

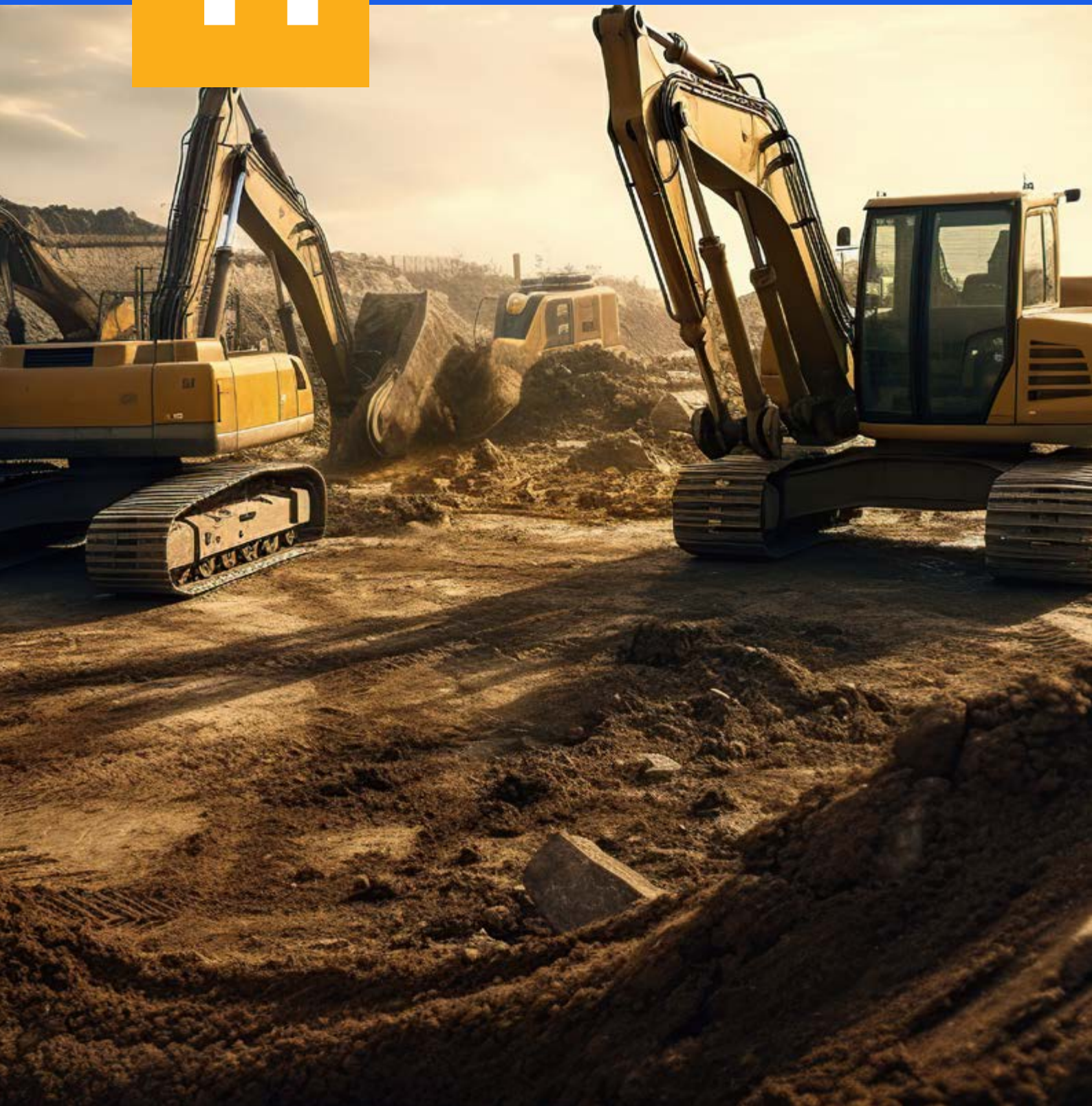
Geography

Year 1

SECTION

11

# MINING IN GHANA



# HUMAN AND ENVIRONMENT

## Economic Activities

### Introduction

Ghana has many minerals like gold, diamonds, salt, manganese, bauxite, lithium, oil, and gas. Mining is very important for Ghana's economy. It provides jobs and earns money for the country. However, illegal small-scale mining, called 'galamsey', causes serious environmental problems, like destroying water bodies and vegetation. This section lists where the types of minerals in Ghana are found, how they are mined, and their economic importance. It also highlights the need for responsible mining to protect the environment and ensure long-term benefits for the country.

