MINING IN EAST AFRICA

Mining is a term generally used to mean all the processes involved in the extraction of valuable minerals either in liquid or solid form from the earth's crust for economic use. Minerals in East Africa are found in regions where ancient rocks have been affected by volcanic activity.

THE STATUS OF THE EAST AFRICAN MINING INDUSTRY

- The annual output of minerals industries is small compared to agricultural production.
- The output of minerals is very low due to use of crude technology in extracting the minerals.
- The poor transport and communication network in some parts of East Africa has led to valuable deposits being unexploited e.g. coal in Southern Tanzania.
- Limestone (for cement), quarrying of rocks, sand and clay are, however, on the increase throughout the east African region and they are consumed locally.
- Some minerals have not yet been found in great quantities to be exploited for commercial markets like iron ore, coal, tin, wolfam but they are being mined on small scale.
- Vermiculite gold and cobalt are the leading exports of value for Uganda: Diamond and lime stone for Tanzania, and soda ash, limestone (cement), fluorspar for Kenya.
- Oil drilling in western Uganda (Semlik valley basin) is in its final stage.

TYPES OF MINERALS FOUND IN EAST AFRICA

There are three major types of minerals. These include:-

a) Metallic minerals: Iron ore, lead, Niobium, tantaleum (columbite), Tin, Tungsten, Chromite, Beryllium, copper.
b) Non-metallic minerals: Clay, feldspar, Glass, (Silica sand), limestone, marble, phosphates, Trona, Vermiculite
c) Fuel minerals. Oil, natural gas and coal.

The major minerals found in East Africa

The distribution of minerals in East Africa is not uniform because of in differences in geological events like earth movements

Mineral	Uganda	Kenya	Tanzania
Copper	**Kilembe**		
Cobalt	**Kasese**		
Diamond	**Bushenyi, Kabale**		**Mwadui-Shanyanga Province**
Iron Ore	**Muko, Manafwa**		**Southern Tanzania**
Tin	**Mbarara, Kisoro, Kabale**		**Karagwe North West**
Titanium	**Tororo, Manafwa**		**Metelani Northern Tanzania**
Tungsten	**Kabale, Kisoro**		**Karagwe Northwest**
Gold	**Buhweju,Tira, Karamoja, Kabale, Kamalenge**		**Around L. Victoria, Mbeya, Mpandu, South West Tanzania**
Gypsum	**Mbarara, Bundigyo**		
Limestone	**Kasese, Tororo, Hima**		**Morogoro Region,Tanga**
Marble	**Moroto**		
Phosphates	**Tororo**		**Minjingu in Arusha Region**
Salt	**L. Katwe**		
Vermiculite	**Namekhara (Manafwa)**		

Fluorspar		**Kerio Valley**	
Soda Ash (Trona)		**L. Magadi**	**L. Natron, Balangida, Eyasi**

Draw a sketch map of East Africa showing the distribution of minerals

METHODS OF MINING USED

Mining is an extractive industry; once the minerals are extracted from the ground, they cannot be replaced. The deposit in which minerals are contained is called as an **ore** and these vary considerably in how rich they are. For a mineral to be mined:

- There must be a high demand for it.
- The ore deposits must be sufficiently rich and large.
- There must not be great problems of extraction, processing, and transportation.
- There must be large sums of capital to invest in the extraction.

A wide variety of different methods of mining are employed in East African countries ,in some cases mineral bearing rocks are easily accessible but in other cases, deposits are less accessible hence they require expensive equipment to work on them.

The main methods include:

Open cast mining, Drilling, Adit mining, Underground mining, Placer mining and Panning method/Dredging

OPEN CAST MINING.

Open cast is the exploitation of minerals that occur close to the surface. It involves the removal of the overburdening materials that is the vegetation and unwanted material and damped nearby. The rock ores are blasted using explosives, and then huge power shovels are used. The mineral ore is removed from the blasted rocks and taken for processing

THE BENCH METHOD

This is the open cast mining where terraces or benches are constructed to remove the Ore found at deeper levels. IT ensures that the sides do not become so steep and it helps in transporting of the Ore.

