

# The Role of Mining Sector in Indian Economy

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**Abstract:-** The wellbeing of a nation's economy is very much dependent upon the Mining Sector. When we look upon the situation of the National Economy, we see the mining industry as a significant contributor, despite which it is one of the most ignored sectors. Still, the role and the contribution of this sector varies and differs significantly in impacting the country's economy with a significant dependence on the underdeveloped or still developing resource and the government policies of the nation. For any industry to develop, vast amounts of natural resources are required, most of which are fulfilled by the Mining Industry. However, because of the lack of reforms and proper production techniques and technologies, the Industry is yet to bloom at its peak. In the present paper, the authors try to elucidate the actual impact of the mining sector and highlight some of the most overlooked problems, like productivity and comparative advantage with a focus on consequences of mining, and its felt impacts in one of Asia's transitional economy; 'India' through the economy point of view. Which, if corrected, may exponentially increase the productivity and total output of the Mining Sector. The diverse and varying character of the mining sector is opening up new and engaging opportunities for investment, technological assistance and knowledge sharing, from the foreign powers.

**Keywords:-** Economics, Geoscience, Geo-Economics, Mining, Mineral Sector.

## I. INTRODUCTION

The mining sector plays a vital role in the Indian Economy; it occupies one of the most crucial positions of the supply chain resources. Its excavation and processing have the calibre to be the driving force of a significant chunk of the country's economy, opening its doors to overall economic development. Nevertheless, the role of this sector significantly varies and differs on a country level and is neither documented properly nor is comprehensive due to which its potential has not been exhausted to its fullest yet. It is a widely accepted fact that some of the world's most miserable, weakest, and worst-performing nations are mineral dependent.

The authors have tried to answer two questions through this study: What is the economic impact of mineral processing and mining? Is the mineral wealth manageable to advance the economic benefits in a shorter period and to sustain it over the long term? These two questions have been thoroughly answered by keeping in mind the interests of both the national economy and the local community.

The mining sector is viewed as the quintessence of India's economy. India is very well endowed with significant occurrences of Sulphur, aluminium, limestone, bauxite, iron ore, gypsum, copper, phosphorite, gold, lead, zinc, diamond, manganese, coal, natural gas, and crude. Excavation, processing, and the sale of the minerals obtained from these natural resources play a vital role in providing significant revenues for India's economy through FDI and Foreign Exports. As an outstanding contributor to the GDP, as a foreign export earner for the national economy, as an extensive employer and as a tax generator, mining has always been considered the locomotive of India's economic development.

While not perfect, the government has taken some measures, including releasing the New Mineral Policy in 2019. With an optimistic aim to "increase the production of major minerals by 200 percent in 7 years". This was done to support the NMP 2008 as it "seems to be only on paper and is not being enforced perhaps due to the involvement of compelling vested interests or a failure of nerve," as quoted by Hon'ble Supreme Court of India. It has also been quoted as promoting "rapacious mining in several parts of the country." While the NMP 2019 indeed a good start, the authors of the paper represent the truth of the current status of the mining industry and highlight specific challenges that are still not rectified.

The paper deals with the effects of mining on national and community economies, the most effective ways to manage mineral wealth, the mining sector's challenges, employment opportunities through the mining industry, the socio-economic challenges, and the impact of politics on India's mining sector.

## II. MINERAL WEALTH OF INDIA

The Indian Mineral Sector is an Industry with much potential. Part of this is based on the fact that India has vast reserves of a variety of minerals like Coal (4th largest), Bauxite, Titanium ore, Chromite, Natural Gas, Diamonds, Petroleum, and Limestone.

India also currently mines a different amount of minerals. According to the 2018 Annual Report published by the Ministry of Mines of India, “India produces as many as 95 minerals, which includes 4 fuel, 10 metallic, 23 non-metallic, 3 atomic and 55 minor minerals” (refer to Figure 2(b) for comparison of number of mines). in India There were a reported 1405 mines for the year 2018-19 most of which were based in Madhya Pradesh followed by Gujarat, Karnataka, Odisha, Andhra Pradesh, Tamil Nadu, Chhattisgarh, Rajasthan, Goa, Maharashtra and Jharkhand.