### At the end of this section, you will be able to:

- Examine the methods, importance and problems of lumbering and mining in Ghana (Mining)

### Key Ideas

- Mining is the extraction of minerals for human use.
- Ghana is endowed with economically valuable minerals such as gold, diamonds, manganese, salt, bauxite and oil.
- Mining in Ghana is done by three methods digging underground tunnels, open cast pits and river dredging.
- Mining has contributed to the social and economic development of Ghana through foreign exchange, employment and development of social amenities and infrastructure.
- Although mining has contributed to Ghana's economic development, the environmental degradation caused is an emerging challenge, especially through illegal small-scale mining, referred to as 'galamsey'.
- Illegal mining is difficult to stop.

# MINING IN GHANA

## Meaning of Mining

Mining is one of the major primary economic activities in Ghana. It involves the extraction and processing of valuable mineral resources, such as gold, diamonds and manganese for industrial, domestic and commercial purposes. Ghana has rich mineral deposits.

## Distribution or Location of Minerals in Ghana

The table below shows the many locations in Ghana where eight minerals can be found.

**Table 11.1:** Principal minerals and where they are mined

| Mineral   | Location   |
|-----------|--|
| Gold      | Obuasi, Bogoso, Konongo, Dunkwa, Tarkwa, Prestea, Bibiani, Ahafo-Kenyase, Damang, New Abirem, Techire. |
| Crude oil | Offshore deposits in the Gulf of Guinea, for example Jubilee and Sankofa fields.                       |
| Salt      | Ada, Elmina, Winneba, Daboya, Pambrose, Apam.  |
| Bauxite   | Awaso, Kibi, Mt Ejuanema.  |
| Diamond   | Bonsaso, Birim valley, Akwatia, Oda, Kade.   |
| Manganese | Nsuta, Himakrom.   |
| Lithium   | Ewoyaa.  |
| Limestone | Nauli, Bongo-Da, Oterkpolu, Fo River, and the Daboya deposits.   |

Map below gives details of five major minerals and the locations where they are mined in Ghana