UNDERGROUND MINING

Underground mining is used in areas where the mineral deposits are covered by a great thickness of earth rocks. In this method, most minerals occur in deep rocks that are extremely hard to remove using mechanical shovels.

Vertical shafts are sunk downwards for several meters to reach mineral seams. From these shafts, horizontal tunnels are driven outwards to reach the seams of the mineral bearing rocks. Explosives are used to blast the minerals being extracted Railway tracks are used to transport ore and waste materials to the foot of the shaft for hoisting to the surface.

ADIT MINING

This is employed where minerals occur in gently sloping seams with outcrop on the side of the high land or valley. They are horizontal or gently inclined tunnels that are driven into the hillside.

ALLUVIAL/PLACER MINING

This is employed when minerals occur in alluvial deposits. It is done by mixing the alluvium with a great deal of water and tilting or rotating the gravels until the lighter practices(sand, mud, dust, stones) are washed off, leaving behind the heavier ores like gold, tin, chromium, platinum which have a higher specific gravity. Depending on the extent of the alluvial deposits, the quality of the mineral particles and the nature of the underlying surface, one of the following methods are employed:

- In small deposits, streambeds', panning is used. It is done by hand, the material being swirled round in a circular pan until the lighter material has been washed away.

- A dredge
- Hydraulic mining

FACTORS FAVOURING THE DEVELOPMENT OF THE MINING INDUSTRY IN EAST AFRICA

- Presence of rich and large mineral deposits in different parts of East Africa has enabled large scale mining to take place.
- Nearness of the minerals to the earth's surface like lime, vermiculite alluvial gold has made the extraction of the minerals easier and cheap
- Presence of a variety of minerals with high commercial value have attracted both local and foreign investors in in the mining sector.
- Availability of abundant water supply used in the cooling of rock minerals during blasting, cooling of the mining equipment and the processing machines.
- Presence of adequate capital provided by governments of East Africa, the private sector and donor agencies to purchase the equipment for mining as well as paying the workers.
- Presence of large and ready market for the minerals both domestically and internationally because of their high quality or grade.
- Availability of improved transport and communication networks like Road, Railways plus communication which help in the distribution of rock minerals to the processing centres.
- Availability of a variety of sources of power/energy like Hydro Electricity Power and thermal Power in the East African region which is used in the extraction and processing of the minerals
- Presence of both semi-skilled and skilled labour provided by nationals and foreigners used in the extraction, processing, transportation, marketing and distribution of the minerals.
- Presence of appropriate technology like conveyor belts, explosives, GPS used in the mining of large quantities and processing of the minerals.
- Geological research carried out by the minerals departments of East Africa which has led to the discovery of new mineral deposits and production of high quality and quantity mineral products.
- Relative peaceful environment / politically stability which has allowed investment by both local and foreign investors.
- Supportive government Policies like liberalization and privatization, giving of incentives to the investors has encouraged both local and foreign investors to invest in the mining sector of East Africa.

BENEFITS/IMPORTANCE OF MINING SECTOR

- It has led to the provision of raw materials for development of industries i.e. limestone for Bamburi cement at Mombasa, Tororo Cement Industry, Hima cement in Kasese.
- It is sources of foreign exchange through export of minerals and mineral products thus development of both social and economic infrastructures and importing manufactured goods.
- It provides of employment opportunities people both nationals and foreigners who earn income which has enhanced the standard of living of the people.
- It has enhanced educational and research activities leading to acquisition of skills
- It has led to development of towns/urbanization for example Kasese in Uganda and Mwadui in Tanzania thereby providing better social services like health, education, electricity
- It has led to development of economic infrastructure such as has roads and railway lines, ports which have enhance trade and commerce.
- It has led to economic diversification thus reducing on over dependence on specific sectors like agriculture

- ❖ It has contributed to generation of government revenue through licenses and taxes imposed on the mining companies and people involved in mining and this has helped in the provision of social services, and paying of civil servants in East Africa.
- ❖ It has promoted international relationship through export of minerals and mineral products which has resulted into peace for economic investment.

