities. In general quaternary activities are considered to be new and started in the last decade.

QUINARY ACTIVITIES

These are activities that are done by top executives or officials in fields such as governments. They involve the highest level of planning and decision making in the society or economy. Quaternary and quinary activities e.g. research and information are important in the development of farming, mining, tourism and trade.

Importance of human activities

1. Helps in generation of government revenue
2. Helps in producing raw materials such as cotton for textile industries.
3. They provide employment to peoples in the country..
4. Human activities such as agriculture and fishing lead to production of food.
5. Activities like construction of roads contribute to the development of transport and communication networks. Environmental problems caused by human activities Human activities has great impacts to the environment hence the following is the environmental problems that caused by human activities. These problems include Air pollution, Water pollution, Soil pollution, Deforestation, and Soil erosion.

Measures for controlling environmental problems caused by human activities

1. Discouraged the improper dumping of waste in the soil or water
2. The use of modern methods in agricultural activities such as crop rotation, inter cropping, fallowing strips, contour ridging.
3. Encouraging Afforestation and restricting deforestation 4. Excessive use of chemicals in the control of pests should also be discouraged.
5. The government should enact strict laws.

Topic 2: AGRICULTURE

Agriculture is the branch of science which deals with crop cultivation and animal keeping. It is categorized as a primary activity since it involves the production of raw materials that can be used by other industries.

SMALL SCALE AGRICULTURE
It is the type of agriculture (crop cultivation) where a farmer owns a piece of land covers less than 5 hectares.

Characteristics of small farming at subsistence level
1. Labor force involves the use of members of the families
2. Implication of simple tools like hoes, pangas to cultivate and few cases they use animals.
3. There are varieties of ways to improve the fertility such as the use of organic manure, mulching (covering the top soil with dead crops and animal remains to retain moisture),
4. Many crops are grown at once. You can find the farm with mixed crops such as beans, maize, sunflower and some watermelon.
5. Very little or no surplus. This is because subsistence agriculture is for consumption.
6. The land cultivated for subsistence farming is always small
7. Little or no use of technology inform of seeds, manure and tools.
8. The common are maize (African staple food), millet, sunflower, fruits and vegetables.

Effects of rapid population growth on small scale agriculture
population; is the demographic situation where number of people at a given area is greater than the available resources. The available resources may include; Land, Water, Minerals etc. Over population is sometimes called population pressure Continuous increase in the number of people is serious problem facing small scale agriculture because: it reduces the average size of land, results to over exploitation which lead to reduced soil fertility. In the other side increasing population has increased amount of labour force in agriculture.

Advantages of small scale agriculture
i) It is costless because easy to control farm work
ii) More than one crop can be obtained from the farm [one plot]
iii) Provide employments to the family members Disadvantages Difficult in applications of machines such as tractors is because of small farming size. Low productivity hence poor standard of living Gender imbalance: because women are not involved in land heritage and ownership Heritage of land leads to land fragmentation and over population in a small piece of land hence results into shortage of land

TYPES OF SMALL SCALE AGRICULTURE
There are two types of small scale agriculture;
a) Shifting cultivation/ non sedentary
b) Bush fallowing /rotational

SHIFTING CULTIVATION (NON SEDENTARY)
Is the system in which a peasant keeps on shifting from one area to another as a result of soil exhaustion. In this type of agriculture

peasants cultivates certain piece of land until the soil is exhausted after 2-5 years then shifts to a new piece of land where he cleans and cultivates. It is the oldest method. Done by burning of trees on a given area and set the area ready for cultivation The crops grown most of them being scanty crops It involves slashing and burning of bushes and grasses It is practiced when there is low population for easy shifting and possession of a certain piece of land Production is for subsistence Simple tools are used like hand hoes because of low technology The cultivators do not have permanent settlements since they expect to leave any time , sites are selected in the virgin forest and therefore tend to be fertile

Advantages

1) More than one crop can be harvested in a plot
2) Burning involves production of ashes which assist in soil fertility
3) Food supply is assured since the family cultivates for self-sufficient basics
4) The system does not cost since simple tools are used for production
5) Family labour is used in the production process

Disadvantages

1) Deforestation and soil erosion
2) The use of fire kills [destroys] the natural habitats and wild animals
3) The system can be applied on the low populated areas
4) Low productivity because the plots are small and due to poor control of pests and diseases.
5) Destruction of ozone layer due to burning of bushes and grasses.

Decline of shifting cultivation Shifting cultivation nowadays due to the following reasons;
Increased population Rapid increase of population has resulted in the shortage of land for cultivation Advancement of science and technology Influence of government policy which encourages on sedentary and other farming types which are environmental friendly Reaction from environmentalists Engagement of people in other economic activities

ROTATIONAL (BUSH FALLOWING)

Is the system of farming in which peasant cultivates in a certain area until it gets exhausted and leave it for a certain period of time to regain its fertility. It differs from shifting cultivation in that farmers are settled and hence are rotating rather than shifting to a new home. Rotational bush fallowing is the simplest form of sedentary farming. This system took place after shifting cultivation failed to perform well due to increase in population.

Characteristics of Rotational/Bush fallowing

Simplest tools are used through slightly more advanced technology than shifting cultivation Slashing and burning of bushes The community can involve or engage itself into other activities like fishing, hunting e.t.c Farmers are settled but the farms are the ones which are rotating.

Advantages

Since the people are settled they engage fully and effectively in the production process. Slashing and burning involved in the farm preparation adds fertility to the land Fallowing gives room for the improvement of the soil and encourages the recovery of vegetation It takes places where there is high population unlike shifting cultivation Farmers can involve in other economic activities such as fishing

Disadvantages

There is low production because of the use of low technology and simple tools Slashing and burning can lead to environmental degradation as well as loss of biodiversity Poor trade among communities How small scale agriculture is improved In order to improve small scale farming the following should be done i.e.

i) Proper ways of using fertilizers and pesticides etc
ii) To educate farmers 0n good farming methods/practices
iii)To discourage some traditional ways of life i.e. sex preference
iv) Farmers should be given loans
v) To establish market for selling crops
vi) The government should facilitate good transport and communication network vii) To encourage people to have permanent settlements so that they can organize their farms

LARGE SCALE FARMING

Is a type of agriculture which takes place in a large area of land approximately 100 hectares. This is also known as commercial agriculture or state agriculture. The money gained from large scale agriculture is essential for keeping the system going on. The type of farming practiced is normally monoculture. In developing countries monoculture is associated with tropical and sub-tropical plantations which were established through European colonization. The most pronounced from large scale agriculture is plantation agriculture

Characteristics of large scale farming
Involves the production of cash crops Only one crop is produced [monoculture] Farms are very large found in sparsely populated areas Use of high levels of technology [tools are very much modern] hence high capital. It involve the use of skilled and unskilled labourers.

Advantages of large scale agriculture
1) Productivity is very high and large amounts of capital/income is obtained
2) Risk of pests and diseases is highly reduced
3) Promotes the growth of other sectors
4) Promote the development of social services i.e. Housing Electricity And water supply
5) Provides employment to the people.
6) It is the source of foreign money exchange.

Disadvantages of large scale agriculture
1) Large capital is needed
2) Fluctuation of price in the world market [the farmers may face loss when the price falls down]
3) It causes unequal development in different areas
4) Loss of soil fertility due to continuous application of artificial fertilizers for example ammonia sulfate
5) It involves the exploitation of workers
6) It causes air pollution
7) It may cause separation of people away from home.

Problems facing large scale agriculture
(1) Population increase which resulted into short age of land.
(2) Lack of Government support.
(3) Loss of soil fertility due to the act of practicing monoculture. How large scale agriculture is improved.
(1) The Government should enact and implement laws about population increase e.g family planning policy.
(2) The Government should improve transport and communication systems such as railways, roads etc.
(3) The Government should control rural-urban migration to overcome the problem of labour supply
(4) The Government should provide loans/capital to the farmers
(5) The Government/stakeholders should encourage the use of modern farming methods such as the use of machine and fertilizer

PLANTATION AGRICULTURE
Refers to the large farm or large area of land designed for agricultural growth. Often includes housing for the owner and workers. The crops planted for commercial purposes. Major African countries involving in plantation agriculture Palm oil are found in Nigeria and DRC, Rubber –Liberia, Sisal – Tanzania (Morogoro, Tanga), Tea - Malawi and Kenya, Sugar – South Africa, Tobacco – Zimbabwe & Tanzania (Lyamungu) and Cotton –corn-USA.

The major crops grown in plantation agriculture includes the following.
COFFEE
There are several types of coffee but the famous ones are three;
a) Arabica; Have large leaves and can grow to 9m high; It has the finest flavor
b) Robusta; They grow up to 5m tall

c) Liberica; It is a low land coffee Uses of coffee Beverage packing Source of income Leaves are used as medicine to treat stomach aches Trees are used as fire wood Pulps are used for fertilizers The chief producers of coffee in the world are such as; Brazil Columbia Ivory coast. And the other percent comes from Mexico Uganda Indonesia Ethiopia India In Tanzania coffee is produced in Mbeya, Arusha, Kilimanjaro and Bukoba.

COTTON

It is an annual crop which is divided into three varieties basing on the size of the fibrous and the lint. It is grown in Egypt and Persia. In Kenya, cotton is grown in Nyanza district while in Uganda cotton is grown in the Buganda District.

TEA

Tea is grown in Tanzania mainly in Mbeya, Bukoba, Iringa, Kagera and Tanga regions. Cotton In Kenya, cotton is grown in Nyanza district while in Uganda cotton is grown in the Buganda District. SISAL In Tanzania sisal is mostly grown in Tanga, Kilimanjaro, Arusha, Morogoro, Lindi and Mtwara regions. Mombasa, Thika, Murang'a, Machakos and Taita Taveta are areas where sisal is produced in Kenya. WHEAT

The wheat yields in the world are highest from countries of Western Europe. The following are leading producers of wheat: Russia, usa, China, India, Canada France, Turkey, Australia, Pakistani, German, Romania, Itary and Argentina. In East Africa, Kenya is the leading procedure of wheat followed by Tanzania.

LIVESTOCK/ PASTORAL FARMING

It is the keeping/rearing of animals (goats, cattle, sheep) and poultry (birds) .It can be distinguished into traditional (subsistence) livestock keeping and modern(commercial) livestock keeping

(1) TRADITIONAL/SUBSISTENCE LIVESTOCK KEEPING SEDENTARY LIVESTOCK KEEPING - Livestock are kept in one permanent place. Food and water are brought to the animals hence zero grazing because no grazing is involved.

PASTORALISM

Pastoralism is an economic activity which involves grazing livestock (animals) on natural pastures. The pure pastoral societies of East Africa include: Maasai, Karamajong. The cultivator pastoralists (mixed farmers) include the Sukuma, Gogo and Nyamwezi.

NOMADIC PASTORALISM

Is practiced by wondering groups of people in remote areas especially semi –desert and desert areas. Nomads are members of a group of people who having no fixed home, move around seasonally in search of food and water. The farmers specialize in keeping animals on natural pasture land for example, Masai, Barbaigs, Kwavi, Karamajong. - They keep on moving looking for water and grazing land (pasture) - They live in simple temporary houses Their wealth depends on number of cattle they have thus they do not sell their animals unless are exchanged for necessary requirements, hence the problem of overstocking, soil erosion and desertification, also they may cause sedentary cultivator. E.g. - Gogo pastoral & Gogo sedentary - Kwavi pastoral & Kwavi sedentary - Maasai pastoral & Kaguri sedentary - Kurya pastoral & Wagita sedentar

CHARACTERISTICS OF NOMADIC PASTORALISM

(i) Animals i.e. cattle are kept for prestige, for paying bride gift, for food and for sale.
(ii) The breeding process is uncontrolled
(iii) The herds are large in size
(iv) There is poor control of pests and other diseases
(v) The animals are of poor quality and low value
(vi) It takes place where the population is scarce
(vii) There is no permanent settlement as farmers move constantly with animals
(viii) There is no crop cultivation and therefore animals are the support for family life.
(ix) There is poor or no use of technology.

ADVANTAGES OF NOMADIC PASTORALISM

i) It is cheap
ii) It guarantees food for the family especially when the animals are many
iii) Some traditional varieties of animals are resistant to diseases and other environmental hardships

DISADVANTAGES OF NOMADIC PASTORALISM

i) The animals produce little milk and of low value
ii) A lot of time is wasted moving from one place to another
iii) This system of livestock keeping causes soil erosion and desertification
iv) Many animals perish due to lack of pests control

SEMI-NOMADIC/SEDENTARY PASTORALISM

This is the system of livestock keeping in which a farmer has started selling and began growing crops to supplement pastoral activities. The farmers travel from their home state with their herds to distant places grazing, in search of pasture and water especially during the dry season.

SEDENTARY LIVESTOCK FARMING

This is a system of livestock keeping where by a farmer keeps animals while settled permanently in one place.

FACTORS FOR THE CHANGE FROM NOMADIC PASTORALISM TO SEDENTARY LIVE STOCK FARMING

i) Population increase has decreased the size of the pasture
ii) Involvement of farmers in other economic activities
iii) Advancement of technology iv) Government advice

CHARACTERISTICS OF SEDENTARY LIVESTOCK FARMING

i) More advanced technology is used
ii) The number of animals is not so high
iii) The animals are kept in shades
iv) There is disease control
v) It can be practiced in relatively densely populated areas e.g. town

ADVANTAGES OF SEDENTARY LIVE STOCK FARMING

i) The animals are healthy and hence have high yields
ii) There is a disease control
iii) The method encourages the improvement of the environment
iv) Sedentary live stock keeping enables the farmer to engage themselves in other activities.

(2) COMMERCIAL LIVESTOCK FARMING

- This is the practice of keeping livestock for sale. It includes Beef farming and dairy farming on ranches. - Beef farming is keeping of animals for production of meat for sale - Dairy farming is keeping of animals for production of milk for sale Commercial livestock farming is more developed in the temperate grasslands such as the prairies of USA and Canada, the pampas of Argentina and the downs of Australia.

CHARACTERISTICS OF COMMERCIAL LIVESTOCK FARMING

(i) Commercial livestock farming takes place in ranches which occupy thousands of hectares.
(ii) It is characterized by the application of modern scientific and technology methods.
(iii)It normally involves the use of improved breeds or hybrids in order to advance high yields.
(iv) It is capital intensive, substantial amount of capital is required for farm machinery and fencing.
(v) Large amount of animals is kept for commercial purpose (sale) rather than for subsistence purpose.
(vi) There is little or no migration in livestock farming. This is due to the permanent and reliable food supply (vii) The animals are of high quality and value.

ADVANTAGE OF COMMERCIAL LIVESTOCK FARMING

(i) It stimulates the development of other sectors such as industry
(ii) It reduces unemployment through creating employment chances
(iii) It generates government revenue
(iv) It provides food products such as meat and milk.
(V) They are source foreign exchange.

DISADVANTAGES OF COMMERCIAL LIVESTOCK FARMING

(i) It involves ranches which are expensive to maintain and establish.
(ii) It needs large areas with scarce population; therefore it cannot take place where the population is high. (iii) It may cause environmental problems such as land degradation, deforestation.
(iv) It influences climate changes due to deforestation in order to establish ranches. Comparative study of livestock keeping between Australia and Tanzania. Livestock keeping in Tanzania and Australia has some similarities and differences Similarities

similarities

(1) Livestock keeping in both countries there are common types of livestock kept. There mainly cattle, goats, sheep and poultry.
(2) Animal products ad like animals are sold in both countries, some common products meat, milk, skin, etc. (3) In both Countries are practiced at both the subsistence ad commercial levels.

(4) Sedentary livestock keeping is practiced in both countries. This is done in areas that are highly populated .E.g. Chagga in Tanzania
(5) Ranching in Tanzania ad Australia is carried out in the sparsely populated areas. In Tanzania, It is mainly carried out i areas such as Kagera, Tanga, and Morogoro which in Australia this is practiced in the areas. Referred to as outback.

Differences
(1) In Australia more scientific methods are employed in the management and running of livestock keeping compared to Tanzania. Australia they use paddocks, animal food supplements and proper animal health care. (2) Livestock keeping in Australia is more advanced than in Tanzania For example when it comes to use of machinery in activities such as milking ad sheep shearing.
(3) Pastoralism and sedentary livestock keeping ad the main types of livestock keeping practised in Tanzania while in Australia, ranching in the main type of livestock keeping.
(4) In Tanzania main types of animals kept are cattle while in Australia main types of animals kept are sheep. (5) Ranching in Tanzania ad Australia is carried out in the sparsely populated areas. In Tanzania, It is mainly carried out in areas such as Kagera, Tanga and Morogoro while In Australia; this is mainly practiced in the areas.