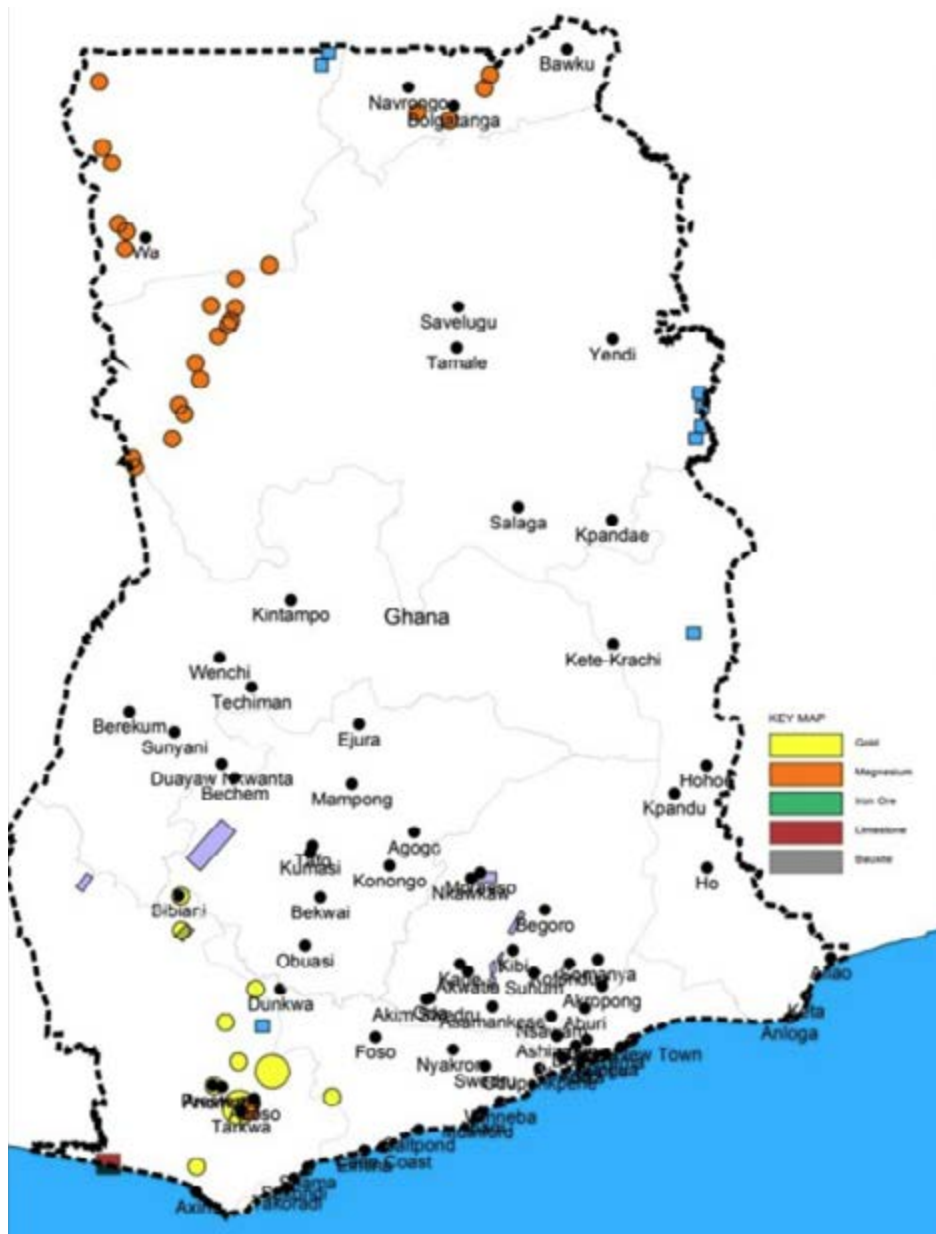


Fig. 11.1: Map of Ghana indicating the mining areas of four minerals

## Factors Promoting Mining Ghana

1. **Favourable government policy:** the government of Ghana has policies that promote mining. Mining leases and licensing is done according to rules and legislation. The Minerals Commission coordinates the activities of mining.
2. **Availability of good transportation systems:** Good transportation systems have promoted mining in Ghana. In some mining communities, the roads leading to these areas are either constructed or mended by the government or the mining company. In some instances, the minerals like gold and diamonds are transported by air, such as from Obuasi, Tarkwa and Kenyasi to the airport for export to other countries.

3. **Availability of mineral ore deposits:** Ghana has rich deposits of minerals such as salt, diamonds, gold and manganese. They are widespread over the whole country.
4. **Availability of cheap labour:** Ghana has a labour force which costs little to hire for work in the mining sector. Jobs include labourers, machine operators, surveyors, geologists, security guards, as well as those who perform administrative responsibilities.
5. **Access to capital:** there is easy access to loans as well as foreign investment in the mining sectors. The multinational companies have invested huge sums of money in the mining industry. For example, Newmont, AngloGold Ashanti, Goldfields, Ghana Manganese Company Ltd and Ghana Bauxite Company Ltd among others.
6. **Access to markets:** there is a ready market for minerals both domestically and internationally. Minerals such as gold, diamonds, salt, oil and gas have huge demand both in Ghana and abroad. Most of these minerals are exported to other countries for foreign exchange. The money gained from the sale of minerals is reinvested and also helps meet the operational cost of the mining companies.
7. **Improvement in technology:** Improved and advanced technology has made the exploitation of minerals very efficient, cheaper and safe. The use of excavators, underground shafts and modern technologies has helped improve the methods and increased production.

