SUBJECT: GEOGRAPHY
SEMESTER: UG 4th (H)
PAPER: GEOC-402(ECONOMIC GEOGRAPHY)

MINING

Mining

Mining is the extraction of valuable minerals or other geological materials from the Earth, usually from an ore body, lode, vein, seam, reef or placer deposit. These deposits form a mineralized package that is of economic interest to the miner. Mining is required to obtain any material that cannot be grown through agricultural processes, or feasibly created artificially in a laboratory or factory. Mining in a wider sense includes extraction of any non-renewable resource such as petroleum, natural gas, or even water. Mining of stones and metal has been a human activity since pre-historic times. Modern mining processes involve prospecting for ore bodies, analysis of the profit potential of a proposed mine, extraction of the desired materials, and final reclamation of the land after the mine is closed. Mining operations usually create a negative environmental impact, both during the mining activity and after the mine has closed. Hence, most of the world's nations have passed regulations to decrease the impact.

Importance of mining in economy

Mining plays a dominant role in the economy. The mining industry is considered as one of the fastest growing economies all over the world but in particular, the contribution of mining to the country, especially those who export mineral products, is felt intensively. There are some economic benefits of mining which befalls a country, thereby placing emphasis on the economic significance of mining and their impact on both the government and the people. In contrast, many people have now raised the question why is mining important to daily life**,** given that the impact of this industry is felt less by countries who rely on imported goods. Most people underestimate the importance of the role of this sector in global economies, but little do they know national governments of countries who export minerals rely heavily on this industry to boost their economic performance. As a matter of fact, many developing African countries are dependent on the exploration and the exploitation of their mineral resources such as coal, gold, ore, iron, and many other mineral sectors which are deemed to open many opportunities for many economies. So the importance of this sector is highlighted with the economic significance of mining, especially since the economic benefits of mining are apparent.

Similarly, the economic benefits of mining also highlight the economic significance of mining, given that both concepts are subsequent consequences of each other. With the economic significance of this sector affected by the economic benefits of mining, an economist always considers which significant decisions of the sector can positively impact the economy and highlight the industry's importance, hence the need for learning what the economic benefits of mining are. Some of these benefits include: providing livelihood to local communities, generating income for the local government thereby directly contributing to its economy, promoting a more efficient use of energy, saving people money, promoting environmental awareness through rehabilitation programs resulting to more renewable sources than ever.

With these benefits being apparent, the contribution of this sector to the economy is sure to be significant. The contribution of the mining sector to the economic situation of a country is

more significant than most people think. The role of this sector in everyday life is to provide essential materials to help facilitate the assembly of new ones, making it necessary for a country to practice safe mining to keep the other industries going. This is the reason why mining is important to daily life, because, without this sector, many industries will be crippled, especially the manufacturing industry. The economic importance of this industry has been underestimated by many, but it has been proven that mining plays a crucial economic role to keep the economy going and for a country to experience growth. The facts mentioned earlier all highlight the impacts of this sector on a country's wealth, and it is important to take note what these are for you to understand better why it is necessary for everyday life.

The importance of mining on economy can be well understood by citing the example of Ghana. Mining is one of the oldest industries to have ever developed in West Africa. Mining existed in Ghana long before the colonial era. The mining sector is an important segment of the Ghanaian economy and has played a significant role in the country's socioeconomic development since the colonial period. Historically, the mining sector's contribution to gross foreign exchange, particularly gold, has only been paralleled by the cocoa sector. However, there is strong scepticism as to whether the mining sector's fiscal regime presents opportunities for increased government revenue from the mining sector for Ghana. That, despite surgical mineral commodity prices, the contribution of the mining sector to the national economic is clearly not visible. Many have argued that the current state of the Ghanaian economy does not suggest that there has been a significant positive impact. The country is unlikely to meet the Millennium Development Goal (MDGs) of reducing poverty by half by the year 2015. There is also conclusive evidence to suggest that poverty is acutely pervasive. The country is placed relatively low on the UN Human Development Index, ranking 135 out of 186 countries in 2006 (WB, 2003).

Classification of mineral resources

Minerals are of two types: Fuel and Non-Fuel

Fuel minerals include Fossil fuel (eg coal, petroleum etc) and Others (nuclear minerals)

Non-Fuel is of Metallic and Non-metallic

Metallic are of ferrous (iron ores), Ferro alloy (manganese, nickel etc) and Non-ferrous (copper, bauxite etc)

Problems of mining

The major problems of mining industry are discussed as below

- **Infrastructural Challenges**

For mining companies and agencies to be able to effectively carry out their operations, certain basic amenities must be put in place by the government. Good road networks, constant power supply, and even water supply are important to mining activities hence the government must ensure these facilities are put in place for smooth running of mining operations.

- **Inadequate Finance**

The Nigerian mining sector is currently dominated by small-scale miners who lack sufficient funding to expand their business, the insufficient fund stands as one of the key problems of mining in Nigeria. Many of these miners rely on crude methods and equipment to carry out their operations and these methods would not yield much in terms of reward for them.

- **Non-Availability of Accurate Geological Data**

The information currently available on minerals found in Nigeria as well as localities where they can be found is insufficient. There is still a heavy reliance on data obtained over 50 years ago.

- **Non-Availability of Well-Equipped Laboratories**

Well-equipped laboratories are necessary for more research to be carried out on these minerals. This is necessary especially in the exploration for new locations that contain minerals as well as the processing and beneficiation of these minerals after extraction to increase their grade.