Topic 3: WATER MANAGEMENT FOR ECONOMIC DEVELOPMENT

Water Is a colorless, odorless and tasteless liquid found naturally on land surface, atmosphere and water ground reservoirs, and essential for most plant and animal life. Water management Refers to the skillful and careful use and control of water and water resources. It is the management of water resources under set policies and regulations. Water should be managed since it is becoming a more valuable commodity due to droughts and over uses.

Economic uses and importance of water

Water is used for domestic purposes
Water is used for agriculture development [irrigation]
Water is used as a source of hydro-electric power
Water is used for industrial development
Water encourages the development of the fishing industry
It encourages the development of the tourist industry Water is used for navigation i.e. it stimulates the development of transport and communication
Water influences weather activities i.e. rain formation
Water provides habitat for various living organisms

Relationship between family size, water supply and quality of life
There is a very close relationship between quality of life and water. An adequate and reliable water supply greatly improves the quality life of people. This is because they do not have to spend most of their time, income and effort searching for water. Availability of water means that family members are easily able to cook, clean themselves and do other family chores. - Also the family size determines how much water is needed at a given time and how frequently available it should be. The larger the family the larger the amount of water, the smaller the family the lower consumption of water.
- Where the water is not piped and frequently supplied for example in rural areas, family members especially girls and women spend most of their time and effort looking for water. In some other communities, girls are not allowed to go to school since they are required to fetch water and ensure that it is available for the whole family.
- In case of a smaller family, they are able to use stored water over a long period in case the frequency of water supply is low. Therefore, under conditions of low water supply, a small family is more likely to experience water shortage problem than a large family. Relationship between Vegetation and water supply - Vegetation play a very crucial role in ensuring a continuous water supply. Presence of places with dense forests and other forms of vegetation act as water catchments. This means that they retain water by preventing it from easily washing away or rapidly evaporating.
- Places with abundant vegetation therefore have higher chances of experiencing a reliable water supply than places that have little or no vegetation. Indeed, the lack of vegetation may lead to desertification and consequently very little or no water availability.
- It is also important to note that vegetation cannot exist if there is lack of water. Even desert vegetation requires water, though in small amounts for it to exist. The more available water is the denser and healthier the vegetation will be. Where there is little water available the vegetation is sparse.
- Vegetation and water supply are therefore highly related and dependent on each other. How long distance to water sources affects the girl child.
- In rural areas, family members especially girls and women spend most of their time looking for water. In Tanzania, most rural communities the task of fetching water is placed on women and girls. It is the girls who have to do this as the women are engaged in other domestic duties or family chores such as taking care of babies and cooking. The distance between the home and the water

source affects the girl child in the following ways;-

(i) When the distance is long, it means that the girls have to walk the long distance to fetch the water. By walking the long distance they get tired, they may get attacked/molested along the way and in some cases, there is a little time left for activity such as learning or playing. For those who are lucky to go to school, they tend to be too tired to pay much attention in class hence, poor performance. But for those who are not lucky enough to go to school are condemned illiteracy. All of these may turn into early marriages or teenage pregnancies and some of them tend to experience psychological problems in their childhood as well as in their adulthood due to lack of time to play, robs them of a happy and balance childhood.
(ii) On the other hand, if the distance from the home to the water source is short, then the girls spend less time in fetching water and hence they have more time to play and to go to school, thus they will be able to pay attention in the class and do well in their studies.
(iii) In addition, children who are consistently exposed to hazardous, un portable water or exposed to pumps or water source that have been contaminated by water-bone bacteria, contracting diseases such as cholera and they are often affected by life threatening diarrhea from parasites in unclean water.

PROBLEMS CAUSED BY WATER
i) Water causes floods
ii) Water provides habitat of dangerous animals
iii) Polluted water is a source of water born diseases iv) Flowing water causes soil erosion v) Large water bodies may cause barrier for communication.

RIVER BASIN DEVELOPMENT RUFIJI BASIN DEVELOPMENT AUTHORITY [RUBADA]
Was authorized by the government of Tanzania in 1975 to plan and coordinate the development activities in the Rufiji River. Rufiji river has two main tributaries:- Great Ruaha Kilombero River It is situated in Iringa but there are other centers which are located close to the basin Boarders i.e. Dar es salaam Morogoro Mbeya Songea Dodoma Benefits of RUBADA
1) Hydro power plants. Twenty two major hydro power sites have been identified in the Rufiji basin of kidatu, Mtera, Mpanga, Ruhudji, Mnyera and Iringa Lukose. - It generate electricity which is used within the immediate area in other parts of the country.
2) Agriculture A large number of irrigation projects have taken place in the basin (Improvement of Agriculture production due to irrigation). i.e. Sugarcane, growing rice in the kilombero and usangu plains.
3) Forestry 10% of the total basin is covered by forests which are important for regulation of water resources.
4) Industrial development Due to the availability of power, industrial activities have advanced in the region hence increase the volume of trade in the country.
5) Tourism Rufiji basin is one of the major tourist attraction in Tanzania i.e. Selous game reserve, Rungwe and Usangu game reserve as well as Mikumi and Ruaha and National parks which are tourist attractions, are located within the basin. Problems faced by RUBADA Lack of enough capital to invest in the area Infrastructure is poorly developed. Lack of qualified personnel Low level of technology Fluctuation of water levels Lack of support by local communities

IMPORTANCE OF RIVERS, DAMS AND LAKES
1) Helps in generating HEP
2) Promote transport and communication
3) They supply water for irrigation and domestic uses and industrial activities
4) They modify the environment like introducing moisture to the atmosphere which later leads to the formation of rainfall
5) They attract settlement
6) Features like waterfalls attract tourists
7) They promote fishing industries

PROBLEMS OF RIVERS, DAMS AND LAKES
1) Fluctuation of volume of water
2) May lead to spread of diseases like bilharzia etc
3) Flooding of rivers may lead to destruction of properties
4) The invasion of vegetation in these water bodies lead to problems in fishing and navigation.

TENNESSEE RIVER VALLEY AUTHORITY (TVA)
Tennessee river valley is found in the U.S.A and is a tributary of Ohio river. The government of U.S.A organized the development of the valley with the general aim of solving economic difficulties of the people. Benefits of the Tenessee Valley Authority (TVA)
1. There has been an increase in water supply for irrigation, domestic use and industrial use.
2. Navigation in the Tennessee River has improved such as the commercial freight ships operating in the river. 3. Hydroelectric power was made available to many people.
4. The floods have highly been controlled.
5. The project has created job opportunities for many people.

6. Increase on the size of arable land due to soil control.
7. Fishing industry has developed due to the construction of dams.
8. Provision of hydroelectric power has led to the development of different manufacturing and heavy industries.

Problems facing Tennessee River Valley
1. Soil erosion can also affect the established Tennessee River Valley project.
2. Soil exhaustion due to intensive farming hence poor farming and low yield.
3. Water pollution especially by the industries discourages the utilization of water from the river basins for economic development.
4. Accumulation of silt in the dams leads to the reduction of the volume of water.
5. The outbreak of diseases like cholera due to accumulation of water.
6. Unreliable rainfall and excessive evaporation lead to the drying of the river and other water bodies hence economic activities cannot take place easily due to the dryness.

Prospects of the Tennessee River Valley
1. Constructing more dams for retaining water all year round
2. Maintaining the roads and modifying them to better standards
3. Training the local people on other economic activities like navigation fishing and not to rely on one activity to solve the economic problems of the people

LAND RECLAMATION
The recovering of land that has been rendered unsuitable for use to make it usable again Or Is the process of turning the poor land into a useful state through the improvement practices for economic and social development.

AIMS OF LAND RECLAMATION
The main aims of land reclamation are as follows;-
(i) To increase the size of land available for agriculture purposes. This was carried out in the Tennessee valley. Previously unused land was irrigated in order to increase crop production.
(ii) To increase the size of land available for human settlement. This may become necessary if the population of an area grows beyond the land is available. It may also create land to resettle people who are being moved from another area.
(iii) To make available more land for the establishment of
industries and offices.
(iv) To be in proximity to resources in order to be able to gainfully utilize them.

FACTORS WHICH MAY CAUSE LAND TO BECOME UNUSABLE
1) Land may be damaged due to natural hazards like fire
2) Human activities can also damage the land i.e. poor farming methods, mining and pollution.
3) Cares of water logged land for example swamps and marshes Methods of reclaiming the land/Land reclamation techniques
1) A forestation or reforestation [planting trees]
2) Tsetse fly control which is done by clearing, spraying the area in order to kill them
3) Irrigation which is practiced where the natural precipitation is not sufficient to meet the crop moisture requirements
4) Draining water using canals and pumps can reclaim or constructing embankment for water logged land /marshy areas or wetlands
5) Planting reeds so as to allow water absorption by plants so as to dry the areas for cultivation.
6) Planting grass cover to check erosion
7) Burning reeds so as to clear the area for cultivation and settlement
PURPOSES OF RECLAIMING THE LAND
1) To increase availability of arable land for cultivation.
2) To expand carrying capacity of land. This means that the land can be used for industrial areas as well as residential areas.
3) For road and railway construction.
4) To control floods caused by water from the sea. The best example of land reclamation in the world is the Zuider Zee land reclamation scheme in Holland (Netherlands).

LAND RECLAMATION IN NETHERLANDS
Netherlands lies between the North Sea [north] and Belgium [south], Netherlands means low lands, it was covered by flood water from the sea, in one part were marshes, swamp land or land covered with poor soil. Netherland occupies an area of 40844 square km. the land in the northern parts of the country have been reclaimed from the sea and made arable. An area of reclaimed land is called POLDER. A project drawn by a Dutch engineer called CORNELIS LELLY.

AIMS OF LAND RECLAMATION IN NETHERLANDS
To increase dry land for residential and industrial development To reduce the danger of over flooding and obtain land for agriculture

and livestock keeping activities e.g. in 1953, 1800 people died due to the rise of sea level.

STEPS OF LAND RECLAMATION TAKEN IN NETHERLANDS

1) Dykes /embankments were built to enclose part of the sea water. The sand was imported from Germany and Sweden
2) Water was pumped out of these areas using wind mill and electrical pumps
3) The dry land was planted with reeds to control weeds and preserve moisture in the soil and to absorb more salt from the soil Sustainable Use of Water Resources The Types of Underground Water and how it can be Tapped for Use at Local and National Levels in Tanzania Water can be found both on the surface of the earth and underground. Underground water also called ground water or subterranean water, is the type of water found below the surface of the earth. Underground water include all water that is found below the earth's surface, occupying interstices (pores) or voids of pervious rocks and soil. Like surface water, it is derived principally from precipitation that falls upon the earth's surface and percolates downward under gravity.

Different Resources Obtained from Water Underground

water is categorised based on its source as follows

1. Connate water: It may also be described as fossil water. This is water trapped in the pores of the rock during the formation of the rock. Connate water can change in composition thought the history of the rock. Connate water is normally saline. Formation water or interstitial water, in contrast, is simply water found in the pore spaces of rock and might not have been present when the rock was formed. This type of water can be found in desert rocks where rainfall does not occur for a long period of time. Connate water generally plays an insignificant role in ground water studies. Agroforestry as practised in Shinyanga region
2. Meteoric water: This refers to underground water which originates from rainfall and other forms of precipitation such as hailstorms and snowfall. When the rainfalls or snow melts, a considerable portion of this water gradually infiltrates into the ground. This infiltrating water continues its downward journey to the zone of saturation to become part of the ground water in aquifers (water–bearing rocks).
3. Juvenile water: Juvenile water, also described as magnetic water, is water that exists within magma. It is brought close to the earth during vulcanicity. Magnetic water rises from great depth accompanying the magma flow from down the earth's crust.
4. Oceanic water: This is underground water that results from the seepage of ocean water into the ground. It is common in coastal areas where ocean water seeps horizontally into the ground from the ocean. Underground water can be tapped and put into various uses. The water tapped from the ground can be used for domestic and industrial purposes. Domestic uses include cooking, washing, bathing, watering plants, cleaning and many other uses. Industrial uses may include cooling of machinery, dissolution and dilution of chemicals, beverage manufacture, etc. Underground water can be tapped in a number of ways which include the following:

1. Drilling boreholes: These are holes dug deep into the ground to reach the water table. When the water table or underground water is reached, the water seeps up through the hole under pressure. It is then brought above the ground by pumping manually or using a water pump.
2. Digging wells: Just like boreholes, a hole is dug into the ground until water is reached. The difference between boreholes and wells is that water from the well is mainly drawn mechanically using containers such as buckets that are raised mechanically or by use of simple pulleys or hand. The walls of wells may be lined with bricks or stones and cement.
3. Where the water occurs very close to the surface, the soil may be scooped to expose the water. The water may then be scooped using cups or other containers. It may be directed to farms for irrigation via channels or trenches. The water may also be pumped and channelled into pipes to provide tap water.
4. Underground water may be naturally exposed to form springs or oases in deserts. This water may be scooped directly using containers. It may also be directed to farms through channels.

Methods Used for Extracting Resources from Water

There are a number of resources that can be obtained from water. Outlined below are some of the resources that can be extracted from water:

1. Fish and other edible creatures, such as crabs and prawns: These resources may be caught either for sale or family consumption.
2. Building materials: The building materials obtained from water include sand, coral rock, gravel and clay. Sand can be obtained from beaches of seas or lakes or river valleys and rocks are collected from the sea shore. The rocks and gravel are a result of erosion of the coastal rock by sea waves. Clay can also be obtained from the sea floor or river bed.
3. Electricity: Marine wind is used to turn windmills to generate electricity. Hydroelectric power is also a resource from the water since it results from the running water which is used to turn turbines to generate electricity.
4. Saltwhich is used at home and in industries, is mainly obtained from sea water though it can also be extracted from salty rivers and lakes.Brick-lined well
5. Ornamental items such as cowrie shells, snail shells, lobster shells, etc are also water resourcessince they come from animals that inhabit water.
6. Sea weed is used in many maritime countries as a source of food, for industrial applications and as a fertiliser. High utilisation of these plants as food is in Asia, particularly Japan, Korea andChina, where sea weeds cultivation has become a major industry.
7. Limestone and gypsum: Limestone forms from shells of dead marine organisms ranging from molluscs to corals and plants. Limestone can be used directly or converted into cement for construction purposes. Gypsum forms during evaporation of sea water

and thus may occur with limestone. The gypsum deposits are mined and generally converted into Plaster of Paris which is mainly used as a building material.

Extraction of resources from water

The following are the means by which the named resources may be extracted from the water: Fish and other edible marine creatures Fish may be obtained from water through use of a hook and line, nets, herbs, spears or traps. In the case of a hook and line, bait (such as worm or meat) is attached to a hook which is joined to a stringtied to a long stick or rod. The hook is sunk into the water. When the fish bites the bait, it gets caught by the hook and pulled out. This method is used for small-scale fishing.

Another method of catching fish is through use of certain plants called tephrosia. This plant ispoisonous to fish. When the leaves of this pea plant are pound and mixed with water, the fish arepoisoned and they fall unconscious and float on water. They are then picked from the water by hand oruse of a spear (harpooning). The fisherman spears fish in water and it is attached to the tip of the spearfrom which it is detached and put in a container. The traps are mainly used where there are floods or at the coast where there are tides. These traps areset up at the bank of the river or on the beaches. The fish are washed into the banks or beaches by thewater. As the water receded the fish remain trapped behind the traps. Nets are used to catch a large number of fish. With nets the fish are enclosed in a net with smallperforations through which fish cannot penetrate. They are then hurled to the sea shore, removed fromthe net and put in containers. Sand Sand is extracted from the beaches or dredged from the ocean or river beds. This can be done by usingscooping machinery or by hand using shovels, pans, hoes, etc. It is then loaded onto truck or lorryusing shovels or a grab dredge. Salt The process of extraction of salt from water involves evaporation. The salty water is trapped inevaporation ponds. The sun evaporates the water. As the water vapourizes, the salt remains behind.Eventually, enough of the water evaporates to leave behind a layer of salt crystals that can becollected, dried and stored in bags.Another alternative for salt extraction from the water is by means of evaporation tanks. Salty water ispumped into the tanks where the water is evaporated, leaving the salt behind.
Hydrolectricity

• Hydroelectric power is generated by using turbines that are turned by the fast-flowing river water,where the kinetic energy of the water is transformed into electrical energy.

• Tidal power or marine wind is used to turn windmills to generate electricity. The kinetic energy ofwind is converted into electrical energy by windmills (wind turbines). Ornamental items These can be obtained from the sea or lake by picking them using hands. This is normally done duringlow tide and after the water has receded. Ornamental items are brought to the shore from deep sea bythe tides or sea waves. Seaweeds are harvested by hand-picking. The weeds occur naturally or they can be planted. Limestoneand gypsum are mined by quarrying.