## Methods of Mining in Ghana

The method of extraction depends on whether the minerals are deep underground or closer to the surface or are found in water bodies. There are three methods:

### 1. Deep Shaft Method or Underground mining

- a. This method is used in areas where the minerals are found deep underground as practiced at Obuasi, Kenyasi, Tarkwa and Chirano gold mines.
- b. This involves digging vertical shafts to reach the mineral ore. The shaft is typically a cylindrical tunnel drilled by a machine.
- c. Horizontal tunnels are then drilled from the vertical shaft. The overlying rock or roof of the tunnels is supported with concrete and steel beams to prevent it from collapsing.
- d. The exposed ore is drilled and blasted into smaller fragments, using power drills and explosives like dynamite.
- e. Locomotives or small trains are used to convey the ore to a cage or dump truck and subsequently to the surface.
- f. The fragmented ore is loaded onto large trucks and hauled away from the mine to the processing plant for further treatment.
- g. Processing and extraction of the minerals is typically done by crushing and grinding the ore and then using a variety of chemicals such as cyanide, mercury, carbon-in-leach (CIL) and physical methods to separate the mineral from its ore.

- h. Sometimes, the mining sites are rehabilitated. That is, after the mineral-bearing ore is exhausted the mined pits are refilled with waste material to restore the land to its natural contour to minimise environmental impact and promote land reclamation.

The link below is a video on the activities involved in deep shaft or underground mining. Watch to get a deeper understanding.

[Underground Mining \(youtube.com\)](#) – short video mining precious emeralds

## 2. Open-cast or Surface Mining method

- a. This method is employed in areas where the mineral ore is found close to the surface of the earth.
- b. It begins with clearing the area of any vegetation.
- c. The top layer of soil is removed with excavators, bulldozers and dump trucks. The removal of this layer exposes the mineral-bearing ore or rock.
- d. The exposed ore or rock is drilled and blasted into smaller fragments using power drills and explosives like dynamite.
- e. The fragmented ore is loaded onto large trucks and hauled away from the mine to the processing plant.
- f. Processing is then done which involves crushing and grinding the ore.
- g. Chemicals such as cyanide or mercury are used to separate or extract the mineral from its ore.
- h. After the mineral-bearing ore is exhausted the mined pit is refilled with waste material to restore the land to its natural contour with the aim of minimising the environmental impact and promoting land reclamation.



**Fig. 11.2:** Some open cast or surface mining sites in Ghana

### 3. Dredging Method

- a. This is also called alluvial mining, which is mining in water bodies, especially rivers. Some of the rivers in Ghana where alluvial mining is practiced are Birim, Bonsa, Ankobra and Pra.
- b. Dredging involves first exploring the area to identify rivers or streams where the sediments contain precious metals like gold, as in Pra River or diamond in Birim. After all the preparatory works, such as permits and approvals are obtained, a dredger is set up on the river.
- c. The dredger is a floating platform fitted with specialised equipment for lifting the river sediment. Depending on the mining operation's size and scope, the dredger's size and capacity may differ.
- d. The dredger works by using a suction hose and pumps to suck sediment, sand and gravel, as well as gold-bearing material, from the riverbed. The material is then pumped through the dredger's pipelines to a processing facility on the riverbank on a floating barge.
- e. At the processing plant, the material is screened and sorted to remove larger rocks and debris. The remaining material, which contains gold, is then sent to be refined.
- f. Gold is heavier than other sediments so flowing water is used so separate it out, gravity making it concentrate at the bottom of boxes in a sluice system.
- g. Monitoring environmental conditions during and after dredging operations is environmental compliance. After the dredging operation, reclamation activities are carried out to bring the affected areas back as close as possible to their original condition. This includes riverbanks and replanting vegetation to reduce erosion and restore habitats.



