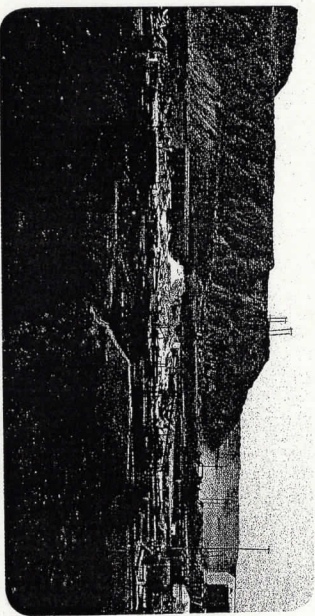
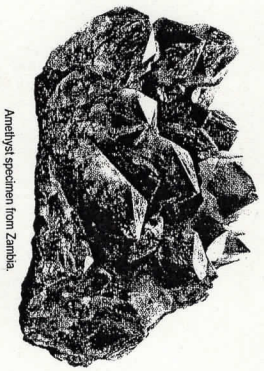


Mining is the heart of Zambia's economy. Copper is the main mineral mined and exported from the country. Zambia is also the second largest producer of cobalt. It also produces precious metals (gold, silver), gemstones (amethyst, aquamarine, emerald and tourmaline), coal and industrial minerals. Historically, the Zambian economy has been largely based on copper mining. Zambia has around 6% of the world's known reserves of copper. Copper exports make up almost 75% of the country's exports. Zambia ranked sixth in global production and accounted for 4% of the world's copper production in 2014. Zambia is also high on the list of cobalt producers in Africa and the world.



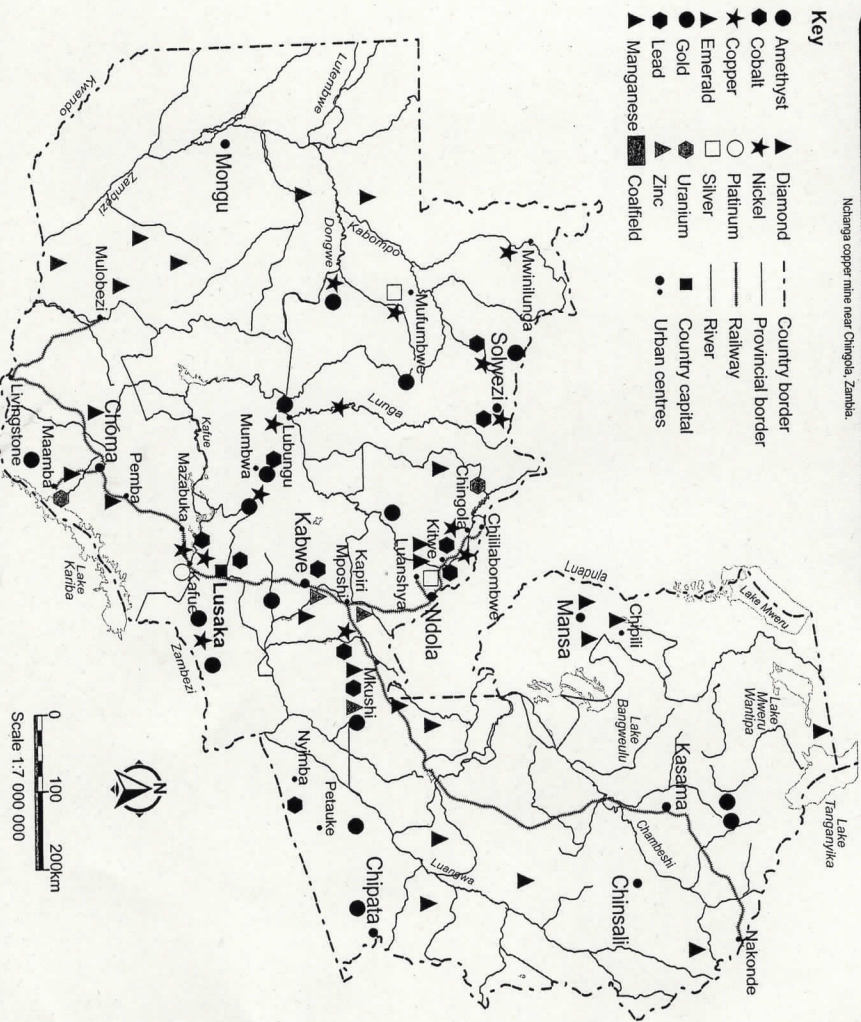
Nchianga copper mine near Chingola, Zambia.