The Problems Caused by Extraction of Water Resources

Extraction of water resources may cause various problems and disturbance to ecosystem. Below are some of these problems:

1. Overfishing, and indiscriminate fishing whereby even very young fish are caught reduces theavailability of fish resources in water. It also causes an imbalance in the ecosystem.
2. Water pollution is a problem where dynamites or poisons are used as methods of fishing.Dynamites produce loud sounds which disturb the fish and other aquatic organisms while poisonkills fish, aquatic plants, and other marine organisms.
3. Sand harvesting may lead to loss of media for growth of plant life. It may also disturb aquatic life,for example, it may interfere with breeding of some marine organisms such as monitor lizards,Salt evaporation ponds 23snakes, crocodiles, alligators and turtles. These animals normally lay eggs in the sand. Sand extraction from river banks may also lead to flooding since the sand deposited besides a river acts as a levee which prevents water from leaving its channel during floods. It may also accelerate river erosion because the extraction process loosens the soil and makes it easy to erode.
4. Harnessing hydroelectric power from river water requires dams to be constructed. This can cause water shortage to the areas downstream. Water trickling from the tank to the nearby areas may also lead to flourishing of disease vectors such as mosquitoes and snails which harbour causative agents for malaria and schistosomiasis respectively.

Some of the solutions to these problems include the following:-

1. Giving guidelines on the kind of nets allowed for fishing certain fish species. To achieve this, the fishermen must be closely monitored to ensure that holes of the nets they use for fishing are not too small to catch even young fish.
2. Restricting fishing in some parts of the water, especially those areas identified as fish breeding grounds, so as to allow fish to breed and increase in number.
3. Encouraging and educating people to practice fish farming so as to reduce fishing pressure on natural water bodies such as rivers, lakes and seas.
4. Restricting or controlling sand harvesting in beaches and shores so as to ensure that aquatic environment is not destroyed and that aquatic life is not disturbed.
5. Banning the use of dynamites or poisons in fishing because this act pollutes the water and is likely to harm fish consumers.

6. Taking stern actions against those people breaching environmental conservation laws. The actions may include fines, jail sentences or both. Water pollution Water pollution is the introduction of substances that lower the quality of water bodies such as oceans, rivers, lakes, aquifers and ground water. This makes the water unsafe for use in homes and industries. Water pollution also affects living organisms (plants and animals) living in water.

Water pollution is caused by some or a combination of many factors.
The following are some of the major causes of water pollution:
• Agricultural chemicals; Agricultural chemicals that are applied to crops and animals drip onto the soil and may eventually run off into the local streams and rivers. They can also seep down to reach ground water. These chemicals contaminate the water and make it unwholesome for human use and can drastically affect the aquatic life.
• Oil spills; Oil spills in oceans and seas cause water pollution and big problems for local wildlife, fishermen and aquatic organisms. Oil spilled onto land is also carried into water bodies by surface run off. This includes drips of oil, fuel and fluid from motor vehicles, oil spilled onto the ground at filling stations; and drips of oil from industrial machinery. These sources and many more combine together to form continual petroleum pollution to all of the world's waters.

Mining Mining causes pollution in a number of ways.
They include the following:
1. The mining process exposes heavy metals and sulphur compounds that were previously locked deep in the earth. Rain water leaches these compounds out of the exposed earth, resulting in "acid mine drainage" and heavy metal pollution that can continue long after the mining operations have practically ceased.
2. The action of rain water on piles of mining waste (tailings) transfers harmful chemicals to freshwater supplies.
3. In gold mining, cyanide is intentionally poured on piles of mined rock (a leach heap) to chemically extract the gold from the ore. Some of the cyanide ultimately finds its way into nearby water.
4. Huge pools of mining waste slurry (semi-liquid mixture) are often stored behind containment dams. If a dam leaks or bursts, water pollution is likely to take place.
5. Mining companies in developing countries sometimes dump mining waste directly into rivers or other water bodies as a method of disposal. Other pollutants:
• Sediment: The act of clearing the forests to get ample land for agriculture, settlement or wood, leaves the land bare and exposed to the agents of denudation. This accelerates soil erosion and the sediment is free to run into nearby streams, rivers and lakes. The increased amount of sediment running off the land into nearby water bodies seriously affects the fish and other aquatic life. Poor farming practices and cultivation along and close to the rivers, exposes the soil to erosion agents. Soil erosion causes water pollution.
• Industrial Chemicals: Most of the water that is used in the production process in industries is eventually discharged into water bodies. This waste water may contain harmful chemicals such as acids, alkalis, salts, toxic chemicals, oil, heavy metals and even harmful bacteria, and other reagents. These substances affect the quality of water and the lives of aquatic organisms.
• In some cases, the waste water discharged into a water body may be hot enough to kill any organism living in that water.
• Sewage: In developing countries, about 90% of untreated sewage is discharged directly into rivers and streams. This renders the water unwholesome for domestic and other uses. Untreated sewage harbours a myriad of disease-causing organisms. This is the reason why diseases such as cholera, dysentery, typhoid and bilharzias are very common among African countries. Leaking septic tanks and other sources of sewage can contaminate ground and stream waters as well.
• Marine debris: (marine litter) Marine debris is trash in the ocean. This is litter that ends up in ocean, seas or other large water bodies. The debris mainly comes from urban sewers and garbage thrown overboard from ships and boats. Examples of marine debris include plastic bags, water bottles, balloons, shoes, lags etc. It can also include items that wash in from the ocean, such as fishing line, ropes, nets and traps, and items from ship such as lost cargo from container ships.
• Heat: Heat is a water pollutant. Increase in water temperature results in deaths of many aquatic organisms. This is because, as water temperature increases, the amount of oxygen that can dissolve in it also decreases. Therefore, warm and shallow water will contain very little oxygen to an extent that the dissolved gas will not sustain aquatic life.
• This increase in temperature is most often caused by discharge of cooling water (which is always hot) by factories and power plants.
• Global warming also contributes significantly to heating of the oceans. For resources to be sustainable, they must be conserved to ensure continuity and availability to upcoming generations.

Water, as a resource, can be conserved thought the following ways:
1. Avoiding wastage: All people should use water wisely to minimise wastage. All taps should be turned off when they are not used. The used water may be re-used again. For example, water that has been used to rinse clothes can be re-used to mob the floor, soak the dirtiest clothes, rags etc. Do not use water directly from the tap, instead fetch the water in a container and use it wisely.
2. Controlling polluting: People should neither throw wastes carelessly nor introduce any chemicals into water. Stern laws should be made and enforced to stop industries from dumping toxic wastes into the water bodies. Any industry found polluting the water by any means should be heavily punished or even closed down altogether.
3. Protection of water catchment: Vegetation in water catchment areas should be protected and cared for. People should not carry out

agricultural activities close to water sources. Planting of trees that consume a lot of water, such as eucalyptus, near water sources or rivers should also be avoided. Any activity that destroys the water catchment should be banned. In the past, the government ordered people to cut down all eucalyptus trees planted close to water sources so as to prevent the water sources from drying up.
4. Education: People should be educated about the importance of conserving the water resources. This education can be conveyed thought mass media and introducing water conservation courses in schools and colleges. The government and other organizations concerned with conservation of water resources should involve local communities so as to get maximum cooperation in their endeavours. The local people must be involved at all levels and should be given freedom to suggest how best these resources can be conserved.
5. Sewage treatment: Sewage is water containing waste matter produced by people. Much industrial sewage contains harmful chemicals and other waste materials. Sewage must be treated before it flows from sewerage systems into lakes, rivers, and other bodies of water. Untreated sewage contaminates the water and, in time, can kill fish and aquatic plants. The sewage makes the water unsafe to drink and can also prevent use of the water for swimming, fishing, and other recreation. Most cities and towns have at least one sewage treatment plant. In most rural areas, homeowners must provide their own sewage treatment. Most do so with large underground containers called septic tanks or pit latrines.
6. Controlled use of agrochemicals: Farmers should be educated on the correct use of agrochemicals. Also agricultural activities should not be carried out in areas close to water bodies. The use of organic manures and chemicals in place of harmful industrial chemicals for agricultural production should be emphasised.
7. Recycling of products: People should be advised to recycle the waste instead of dumping it in water sources. This will help reduce the problem of water pollution.
8. Immediate clean up When oil is accidentally spilled in water it should cleaned up immediately before causing any harm to aquatic life or people using that water. This can be done by use of chemicals or special machines called skimmer ships Water Pollution Many resources are extracted from water and used by man.

The following are the means by which the named resources may be extracted from the water:
• Fish and other edible marine creatures Fish may be obtained from water through use of a hook and line, nets, herbs, spears or traps. In the case of a hook and line, bait (such as worm or meat) is attached to a hook which is joined to a stringtied to a long stick or rod. The hook is sunk into the water. When the fish bites the bait, it gets caught by the hook and pulled out. This method is used for small-scale fishing. Pollution Water pollution is caused by some or a combination of many factors. The following are some of the major causes of water pollution:
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• Mining companies in developing countries sometimes dump mining waste directly into rivers or other water bodies as a method of disposal.
• Sediment: The act of clearing the forests to get ample land for agriculture, settlement or wood, leaves the land bare and exposed to the agents of denudation. This accelerates soil erosion and the sediment is free to run into nearby streams, rivers and lakes. The increased amount of sediment running off the land into nearby water bodies seriously affects the fish and other aquatic life. Poor farming practices and cultivation along and close to the rivers, exposes the soil to erosion agents. Soil erosion causes water pollution.
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• This increase in temperature is most often caused by discharge of cooling water (which is always hot) by factories and power plants.
• Global warming also contributes significantly to heating of the oceans. The Main Sources of Water Pollution There are two major sources of water pollution which are direct and indirect sources. Direct sources includes effluent from factories, refiners and domestic sewage which affect directly water supply systems. Indirect sources include pollution from runoffs, ground water and contaminated rain water. There are other sources such as oil spills and marine or river dumping of waste.

Ways of Conserving Water Resources
For resources to be sustainable, they must be conserved to ensure continuity and availability to upcoming generations.

Water, as a resource, can be conserved thought the following ways:
1. Avoiding wastage: All people should use water wisely to minimise wastage. All taps should be turned off when they are not used. The used water may be re-used again. For example, water that has been used to rinse clothes can be re-used to mob the floor, soak the dirtiest clothes, rags etc. Do not use water directly from the tap, instead fetch the water in a container and use it wisely.
2. Controlling polluting: People should neither throw wastes carelessly nor introduce any chemicals into water. Stern laws should be made and enforced to stop industries from dumping toxic wastes into the water bodies. Any industry found polluting the water by any means should be heavily punished or even closed down altogether.
3. Protection of water catchment: Vegetation in water catchment areas should be protected and cared for. People should not carry out agricultural activities close to water sources. Planting of trees that consume a lot of water, such as eucalyptus, near water sources or rivers should also be avoided. Any activity that destroys the water catchment should be banned. In the past, the government ordered people to cut down all eucalyptus trees planted close to water sources so as to prevent the water sources from drying up.
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Topic 4: SUSTAINABLE USE OF FOREST RESOURCES EXPLOITATION OF FOREST RESOURCES

Forest refers to an extensive area of land which is mostly covered by trees of different sizes and species. Or a forest is a dense growth of trees, plants and undergrowth covering a large area of land. Forests can be natural or man-made (planted)/ Artificial forest

Importance of forests
i) Forests prevent soil erosion; Trees and grasses preventing movement of agents of erosion like water winds and moving ice.
ii) They maintain water sources like rivers, catchment areas, springs and lakes. This is due to the fact that forest support rain formation.
iii) Forests are also used for scientific studies (research).

iv) Where there is a variety of trees, tourism can develop because of scenic beauty. Hence the country can gain foreign money.
v) Forests provide habitats for animals and birds of different varieties.
vi) Forests contribute to the modification of the climate especially through rain formation and moisture conservation.
vii) Forests also introduce oxygen in the environment which is produced during photosynthesis. In this process the trees clean the air by absorbing carbon dioxide. Carbon dioxide is the raw material used during photosynthesis.
vii) Trees are also a source of fuel energy since they are used for firewood and charcoal making.
viii) Forests also provide raw materials for paper and pulp industries from which writing materials are produced.
ix) They provide building material like poles and timber.
x) Some tree species are used for making medicine and also provide fruits as well as ornamental flowers.
xi) Forests contribute to soil development through rotting of leaves which lead to formation of humus. Humus is very important in plant growth.

TYPES OF FORESTS

There are two broad types of forests: Natural forests and planted (artificial) forests. Natural forests is the type of forest that develop naturally without intervention of man while planted forests are planted and cared for by man. Distribution of Forests by Type Due to factors such as climate and tree species, natural forests can further be subdivided into the following broad categories.

1. Tropical rainforests: They are found around the equator, between 23.5°N and 23.5°S. Trees in the tropical rainforests are tall and often take a very long time to mature. They consist of indigenous trees which are typically broad-leaved, and they contain thick under growths of shrubs and other vegetation.
2. Temperate forests: These forests occur in the mid latitudes of both hemispheres. There are four distinct seasons in temperate deciduous forests and precipitation falls throughout the year, as rain in the spring, summer and fall and snow in the winter. The forest floor in temperate forests supports mosses, ferns and wild flowers. Maple, oak and birch trees are some examples of the deciduous trees that dominate these forests. There are also small numbers of evergreen trees such as pines and fir.
3. Coniferous forests: Coniferous forests are typically found in coastal areas with mild winters and heavy rainfall or in in-land mountainous areas with mild climates with temperature that fluctuates little throughout the year. Evergreen conifers dominate these forests. They are characterized by evergreen, need-leaved trees, with little undergrowth and tall trees which take very long time to mature. Dominant tree species found in coniferous forests include cedar, cypress, Douglas fir, pine, spruce and redwood. Some deciduous trees such as maple, and mosses and ferns are common in coniferous forests.
4. Boreal (taiga) forests: These are the northernmost forest type and are found between 50°N and 60°N. Boreal forests are characterized by long winters and short summers. Most precipitation is in the form of snow. Trees are mostly evergreen and include species such as spruce, fir and pine.

Factors for Distribution of Forests Forest distributions are affected by a number of factors which include the following:

1. Soil: Different types of soil offer various types of vegetation. For example, a damp and marshy soil will favour growth of types of trees such as mangroves, which are generally found on the coastal areas of the tropics or subtropics. On the other hand, sandy soils located in dry desert areas will support prickly bushes and cactus where the aim of the plant is to conserve water.
2. Rainfall: Water is an essential component of all living organisms. Trees need water for various physiological functions such as photosynthesis and cooling. Hence, it is essential for growth and development of any particular vegetation. Forests thrive well in areas that receive sufficient rainfall which is evenly distributed throughout the year.
3. Temperature: The warm and wet equatorial climate supports the growth of mainly huge, tall, deciduous trees. The cooler temperate climate supports needle-leaved trees which are adapted to that particular climate. The moderately hot tropical climate supports a variety of softwood and hardwood trees which thrive best in the tropics.
4. Relief: Relief refers to variation in altitude in an area. Differences in altitude along the slope of a mountain bring about differences in the type of forests along a mountain slope. For example, you will always find dense forests on the foot of Mount Kilimanjaro. As you move up from the foot of the mountain, the vegetation type and density changes gradually. At a height ranging between 1800 and 2800 m, there is the tropical rainforest, followed by the temperate forest at around 4000 m. Between 3000 and 3500 m, the forest is dominated by scanty vegetation, with patches of a bamboo forest.
5. Aspect: In physical geography, aspect generally refers to the horizontal direction to which a mountain slope faces. The slope of a mountain facing the direction of prevailing winds (windward side) will always receive higher amounts of rainfall than the slope facing the opposite side (leeward side). For this reason, dense forests will always grow on the windward side, due to abundant rainfall, while the leeward side will consist of scanty and poor vegetation.
6. Drainage: If the soil has too much water, plants cannot get enough oxygen from the soil. This will affect root respiration and the plants may eventually die. On the other hand, plants cannot grow well if they do not have healthy roots for absorbing water from the soil. So, the proper balance of plant health, water and air is necessary for maximum plant growth and development. Well drained soils support growth of a variety of big trees compared to water-logged and swampy lowland. However, few plants such as mangrove can thrive in shallow sea shores which are more or less permanently covered by water.
7. Human activities: Human activities such as clearing the vegetation to get land for agriculture or settlement greatly affect the distribution of forests. Most of the natural forests of the world have been cleared by man. In some parts man has planted forests (artificial forests) on bare lands or in place of natural forests.