**Fig. 11.3:** Dredging method

## Economic Importance of Mining in Ghana

Mining is economically important to Ghana in the following ways:

1. **Provision of employment:** mining employs many Ghanaians. Some of the professionals employed in the mining sector are drillers, geologists, surveyors, and drivers, including heavy machine operators, accountants, administrators and security guards.
2. **Provision of income to workers:** Mining provides income to people. Those who are employed in mining spend their wages and people in other sectors of the economy like shops and services earn a living.
3. **Generation of Revenue to the government:** The government and local authorities earn revenue from mining activities. The government receives revenue through taxes while local authorities receive royalties from mining activities. For example, Newmont or Goldfields pays taxes to the central government while the local authorities such as the traditional council and district assemblies are paid royalties.
4. **Foreign exchange earnings:** The export of minerals such as gold, salt and diamonds help the government of Ghana to earn foreign exchange. This can be fiscal cash or in exchange for other goods. For example, gold for oil, where Ghana's gold is exchanged for oil from the United Arab Emirates. When minerals are sold to other countries, payment is made in foreign currency such as US Dollars or Pounds, thus increasing the foreign exchange reserves of the country.
5. **Provision of infrastructure and social amenities:** Mining helps to provide infrastructure and social amenities, especially in the areas where mining occurs. The existence of a mining company in an area leads to the provision of roads, electricity, schools, health facilities and clean drinking water. Sometimes the mining companies do this as part of their corporate social responsibilities. For example, Newmont and Goldfields have provided some of these facilities in their areas of operation such as Ahafo (Newmont) and Tarkwa (Goldfields)
6. **Attraction of foreign direct investment:** Mining helps the country to attract foreign investments. For example, Newmont, AngloGold Ashanti, Goldfields and other big mining companies have invested huge sums of money in the mining sectors which helps boost the Ghanaian economy.
7. **Diversification of Economy:** Mining has helped Ghana to diversify its economy. In other words, Ghana does not rely only on one sector for its development. In addition to our traditional cocoa production, mining has also helped to expand the sources of income and foreign exchange from the exploitation of minerals.



## Socio-Economic Problems Facing the Mining Industry in Ghana

The following are the social and economic problems faced by the mining industry in Ghana

1. **Illegal mining or ‘galamsey’:** Illegal mining or ‘galamsey’ poses a serious problem to the mining industry in the sense that permissions to mine are not requested, licenses not obtained and laws not followed. It is difficult for the Minerals Commission to monitor and regulate the activities in the illegal mining industry.
2. **Inadequate capital:** Mining activities need huge capital investment. Most Ghanaians, including the Government of Ghana, do not have the required amount of money and capital in general to undertake the exploitation of minerals. Bank loans also attract huge interest on repayments. That is why large-scale mining activities are mostly done by foreign or multinational companies, such as Newmont and Goldfields Gh Ltd.
3. **Lack of skilled personnel:** There is a shortage of skilled surveyors, machine operators and geologists in Ghana. The education system is currently not able to train enough skilled personnel to meet demand, however this will change in time.
4. **Low level of technology:** Lack of technology is a problem facing Ghana’s mining industry. The application of modern technology is low in small-scale mining activities. The methods of small-scale miners tends to destroy the environment because they cannot afford the methods, machinery, equipment or people to protect and restore it.
5. **Inadequate and poorly maintained infrastructure:** Examples include unsurfaced or damaged roads, unreliable power supply, lack of housing for workers and no basic amenities such as clean water.
6. **Conflict between miners and local communities:** sometimes mining companies face a challenge of conflicts and unrest with the local communities in which mining occurs. Examples have been recorded at Kenyasi, New Abirem, Obuasi, Asankragua and Techire among others. These conflicts pose threats to both the workers and the inhabitants of these areas.
7. **Corruption and Governance Challenges:** Changes in government and government policies pose challenges to the mining activities themselves. What might have been acceptable under an old government may change with a new one. Those charged with the responsibility of granting of licenses, collecting of taxes and release of mining concessions may demand some sort of favour for their service.
8. **Health issues:** the deep pits left after open cast mining fill with water and breed mosquitoes. This leads to the spread of malaria and other waterborne diseases. People catching these diseases are unable to work to provide for themselves or their families.