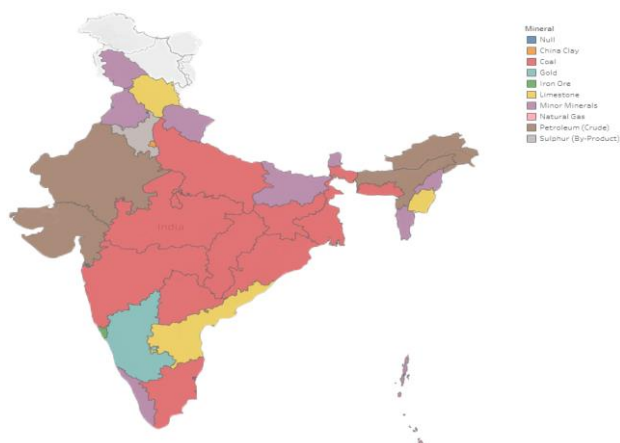


Figure 1: Map of India depicting states by highest total value mineral

However, in terms of the total value of production of minerals, the statistics change with Odisha (23.66%) in the leading position followed by Rajasthan (17.27%), Andhra Pradesh (8.62%), Chhattisgarh (8.49%), Karnataka (8.37%), Telangana (6.73%) and Gujarat (5.20%).

These mines hold the leases for mining and cover around 3,66,010.88 hectares. Most of this Industry is dominated by the Private Sector, with their contribution standing at 67.33% of the total value of production. (refer to Figure 2(c) for value of Mineral Production by category)

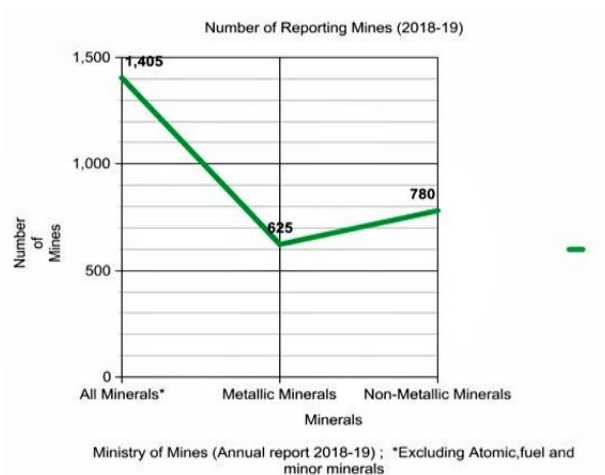


Figure 2: Number of Reporting Mines in India (2018-19)

According to Mining Contribution India data, India ranks 5th in the world in production value of metallic mineral and coal. This is the list which is mostly dominated by High-Income Countries. However, in the overall index for mining, India ranks 56th, and that is something India has to work on.

Commodity	Unit of quantity	Production		Contribution Percentage %	India's rank in order of quantum production
		World	India		
<b>Metallic Minerals</b>					
Bauxite	'000 tonne	289,000	64,664	8.53	5 <sup>th</sup>
Chromite	'000 tonne	34,800	3,727	10.71	4 <sup>th</sup>
Iron	Million tonne	3,305	192	5.81	4 <sup>th</sup>
Manganese	'000 tonne	51,200	2,393	4.67	6 <sup>th</sup>
<b>Industrial Minerals</b>					
Magnesite	'000 tonne	29,800	299	1	10 <sup>th</sup>
Apatite & Rock Phosphate	'000 tonne	276,000	1,181	0.43	17 <sup>th</sup>
<b>Metals</b>					
Aluminium (Primary)	'000 tonne	58,800	2,896	4.92	4 <sup>th</sup>
Copper (Refined)	'000 tonne	23,400	787	3.36	6 <sup>th</sup>
Steel (Crude/Liquid)	Million tonne	1,623	97.44	6	3 <sup>rd</sup>
Lead (Refined)	'000 tonne	11,300	142	1.25	14 <sup>th</sup>
Zinc (Slab)	'000 tonne	13,800	672	4.87	4 <sup>th</sup>

Table 2: Comparison and rank of Indian mineral production against the World (Source: Ministry of Mines, Annual Report 2018-19)

### III. ROLE OF MINING IN THE GROWTH OF INDIAN ECONOMY

The most crucial parameter to transfer Mineral and Metals into economic and socio-economic development revolves around the revenues generated from the sector for investment, reformation, advancement and also public spending. These revenues are very important to countries in the Low-income group which have less resources for tax collection and economic production. (refer to Fig 3(a))

There are a number of factors which are directly proportional to the amount of revenue collected through the mining industry and the percentage of contribution to the National Economy in any year. Majorly, commodity price, the level of mining, total productivity of the mines, the size of the mining project, age in the mining life cycle and the size of the National Economy are the prime factors that influence the revenue collection through the Mining Sector. (refer to Fig 3(c) for Lifecycle employment and revenue contribution)