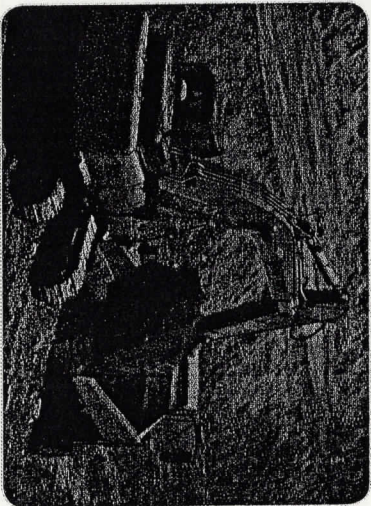
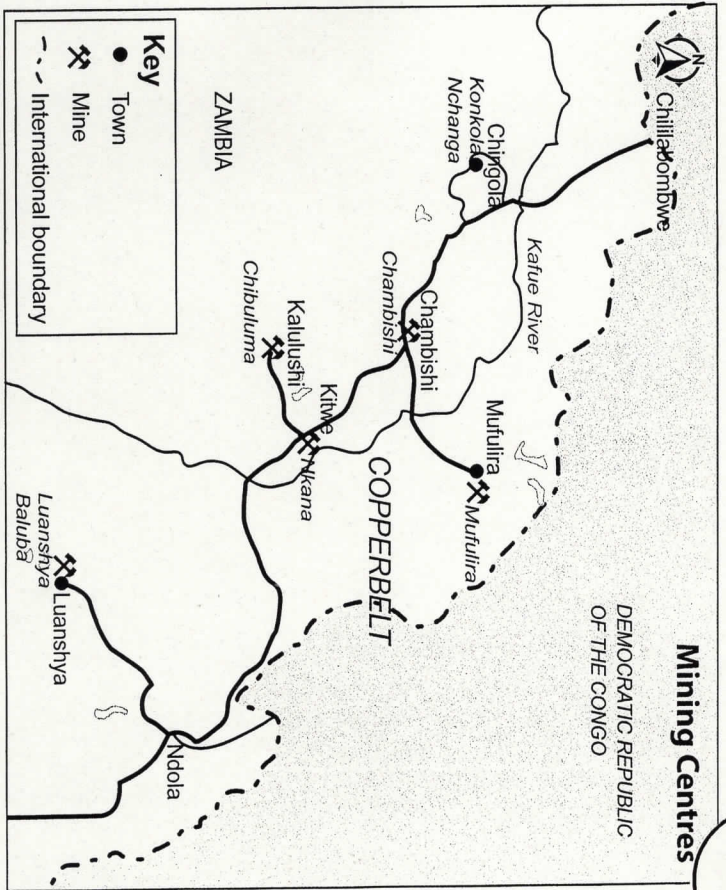
Amethyst specimen from Zambia.



Polished piece of malachite (a copper carbonate hydroxide mineral) from Zambia.



Mining Centres



Copper mine in Kitwe.

Zambia's major minerals are transported to the major buyers in three ways: road, rail and sea. From the areas of production, that is mining areas, copper is transported either by road or rail to Dar es Salaam in Tanzania, Port Elizabeth or East London in the Republic of South Africa or Maputo in Mozambique.