## Environmental Problems Associated with Mining Activities in Ghana

The following are the problems created by mining activities

1. **Illegal mining or “galamsey**: leads to the pollution and destruction of the physical environment, including landscapes, soils and vegetation. Examples can be found around Konongo, Manso area, Mankr naso, Oda and Kibi.
2. **Pollution of water bodies**. Mining pollutes rivers, streams and lakes. Chemicals used in mining, such as mercury and cyanide, contaminate water sources. Fish, a source of local food are killed. Rivers become blocked and fishermen cannot sail their boats. Rivers that are polluted by ‘galamsey’ include the Pra, Birim, Bonsa, Ankobra and Daboase.
3. **Destruction of agricultural land**: Mining can lead to land degradation where efforts are not made to restore it back to its original state. This mostly affects farmlands such as cocoa farms, including food crops. The land is exposed to erosion and direct sunshine.
4. **Deforestation**: mining can lead to the loss of forests if efforts are not made to restore them by replanting. Examples can be found around Daboase, Offin Dunkwa, Manso and Akim Oda.

## Solutions to the Problems of Mining in Ghana

1. Easy accessibility to capital. Granting of loans with low interest rates will mean modern machines and techniques can be accessed that do not damage the environment.
2. Supporting research into and the adoption of innovative technologies can lead to more environmentally friendly mining practices.
3. Strengthening regulations of mining activities. The Ministry of Lands and Natural Resources, in collaboration with the Minerals Commission and other related bodies, must develop ways to enforce rules and regulations in the mining sector, for example the law on preventing mining in forests and close to water bodies.
4. Encouraging mining companies to adopt sustainable and responsible mining practices is crucial. Mining companies should be monitored in some way to ensure they undertake environmentally sustainable mining.
5. Engaging with local communities and establishing mechanisms for benefit-sharing. Local communities, including opinion leaders such as chiefs, should be more involved in decisions regarding mining activities in their communities.
6. Promoting responsible mining practices, such as using cleaner technologies, minimising waste, and rehabilitating mining sites after mining operations are complete.

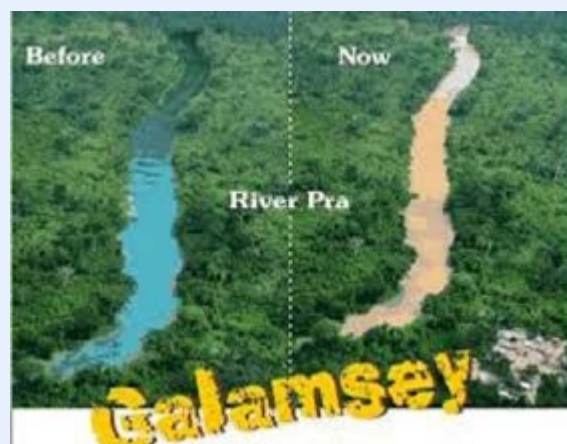
7. The government should work towards recognising and regulating the small-scale mining sector to curb illegal mining activities or ‘galamsey’. The policy on community mining should be effectively implemented.
8. Strict enforcement of health and safety regulations such as providing proper training, safety equipment, and medical support to prevent accidents and mitigate health risks.

The link below gives a detailed video on mining in Ghana. Watch for further information on types of surface mining.

[What is Mining - More Science on the Learning Videos Channel \(youtube.com\)](#) .

### Activity 11.1

1. Click on the video links to learn more about mining activities in Ghana including the various methods of both legal and illegal and answer the question that follows;
  - Ghana illegal gold mining: Environmental destruction and corruption
  - The Current State of Mining in Ghana: Challenges and Opportunities
  - Ghana is Africa’s largest gold producer, but it has an illegal mining issue: 5 essential reads
  - a. Write down your findings and share them with your friend.
2. Describe the three methods used in Ghana to extract minerals and precious metals.
3. Outline the economic importance of mining to Ghana.
4. Discuss with a friend the problems created by mining for minerals and precious metals in Ghana and suggest a solution to each problem. Prepare an information sheet for the class which outlines each problem and clearly states your solution.
5. Study the photograph of the river Pra below which shows the river before and after illegal mining (called ‘galamsey’ which means ‘gather and sell’)