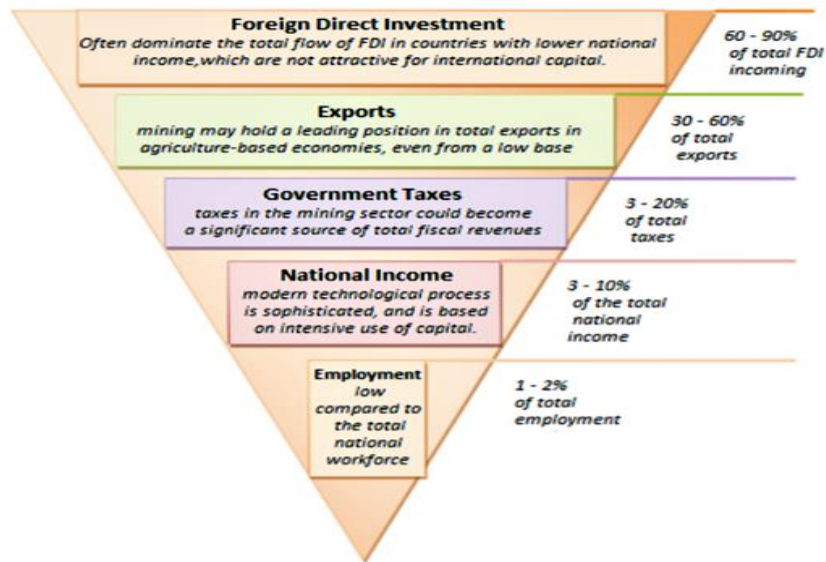


Figure 3: Macroeconomic contributions of mining in national economies with low or middle incomes (Source: ICMM)

#### A. Gross Development Product

Which economy can be called as a “Mineral oriented Economy”? What is the level of their economic progress? What is the level of their economic development?

First questions first there is no formal acclaimed definition of “Mineral Oriented Economy” however we have a very generalized and informal approach to that, which is, “the country with an excellent and fascinating mineral base, that generates high revenue for the National economy can be referred as a Mineral Economy”

The mining sector is one of the most important ones from the core sectors of the country that exponentially influences the growth of a national economy. Not only does it contribute widely to the GDP, but it also serves as the backbone of the development of other industries such as Cement, Steel, Power, Iron, Electrical, etc. As per the advance estimates for 2019-20, the growth in real GDP during 2019-20 is estimated at 5 percent, which is expected to grow at a much higher rate in the upcoming years.

S.N.	Parameter	2011-12	2012-13	2013-14	2014-15
1	GVA (All sectors)	8195546	9252051	10477140	11550240
2	GVA (Mining and Quarrying)	262813	284771	298544	275812
3	% Contribution of Mining & Quarrying in GVA	3.21	3.08	2.85	2.39

Table 3: Contribution of Mining and Quarrying in total GVA (2011-15) (Source: CSO)

#### B. Employment

Mining generates a substantial amount of employment in India. It is a labor dependent sector. It acts as a significant variable in achieving sustainable and inclusive growth. In the past, it has emerged as the 3rd largest employer in the country. However, presently, if we consider the data from the year 2015-16, the mines employed only 4.88 lakh people on average daily (refer to Figure 3(d) for change of

employment on a timeline). Of the major minerals, fuel accounted for 78% of the total employment, metallic minerals 16%, and non-metallic minerals, about 6%. Of the eight core sectors of the Indian Economy, five sectors depend on it for raw product. The Mining Industry has a 1:10 ratio of Indirect Employment creation due to subsidiary and dependent industries, thus resulting in 2.3 Crore jobs. This will also help to fill in the nonfarm job gap.

FIMI reportedly told the Hon'ble Prime Minister of India Shree/Mr. Narendra Modi that “the mining sector has the potential to provide employment opportunities to about 50 lakh people directly and create overall employment opportunities for about five crore people in India”. Currently, there is a deficiency of mining sector specialists like engineers, geologists, and skilled and semi-skilled tasks. The main problem with mining employment is that it has un-skilled workers, dropping down productivity. While the government has a plan to train 4,50,000 people in the next ten years, efforts have to be ramped up.