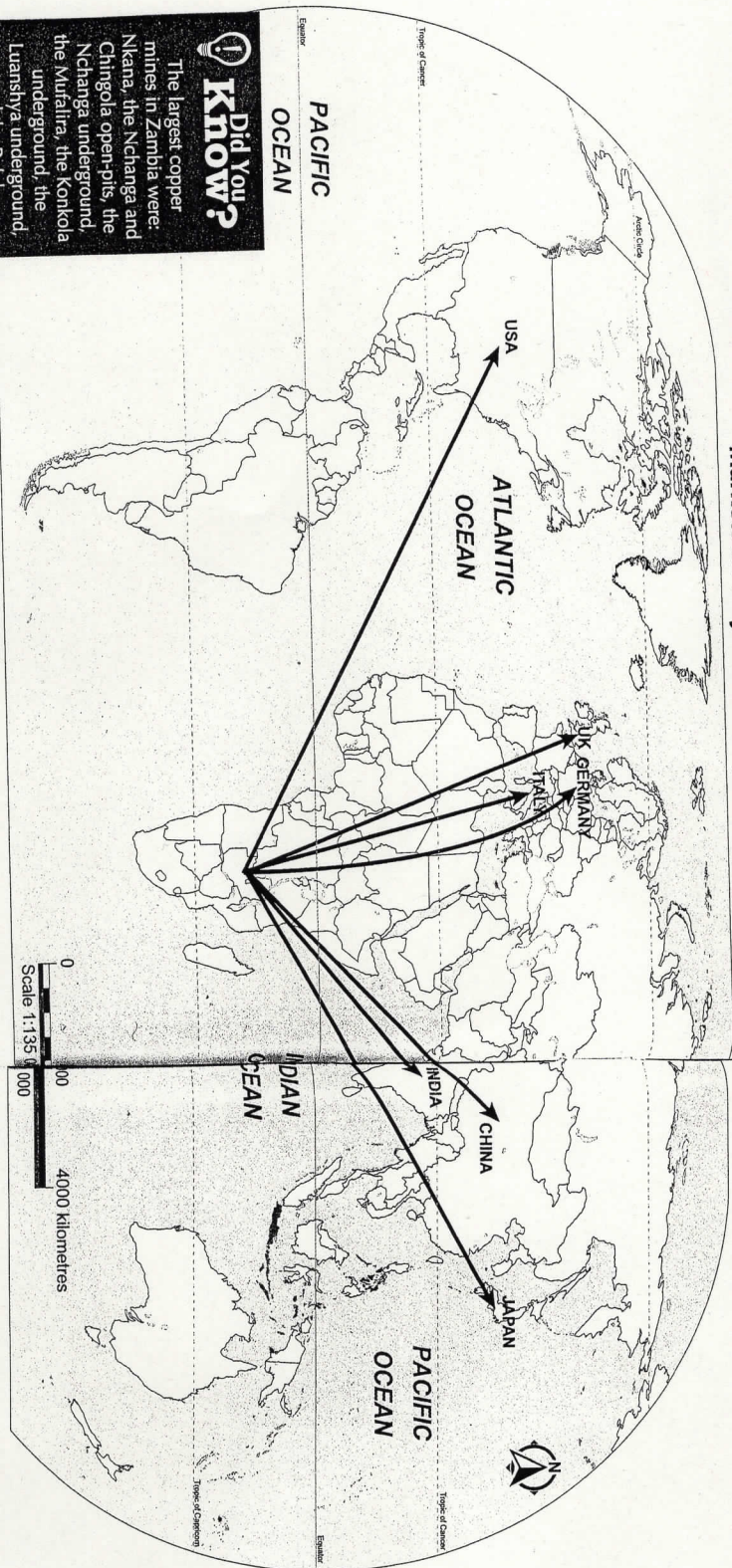
The key rail lines in Zambia are the government-owned Zambia Railways (ZRL) which runs from Livingstone on the Zimbabwe border through Lusaka and the Copperbelt into Democratic Republic of the Congo and Angola, and the Tanzania-Zambia railway (Tazara), co-owned by Zambia and Tanzania. It starts from

Kapiri Mposhi and extends eastwards to the Tanzanian port of Dar es Salaam. Currently, the line through Angola to the Atlantic coast requires rehabilitation but the Livingstone route through Zimbabwe links to the major south coast ports of Durban and Cape Town.

The major roads used for the transportation of minerals to the ports run almost side by side with the lines of rail. From the main mining areas – the Copperbelt and North-Western provinces, minerals such as copper and cobalt are transported by trucks on the Ndola-Kitwe dual carriage way – which is the most used inter-city highway and then via the Lusaka-Copperbelt road, which is the most used inter-provincial highway. At Kapiri Mposhi, some trucks take the North-Eastern branch of the Great North road. The great North Road runs from Chitundu and passes through Kafue, Lusaka, Kapiri Mposhi, Mpika, Isoka up to Tanzania. Other trucks proceed on the Copperbelt-Lusaka road up to Chitundu border. They then cross into Zimbabwe, enroute to the South African ports of Port Elizabeth and East London. The map below shows these routes.