Types of forest resources

1) Timber For making furniture and constructional works or match making for pit pups and making of wood pulp for manufacturing new prints and crayon. In Brazil 30% of timber is used mainly for furniture, harbor piles and clock gates, boat building and tanning extractions, 70% is used for fuel

2) Raisins and gum Are obtained from tree balks

3) Fiber materials For different uses such as shifting for upholstery cushions etc

4) Oil from nuts Can be processed for vegetable oil

5) Fruits and flowers For human and animal consumptions

6) Medical plants Including the castor oil plant, salsa parilla, cinchona which are used for making genuine Ways of obtaining forest resource Forest resources can be obtained in controlled or uncontrolled method. Uncontrolled method; Plant cover is removed over an extensive area and leave the land open unreliable to erosion agents i.e. using fires, shifting cultivation, deforestation. Controlled method; Are governed by government directions which discourage the use of fire and encourage sustainable development of forests for the benefits of the people and the creatures that inhabit such places. They include reforestation i.e planting trees to replace harvested forest resources.

Problems arising from exploitation of forest resources

Over exploitation of forest resources can cause the following environmental problems;

i) Increase in soil erosion; As the rain drops /falls harshly in the exposed soil and remove the fertile soil.

ii) Excessive evaporation; This causes drought (problems of water because streams and springs dry up).

iii) Destruction of animal habitat.

iv) Accelerated desertification. This caused by prolonged drought of an area since the absence of forest affect rain formation.

v) Pollution of the atmosphere which can lead to greenhouse effect and global warming i.e. when forests are cleared by burning adding carbon dioxide in the atmosphere.

vi) Disappearance of some species of trees (loss of biodiversity).

vii) Unreliable rainfall due to the excessive evaporation

Forest conservation measures

i) Planting trees where other trees have been cut (reforestation) and planting trees where there never existed any tree before (afforestation). Setting aside some areas and declaring them as protected areas.

ii) Educating people on the importance of conserving the forest and persuading them to fully participate in all activities involving forest conservation. Also there should be clear policies giving directions on the proper use of the forest resources.

iii) There should be alternative energy resources used instead of depending on the trees. For example Solar energy, Geothermal power, bio-gas and HEP

iv) There should be careful land use planning in order to avoid destruction of trees. Population control should be encouraged in the countries so as to reduce pressure on the forest resources and the land in general.

v) Agricultural methods should be improved so as to encourage proper land use methods like shifting cultivation should be discouraged.

vi) Destocking (reducing the number of animals) should be encouraged among the pastoralists, because having too many animal leads to the destruction of vegetation. vii) New and fast growing trees should be introduced. Agro-forestry means the practice of inter cropping trees and crops in the same farm. Trees can be inter-cropped with crops like beans, bananas etc.

Advantages of inter cropping the trees with crops (agro-forestry)

i) Trees prevent soil erosion while the crops like beans add nutrients to the soil.

ii) A farmer gets a variety of profits from the same farm. That is forest products and crop products.

iii) Family members get firewood from around homestead without traveling very far in search for firewood.

iv) Trees provide shades to other plants on farm land.

v) The rotten trees add nutrients to the soil hence soil fertility.

Disadvantages related to Agro-forestry

i) When large trees are inter-cropped the annual crops tend to suffer leading to decline in production. This is so because the large trees tend to take up most of the moisture, nutrients and block the light from reaching the annual crops.

ii) Some trees are harmful to crops since they produce poisonous substances.

iii) Mechanization cannot be easily done because of the trees. Examples of areas with timber industry are:- Sweden Canada And some parts of Japan where coniferous trees provide most of the forest resources. 60% of Canada is covered by forests and the major species are Oak, Chestnut, Spruce, and Pines Factors which have led the development of the timber industry

1) Low temperature discourage settlement hence leave room for trees

2) Enough rainfall leads to the growth of the coniferous forests

3) Availability of capital

4) Cheap means of transport
5) Sound forest management strategies

Factors which have led to the development of the timber industry in Gabon
i) Availability of many tree species.
ii) Availability of rivers like Ogowe facilitates the transportation of the timber products.
iii) Large foreign companies which were given concession to exploit the forests have capital.
iv) Constant market for timber products.

Topic 5: SUSTAINABLE MINING

Meaning of some common terms: Mining Is the extraction of valuable minerals or other geological materials which form the package of economic interest to the miners. Mines; Are places where Minerals are obtained or are the places where minerals are extracted. Minerals; Substances with constant chemical composition which are formed naturally in the earth's crust or Is the chemical composition of two or more elements within the earth's crust. Types of mining industry Surface mining; Extraction of minerals found close to the earth's surface, e.g corals and limestone. Underground mining; Extraction of minerals found deep in the ground e.g. gold, diamond etc

MINERAL DISTRIBUTION IN THE WORLD
Distribution of mining industry regions in the world, minerals are unevenly distributed in the world. Mining activities are concentrated where minerals deposits are in, some regions are rich in mineral resources e.g. south Africa while others are poor in minerals this is due to geological factors which led to their occurrence. Methods of mining
(a) Open cast mining It is used to extract minerals which usually occur close to the earth's surface It involves removing the top layers of the earth and other overlying materials above the mineral areas Earth moving machines and bulldozers are used. Electric shovels-to dig up minerals and load it into the lorries or trucks It is the cheapest method Example Quarrying of lime stone and corals at kunduchi in DSM and Barubuni in Kenya
(b) Alluvial mining Takes place where minerals occur in alluvial deposits (materials deposited by water). It involves mixing of alluvial deposits with water. Then the mixture is rotated until light particles like sand, mud and small stones are crashed off Then the mineral particles like gold, platinum and diamonds are left behind (c) Underground (shaft mining) It is used in mining ore that lie deep below the surface of the earth Vertical shaft is dug up to the layer containing the mineral, and then the tunnel is dug up horizontally to reach the minerals. Hence, the minerals are transported from the tunnels to the base of the shaft from where it is hoisted onto the surface.

TYPES OF MINERALS AND DISTRIBUTION OF MINING REGIONS IN THE WORLD
Metallic minerals /inorganic Gold, iron, silver, copper, lead, nickel, cobalt, manganese, tin, aluminium etc Non – metallic minerals Salt, potash, nitrate, Sulphur, diamond and graphite. Energy mineral Coal, natural gas and petroleum Coal It is found in USA in Pennsylvania, West Virginia, Ohio, and interior states like Illinois, Indiana, Kansas, Oklahoma and the gulf province in states like Texas, Alabama. The former USSR in Moscow, Donetsk coal basin and kuanetstk coal basin. Other countries include china, United Kingdom, South Africa, Zimbabwe at wonkie, Zambia, Nigeria, Botswana, The Democratic Republic of Congo, Mozambique, Morocco, Malawi, Sudan and Tanzania [from the Ruhuhu basin, ketewaka- Mchuchuma and Songwe-kiwira] Gold It is found in South Africa, Ghana, Tanzania, Zimbabwe, DRC, Uganda and Kenya Salt minerals It is found in Tanzania along the coast, Uvinza in kigoma and China Copper It is found in Zambia, DRC, Uganda –kilembe, Mauritania, Botswana, Chile, Canada, the former USSR and USA Natural gas It is found in Tanzania at Songosongo Island in Kilwa, Nigeria and Middle East Diamond This is found in Tanzania [Mwadui shinyanga], South Africa, DRC, Namibia and sierra Leone and guinea Phosphate It is found in Tororo –Uganda and Morocco at khourigba, youssonta and ben gueri within the maseta Rouxite It is the ore of aluminum. It is located in guinea, Ghana and Cameroon. Iron ore It is in German, Sweden, USA, and china, Brazil, Australia, France, UK, Liberia, Mauritania, Zimbabwe, Gabon, Algeria, Angola and South Africa.

Contribution of mining industry to the economy (economic importance of mining industry) of any country
i) Mining leads to the development of industries in the country for example steel cutting industry, coal has led to the development of heavy industries in china, USA and chemical industries.
ii) Mining contributes to the earning of foreign currency in the country for example copper in Zambia, gold in South Africa, oil in Nigeria, Libya, Algeria and Middle East and Kuwait.
iii) Mining industry provides employment opportunities to the people i.e. in Zambia copper mining employs a lot of people also many people are employed in the gold mining areas in south Africa [in rand mining areas] iv) Mining stimulates the development of transport and communication of other economic systems in any country for example in South Africa mining led to the development of a dense network of roads and railway lines in the eastern part.
v) It encourages the development of other economic sectors since it generates capital for the country, for example mining in china has led to heavy investment in agricultural machinery.
vi) Mining also leads to the improvement in the international relations through forming international organizations for the countries which deals with mining and exporting certain types of minerals for example Nigeria is the member of OPEC to the oil mining industry
vii) Mining leads to the development of towns and large cities like the industrial conurbation of rand in South Africa. Conurbation is

the large zone formed as a result of the combination of many towns into one zone.
viii) Also mining leads to the diversification of the economy of the country so that the country cannot depend on one source of revenue or income
ix) Mining has stimulated the construction activity especially in the supply of corrugated iron sheets for roofing the buildings etc
x) It also supplies some energy since some minerals are energy reserve like coal, petroleum, uranium and natural gas

FACTORS THAT INFLUENCE THE DEVELOPMENT OF THE MINING SECTOR INCLUDE THE FOLLOWING
a) Availability of capital to be invested in the mining industry like buying the machinery. Lack of enough capital, the mining industry develops slowly.
b) Nature of transport system. If the transport system is efficient mining develops fast but if the transport is poor then mining does not develop fast.
c) Availability of labour. Is another factor that contributes to the development of the mining sector, for mining to develop fast there should be readily available labour but if labour is unavailable then mining becomes poor
d) Nature of market. If the market is good then the mining industry grows fast if it is poor the mining industry develops slowly.
e) Water availability. This also leads to the fast development of the mining industry if the supply of water is reliable. But the situation is different when the supply of water is poor. Water is needed for cooling the engines of the machines and cleaning the minerals.
f) Nature of government policy. If the policy is supportive the mining industry develops fast but if the government policy is non supportive then the mining industry develops slowly.
g) The availability of deposits and their value. If the deposits are large and valuable mining takes place fast. But if the deposits are small and poor valuable mining take place slowly.

Problems facing the mining industry in Africa and other parts of the world
a) Decline or exhaustion of mineral deposits because of over exploitation like coal, copper in Zambia and some parts of USA and south Africa.
b) Poor number of skilled labour in the developing countries like Tanzania this has led to poor exploration and low yield. i.e low quality and quantity minerals.
c) Some countries lack important mineral deposits like Japan and Norway, in some countries the available mineral deposits are of poor quality like coal in Tanzania.
d) Poor capital in the developing countries has led to the decline in the mining sector.
e) Poor transport system especially in the developing countries has led to the poor mining activity some parts of central Tanzania have poor roads which are impassable during the wet season.
f) Competition with other economic sectors for water supply is a problem for example in south Africa water is scarce and the available is competed for by agricultural sector, mining and manufacturing industry.
g) There is a severe problem of constant power supply. This affects the mining industry
h) Poor conditions of workers in the mining areas leads to a problem in labour supply
i) Political problems especially civil wars lead to the poor mining development caused by labour unrest
j) There are problems of local market especially in the developing world. There is also a problem of price fluctuation in the world market which affects the development of the mining industry in many countries in the world
k) There are problems of food supply in some countries like Zambia this leads to the poor mining development

Problems caused by the mining industry
i) Mining leads to environmental problems. Like land degradation, soil pollution, water pollution and deforestation.
ii) It attracts people causing high population pressure in the mining centers which in turn causes many social and economic problems like poor housing, unemployment, shortage of land for other activities and sometimes food shortage.
iii) Mining leads to the death of people due to accidents caused by the collapse of mines
iv) Mining causes the decline of the economic sectors especially agriculture many people rush to the mining centers to labour supply
v) Mining industry has also led to the occurrence of conflicts like wars which are taking place in the DRC and the Gulf war of 1990s was due to mineral resource that is oil
vi) Spread of diseases due to high population pressure in mining centres.

Effects of mining to the environment
i) Mining leads to environmental pollution Like water pollution, air pollution, soil pollution and noise pollution
ii) Mining causes land dereliction (abandoning of exhausted land) This destroys the nature of the landscape and leads to mineral resource exhaustion
iii) It accelerates deforestation as a result of clearing of vegetation so as to establish the mining centres and settlement
iv) The size of the land is reduced and the soil structure and texture are destroyed because of the mixture with rock fragments and hence plant growth can not take place easily.
v) Mining leads to the disappearance of valuable plant species. i.e loss of biodiversity.
vi) Green house effect and global warming can occur as a result of the used energy generating minerals like coal, uranium etc these produce gases like carbon dioxide which pollute the atmosphere.
vii) The pits which are flooded with water act as mosquito breeding places and hence accelerate the spread of malaria

SUGGESTED WAYS OF MINIMIZING THE EFFECTS OF MINING TO THE ENVIRONMENT
a) Improving the methods of extraction
b) Reducing the population pressure
c) Reclaiming the areas which have been affected by mining like planting the trees
d) Developing other sources of energy rather than depending on energy resources from the ground
e) Establishing other economic activities like fishing, tourism and market gardening instead of depending on mining only

CASE STUDY COAL MINING IN USA

USA is the leading producer of coal in the world and accounts for 24% of the world's total production. The major coal fields include: The eastern province which is the most productive in which there are states like Kentucky, Pennsylvania, West Virginia and Ohio The interior that include the states like L.Hunan, Indiana, Illinois, Missouri, Oklahoma and Kansas The gulf province that includes the states like Texas, Alabama and Arkansas Factors that have stimulated the development of coal mining

1) Presence of large deposits in many parts of USA.
2) Advanced technology used in the mining activity. The use of machines.
3) Good market within and out of the USA due to the presence of iron and steel industries.
4) Well developed transport system.
5) Capital availability since the country is very rich.

Advantages of coal mining in the USA

1) It has stimulated the development of industries since it provides power.
2) It has led to the development of the transport system especially the railway lines.
3) It has created employment opportunities.
4) It has stimulated the development of the iron mining sector.

Disadvantages of coal mining

1) It has led to the creation of pits in the ground leading to the formation of ugly landscape.
2) Coal has contributed to the environmental pollution like air, water and noise pollution.
3) It is facing a great challenge from the environmentalists and other sources of energy.
4) It has led to the reduction in the size of the arable land.
5) Coal is a non-renewable resource hence it gets exhausted when exploited.

OIL PRODUCTION IN THE MIDDLE EAST

Middle Eastern countries together produce over of the world's petroleum [oil]. The major producers being Saudi Arabia, Iran, Kuwait and U.A.E. Others are Oman, Iraq, Turkey, Syria, Lebanon, Israel and Jordan. Factors leading to the production of oil in the Middle East

1) The deposits are very large. The Middle East has a very huge deposit of oil.
2) The oil is easily obtained in the Middle East. Most of the oil is obtained from underground, only a small percentage obtained from under sea.
3) The oil can be easily exported (transported). Most of the Middle East fields are located around Persian Gulf (easy to export).
4) Oil drilling is the only economic activity in the Middle East.

Problems that have been facing oil extraction in the Middle East

1) There has been technological backwardness in many countries combined with small populations and lack of local capital. This forced the international companies to involve themselves in the oil exploitation.
2) Labour unrest due to frequent conflicts that take place in the Middle East like the gulf war. These conflicts have made the oil mining industry become insecure also there are frequent disputes which complicates oil mining because of these issues/conflicts.
3) Poor transport system from production areas to refining ports.
4) Reduction of oil reserves as it is non-renewable resources i.e. it is decreasing day after day.

DIAMOND MINING IN SOUTH AFRICA

South Africa is the third world producer of diamond, the first is DRC and the second is the former USSR. Others are Botswana, Ghana, and Sierra Leone etc. Diamond is the hardest mineral. In South Africa mining began in 1871 at Kimberly. The methods involved in the mining process are placer method for alluvial diamond and shaft method for the diamond found in the deep ground. Diamond is used for making jewels, manufacturing the drilling bits, making cutting instruments like for cutting glass, diamond dust for polish. Places or areas where diamond is produced in South Africa are;

i) Kimberly cape province
ii) Transvaal
iii) Port mus burg
iv) Orange free states(Pretoria)

Importance of diamond mining in South Africa

i) Provision of employment opportunities not only in South Africa but also in other countries.
ii) Development of social services.
iii) Development of towns and cities e.g. Pretoria.
iv) Increases the national income from its sales.

Problems facing diamond mining in South Africa

i) Price fluctuation in the world market which causes low profit making.
ii) Labour unrest, no peace, misunderstanding among blacks and whites.
iii) Shortage of food among workers caused by overpopulation around mining centers.
iv) Competition from other mining countries.

IRON MINING IN LIBERIA

Liberia is well endowed with large resources of Iron ore. Liberia is the leading producer of Iron ore in Africa. Iron mining is very important to the economy of Liberia. The areas with mineral deposits include Walogosi Mt. ranges in Western Liberia, Bomi hills,

Bong Mountains, Nimber Mountains ranges and Bio mountain ranges. Open cast method is widely used.