- **High Risk and Health Hazard**

Mining naturally is a risky venture but in Nigeria, the risk level is even much higher than in many other countries of the world where technological advancement and better methods have lowered the risk involved.

- **Regulation**

The mining industry in Nigeria is still not well regulated. This has made it really easy for illegal miners to operate. Ministry officials charged with overseeing this industry are underequipped for the job.

- **Activities of Illegal Miners**

In order not to pay government taxes, many small-scale and artisanal miners' resort to illegal mining operations. A significant percentage of mining operations in Nigeria are carried out illegally.

- **Lack of Proper Legislation and Inconsistent Government Policies**

Over the years, lack of proper legislation and constant shifting in position of the government on matters affecting the mining industry has scared away prospective investors.

- **Low Productivity**

The productivity of our mines is still very low due to the use of old equipment and mining methods. Most of our mining operations are still being carried out by artisanal miners who cannot afford to purchase expensive modern equipment to carry out their work. They have to rely on the use of crude implements like digger and spade to dig the ground.

Major Solutions

Following are some suggestions to overcome the various problems faced by mining industry

- **Infrastructure**

The government should ensure it provides basic amenities such as potable water, good roads, and constant power supply all over the country. Availability of these facilities will boost mining activities in the country

- **Finance**

Loan facilities are not easily obtained by mining companies and this has hindered the expansion of small-scale mining companies. Some of these companies have had to look outside of Nigeria for funds. Also, the approved mining license should be acceptable as collateral for obtaining a loan in Nigeria.

- **Accurate Geological Data**

Current geological data should be updated to ensure they are more reliable. The Nigerian Geological Survey Agency is currently collaborating with Geological departments in our Higher Institutions to update our geological maps.

- **Laboratories**

Establishment of standard and well-equipped laboratories either by the government or by individuals or companies with government support should be encouraged. Establishment of these laboratories will significantly boost our mining operations.

- **High Risk And Health Hazard**

With proper funding, mining companies and individuals involved in mining will be able to procure modern equipment to enable them to carry out their operations smoothly. Also, health facilities should be put in place to cater to the medical needs of people directly involved in mining operations.

- **Regulation**

Proper regulation of the mining industry must be ensured to enable the government to collect the maximum tax it is entitled to from operators in the industry. Majorly of these illegal miners have no other means of survival since they have been involved in mining for many years. The government should encourage these miners to set up proper mining operations in line with available legislation in the country. That way both the interests of the government and those of the illegal miners are protected.

- **Lack Of Proper Legislation And Inconsistent Government Policies**

The government should decide and make known its position on mining and ensure proper legislation to back this up is enacted. One such legislation recently passed is the mineral act which was signed into law in 2007. It is hoped that this law and similar laws would ensure transparency in the process of granting mining licenses, ensure the security of tenure, and encourage competitive fiscal terms and lead to significant growth in our mining industry.

- **Low Productivity**

The productivity of our mining industry can be significantly increased if modern methods and equipment are used by miners in carrying out mining operations. Modern equipment like bulldozers and excavators will do a faster and neater job excavating the earth than a human with a spade and digger would.

Future prospects

The clever implementation of digital technologies like the Industrial Internet of Things (IIoT) and automation could transform mining, making it safer, more productive, efficient, sustainable, and profitable, and therefore better able to take on the challenges it faces. When we consider that over the last 15 years, the average cost of producing copper has risen by more than 300%, while the grade has dropped by 30%, these new efficiencies offer a cost-effective way to increase profitability.

One of the biggest areas of promise is in IIoT's ability to transform expensive and inefficient manual and mechanical processes into digital ones. IIoT technology enables mining organisations to collect vast quantities of data about their operations remotely and in real time through internet-connected sensors. This data can then be acted upon and used to improve efficiency on site, ensure a safe environment for miners and monitor the operational status of machinery. Advanced IIoT solutions can even form the backbone of a fleet of completely autonomous haul trucks, drills and excavators which can deliver additional savings, reducing fuel and staffing costs and optimising operating efficiency.

The application of technology will continue to remove people from the brute force aspect of the business, whilst advancing the ability to find, extract and process mined materials, quicker, cheaper and at a better rate per tonne. The recent modest recovery in mining productivity has been threatened again as demand improves and prices recover, and as a result, the industry is under pressure to focus on methods to improve efficiency. Naturally this falls on the supply chain, and we believe, block chain and smart contracts will be a key building block to achieve this.

While base and precious metals mining are mature markets, we are witnessing the start of a new era for lithium and cobalt production as demand for these two materials undergoes exponential growth from lithium-ion batteries. The compound annual growth rate for electric vehicles (EVs) uptake over the next decade is expected to be around 27%, but already growth rates are much higher than this, albeit off a low base. Critical infrastructure industries such as mining are struggling to attract and retain the right technological capabilities. Ultimately, the main barrier for graduates entering these industries is proprietary outdated technologies, which demands time-consuming and expensive training and limits future job prospects. As a result, the job market stagnates and older generations are the only people with the knowledge of how specific systems work.

Looking ahead, companies will need to agree on technical standards that are open, based on common languages. This means process control systems in one organisation are compatible with those from another. This will not only make it easier and cheaper for existing staff to replace and repair control systems, it will also be easier for new talent to be attracted to and retained within the mining sector. Now that intrinsically safe devices are more prevalent, we'll see more technology actually down in the mines and the savvy businesses will be those that start to take advantage of this early. This will include improving on processes such as digital audit checks, where safety and quality control remains paramount. But we're likely to see an increase in areas like in-location video conferencing and digital product tracking.