The next phase of transportation of copper and other major minerals from Zambia is by sea from the ports as shown on the map, to the major markets. From the ports on the eastern coast such as Maputo, East London, Dar es Salaam and Port Elizabeth, the minerals are either transported by sea via the Indian Ocean to Asian countries such as China, India and Japan, or around the Cape, and then across the Atlantic Ocean to North America or Europe.

Markets for Major Minerals produced in Zambia



Did You Know?

The largest copper mines in Zambia were: Nkana, the Nchanga and Nchanga open-pits, the Nchanga underground, the Mufulira, the Konkola underground, the Lianshya underground, and the Baluba underground.

Copper is traded at the two primary markets that are in New York and London. The London Metal Exchange (LME) is the world's major non-ferrous base metals market and the centre of physical copper trading.

For a long time the United States, Russia, and Japan were the three largest consumers of copper. However, with growing demand from its industries, China has become the leading market and consumer of copper. China is a very important market for Zambia copper. In China, electrical and electronic products are the largest end-use market for copper products. Building construction account for nearly a third of China's copper consumption, with transportation equipment, industrial machinery, consumer and general products taking about 10 per cent of the copper supply each.

The other major markets for Zambian copper are Germany, UK, China, India, Japan, Italy and the USA. Japan, the USA and Germany are among world leaders in production and export of automobiles, steel, ships, machine tools, and electronic equipment. All these need copper. Manufacturing and heavy industry make up an important segment of the German economy. In addition to being one of the leading producers of motor vehicles, iron and steel, and machinery, Germany also manufactures aircraft for Airbus, a major European aerospace company. The wiring system of an aircraft needs kilometres of the copper wires.

Impact of mining on the environment

Although mining leads to development, it can also have a negative impact on the environment. For example, the chemicals used in the mining process often escape into the environment causing large-scale air, water and land pollution. The following are some of the negative aspects of the mining industry:

Pollution

Mining causes air, water and land pollution. Some chemicals leak into the nearby rivers, or are disposed on land; this changes the chemical composition of the land. Besides this, since the chemicals are poisonous, they make the soil unsuitable for plants to grow. Also, the organisms that live in the soil find the polluted environment hostile for their survival. Chemicals like mercury, cyanide, sulphuric acid, arsenic and methyl mercury are used in various stages of mining. Most of the chemicals are released into nearby water bodies, and are responsible for water pollution. During the smelting of copper, a lot of gases are released into the atmosphere. These cause a lot of air pollution.

Land degradation

Land degradation means that the soil has lost the capacity to produce. This happens in mining areas where mining activities leave pits and piles of mine dumps. These areas cannot be used for settlement, agriculture or any activity.

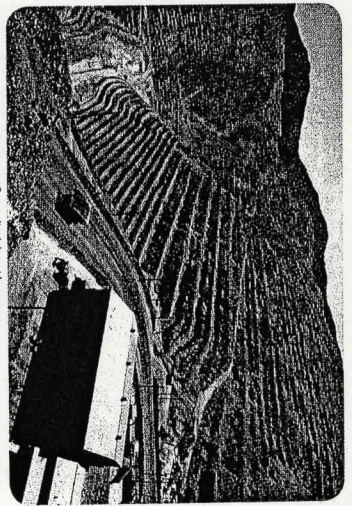
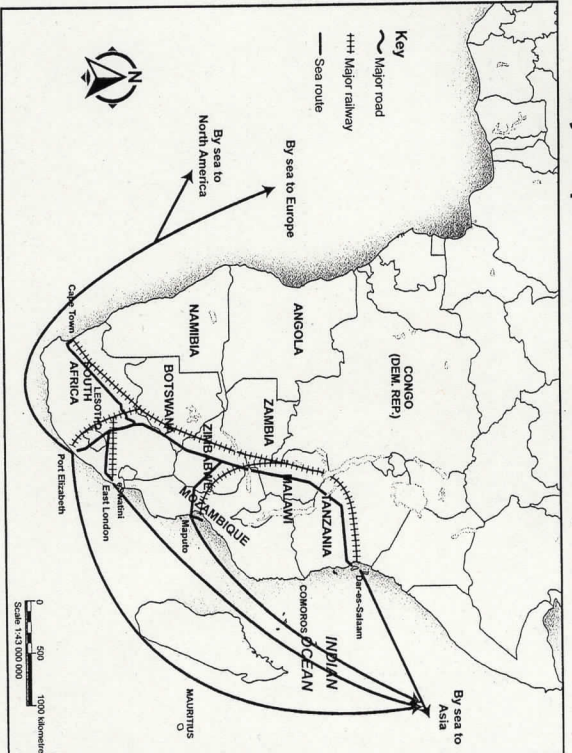
Displacement of humans and animals