Factors for the development of Iron mining in Liberia
1) Availability of iron ore both high grade and low grade.
2) Development of the railway to Bomi hills from Monrovia.
3) Labour availability since west Africa has high population.
4) The government policy favors mining industries in Liberia.

Advantages of iron mining in Liberia
1) It has contributed to the export earning
2) It has contributed to the development of industries especially steel industry and Buchanan.
3) It has encouraged the development of towns.
4) The mining industry has stimulated the development of social services like schools, roads, hospitals, shops and police stations.
5) It has led to the improvement of the port facilities such as Buchanan.
6) Iron mines have provided market for the locally produced food stuffs.
7) It has stimulated the development of infrastructure like the railway system etc. 8) Employment opportunities.

Problems facing iron mining in Liberia
1) Competition from other countries like south Africa which produce iron.
2) There is exhaustion of deposits in the mining areas. 3) Poor transport from other west African countries.
4) The deposits are scattered.
5) Civil war between the government and rebels.

IRON MINING IN SWEDEN
Sweden is endowed with iron minerals. It is among the Scandinavian countries. Areas where iron mining takes place include places around koruna and other mining centers at Gullivane and Suapavaara. Factors for the development of iron mining in Sweden
1) The development of the railway stimulates the iron mining industry.
2) High market in Europe due to the developed industry especially in Germany.
3) Power supply from the great hydroelectric power at Porjus etc.
4) The use of advanced technology.
5) The government supports industrial development.
6) Constant water supply needed in the cooling of engines and cleaning.
7) High government stability has encouraged the mining industry, this is because labour is under high security. 8) Availability of high grade iron deposits

Importance of iron industry in Sweden
1) Creation of employment opportunities.
2) Has stimulated the development of transport and communication.
3) It has led to the development of heavy industries including steel and iron industry as well as car and ship building industry Volvo and Scania cars are produced in Sweden.
4) It has promoted agriculture, forestry and tourism.
5) International trade has expanded.
6) Towns have developed due to the contribution of iron ore mining.
7) Social services have improved to a great extent.

Problems facing iron industry in Sweden
1) Formation of ice in winter at the Luck port complicated the transportation. To solve this problem another link was formed to ice free port at Narvik.
2) Exhaustion of some iron deposits due to excessive extraction.
3) Stiff challenge from the environmentalists who are against the current trend of fast industrial development.

NATURAL GAS PRODUCTION IN TANZANIA
In Tanzania natural gas deposits have been discovered at Songosongo in kilwa in 1975 but there has been a delay in realizing full exploitation of gas due to the following reasons;
1) There is low technology among the Tanzanians that can be used in exploiting natural gas at Songosongo island along the coast of the Indian ocean.
2) Low capital to be invested since Tanzania is one of the poor countries.
3) Poor transport [infrastructure] that can facilitate exploitation of natural gas.
4) The use of other available sources of energy like HEP and forest has delayed full extraction of natural gas from Songosongo.

Advantages of the extraction of the gas from Songosongo
1) It will lead to the reduction of over dependence on gas from outside.
2) It will stimulate the development of some iron and steel industries by using the available iron deposits in Tanzania as well as scope iron materials.
3) It contributes to the promotion of environmental conservation since natural gas is clean and environmentally friendly.
4) It will lead to the creation of employment opportunities in the country so as to solve the problem of unemployment for example some people are now employed to dig traces and lay down the pipe lines and construction of other important structures.
5) The standard of living among the people will raise due to the provision of efficient sources of energy.

6) It can stimulate exploitation of other resources like petroleum which is expected to be present at Songosongo.
7) It can stimulate the gain of foreign currency through selling it abroad

Topic 6: TOURISM

Tourism refers to the travel of people away from home to other place for recreation, leisure, religious, family, or business purposes, usually of a limited duration. Tourism involves visiting places of interest like wildlife, beaches, museums etc,

Types of tourism
There are two categories of tourism, namely, Domestic and international tourism.
Domestic tourism involves travel within the same country. For example, when people move from Mbeya to Mikumi National Park to view wild animals, this kind of tourism is called domestic tourism.

International tourism involves movement from one country to another for leisure, business, education, etc. For example, many people travel from Europe and America to Tanzania to climb Mount Kilimanjaro, or to view other attractive things.

Factors for the Development and Growth of the Tourism Industry in the World
Factors Which have Contributed to the Development and Growth of Tourism in the World Describe factors which have contributed to the development and growth of tourism in the world

Physical factors
Presence of Good climate Beautiful landscape (scenery)

Socio-cultural factors
Accessibility of the area of interest, transportation like roads, and railway sis required. Presence of national park like Serengeti
Availability of good social services like medication, good food, water supply etc

Political factors
Presence of peace in the country Government policy that helps to develop tourism industry Religious factors People often travel to places of religious importance to seek inner peace, get blessing of their favourite gods and spiritual leaders, attain salvation before death, etc. Examples of places that are well known for their religious significance are Jerusalem in Israel, Mecca and Medina in Saudi Arabia, Varanasi and Amritsar in India, etc.

Importance of Tourism in the World
There is a lot reasons to say Tourism is important, some of them include the following:
1. Source of foreign exchange
2. Source of employment
3. Improvement of infrastructure
4. Promotes international relations
5. Source of government revenue
6. Conservation of wildlife and environment and protection of historical sites
7. Economic use of marginal lands
8. Preservation of culture

Impact of Tourism in the World Positive impacts of tourism
1. It helped in foreign exchange
2. Tourism has led to creation of job opportunities. Many people have been employed in the tourist sector, a fact which has helped improve their quality of life.
3. It brings together people of different colors, cultures and religions.
4. It leads to job creation in rural areas, thereby reducing rural-urban migration.
5. It has led to diversification of economies of countries involved in the sector. For example, tourism is now earring more revenue than agriculture and other sectors of the economy in Tanzania.
6. Tourism has enabled sustainable conservation of wildlife and the environment and preservation of cultural heritage and historical sites.
7. It influences development of infrastructure in host countries. In Tanzania, for example, roads to national parks such as Serengeti National Park have been improved Negative impact of tourism
1. Bad behaviour and overcrowding to the host community.
2. The tourists can lead to erosion of traditional cultures and values.
3. Tourism poses a threat to natural and cultural resources such as water supply, beaches, coral reefs and pollution.
4. High expenditure towards improvement of social services.

5. Jobs created by tourism are often seasonal and poorly paid
6. Tourism can cause events such as terrorism, natural disasters and economic recession.

Ways of Addressing the Negative Impact of Tourism

Ways of addressing negative impact of tourism include:
1. Diversification of revenue sources such that when the tourism industry collapses they do not suffer economic difficulties.
2. Laws and policies should be put in place that ensures the revenue accrued from tourism benefits the local community and the government in general.
3. Tourists should be directed to obey the culture and traditions of the host communities.
4. Promotion to conserve and preserve the environment
5. The laws, rules and regulations should be enacted and enforced to combat criminal incidences, child labour, drug abuse, and prostitution\
6. New tourist attractions should be established and developed so as to reduce pressure exerted to already established attractions.
7. The local people should be involved in tourism activities so that they benefit in conserving the tourist attractions like wildlife conservation areas, etc.
8. There should be integration of tourist activities with the protection of the environmental condition through the eco-tourism approach.

TOURISM IN NAMIBIA

Namibia is a newly independent country but the tourism sector has grown very fast within a short period of time. Incidentally tourism is the 3rd largest contributor to the gross domestic product after mining and agriculture. The number of visitors in Namibia has been increasing year after year. For example in 1993 over 368,000 visitors came to Namibia, 560000 in 1996, 615000 in 1997 and over 800000 are projected for the year 2007. The overall growth of the tourism sector is targeted at 10-12 percent per year

Factors that have contributed to the tourism growth in Namibia

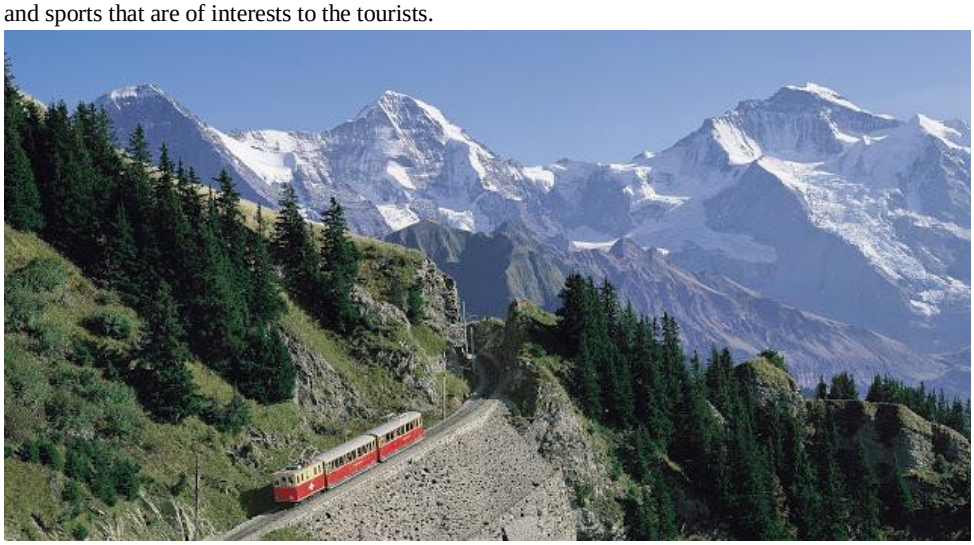
1) Advertisement that has been done by the government and the private sectors
2) Strong policy on promoting the tourism industry
3) Namibia has a favorable investment potentials created by Namibia's free market economy and the government commitment to promote free enterprise
4) Well developed infrastructure has facilitated easy accessibility of different places in Namibia
5) There are a lot of attractions which include:- Climate endowed with beautiful sunshine, Abundant wild life in the game reserves like hardtop and mahango game reserves, national parks like the Etosha and Malili national park, Caprivi Aaan and Viljoen game parks.
6) The establishment of the Namibia stock exchange [NSX] that has attracted foreign investors, has been another contributing factor in the tourism development
7) The hard work made by both the public and private sector. The private sector has invested substantially in the development of infrastructure
8) The influence of development of other activities has facilitated the development of tourism in Namibia
9) The aid from European countries has also enhanced the tourism development process in the country

Importance of tourism to Namibia

a) It has led to the preservation and boosting of the country's cultural values and norms
b) It has stimulated the further development of infrastructure
c) It has promoted the move towards environmental conservation in the country with an aim of maintaining the country's beauty
d) It has contributed to the employment creation in the country
e) It has contributed to the gross domestic product. It is the third contributor to the GDP after mining and agriculture
f) Social services have improved in the country especially with the introduction of the community based tourism
g) Tourism has earned Namibia an international repute. It has led to the formation of the people's lives in general Tourists resorts in Namibia The tourist resort in Namibia includes Cape gross seal reserve, Caprivi Game Park, Daan Viljeon park, Duwisib castle, Etosha national park, Fish river canyon, Gross barmen hot spring resort etc.

TOURISM IN SWITZERLAND

Switzerland is a famous country in the world due to its tourism development. It is also referred to as the playground of Europe since tourism takes place all the year around and many tourists visit Switzerland because of its attractions. There are also different games and sports that are of interests to the tourists.



Factors influencing the development tourism industry in Switzerland

1. Beautiful scenery made by the Alps Mountains which have U-Shaped valleys pyramid peaks and snow cover. Also presence of water bodies like Geneva which adds to the beauty of the scenery.
2. Its central location in Europe has also led to high accessibility of the country from different directions in Europe and other countries like America etc.
3. Ideal climate which allows the activities to take place both in winter and summer
4. Good hotel management so as to meet tourists demand
5. Availability of skilled labor. This has led to the efficient running of the tourism industry
6. Hospitality of the Swiss people has been another attraction to the tourists
7. Its policy of stability has made peace dwell in the country and hence tourists have been encouraged to visit the country
8. It has international institutions like banks and conference centers used by different nations because of its peace

Importance of tourism in Switzerland

i) It is the major employer in the country. During the peak season it employs more than 120,000 people. This is six or seven times as many as Tanzanian tourism employments.
ii) It has contributed to the earning of foreign exchange in the country hence capital is accumulated from the tourism industry in a great amount.
iii) It has stimulated the development of science and technology for example electrification of the railway systems.
iv) It has accelerated the foreign responsibility of the Swiss country. This has been followed by the improvement in the international relations between Switzerland and the countries where tourists come from.
v) It has contributed to the provision of employment to the people.

Problems facing tourism in Switzerland

1) Severe cold during winter which leads to the blocking of railway lines
2) Landslides and avalanches are dangerous to the tourists
3) There is competition between the tourism industry and transhumance in the use of the Alps Mountains
4) Steep slopes of the mountain have led to the problems of transport to different parts of Switzerland.
5) Environmental pollution due to the coming visitors

TOURISM IN TANZANIA

The importance of tourism in Tanzania
1. Tourism Source of foreign exchange
2. Improvement in the standard of living
3. Source of employment.
4. Improvement of infrastructure
5. Market for locally produced goods and services
6. Environmental conservation
7. Strengthening of international relations
8. Source of foreign exchange

Problems Facing Tourism Industry in Tanzania
Problems facing the tourism industry in Tanzania include:
1. Poor transport and communication
2. Poor marketing of the tourist attractions
3. Shortage of capital to develop tourism industry
4. Poor coordination policies government and stakeholders in the industry
5. Crime that caused by tourists from visiting tourism areas.
6. Poaching has led to extinction of some animals
7. Stiff Competition competition from other countries with the same attractions
8. Failure to master different languages creates a communication

Methods Used to Increase the Income of Tourism Industry in Tanzania
Ways of increasing income from the tourism industry include:
1. Marketing and publicity
2. Promotion of domestic tourism
3. Expanding tourist industry by opening and expanding new tourist attraction like coastal area.
4. Training of tourism personnel
5. Improvement of infrastructures
6. Improvement of safety and security
7. Controlling poaching because it reduces numbers of wild animal Lessons to Promote Tourism Industry in Tanzania

How to promote tourism in Tanzania
1. The ministry of Natural Resources and Tourism, through Tanzania Tourist Board (TTB), must promote Tanzania's tourist attractions through conducting publicity campaigns, preparation and publication of destination brochures and provision of tourist information.

2. Improvement and development of transport and communication infrastructures, particularly in areas with tourist attractions, in order to make these attractions accessible from the town centres.
3. Tourism resources such as national parks and game reserves should be protected from human encroachment. Also the environment on which the animals thrive, such as natural vegetation and water resources should be conserved.
4. There is need to identify and develop tourist attractions and improve the existing ones so as to diversify the tourist activities. Special emphasis should be put on improvement of pre-historical and archaeological sites, most of which are in very poor states.
5. The level of hospitality to tourists must be improved through training of the tourism personnel so as to meet the world's standards.
6. Attracting both local and foreign investors to put up facilities such as hotels, motels, lodges, etc. for tourists.
7. The political stability, peace and tranquility should be maintained to ensure maximum security to tourists.

Topic 7: MANUFACTURING INDUSTRY

Manufacturing industry refers to the industry which involves processing and changing the materials in order to make new products of greater value to man. Manufacturing industries are also referred to as secondary industries.

Significance/Importance of manufacturing industry

i) It provides employment
ii) Diversification of the economy; Industries reduce the reliance on one type of product
iii) Earning of foreign currency example Germany earns foreign currency because of exporting the manufactured products
iv) It leads to self-sufficiency. The country reduces its reliance on imported goods hence its economy becomes stable
v) Development of transport and communication like roads railway lines, ports etc
vi) It encourages improvement of social services
vii) It reduces expenses on imports

TYPES OF MANUFACTURING INDUSTRIES

Manufacturing industries are divided into processing and fabrication industries. Processing industries are the ones which deal with preparing the raw materials for fabrication. For example coffee pulping, decorator and cashew nuts hullers Fabricating industries are the ones that deal with making new products from the processed materials for example textile industry. Manufacturing industries can also be classified as heavy industries or light industries Heavy industries are industries which involve the production of bulky and heavy products like iron and steel industry, car assembling and shipping etc Light industries are those which involve the production of light and complex products for example the manufacture of plastics, textiles, cosmetics and paper

Factors influencing the location of industries

These are several factors which combine to influence the location of industries these include:
1) Availability of raw material. Some industries are located near to the source of raw materials Example most of the processing industries and food manufacturing industries
2) Fuel and power availability. For example location of iron and steel industries in United Kingdom and china
3) Human resources, this helps to the labour supply both skilled and unskilled
4) Availability of capital. This is needed for the investment in the machinery and importation of raw materials 5) Market availability.
6) Industrial inertia and historical factors Industrial inertia is the tendency of old industries to remain in the same area without shifting to the new area. Despite of unfavorable conditions these industries continue being in the same area because of the well-established transport system and assured supply of labor as well as social services supply.
7) Availability of transport and communication systems.
8) Government policies. This helps on balancing the economic development of a certain area and provision of jobs
9) Government stability, Is the ability of government in maintenance of peace of a particular place.