PROBLEMS FACING THE MINING INDUSTRY

- Existence of minerals in small quantities for example **iron ore in Kabale** and **coal** in Southern Tanzania discourages investor.
- Low quality of minerals for example gold in Mubende discourages investors and also leads to low profit margins.
- Exhaustion of some mineral deposits which results into closure of some mining centres.
- Competition from other mining countries for example gold mining in Republic of South Africa results into losses.
- The use of inappropriate/crude technology in the extraction of minerals for example use of hand hoes and shovels in the extraction of lime in Muhokya-Kasese leads to low output.
- Limited capital to invest in the mining industry leads to low output.
- Remoteness of some mineral deposits which discourages investors thereby leading to limited output.
- Limited domestic market for the East African minerals due to high levels of poverty among the people of East Africa leads to low profit margins
- Shortage of power and energy supply because there are few power station and they are low capacity results into low productivity.
- Poorly developed transport network and unevenly distributed communication networks have hindered the transportation of the minerals.
- Shortage of the skilled labour due to the nature of the theoretical education system has led to hiring of expatriates thus profit repatriation
- Hostility of some tribes like Jie and Matheniko tribes in North Eastern Uganda scare away investors.
- Occurrence of political unrests/insecurity in some parts of Uganda and Kenya scare away investors in the mining sector.
- Nature of the terrain for example rugged land scape limits accessibility of some mining centers thereby leading to low output.
- Occurrence of accidents resulting from collapse of some mineral deposits scare away workers leading to low productivity.
- Unfavourable climate conditions for example some areas experiencing very hot temperatures of about $30^{o}c$ scare away foreign investors.
- Smuggling of minerals across the East African boundaries which results into price fluctuations.
- Profit repatriation because most of the mines are owned by foreigners
- Restrictions from environmental conservation like National environmental organization discourages investment in the mining sector.
- Misallocation/corruption of government resources which leads to low productivity.

Problems created by the mining on the physical environment

- Mining leads to environmental pollution of air, water and land due to emission of dust
- Excavated hollows created open cast mining have become breeding grounds disease vectors like mosquitoes
- Destruction of the agricultural land by dumping of molten slag/unweathered materials
- Deforestation is on increase due to open cast mining.
- Loss of wildlife due to destruction of the habitant
- Mining accelerates landslides due to vibrations caused during mineral extraction.
- Destruction of the beautiful land scape through dumping of mineral residues/molten slag
- Growth of slum areas and their associated evils i.e. Kasoli in Tororo
- Unemployment and under employment due to the decline in the mining activities for example copper mining at Kilembe mines in Kasese.
- Destruction of the wetland ecology i.e. in Bushenyi.
- Accidents-loss of life
- Profit repatriation because the mines are mainly owned by foreigners.

Steps being taken to improve the mining sector

- Liberalization of the mining industry to encourage both local and foreign investor in East African countries
- Extension of hydro electrical power to mining areas
- Privatization of the mining sector to allow increase in quality and quantity output.
- Recycling of minerals by products i.e. cobalt from copper pyrites
- Training of manpower in geology mapping and extraction of the minerals,
- Improvement of the transport and communication system
- Fighting corruption through legislation and monitoring by government organs like the Auditor general, Inspector general of government.
- Accessing loans from local and International banks i.e. Africa development Bank, Work Bank.
- Empowering of local investors by giving incentives like tax waivers/holidays

MINING IN TANZANIA

DIAMONDS AT MWADUI – WILLIAMSON MINES

Diamonds are by far the most important minerals being mined in Tanzania. Tanzania has been a significant diamond producer for several decades, with the bulk of production coming from the Williamson Diamonds mine at Mwadui where commercial production began in 1925.