- a. Describe the differences between the two pictures in a short paragraph.
  - b. Give the reason for the brown colour of the river in the now picture.
  - c. What impact will 'galamsay' have on river creatures and local people?
4. The table below shows some minerals and where they are mined in Ghana. Minerals and locations are mixed up in the table.

| Minerals  | Location  |
|-----------|---|
| Manganese | Obuasi, Bogoso, Konongo, Dunkwa, Tarkwa, Prestea, Bibiani |
| Diamond   | Ewoyaa  |
| Lithium   | Ada, Elmina, Winneba, Daboya                              |
| Salt      | Awaso, Kibi, Kenyansi                                     |
| Bauxite   | Bonsaso, Birim valley, Akwatia, Oda, Kade                 |
| Gold      | Nsuta, Himakrom   |

- a. Copy the table matching the correct mining location with the mineral mined there.
- b. After matching the minerals with their correct mining location, draw a map of Ghana and accurately locate all areas. Use a colour key to show what mineral is mined at that location.

# Review Questions

1. List six minerals mined in Ghana and name a location where each one is mined.
2. Explain why each of the following factors help to promote mining in Ghana:
  - i. Favourable government policy
  - ii. Availability of good transportation systems
  - iii. Availability of mineral ore deposits
  - iv. Availability of large and cheap labour
  - v. Access to capital
3. a. Copy and complete the gaps in the following table for **surface** and **alluvial** mining

|        | Types of mining  |         |          |
|--------|--|---------|----------|
|        | Underground  | Surface | Alluvial |
| Method | 1. Prospecting to identify mineral deposits<br>2. Drill shaft<br>3. Cut tunnels<br>4. Blast out ore<br>5. Load into wagons<br>6. Lift to surface<br>7. Crush into small pieces<br>8. Move to processor by road or air. |         |          |
| Risks  |  |         |          |

- b. Add the following risks in the correct place on the table. (you can use some more than once)
  - i. Flooding of tunnels by underground water sources.
  - ii. Heavy rains and flooding affect stability of dredging boat.
  - iii. Collapse of shaft or tunnel roof trapping miners underground.
  - iv. Drowning and water related hazards.
  - v. Landslides and rockfalls at working faces.
  - vi. Accidents with heavy machinery or explosives.
4. Explain six reasons why mining is important to Ghana's economy.
5. Choose two socio-economic problems and two environmental problems caused by mining in Ghana. Describe in detail the cause of each problem. State and explain your solution to each problem.

# Answers to Review Questions

1. Gold-Obuasi, diamonds-Bonsaso, bauxite-Awaso, manganese-Nsuta, lithium-Ewoyaa, salt-Ada

2.

- i. Favourable government policy: Supportive regulations and incentives attract local and international investment and facilitate mining operations.
- ii. Availability of good transportation systems: modern and well maintained transport networks built and paid for by foreign mining companies enable the easy movement of minerals and mining equipment.
- iii. Availability of mineral ore deposits: Rich deposits of minerals in Ghana provide the raw materials necessary for mining activities.
- iv. Availability of large and cheap labour: A plentiful and affordable workforce in Ghana reduces operational costs for mining companies.
- v. Access to capital: Financial resources are essential for funding mining projects and acquiring necessary technology and equipment, loans are usually from mining companies of international banks.

3.

|        | <b>Types of mining</b>  |   |   |
|--------|---|---|---|
|        | <b>Underground</b>  | <b>Surface</b>  | <b>Alluvial</b>   |
| Method | <ol style="list-style-type: none"> <li>1. Prospecting to identify mineral deposits</li> <li>2. Drill shaft</li> <li>3. Cut tunnels</li> <li>4. Blast out ore</li> <li>5. Load into wagons</li> <li>6. Lift to surface</li> <li>7. Crush into small pieces</li> <li>8. Move to processor by road or air.</li> <li>9. Return area back to natural state.</li> </ol> | <ol style="list-style-type: none"> <li>1. Prospecting to identify mineral deposits</li> <li>2. Remove soil and any other surface material</li> <li>3. dig pit</li> <li>4. Blast out ore</li> <li>5. Load into dump trucks</li> <li>6. Move out of pit</li> <li>7. Crush into small pieces</li> <li>8. Move to processor by road or air.</li> <li>9. Return area back to natural state.</li> </ol> | <ol style="list-style-type: none"> <li>1. Prospecting to identify mineral deposits</li> <li>2. Place dredging machine in water</li> <li>3. Dredge upriver sediment</li> <li>4. Pump sediment from dredger to processing plant on bank.</li> <li>5. Remove unwanted sediment using water</li> <li>6. Collect wanted minerals</li> <li>7. Return area back to natural state.</li> </ol> |