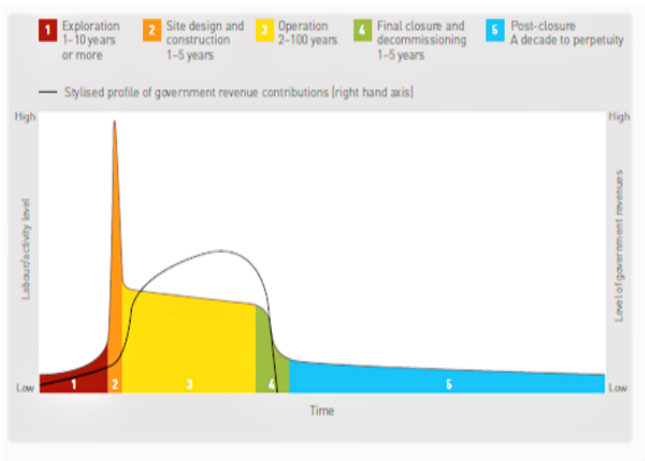


Figure 4: Mining life cycle – revenue and employment contributions (Source: Role of mining in national economies 3<sup>rd</sup> edition)

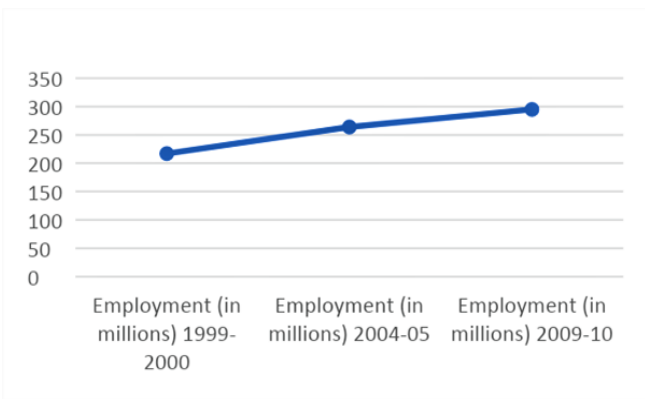


Figure 5: Rate of Employment in 1999-2000, 2004-05 and 2009-10

C. Exports

Mining contributes a lot to the export output of India. During the year 2018-19, the value of exports stood at ₹ 2,19,168, which accounted for around 9.5% of the total value of Indian exports. Diamond had the highest share with around 80.22%, followed by Granite (4.65%), Iron Ore (4.23%), Alumina (2.14%), and Emerald (1.05%).

Around 88% of the exports were confined to only nine countries. Metals and alloys made up only 7.55% of the total mineral exports, with Iron Ore holding the top position at 58.68%. What is surprising is that Coal, which is a major employer and in which India has a comparative advantage (refer to Figure 2(a)), does not make it to the list.

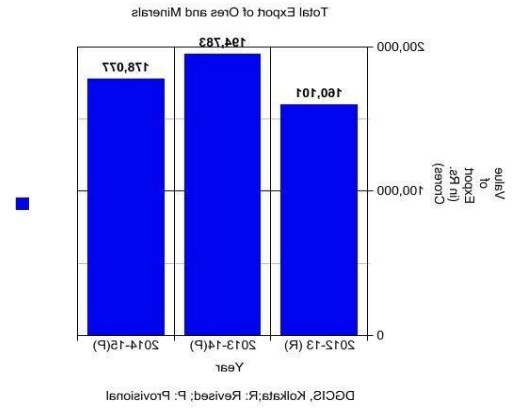


Figure 6: Total Export of Ores and Minerals in India from [2012-15]

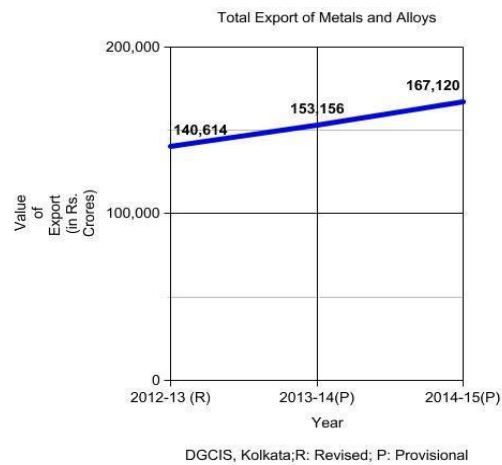


Figure 7: Total Export of Metals and Alloys in India from [2012-15]

D. Corporate Social Responsibility (CSR)

Mining has a great impact on the environment, affecting negatively, for the most part, the local climate, vegetation, wildlife, air quality, and groundwater, among others. The tribal and other local population too are negatively affected.

Thus, the concept for Corporate Social Responsibility emerges, the platform through which mining companies try to improve their image wherein the companies have to spend at least 2% of their annual profits. This topic is touched upon in this paper to reaffirm how important CSR is in balancing the socioeconomic status and overall environment of the mined area.

One prominent example, showing CSR impact, is the skill development program in the Muraidih mine area of Jharkhand where CSR helped fund a skill development program, providing for new livelihood opportunities. Another important example is when the Shah Commission shut down the Iron Mines in Goa during Emergency Rule, and the content of iron in water increased because it was no longer cleaned and monitored by the mining companies.