Willianson Diamonds mine located on central plateau of the Northwest of Shinyanga, 142km from Mwanza and 27km from Shinyanga. It covers an area of 146 hectares.

Draw a sketch map showing the Location of Williamson Diamond mine at Mwadui

The diamond bearing rock has out cropped pipes at Mwadui and is one of the largest in the world. In diamond bearing rocks are known as Kimberlites and there is over 300 Kimberlites known in Tanzania of which 20% are diamond ferrous. The diamond bearing rocks are near the Earth's surface therefore open cast method is used to extract the diamonds.

Method of mining and processing of diamonds

- Open cast method is used on the surface i.e. Heavy excavators are used to dig the rock ores out. Heavy buckets crush and scrub the ore.

- Ores are loaded on the Heavy Lorries and rail wagons and transport the Ores to crushing station where the rocks are broken and loaded on the conveyor belts which carry them to treatment plants.
- The Ores are then passed through water separators where heavy diamonds sink to the bottom.
- The coarse matter is passed over grease covered belts to which diamonds stick.
- Waste materials are removed electronically and diamonds remains behind.

Uses of Diamond

- making Jewell (Gemstone)
- Cutting glass,
- Drilling of hard rock to sink pipes in the oil wells .

Factors which favoured the development of the Williamson mines at Mwadui

- Presence of large deposits of diamonds in North West Tanzania at Mwadui in Shinyanga province.
- The Nearness of the minerals to the earth's surface has made their extraction easy by use of open cast method of mining.
- The gently rolling landscape (Central Plateau) in North West Tanzania which has favoured the construction of the Transport and communication networks and eased the mining of the diamonds.
- The mineral is of high quality or grade therefore great demand for diamonds on the international market because they are used for a wide range of purpose like cutting glass drilling of hard rocks. Diamonds are exported to England, German & Spain.
- Improved transport networks like railways and roads which facilitate the transportation of Machinery, diamond products and workers.
- Availability of adequate capital provided by the Tanzanian government and De Beers family of Companies.
- The nature of the diamonds. The diamonds are dense, hard and repel wastes hence easy extraction of minerals from the rest of wastes.
- Peaceful and stable political environment in Tanzania.
- Constant supply of food stuffs to mine workers since the mines are located in regions which receive moderate rainfall with fairly the fertile soils.

Benefits of Diamond mining in Tanzania

- ❖ It is one of the leading components in generating foreign exchange earnings within the non-traditional exports which helps in the development of other sector of Tanzanian economy like educational and Health sectors.
- ❖ Provisional of employment opportunities to Tanzanians whereby over 2000 people are involved in the extraction of diamond in Shinyanga region of Tanzania hence better standards of Living.
- ❖ Provisional of social amenities to the people of Tanzania like schools, hospitals, recreation facilities, worship places.
- ❖ Promotion of the agriculture sector in Tanzania. This is because the Williamson diamond mine provide ready market for the agricultural product to the workers and miners.
- ❖ Improvement of the transport and communication networks which has made mobility easier in Northern Tanzania.
- ❖ Improved human resource skills, this is because training programs are organized and carried out by the mining company at Mwadui to enrich to workers' skills and techniques.
- ❖ It has led to development of towns in Northern Tanzania like Mwadui town.
- ❖ Industrial development e.g. Treatment plants, agro-based industries.

- ❖ Provisional of hydro-electrical power and clean, safe piped water to people of Tanzania.
- ❖ Promotion of international trade relationship.

Problems facing diamond mining at Mwadui

- Smuggling of diamonds out to Tanzania to neighbouring countries.
- Environmental hazards
- Accidents are common
- Exploitation of the workers whereby on average only US$25 are given to a digger per month.
- Shortage of labour because Northern Tanzania is sparely populated.