Where mining takes place, animals are displaced. Large areas are cleared so that mining activities can take place. This destroys the home of wild animals. As a result, they run away to find new homes. Humans are equally displaced. For example, in 2014, some villagers in the North-Western province were relocated by a mining company to pave way for mining activities.

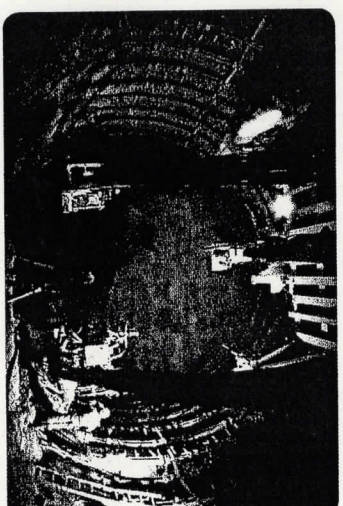
Deforestation

Mining activities lead to deforestation. This is caused by the clearing of large areas of land to construct roads and residential facilities for the mine workers so that mining activities can take place. The mining industry is one of the major causes of deforestation and pollution.

Major export routes of Zambia's major minerals



Open pit mining at Lumwana.



Mineworkers working in an underground tunnel.

Processing and Manufacturing Industries in Zambia

Specific Outcome

By the end of this topic, the learner should be able to state the importance of manufacturing and processing industries.

Importance of manufacturing and processing industries in Zambia

A manufacturing industry is an industry where raw materials are transformed into new products. Raw material are combined with other materials to make a final product. For instance, in the manufacture of tiles, one needs sand, cement and some chemicals heated together and moulded into tiles. In shoe manufacture, chemicals and dye are added to leather to make it suitable for making shoes. Processing industries deal with one raw material converting it into a different form without changing its nature. Flour milling is a processing industry that transforms maize into flour. No additional materials are added to the maize to make flour.

Countries have a lot to benefit from by setting up manufacturing and processing industries. Some of the benefits are described below.

(i) Development of infrastructure

Once an industry has been set up in an area, it will require **power** for lighting and for running the machines. Power transmission lines are therefore installed to connect the industry to the power source.

Water is needed in a factory for cooling the machines or as an ingredient in the manufacturing process. The employees also need it for use. Water pipelines are laid to connect the industry to water supply systems.

Roads are developed for transporting raw materials to the industry and to distribute finished products to the markets.

If the raw materials required are bulky, such as heavy minerals, a **railway** line is built to connect the industry to the source area.

Telephone and Internet connections are also installed to make communication easy. These are some of the infrastructure that develop as a result of setting up of industries.

(ii) Employment

Development of manufacturing and processing industries leads to creation of job opportunities for different categories of employees. Some people are employed at management level, others are at supervisory level, and others as machine operators. Many other employees are employed at lower levels. They may include cleaners and messengers. This reduces unemployment in a country and raises the living standards of people.

(iii) Import substitution

This means producing goods locally, instead of importing similar goods. Developing countries rely, to a large extent, on manufactured goods that are imported from developed countries. These items are usually expensive. To import, a country uses foreign currency to pay for the goods. This makes the country's foreign currency reserve to reduce. Unless a country has goods to export, it may not recover this money. When a country sets up an industry that can make similar goods, it saves its foreign currency to only pay for goods that cannot be made locally. For instance, many African countries including Zambia, are able to make clothing and textiles locally instead of importing them. This is referred to as import substitution.

(iv) Utilisation of social amenities

Development of industries lead to increase in the population within the vicinity of the industry. The population creates a demand for social amenities. As a result, some schools, hospitals and dispensaries, entertainment and other social amenities are provided. Some are provided by the government while others are provided by individuals such as the owners of industries. For instance, the towns in the Copper Belt developed as a result of mining related industries and attracted all types of social amenities.