Effects of the manufacturing industries on the environment

The effects caused by industries can either be positive or negative, positive effects involve the use of virgin land which was once useless and the negative effects on the environment include;
1) Land degradation because of clearing the forests to establish the industry and extraction of raw materials from the land
2) Environmental pollution includes air pollution which caused by the introduction of greenhouses gases like carbon dioxide and nitrogen oxide. Water pollution caused by introduction of hot water and chemicals from the industries, soil pollution and noise pollution.

Types of pollutants

a) Gaseous pollutants; Are the pollutants which occur in gaseous form. These include greenhouse gases like carbon dioxide, carbon monoxide, nitrogen oxide etc which pollute the air. These pollutants on polluting the air lead to the formation of acidic rainfall and global warming. Acid rainfall leads to the addition of acid in the soil which in turn causes the death of plants and microorganisms as well as destruction of buildings by removing the paint on the walls.

b) Particulate dust matter and other solid matter Are the pollutants which occur in particle or solid which emirates from the industries get into the air or water bodies or soil and cause contamination. These can lead to the increase in acid or toxicity in places where they can be dumped
c) Liquid matters; this includes all forms of molten or semi molten materials (liquid). These involve hot water and chemicals from industries. Hot water leads to thermal pollution of water bodies which can kill the aquatic animals/organisms because of the sharp rise in temperature

General effects of industrial pollutants on the health of an individual employee and communities living around
1) Water pollutants cause disease like Cancer, Typhoid, and diarrhea.
2) Air pollution can lead to respiratory diseases like bronchitis to employees and people around.
3) Soil pollution can cause decline in agricultural production and hence lead to starvation to take place
4) People are also affected by noise and sometimes can lead to problems in the blood circulation. For example Blood pressure and heart attack.

Ways of reducing pollutants
a) The combustion system in the engines should be filled with efficient facilities so that the amount of greenhouse can be reduced if not solved totally.
b) The industries should be located far away from the residential areas.
c) Recycling the wastes for example the metal materials should be recycled so as to produce h) Alternative energy sources which are environmentally friendly like solar energy, natural gas, wind power etc.
d) There should be other activities developed so as to avoid over dependency on manufacturing industries only especially in Japan etc. other materials.
e) To avoid noise pollution the parts of the engine should be lubricated and materials used should be like bronze which does not make noise.
f) There should be concerted efforts by the government and non-governmental organizations and some committed individuals in certain environmental pollution.
g) There should be strong policies governing the industrial operations and ensuring that people who invest in industrial operations /development are given proper education on how to handle the waste products properly i.e. recycling h) The industrial wastes should be treated to render them harmless to the health of people.

CASE STUDY SHIP BUILDING IN JAPAN
Ship building in Japan expanded fast after the Second World War The main reasons for that expansion have been outlined below; Japan's enormous increase in external trade which led to the increase in demand of merchant ships Japan's large engineering industry has stimulated the development of ship building. Absence of old established ship building industry made it easy to introduce modernization. Normally old industries tend to create problems in introducing new technology. A large skilled labour force Technology is well advanced and efficient hence has stimulated the fast development of the industry. Strong determination to become successful in industrial and trade activities in Japan Introduction of prefabricated ship building The development of fishing industry in Japan and worldwide has stimulated the development of the ship building industry. Forestry industry in Japan has also contributed a lot since the forest materials are used as one of the components in ship building. Ready market worldwide especially in rich countries The government policy has supported the industrial development of the shipping industry in Japan. Reliable supply of power like HEP power and nuclear energy The need to import raw materials has stimulated the development of the Ship building industry. This is because the country lacks raw materials so it imports most of its raw materials and the ship building industry could help in cutting down some coasts of transport.

PROBLEMS OF THE SHIP BUILDING INDUSTRY
1) Frequent earth quakes threaten the industry because the country lies within the weak zone of the earth's crust
2) Stiff challenge from the other countries like China and South Korea which are also developing their own shipping industries. This reduces the market
3) The industry also faces opposition from the environmentalists and is believed to be one of their sources of pollution in the world. Coastal areas have been polluted and this affects people and animals Location of the shipping industries Most of Japanese ship yards are located along the coast these include: Kobe Osaka, Chiba, Yokohama, Kawasaki, Tokyo and Hiroshima CAR

ASSEMBLY IN USA
The motor cars and Lorries are now produced in the USA on assembly line. Assembly needs considerable engineering Skills. USA is the largest producer of road vehicles and the industry is located along the shores of the great lakes in regions such as Detroit, Cleveland and buffalo. Another important center is Los Angeles in California. Early modern car manufacturing in the USA begun in the early 1900 and half of the world cars are produced at Detroit and the southern shores of the great lakes. Car assembly needs a large area of flat land and there must be good communication with the other industries which supply component parts. The large units of the car are chassis or frame, engine, body, wheels, springs and column. Materials needed for manufacturing the car parts are Iron

and steel for making the body and engine frame Lather and cloth for making the seat covers Rubber for making the tyres Electric wire coverings Glass for windows and the wind screen Lead for the accumulator etc Factors that have influenced production of cars in the USA The use of advanced technology in the making of the car components Availability of labor used in the car assembly and high industrial and agricultural production which need car transport for ferrying the goods produced Also availability of iron and steel for making the car parts, capital availability for the cars produced in the USA, the USA has the market both within the country and out of the country The influence of the government policy that has been encouraging heavy industrialization in order to obtain advanced economic development Good road network has also encouraged the manufacturing of cars. Challenges facing the car industry in the USA Great challenge from other countries like Japan contributing at Tokyo and Yokohama. German centering on Nuremberg, Dusseldorf and the Stuttgart. UK centering on Coventry, Birmingham, Derby, oxford and Dagenham Terrorism has been threatening the country, keeping people uncomfortable. Much of the financial resources are directed to the fight against terrorism Environmentalists also discourage the manufacture of many cars

AIR CRAFT IN RUSSIA

Aircraft cannot be mass-produced. They are like ship buildings which have to be built very much by individual schedules. The Airplanes are usually assembled in the areas where road vehicles are made. But the Russian aircraft industry is highly challenged by the USA which is the largest producer in the world with industries near Los Angeles at Seattle (on the pacific coast) Advantages of the car and aircraft industries

1) Have stimulated the development of international trade
2) Transport has become efficient With planes urgent problems can be attended to.
3) Have stimulated the spread of technology and information. The world has become a global village.
4) It has strengthen unity among the different countries in the world. Problems Car and air craft industries
1) Air pollution because of the introduction of gases in the atmosphere
2) Acceleration of accidents in the air and on the road claiming the lives of the people
3) Drug trafficking from country to country
4) Spread of diseases like AIDS due to the global contacts among the people
5) Acceleration of terrorism and civil wars in many parts of the world The weapons are transported from one continent or country to another
6) Acceleration of climate change due to the destruction of ozone layer caused by smoke produced by cars and airplanes.

HEAVY DUTY VEHICLES IN GERMANY

Germany is one of the world's leading countries after the USA in terms of production of heavy duty vehicles. The heavy duty vehicles are the ones that carry heavy goods (bulky) or do heavy works like earth moving. Examples of heavy duty vehicles include;-

1) Transport vehicles such as containers carries [trucks]
2) Earth moving machines like bulldozers, caterpillars, drilling vehicles, tractors used for ploughing etc.

Factors that have influenced the development of the heavy duty vehicles in Germany

1) Availability of raw materials like iron and steel from the Ruhir region
2) Availability of energy especially from coal mined in the Ruhir region
3) Hard working attitude of the people in Germany has contributed to the fast development of this industry
4) Good transport and communication network has stimulated the manufacturing of heavy duty vehicles. Germany is having well advanced high ways.
5) Advanced science and technology among the people of Germany because of high education
6) Availability of market both in the country and outside the country due to the good quality of goods
7) Availability of enough capital which enable them to implement their objectives.

Problems that Germany has been facing in this industry

1) Tariffs [taxes] charged to the industry tend to be high
2) The WWII which was under the influence of Hitler caused deceleration of the industry.
3) Other countries wanted Germany to limit its industrial sector because it became a threat to them.
4) Germany is currently facing challenges from other countries that are producing the same goods like Japan and the USA
5) Exhaustion of some raw materials like coal and iron is another problem.

Positive effects of heavy duty vehicles

1) They facilitate road construction in the country for example they are being used in Tanzania for road construction such as the Morogoro road.
2) They help in the distribution of goods and services in the country.
3) They also promote the development of industries in the country since they facilitate the supply of raw materials.
4) They create employment opportunities for the people in the country like drivers or operators.
5) It has contributed greatly to the development of International trade.

Problems caused by heavy duty vehicles

1) The heavy trucks that carry bulky and heavy goods contribute to the destruction of the roads especially where the roads are of low quality like the largest part of Tanzania
2) They cause delays on the way during road construction
3) They accelerate the rate of accidents on the way as some other vehicles happen to slam into them when no signs are put on the road during the road construction.

ELECTRONIC EQUIPMENT PRODUCTION IN SOUTH KOREA

South Korea is among the newly industrialized countries whose economy has been growing very fast due to heavy investment in the industrial development. Other NICs are: Taiwan, Hong Kong and Singapore etc The economies of these countries are referred to as Tiger economies because they have been growing very fast. Electronic equipment production industry is classified as high technology industry since it produces light articles like Television, Electronic watches, Desk tops, Calculators, Radios, Sophisticated materials like, Microphones, Magnetic disks, Computer terminals, Software etc In South Korea the major center for electronic production is around Tango in the south where there are more than 150 electronic factories.

Factors for the development of electronic equipment production in South Korea

1) Labor supply in the initial stages of industrial development have been reliable and people are hard-working and efficient
2) High technology because of the advanced education among the people
3) The industry is flexible [foot loose] in location. - It can be located in a small space like the city center it does not need a large area.
4) Ready market for the articles produced in South Korea since they are of high quality and of the current demand in the world.
5) There has been strong government support on the industrial development
6) Agricultural development supports this industry especially in creating capital for investment
7) Efficient transport system in the country

Advantages of the electronic industry in South Korea

1) It has led to the creation of employment to the population of the country
2) It has stimulated fast information flow especially through the internet services which use computers
3) The use of computers has stimulated efficiency and accuracy in processing bulky data in the different enterprise or companies etc. Hectic/laborious work has been avoided through automatic use of machines. In some areas there is a use of robots which can work more than a human being
4) The economy of the country has risen fast as a result of exporting electronic facilities
5) It has stimulated the growth of other industries like heavy industries
6) The export trade has expanded leading to the increased international relation between South Korea and other countries
7) It has contributed to the diversification of the economy of the country

Problems of the electronic industry

1) The spread of viruses in the computers leads to error in data processing. 2) It does not have high market in the developing countries where technology is very low and many people do not know how to use electronic facilities.
3) It has led to the rapid growth of urban population due to the rural-urban migration. This has led to the rise of squatters and congestion as well as the decline of rural areas.
4) It has contributed to the retrenchment of employees (trimming down employees) since few computers can do most of the work more efficiently than human beings for example The use of robots in the ship building and car assembly.
5) There has been worldwide competition especially from America in the manufacturing of electronic devices.
6) They are expensive.

IRON AND STEEL INDUSTRY IN TANZANIA

Among the East African countries Tanzania were a brighter future as far as iron and steel industry is concerned. The bright future is due to the following factors;

1) About 500 million tons of iron deposits have discovered to exist in Liganga area
2) There are large deposits of power resources
3) The existence of high demand for construction materials like iron bars
4) The existence of the present steel rolling industry in Tanga has led to the inspiration for establishing iron and steel rolling industry
5) There also exist other sources of power like HEP especially at stiegleis Gorge. These will provide power for the iron and steel industry
6) The need of cutting down costs which incurred in the importing the iron from other countries

Advantages expected from the iron and steel industry in Tanzania

1) It will create employment opportunities for the populations especially in the southern parts of Tanzania

2) It will lead to the local supply of steel material to steel rolling industry in Tanga
3) This will cut down costs of importing steel from other countries and hence it will save a lot of government revenue that could be used in importing steel
4) It will facilitate the construction sector such that stronger buildings and bridges will be set up.
5) It will also facilitate the development of transport and communication within the country 6) Agriculture will also improve since farm implements will be produced in a greater quantity and will be cheaper compared to the imported iron and steel materials

Factors limiting the development of iron and steel industry in Tanzania
1) Lack of capital since Tanzania's economy is very low
2) Low technology among many Tanzanians This has led to the existence of poor skilled manpower.
3) There are poor transport and communication systems such that the transportation of iron and steel materials will be problematic.
4) Shortage of internal market is another hindering factor delaying the development of iron and steel industry in Tanzania.
5) Traditionally Tanzania has poor industrial base since it has been depending on agriculture as its economic back bone [economic mainstay].
6) Lack of Government support.

Factors that hinder the development of the manufacturing industries in East Africa
1) Low levels of science and technology
2) Low levels of capital to be invested in the industries
3) People are so migratory (they keep moving from place to place and hence they cannot concentrate on production)
4) Civil wars also hinder industrial development in Tanzania and East Africa in general
5) Low government support on industrial development
6) Poor availability of raw materials
7) Poor transport and communication, Hence the transportation of manufactured goods and raw materials is very costly.
8) Poor labor supply to the industrial places.
9) Limited or poor marketing system.
10) Limited mineral sources and sources of energy. Ways of improving the industrial base in East Africa
1) There should be improvement in transport and communication system.
2) There should be improvement in science and technology so as to facilitate industrial growth.
3) The government should formulate policies which support industrial development in the country.
4) The local resources should be explored and exploited for industrial use.
5) There should be control of population growth so that the capital can be invested in industrial development rather than supporting the rapid growth of population rather than wasting time moving from one place to another.
6) Competition should be encouraged among the Industrial producers.
7) The development of Internal and external trade should be encouraged

Topic 8: SUSTAINABLE USE OF POWER ENERGY AND RESOURCES
Energy Energy is the capacity for doing work. Or the power required on carrying out activity. Power Is the rate of doing work. Or the rate of using energy. You must have energy to accomplish work. Therefore, you need energy to produce power. Without energy there is no power that can be produced.
The Major Sources of Power and Energy Energy sources can be sub-divided into two broad categories. These are renewable and non-renewable energy sources. Renewable sources are those that do not get finished or used up since they are naturally replenished. These include sunlight, water, geothermal steam, wind and biomass. Non-renewable sources are those that can get finished or used up through use, that is, they cannot be replaced once used up. They include coal, petroleum, natural gas, groundwater aquifers, and nuclear energy sources such as uranium and plutonium.
The Origin of Different Types of Energy and Power Sources Some of these energy and power sources are discussed in details below:
Coal: Coal is a fossil fuel that forms when dead plant matter is converted into peat, which in turn is converted into lignite, then sub-bituminous coal, after that bituminous coal, and lastly anthracite. This involves biological and geological processes that take place over a long period of time. Coal is black or brown in colour.
Sunlight: The sun is a source of sunlight and all forms of energy on earth. Sunlight can be harnessed to generate electricity (solar power). This is achieved by using solar panels which absorbs the solar energy, converts it into electrical energy and stores it for later or immediate use. Waves and tides: Waves are generated by wind passing over the surface of the sea, ocean or lake. As long as the waves propagate slower than the wind speed (just above the waves), there is an energy transfer from the wind to the waves **Wind:** Wind is air in motion from low to high pressure region. Wind possesses energy which can be converted by appropriate devices, into mechanical energy, which in turn can be used to generate electricity or do any useful work. Water: Water in motion, such as waterfall or cataract, can be harnessed to generate hydroelectricity. First, the kinetic energy in running water is converted into

mechanical and then electrical power.
Biomass: The term "biomass" refers to organic matter that has stored energy through the process of photosynthesis. This can be transferred through the food chain to the animal's bodies and their wastes, all of which can be converted into energy for everyday human use through processes such as combustion.

Petroleum (crude oil): Petroleum is a fossil fuel formed from fossilised remains of plants and animals. When refined, it produces various petroleum fractions, which are put to various uses of energy generation. It can be used to power cars and many machines, and burned to produce heat and light or generate electricity.