FLUORSPAR MINING IN THE KERIO VALLEY IN KENYA

Fluorspar deposits are located in Western Kenya, in the Kerio valley. This valley is known for significant fluorite deposits, which were first discovered in 1967. Fluorspar is found in thick bed and outcrops on the earth's surface along the sides of the Kerio rift valley near Kimwarer.

Draw a sketch of Kenya showing the location of Kerio minung area

Quarying/open cast mining is used in the extraction fluorspar because of it is nearness to the earth's surface.

STAGES OF PRODUCTION

- Fluorspar is transported by the conveyer belts to the crushing plant to reduce its size.
- It is further rushed with water and sodium bicarbonate to produce a thick gritty cream known as slurry.
- Conditioning is done by adding more chemicals.
- It is part dried to reduce the moisture.
- Fluorspar (Fluorite) is separated from waste materials called filtrate
- Conveyer belts are used to transport fluorite to warehouse where it is bagged and filtrate is taken to waste dip.
- Bagged fluorites are transport by lorries/trucks to Kaptagat rail station and then it is taken to Mombasa.

USES OF FLUORSPAR

Calcium fluoride (CaF2) or fluorspar is the major source of fluorine for the chemical industry and used in three main industrial sectors:-

- In the chemical sector for the production of hydrofluoric (HF) which is a precursor in the synthesis of a wide of flouro chemicals e.g. tooth paste, pharmaceuticals, herbicides etc
- In metallurgy as a fluxing agent for steel plants, in magnesium metallurgy, and to form aluminum fluoride (AIF3) for use in the production of aluminum by eledrolysis.
- In the glass and ceramics' industries as an opacifier, in surface treatments, lens coatings, additives and coluring agents and for welding rod coatings and in cement production.

Fluorspar is mainly exported to European countries like Germany, Poland, UK and C.I.S of Russia. A small percentage of fluorspar is used in East African steel rolling mills, Bamburi cement works at Mombasa and Uniliver.

Factors which favoured the mining of Flourspar of Kerio Valley

- Presence of large deposits of fluorite in Kerio valley Western Kenya
- The nearest of the fluorite to the earth's surface has made the extraction of easy by use of open cast method of mining.
- Presence of large local and international markets for fluorspar because it is at a high quality and used for a wide range of purposes.
- Availability of adequate capital provided by the Kenya fluorspar company Ltd to purchase the equipments required in mining of flourspar.

- Improved transport and communication networks in Western Kenya for the distribution of the minerals.
- Favourable government policy of privatizing the mining sector
- Relatively stable political environment in Kenya has enhanced the mining of flourspar.

Importance of fluorspar mining in Kenya

- Kenya Fluorspar Company is the only large-scale operation of its kind in Kenya and is a leader in foreign exchange earnings.
- Provisional of employment opportunities to Kenyans.
  The company is the leading employer in the area of Kerio Valley.
- The company provides a wide range of social amenities like health, education and other facilities to its employees as well as the local community
- Development of the industrial sector in Kenya because it is used as a raw material in a wide range of industries e.g. manufacturing of cement at Bamburi
- Promotion of the agricultural sector in Kenya because the workers of Kenya fluorspar company ltd provided ready market for agricultural produce.
- Promotion of international trade relationship.

Problems facing fluorspar mining at Kerio Valley

- Displacement of the Kenyans. Over 1,400 families were displaced.
- The extraction of fluorspar in Kerio area has exposed the communities to constant health hazards through its mining activities like noise from explosives and discharging the harmful effluents into the Kerio –river
- Industrial pollution through the dumping of effluents with fluoride, phosphate and sulphate on the land and water bodies and emitting of dangers gases into the air during the processing of fluorspar.
- Competition with other fluorspar producing countries like USA, Republic of South Africa which has led to the price fluctuation on the world Market.
- Transport is difficult due to the rugged terrain in Western Kenya.
- Water problem water supply to the mines yet fluorspar extraction requires a lot of water in processing