|       | <b>Types of mining</b>   |  |  |
|-------|--|--|--|
|       | <b>Underground</b>   | <b>Surface</b>   | <b>Alluvial</b>  |
| Risks | <p>Collapse of shaft or tunnel roof trapping miners underground.</p> <p>Flooding of tunnels by underground water sources.</p> <p>Accidents with heavy machinery or explosives.</p> | <p>Landslides and rockfalls at working faces.</p> <p>Accidents with heavy machinery or explosives.</p> | <p>Drowning and water related hazards</p> <p>Heavy rains and flooding affect stability of dredging boat.</p> |

#### 4.

- a. **Revenue Generation:** Mining contributes significantly to government revenue through taxes, royalties, and export duties.
- b. **Employment Creation:** The mining sector provides jobs for thousands of Ghanaians, both directly and indirectly.
- c. **Foreign Exchange Earnings:** Mining exports, particularly gold, are a major source of foreign exchange for Ghana.
- d. **Infrastructure Development:** Mining companies often invest in local infrastructure, such as roads, schools, and hospitals.
- e. **Industrial Growth:** The mining industry stimulates the growth of other sectors, including manufacturing and services.
- f. **Technological Advancement:** Mining operations drive technological innovation and skills development within the country.

#### 5.

##### a. **Socio-Economic Problems**

*Problem: Illegal Mining (Galamsey)*

Cause: Lack of regulation and enforcement allows unauthorized mining activities to flourish, often driven by poverty and unemployment<sup>1</sup>.

Solution: Strengthen regulatory frameworks, increase enforcement efforts, and provide alternative livelihoods for those involved in illegal mining<sup>1</sup>.

*Problem: Lack of Capital*

Cause: High interest rates and limited access to financial services hinder the ability of local businesses to secure necessary funding.

Solution: Implement financial reforms to lower interest rates, expand microfinance options, and encourage investment in local enterprises

**b. Environmental Problems**

*Problem: Water Pollution*

Cause: Chemicals used in mining, such as mercury and cyanide, contaminate water sources.

Solution: Enforce stringent environmental regulations, promote the use of safer mining technologies, and conduct regular water quality monitoring.

*Problem: Deforestation*

Cause: Large-scale mining operations clear vast areas of forest, leading to habitat loss and biodiversity decline.

Solution: Implement reforestation programs, enforce land reclamation policies, and promote sustainable mining practices.



## Extended Reading

1. Dadson I. Y. (2021). *Integrated Human and Regional Geography* (2<sup>nd</sup> Ed), UCC Press: Cape Coast.
2. For further information on Mineral and Mining in Ghana [Mineral final](#).

## References

- Dadson I. Y. (2021) *Integrated human and regional geography* (2<sup>nd</sup> Ed), UCC Press: Cape Coast.
- Amankwaa, O.P.J (2002) *Ghana, A Human Geography* Takoradi, Ghana: St. Francis Press Ltd.
- Areola O and others (1992) *Certificate Physical and Human Geography* Ibadan, Nigeria: University Press.
- Bunnet, R. B. and Okunrotifa, P. O. (1986 and 1999) *General Geography in Diagrams for West Africa* Hong Kong: Longman Group.

## Acknowledgements



Ghana Education  
Service (GES)



## List of Contributors

| Name                     | Institution                 |
|--------------------------|-----------------------------|
| Dr. Kate Gyasi           | UEW, Winneba                |
| Prof. Ishmael Yaw Dadson | UEW, Winneba                |
| Glago Frank Jerome       | Akatsi College of Education |
| Susuana Adwoa Appiah     | Tamale SHS, Tamale          |