Natural gas: Natural gas occurs alongside petroleum. The gas can be burned to generate light and/or heat and harnessed to generate electricity. For example, the natural gas from SongoSongo Island in Kilwa is expected to be piped to Dar es Salaam where it will be used to generate electricity and supplied to homes as liquefied gas to be used for heating and lighting. Uranium: This is a radioactive element which produces tremendous amounts of energy upon disintegration (fission) or combination (fusion) of the nuclei of its atoms. This energy (nuclear energy) can be used and is being used by many countries in the world to generate electricity. Methods of Acquiring/Extracting Power and Energy The following are different energy and power resources and the methods used to extract energy and power from these resources:

Coal: Coal is a combustive black or brownish-black sedimentary rock, usually occurring in rock strata in layers or veins called beds or coal seams. Coal is considered as a non-renewable resource because it cannot be replenished on a human timeframe. The activities involved in generating electricity from coal include mining, transport to power plants, and burning the coal in power plants. At the power plant, coal is commonly burned in a boiler to produce steam. The resulting steam is run through a turbine to generate electricity.

Petroleum: Petroleum is a naturally occurring liquid found in rock deep in the ground. This liquid consists of a complex mixture of hydrocarbons of various molecular weights, plus other organic compounds. The energy from petroleum products is tapped mainly by burning. The burning produces heat energy that is used for heating, lighting or doing some mechanical work (such as powering machinery, vehicles, etc). Fuel is burned in a furnace or boiler for generation of heat that is used in an engine for generation of power. Petroleum products can also be burned to generate electricity.

Natural gas: Natural gas is fossil fuel formed when layers of buried plants, gases and animals are exposed to intense heat and pressure over thousands of years. Natural gas is mined from deposits deep underground and brought to the surface. Before the gas can be used as a fuel, it must be processed to remove impurities, including water, to meet the standard of a marketable natural gas. Energy from the natural gas is extracted through burning of the gas. This burning produces heat energy which is used for heating, cooking and electricity generation. The gas is also used as fuel for vehicles and as a raw material in the manufacture of plastics and other commercially important organic chemicals.

Water: The potential energy of dammed or flowing water can be converted into storable electrical energy. Harnessing the flowing water to power machines and mechanical processes is one of the oldest methods of power generation that is used until today. The energy in water may be tapped naturally or artificially. Naturally, flowing water at waterfalls runs through turbines, which generate electricity. River water may also be used to run milling machines. Artificially, water may be lifted to higher points such as tanks or dams where it drops in mass, turning the turbines to generate electricity.

Biomass: Biomass is biological material derived from living things, or recently living organisms. It mostly refers to plants or plant-based materials. As an energy source, biomass can either be used directly via combustion to produce heat or indirectly after converting it to various forms of biofuel. The biofuel can then be burned to release heat energy that is used to power machines or for heating purposes. Wood is burned directly to produce heat and/or light. Wood remains the best biomass energy source to date. Examples of wood include forest residues (such as braches, dead trees and stumps), yard clippings, wood chips, and even municipal solid wastes. Biomass also includes plant or animal matter that can be converted into fibres, or other industrial chemicals, including biofuels. For example, gasohol is a biofuel derived from a mixture of alcohol (from sugar cane) and petrol. This is used as a fuel to run cars and machines. Rotten garbage and agricultural and human waste under controlled conditions can release biogas that can be used for heating, cooking and lighting.

Uranium: Uranium is a radioactive element. The energy from uranium is extracted through nuclear fission or fusion. Nuclear fission involves splitting of an atom while nuclear fusion involves combining two light atoms. The most commercially exploited process is nuclear fission, when the atoms and nuclei of this radioactive element split in nuclear reactors. The process releases a large amount of energy in the form of heat. The heat released is used to boil water into steam, which is, in turn used to turn turbines to generate electricity. Solar energy: Solar energy refers to energy from the sun. This energy can be tapped and used for different purposes. Solar energy is tapped by devices called solar panels. The energy is absorbed by the panels and converted into electrical energy that can be used immediately or stored for later use. The trapped energy can be used to light homes and power gadgets such as phones and

calculators. The heat from the sun can also be tapped directly like when it is used to dry crops or clothes.

Geothermal steam: The geothermal power from geothermal steam is extracted by directing it to run machines that produce electricity. Its heat can also be tapped by placing the material to be heated over the hot steam. Wind energy: The kinetic energy of wind is harnessed by turning windmills, which generate electricity. Each of the several wind mills is supplied with a cable which is used to supply electricity to the main cable which then directs electricity to homes, industries etc. The electricity generated can be used for cooking, lighting and running machines. Wind energy may also be tapped by putting up sails to propel water vessels such as dhows.

The Use and Importance of these types of Power Resources

Power and energy resources are important in two ways. First, it is through the energy and power they produce and secondly, due to their own economic value.

1. The power and energy resources used in industrial development activities.
2. It used to run agricultural machinery such as tractors and harvesters such as petroleum. 3. Petroleum used by machines in agriculture increases agricultural production
4. Environmental conservation: The use of solar, wind, biogas and energy helps to conserve the environment
5. Improvement of Transportation sector because of the use of motor vehicles, ships, aircrafts, etc, all of which are powered by petroleum products.
6. Used in Mining: Most forms and kinds of machinery that are used in mineral prospection, extraction, and processing use power and energy generated from fossil fuel. Therefore, the fuel energy helps in the development of the mining industry.
7. Social services and amenities: Most social services and amenities are facilitated by energy and power. For example, sports, games, schools, healthcare, and homes depend on power and energy in different ways.

Energy and power sources have the following direct economic and social importance:

1. Source of employment
2. Source of foreign exchange
3. Source of government revenue
4. Improvement of transport and communication infrastructure
5. Promotion of trade and other industries

The Problems Facing the Process of Power and Energy Harnessing

Power and energy production endeavour is faced by a number of problems which include the following:

1. Changing climatic conditions: Drought leads to rainfall scarcity and hence a drop in the volume of water in rivers. This problem affects the production of hydroelectric power and is one of the factors leading to low energy production in most parts of the world, especially in the least developed countries.
2. Lack of capital: Energy and power production needs heavy investments in infrastructure, manpower and technology. All these investments require a great deal of capital.
3. Lack of diverse energy sources in respective countries: Most counties have very few energy resources from which to extract power and energy. Worse still, some do not have a single energy resource, so they have to import the resources or power. For instance, uranium and geothermal steam are not found in many countries. Such countries extract power from only a few available resources such as water, wind or solar energy.
4. Poor technology and lack of skilled personnel: Many developing countries lack the technology required to establish energy extraction infrastructures and the skilled personnel needed to perform that function. Most of the power and energy exploitation technology used in developing countries is very old and less efficient and productive. There are also very few people with the necessary skills for setting up and operating equipment as well as conducting research on power and energy production methods, facilities and technologies.
5. High prices: High prices for energy resources hinder energy and power output in most countries that have to import these resources from other countries. Oil is used for energy production. We have recently seen escalating oil prices worldwide. This leads to low purchase and hence low energy and power production. Also the equipment needed for production of energy and power is very expensive and can thus not be afforded by many poor countries. As a result, they resort to inefficient and less productive obsolete technology which cannot produce sufficient power and energy to meet the ever-increasing demand for energy and power.
6. Environment pollution: Energy and power exploitation is sometimes accompanied with the emission of harmful gases that pollute the environment. Coal burning, for example, releases tremendous quantities of carbon dioxide gas into the atmosphere. As such, many countries are either phasing out such energy generation technologies or spending a lot of capital to clean the coal so as to prevent environmental pollution. The power and energy production sector is, therefore, in great pressure to adopt technologies that minimize or cause no environmental pollution.
7. Siltation: Accumulation of silt in dams used for generation of hydroelectric power reduces the volume of water in dams, hence resulting to low power generation. On the other hand, removal of the silt from dams adds to the cost of energy and power production and these costs are pushed on to consumers of energy and power.
8. Scramble for resources: River water is also used for irrigation of crops, domestic and industrial uses, fishing or preservation of

flora or fauna. For example, river Nile is used for irrigation in Ethiopia (Gezira Irrigation Scheme) and, at the same time, required for production of hydroelectric power at Aswan High Dam, in Egypt. If too much water is used for irrigation, little will be available for hydropower generation. This competition on the same resource can lead to international conflicts and even wars. Another example is coal which is used for domestic heating as well as for generation of electricity. This can curtail the generation of power and energy from coal if too much of it is used for domestic heating. In Tanzania, peculiar species of toads are found at Kihanzi power generation station in Kihanzi River. Use of water for generation of hydroelectricity affects the lives of these organisms. This has caused a big concern from environmentalists and wildlife conservation groups.

Ways of Addressing Power and Energy Harnessing

1. The silt accumulating in dams should be dredged regularly in order to keep the volume of water constant. This will maintain the capacity of energy and power generation.
2. Any form of environmental pollution likely to cause global warming and reduction in amount of rainfall should be avoided. People should not cut down trees indiscriminately as this can lead to drought and hence reduction in volumes of rivers needed for generation of hydroelectricity.
3. Countries should diversify their energy generation sources in order to escape the effects caused by such problems as escalating oil prices and climate change.
4. Developing countries should phase out the old energy and power generation technologies and instead adopt the new ones so as to cope with technological advancements to ensure that their energy generation is efficient and highly productive.
5. Research should be carried out often in order to improve energy and power production, as well as come up with new production methods. Research will also help in finding power and energy production methods that cause less or no environmental pollution.
6. The governments should train their people the courses related to energy and power generation at schools, colleges, and universities so as to make them professionally competent in the field of energy and power generation.
7. Countries should set aside enough funds to be used for energy and power generation because success in this sector can boost the growth and development of other sectors. Dormancy in energy and power sector can hinder industrial development and cause the country's economy to drop down.

The Importance of Power and Energy Resources in the Focal Countries

The USA is a technologically advanced country with a huge and very stable economy. It is a developed and heavily industrialized country with a great demand for power and energy required by its industries and its large population These and other factors have contributed to development of various power production resources. Solar and wind are among the diverse power resources in the USA. Solar Power The U.S. is among the top countries in the world in electricity generated by the sun and several of the world's largest small-scale installations are located in the desert Southwest. Solar power includes small-scale solar power plants as well as local distributed generation, mostly from rooftop solar panels. The United States conducted much early research in solar devices and concentrated solar power. There are plans to build many other large solar plants in the United States. Many states have set individual renewable energy goals with solar power being included in various proportions. Solar power accounts for about 1% of the total national generation capacity. It is mainly exploited in the sunny areas of the country which include Nevada and California states. Rooftop solar panels Wind power Wind power is a branch of the energy industry expanding quickly over the last several years. U.S. Wind Generation (KW) by Year Wind power accounts for 4% the total energy produced in the USA. Texas is firmly established as the leader in wind power development, followed by Iowa and California. Wind power is used to run farms, industries and for generating electricity that is fed to the national grid.

The importance of solar and wind power in the USA

1. Source of employment: Solar and wind energy industry is more labour-intensive. The industry supports thousands of people in the USA. The wind energy industry employs many Americans in a variety of capacities, including manufacturing, project development, construction and wind mill installation, operations and maintenance, transportation and logistics; and financial, legal and consulting services. The solar energy industry employs people in jobs including solar panel installation, manufacturing and sales.
2. Industrial development: The energy and power generated from resources such as coal, uranium, petroleum and water are very expensive compared to wind and solar energy. The abundance and availability of cheap energy from wind and sunlight promotes industrial development.
3. Agricultural development: Wind and solar power is commonly used in large farms to supply electricity required for such activities as pumping water, lighting and heating. This has, in turn, promoted large-scale agriculture in the country.
4. Conservation of non-renewable energy resources: Depending on renewable energy sources such as wind, solar and hydroelectricity for power and energy generation helps to conserve the non-renewable energy sources such as gas, coal and petroleum. This ensures that these non-renewable energy resources do not run out or become exhausted soon. They are conserved for future uses instead.
5. Reduced environmental pollution: Exploitation of non-renewable energy resources, such as petroleum, coal, and wood, releases harmful gases to the atmosphere which pollutes the environment. Harnessing and use of wind and solar energy do not pollute the environment. Thus, generating sufficient power and energy from these resources will help reduce environmental pollution that could otherwise result due to dependence on non-renewable resources.
6. Improved standard of living: People employed directly and indirectly in the wind and energy industry earn cash which they spend

on their daily needs as well as other amenities. Solar and wind energy is cheap and hence affordable to many Americans. So, people who had no access to the costly hydroelectricity and thermal electricity are now able to use this cheap power and energy. This has helped improve their living standards.
7. Development of other sectors of economy: Growth in power and solar industry creates positive multiplier effects. For example, industries in the renewable energy supply chain, such as those manufacturing windmills and solar panels, will benefit. The growth of industries involved in the manufacture of wind and solar energy equipment depends on the growth and existence of the solar and wind generation industry. Also local businesses will benefit from increased household and business incomes.
8. Generation of revenue: Local governments collect property and income taxes and other payments from energy project owners. These revenues can help support public services, especially in rural communities, where projects are often located. Owners of the land on which wind projects are built also receive lease payments as well as payments for the rights to transmit electricity through their land. Also they may earn loyalties based on projects' annual revenues.
9. Stabilisation of energy prices in future: Wind and solar energy is providing affordable electricity across the country right now, and can help stabilize energy prices in future. The costs of solar and wind energy technologies have declined steadily, and are projected to drop even more. For example, the average price of a solar panel has dropped significantly. The cost of generating electricity from wind is also declining gradually. The wind and solar energy projects require initial investments to build but once established they operate at very low costs and to most technologies the fuel is free. As a result renewable energy prices are relatively stable over time.
10. Diversification of energy supplies: Using more wind and solar energy can lower the prices and demand for natural gas and coal by increasing competition and diversification of energy supplies. Generation of energy from different resources ensure that the supply is not interrupted in case one resource is finished or exhausted. This ensures constant availability of power and energy. Therefore, wind and solar energy helps to diversify the energy supply in the country.
11. Reliability and flexibility: Wind and solar energy supplies are less prone to large-scale failure because they are distributed and modular. Distributed systems are spread out over a large geographical area, so a severe weather event in one location will not cut off power to an entire region. Modular systems are composed of numerous wind mills or solar panels. Even if one of the equipment is damaged the rest can typically continue to operate.
12. Sustainability: For as long as the sun shines and the wind blows, the energy produced can be harnessed to send power across the grid. The Problems Facing Power and Energy Harnessing in Focal Countries

Problems facing solar and wind power in the USA
1. Generation of wind and solar power depends on prevailing weather conditions. In case of little or no sunshine due to prolonged cloud cover or if there is very low wind speed, then very little power will be generated. This, in turn, leads to generation of little amount of electricity which cannot meet the demand of all consumers.
2. People are still reluctant to change from dependency on the traditional energy sources, such as hydroelectricity. They are, therefore, slow in adopting the use of solar and wind power, thus hindering fast development and growth of the industry. 3. The cost of installation of equipment for generating wind and solar power on a large-scale is very high. This has led to limited investment in the industry.
4. The cost of leasing land for building wing energy projects is very high. The problem has made many companies reluctant to establish wind power projects.
5. The industry is facing stiff competition from other sectors of energy and power, such as coal power, hydroelectric power, and geothermal power.
6. Unequal government subsidies and taxes. Nuclear and fossil fuel technologies enjoy a considerable advantage in government subsidies for research and development, compared with wind and solar energy counterpart which do not get any government subsidies. In addition to receiving subsides, conventional generation technologies have a lower tax burden.
7. Wind and solar power developers may have difficulty obtaining financing at rates as low as may be available for conventional energy facilities.
8. Good wind sites are often located in remote areas, far from the cities where electricity is needed most. Transmission lines must be built to bring the electricity from the wind farm to the city. This increases the cost of generating and providing electricity.
9. Wind resource development may not be the most profitable use of the land. Land suitable for wind mill installation must compete with alternative uses for land, which may be more highly valued than electricity generation. HEP and biogas in Tanzania Hydroelectric power (HEP) Hydroelectric power contributes about 57% of the total power generated in Tanzania. The electricity supply industry is dominated by Tanzania Electric Supply Company (TANESCO). The company operates hydropower generation stations which include Kidatu, Kihansi, Mtera, Pangani, Hale, Nyumba ya Mungu and Uwemba, totalling 561 MW of electricity. TANESCO also generates thermal electricity using gas and diesel by plants located in various parts of the country. There are also independent power plants (IPPs) which produce thermal electricity from gas and diesel and then sell the generated power to TANESCO who feeds it to the national grid. Biogas Due to increasing demand for power and dwindling energy resources, there is need to develop alternative energy sources in Tanzania. One of such sources is biogas, which is used for heating, lighting, and cooking at homes, schools, hospitals, etc. Biogas is produced by anaerobic digestion with anaerobic bacteria or fermentation of biodegradable materials such as manure, sewage, municipal waste, plant material, and crops. Biogas technology in Tanzania was introduced in 1975. But it was not until late 2000s when a study of the biogas sector and how to improve it was conducted. Then the sector saw improved progress in domestic biogas uptake. The government is collaborating with different development partners to

improve on existing technologies and to construct new biogas plants for particularly rural communities. It is estimated that about 700 biogas plants have been constructed in Tanzania. Most of these are in rural areas where raw materials such as livestock and poultry wastes and crop residues are easily and abundantly available.

Importance of HEP and biogas production in Tanzania

Hydroelectricity and biogas are very important power resources in Tanzania.
Outlined below are some of the importances of producing these resources:
1. Hydroelectricity and biogas industry employs people who carry out energy production activities. The sector, therefore, serves as the source of employment opportunities to some Tanzanians. This helps to improve their income and hence the standard of living.
2. The hydroelectricity generated in Tanzania is used to power other industries and sectors of economy. It, therefore, leads to industrial development as well as other economic sectors in the country.
3. Biogas generation in rural areas has greatly helped to improve the living standard of the rural people. Studies have revealed that now women and girls with access to biogas do not spend much time looking for firewood and hence they can instead direct their efforts towards participating in other economic activities to improve family income. It thus saves women and children from drudgery of collection and carrying of fireweed, exposure to smoke in the kitchen, and time spent for cooking and cleaning of utensils.
4. The use of biogas and hydroelectricity has greatly reduced the problem of cutting down trees for firewood. This has consequently helped to prevent deforestation, hence ensuring environmental conservation. Conversely, biogas combustion has no effect to environmental pollution since it produces negligibly very little pollutants into the atmosphere compared to wood, coal and petroleum. The use of municipal waste to generate biogas directly assists in cleaning of the environment and prevention of pollution that could result by dumping of these wastes on land or into water bodies.
5. Most of the biogas projects are undertaken by development partners from abroad. This has helped to improve the relationship between Tanzania and the partners' mother countries.
6. The residue of the organic matter left back after biogas has been generated is used as enriched organic manure, which can supplement or even replace chemical fertilizers.

Problems facing HEP and biogas production in Tanzania

1. Unreliable climatic conditions: Hydroelectric power generation relies on rain-fed rivers and dams. There has recently been occurring long dry spells which lower the volumes of rivers and dams, thus curtailing hydroelectricity generation. This leads to power rationing and hence interruption in economic production.
2. Lack of adequate capital: Generation of HEP and biogas requires investment in installation of hydropower and biogas plants, respectively, all of which are hampered by availability of capital. Due to the country's sluggish economy, investment in the power and energy sector has not been successfully implemented. There is lack of enough funds to finance the establishment of more biogas plants in rural areas. The country relies heavily on donors and foreign investors to finance the projects.
3. Siltation: The continuous accumulation of silt in the dams leads to reduction in water volume and hence low hydroelectricity generation. The problem also leads to increased operation costs because the silt has to be dredged periodically.
4. Lack of skilled personnel: The establishment and operation of hydroelectric and biogas plants require skilled personnel. There are very few locals with the required expertise and professional skills to operate the projects. This has hindered the construction of hydroelectric and biogas plants in the country. The production of energy and power from these two sources is thus minimal.
5. Reluctance by the people: People are still reluctant in adopting the biogas technology. Many people depend on use of wood as their major source of fuel. This has led to low investment in the industry and hence low production of the biogas.

Solutions to problems facing power production

1. The silt in dams should be removed frequently so as to prevent reduction in water volume and the consequent drop in production.
2. The government should invest in other forms of energy generation such as geothermal and coal power in order to reduce overdependence on hydroelectricity.
3. Establishment of training institutions to train manpower on energy production technology. This will help produce skilled manpower to manage the power sector.
4. Power generation must be liberalized in order to attract investors with sufficient capital to invest in the industry.
5. Conducting mass education to educate people to adopt the production and use of biogas. These can be done through seminars, trade shows and mass media, among other means. People benefiting from the use of biogas may be invited to convey the message to those individuals reluctant in adopting the technology.

Solutions to Problems Facing Power and Energy

Harnessing in Focal Countries Propose solutions to problems facing power and energy harnessing in focal countries Solutions to problems facing solar and wind power in the USA
1. Alternative sources of energy have been developed to supplement solar and wind power.
2. People must be taught about the benefit of wind and solar power in order to persuade them to switch from traditional to modern energy sources.
3. Government support as well as partnerships has enabled the setting up of power stations for wind and solar energy exploitation.

4. The government must provide subsidies to solar and wind research and development as it is doing to conventional technologies. Lessons from Countries for Better Harnessing of Power and Energy Resources in Tanzania As far as energy production is concerned, Tanzania has a lot to learn from the USA. The following are some of the lessons that can be adopted and implemented:
1. In USA, the energy sector is liberalized, so many private companies are allowed to generate and sell energy and power. Tanzania should also copy USA's example by allowing more private investors to participate in energy and power generation rather than allowing TANESCO to monopolize the energy production.
2. The USA has diversified its energy and power industry very well. The country generates power from different sources, ranging from nuclear to biogas plants. Tanzania can do the same by using natural gas, coal and uranium discovered in various parts of the country to produce the highly demanded power to boost her economy.
3. The government should form agencies to address the generation of solar and wind energy. There is great potential of wind and solar energy in Tanzania because of the presence of suitable conditions for harnessing these power recourses. There is plenty of wind and sunlight in the country to allow sustainable production of wind and solar energy, which can then be fed to the national grid to help solve the problem of energy in the country.
4. The government should support the development of various energy sources by providing funds to local companies as well as creating favourable investment conditions to multi-million energy production companies to invest in the energy generation sector.
5. The USA uses her own experts to develop the energy industry. Tanzania should also train her own people so that they can take active part in building energy generation projects rather than depending on skilled personnel from outside the country.

Topic 9: TRANSPORT

Transport can be defined as the movement of people, animals, goods or services from one place to another. It provides a link between different parts of the country, region or world. People move from one place to another, either permanently or temporarily for various reasons. Main Types of Transport Main Types of Transport System at Global and East African Level
Types or modes of transport refer to the means by which people, goods, animals or services are moved from one location to another. There are three broad modes of transport. These include:

1. Land transport:
(i) Human transport
(ii) Animal transport
(iii) Road transport
(iv) Railway transport
(v) Pipeline transport

2. Air transport
3. Water transport

LAND TRANSPORT
Land transport is a kind of transport that takes place on land surface. Categories of land transport include the following:

Human transport
Human transport or human portage is the transport of people and/or goods using human muscle power, in the form of walking, and running from one place to another.

Advantages of human transport
1. It is readily available all the time.
2. It is cheap and affordable than any other form of transport.
3. It is Safe than other means of transport
4. It is not affected by congestion.
5. Human transport does not pollute the environment

Disadvantages of human transport
1. It depends on the physical fitness of the person.
2. It is extremely slow and laborious.
3. This transport is only suitable for carrying light goods over short distances.

Animal transport
Refers to the means of transport where by animals are used for movement of people and goods. This form of transport is commonly used in areas where other means of transport are hard or difficult to use like camel is the animal used in desert for transport.

Road transport

Road transport is most common on land and reaches even the most remote areas. It involved the use of various vehicles such as motor cars, buses, trucks, motorcycles, bicycles, carts etc. It is one of the most important means of transport and is crucial to the development of commerce and industry. All the movement of goods begins and ultimately ends by making use of roads.

Advantages of road transport

1. Road transport requires much less capital investment as compared to other modes of transport such as railways and air transport.
2. It involves different types of vehicles and hence gives the person a wide freedom to choose the kind of transport to use.
3. Road transport is most suited for carrying goods and people to and from rural areas which are not served by rail, water or air transport.
4. It is more economic and quicker for carrying goods and people over short distances.
5. As compared to other modes of transport, the process of packing in motor transport is less complicated. Goods transported by motor transport require less packing or no packing in several cases.
6. If the goods are to be sent immediately or quickly, motor transport is more suited than the railways or water transport. Water transport is very slow. Also much time is wasted in booking the goods and taking delivery of the goods in case of railway and water transport.
7. Road transport is a feeder to other modes of transport. The railways, ships and airways. Goods are normally transported to and from airports, ports, or railway stations by road.
8. Roads can be constructed, developed or maintained while they continue to be used.

Disadvantages of road transport

The following are some of these limitations of road transport.

1. Motor transport is not as reliable as railway transport during rainy season
2. There are more chances of accidents.
3. It is unsuitable and costly for transporting heavy and bulky goods over long distances.
4. The speed of motor transport is comparatively slow and limited compared to air transport.
5. Goods transported by road face the risk of being stolen by robbers while on transit.
6. Motor vehicles emit gases which contribute to air pollution and noise pollution.
7. Road transport face the problem of congestion (traffic jam
8. The road transport is comparatively less organized. More often, it is irregular and unreliable. The rates charged for transportation are also variable and unequal.

Railway transport

This is a means of transport that helps people, goods or services to move from one place to another via rails and trains. In Tanzania we have the central line, formerly known as Tanganyika Railway, is the most important railway line in Tanzania. It runs west from Dar es Salaam to Kigoma on Lake Tanganyika via Dodoma. The TAZARA Railway, also known as the Uhuru Railway Railway, links the port of Dar es Salaam in Tanzania with the town of Kapiri Mposhi in Zambia's Central Province.

Advantages of railway transport

1. It is least affected by weather conditions such as rain, fog, etc.
2. The railway transport is better organised than any other form of transport. It has fixed routes and schedules.
3. Its speed over long distances is more than any other mode of transport, except airways. 4. Railway transport is economical, quicker and best suited for carrying heavy and bulky goods over long distances.
5. It is a cheaper mode of transport as compared to other modes of transport.
6. Railway is the safety form of transport, there is low occurrence of accident.
7. The carrying capacity of the railways is extremely large.
8. It is not affected by the problem of congestion as is the case with road transport.
9. Trains making long distance travel quite comfortable as it have such facilities as cafes, bathrooms and sleeping space
10. Modern passenger trains called bullet trains are very fast and efficient. Travelling over 200 km/h, they cover long distances in a very short time.

Disadvantages of railway transport

1. The railway requires a large investment of capital and it takes a long time to construct.
2. Railway transport is inflexibility. Its routes and timings cannot be adjusted to individual requirements.
3. It involves much time and labour in booking and delivery of goods through railways as compared to road transport.
4. It is not suitable for transportation of perishable goods like milk, vegetables and meat as they can easily go bad while on transit
5. Railway transport is not economical for transporting people or few light goods over short distances.
6. Railway transport cannot benefit the rural people as there are very few or no railway stations to serve these areas. Pipeline

transport Pipeline transport is the transportation of Liquid and gases goods through a pipe. Example The Tanzania Zambia Mafuta (TAZAMA) pipeline which runs from the port of Dar es Salaam in Tanzania to Ndola in Zambia, covering 1710 km, and the local Songogas pipeline from Songosongo to Dar es salaam.

Advantages of pipeline transport

1. It is not associated with environmental pollution.
2. Its flexible transport as it can pass through difficult terrains as well as under water.
3. It is not affected by congestion as is the case with road transport.
4. It needs very little maintenance.
5. Is not affected by adverse weather events such as floods, heavy rains, fog, etc.
6. Accidents and theft are greatly reduced compared to other form of transport.

Disadvantages of pipelines transport

1. Environmental pollution can occur if the pipeline leakages is not well maintained and repaired timely.
2. Pipelines are mainly convenient for transporting fluids.
3. Underground pipelines cannot be easily repaired and detection of leakage is also difficult.
4. Pipelines are expensive and they take a long time and intensive labour to build.
5. They have fixed carrying capacities which cannot be exceeded
6. Pipelines conveying flammable or explosive material, such as natural gas or oil, pose special safety concerns and there have been various accidents.

AIR TRANSPORT

This is the movement of people, goods or services from one place to another through the air. It is the fastest mode of transport and involves the use of aircraft such as aeroplanes, helicopters and hot air balloons. Aviation is able to quickly transport people and limited amounts of cargo over longer distances, but incur high costs and energy use. For short distances or in inaccessible places, helicopters can be used. Types of air transport There are two broad categories of air transport, namely, domestic and international. Domestic air transport involves movement of people and goods within the country while international transport involves movement of people and goods from one country to another.

Advantages of air transport

1. It is the fastest mode of transport and most suitable mean where time is an important factor.
2. Travelling by air is comfortable especially over long distances.
3. Air transport is not affected by physical barriers such as mountains, forests, rivers, etc.
4. It is flexible since the routes and planes can be swapped when need arises.
5. The transport is scheduled, so there is no time wasting
6. It does not require huge capital investment in the construction and maintenance of surface track.
7. Air transport can be used to carry goods and people to the areas which are not accessible by other means of transport.
8. Air transport plays a very important role in the defence of a country. Modern wars have been fought mainly by aeroplanes.

Disadvantages of air transport

1. Air transport is controlled to a great extent by weather conditions. When storms, fog, mist, snow, heavy rain or any signs of unfavourable weather conditions are detected, take off of planes is delayed, routes changed or flights cancelled.
2. In case of accidents there is very little chance of survival.
3. Air transport is unsuitable for carrying cheap, bulky and heavy goods.
4. It requires a large amount of capital investment in the construction and maintenance of aeroplanes.
5. Training of the personnel in the aviation sector is a very expensive.
6. It is relatively inflexible as it only serves places that have airports and airstrips. except helicopter which can land in various areas.
7. Insecurity problems are also experienced in air transport. There are cases of hijacking and terrorist attacks.

WATER TRANSPORT

Water transport is the movement of goods and people by means of a watercraft, such as a boat, ship or sailboat, over a body of water, such as a sea, ocean etc.

Water transport consists of:

1. Inland water transport and
2. Ocean and sea transport Inland water transport Most inland water transport takes place in lakes, navigable rivers and canals. Lakes that are major waterways in East Africa include Lake Victoria, Lake Tanganyika and Lake Albert. Sea and ocean transport Sea transport enables countries and continents to connect with sea ports in all parts of the world. Ocean transport is crucial for foreign trade. It has brought the different parts of the world closer and has knitted together all the nations of the world into one big world market. It is, obviously, the cheapest mode of transport.

Ocean transport includes:
(a) Coastal shipping
(b) Overseas shipping Coastal shipping This is one of the most important means of transport for carrying goods from one part to another in a country. It is a cheaper and quicker mode of transport and is most suitable for carrying heavy, bulky and cheap cargo like coal, iron ore, etc. to distant places. However, it can serve only limited areas. Overseas shipping This involves movement of goods and people from one country or continent to another country or continent.

Advantages of water transport
1. Water is a natural route which does not require any cost of construction and maintenance.
2. It is the most suitable means of transporting larger quantities of heavy and bulky goods such as coal, machinery, hardware and timber over long distances.
3. There is minimal congestion in water transport compared to road transport
4. There are minimal risks of accidents and breakdowns
5. It is suitable for transportation of fragile or breakable goods, such as glass, since there is very limited shaking and jolting on the waterways.
6. Water navigation facilities do not need frequent repairs and maintenance

Disadvantages of water transport
1. Water transport is very slow mode of transport
2. Rivers and canals cannot be operated for transportation throughout the year because of climatic change.
3. Modern shipping vessels are very expensive. Port construction, as well as purchase of loading and unloading machinery is also expensive.
4. Water transport system cannot be constructed anywhere. It can only be done in a limited area which is served by water bodies.
5. There is sometimes a problem of strong winds and storms, which greatly interfere with the shipping schedule.
6. Some water bodies are infested with dangerous animals such as hippopotamuses.

The Importance of Transport in Tanzania and East Africa
1. It is Source of employment
2. Promotes trade and commerce:
3. Promotes unity and understanding
4. Facilitates exploitation of natural resources
5. Encourages the development of industries
6. Encourages development of settlements
7. Source of government revenue

Problems Facing Transportation in East Africa
1. Lack of capital:
2. Lack of skilled labour
3. High fuel costs
4. Political problems
5. Land lockedness
6. Impassable waterways
7. Thick vegetation
8. Rough terrain:
9. Differences in railway gauges
10. Corruption and embezzlement:

Measures taken to address the problems of transport industry in Tanzania include the following:
1. Formulation of policies and laws that promote the development of the transport industry.
2. Punishment to government officials involved in corruption scandals pertaining to embezzlement of funds allocated for construction of transport
3. The East African countries should build railway lines with the same gauges and trucks so as to ensure connectivity with all countries in the region.
4. The country should put more efforts on collection of revenue and seek assistance from donors to assist in infrastructure construction.
5. Training of manpower in various fields of transportation sector like pilots, cabin crew, mechanics, civil engineers etc
6. Keeping sufficient oil reserves in order to stay self with the effect of oil fluctuation
7. The advancement of science and technology