The same would happen if CSR were scraped off, and the effect would be even more drastic in areas with poisonous minerals like lead.

#### E. Comparative Advantage

India has a comparative advantage in many minerals. To take specific examples, Iron and Coal have a comparatively low cost of production. Considering the changing Energy Industry of India with more backing going towards Renewable Sources, Coal is emerging as a potential export mineral.

Moreover, given the state of coal production in India, the export market would be huge given the high international price, especially to countries like Bhutan, Nepal, and Bangladesh. The same goes for the iron market, where recently production has increased. Given the high price of iron in the international market, India also has an avenue for exporting more iron.

By exporting to specific countries and importing from specific countries, India can gain an advantage in the net trade. Lastly, the only highlight is that the Diamond trade may be highest, but that is diamond cutting and not mining. Thus, it is more of processing rather than excavating. Thus, holding the assumption that we have a comparative advantage except for the labor side is incorrect.

To conclude, all these points towards just one thing: while India has to import, it should still mine commercially and export, for the benefit of the mining sector.

#### F. Government taxes

Mineral tax refers to any tax or excise or duty levied by the government for the mining of minerals due to the scarcity of their nature. It also incentivizes sustainable usage and helps protect the environment while ensuring that the resources are not depleted.

For instance, a miner in India pays 34% corporate tax, 16.5% Dividend distribution tax, 10% royalty (for new mines) to the District Mineral Foundation (DMF), 2% royalty to the National Mineral Exploration Trust, 2% CSR and these are excluding the high taxes miners have to pay for getting a lease through the auction route. This system of taxation in India is one of the highest globally.

This problem, of course, has an elegant solution, as proposed by FICCI. The solution is “subsuming” all the taxes and royalty into one single chargeable entity i.e., GST. This will act as a mechanism to reduce the burden on Miners during pandemics and other negative situations and will not only ensure the survival and profitability of mines

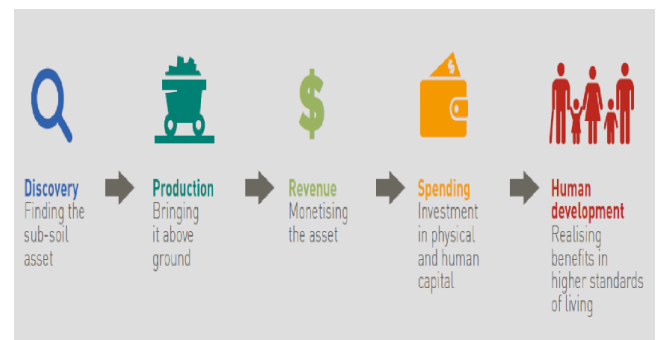
but also facilitate more investment. This will help in boosting the economic impact of the mining sector positively.

#### G. Challenges of the Mining Sector

For a very long time, the mining sector in India is facing many challenges right from environmental hazard and statutory process violations, increased rate of fatalities in mine sites, illegal and unscientific mining, and fewer investments in the mining sector.

A wide range of employment opportunities such as, of hundreds of young geology and mining graduates, have also been affected negatively because of the closure of mines in the top producing states of Odisha and Jharkhand along with Mining curbs in Goa and Karnataka.

Furthermore, the National Mineral Policy 2019 was expected to be a reliever and a policy of revolutionizing the Indian Mineral sector. It would have greatly impacted and catalyzed the National Economic growth. However, the policy had a negligible impact on reforming India's mineral sector in the context of the changing global scenario.



**Figure 8: Asset Transformation- from subsoil assets to development** (Source: Role of mining in national economies 3<sup>rd</sup> edition)

#### H. Productivity

The productivity increase of the Indian Mining sector is one of the most important reasons because of which the production and total output are increasing. This is seen by the Total Factor Productivity (TFP), also called Multi-Factor Productivity (MFP) growth increase from 3.66 % during 1989-2005 to 8.76 % during 2006-2014. However, it is worth noting that, while Australia's mining sector has shown more growth in terms of production, its MFP (and labor productivity) has gone down. This brings out a serious question that is -the increase in India's TFP is due to an increase in labor productivity or due to getting better grades of mineral ore?

The main components of production value	Examples	Key factors determining contribution to the national economy
Operating costs	Supplies (fuel, power, reactive, water, transport); labour	Availability of capacity for local bidding; infrastructure, business environment, industrial policy
Salaries	After taxes and mandatory contributions, net salaries	Achieving education locally, availability of appropriate skills, educational policy
Capital expenditure (investments and depreciation)	Machinery and equipment	The development of the industrial base of the host country
Taxes	Royalties, corporate tax, income tax	Fiscal regime, incomes distribution, transparency, of financial management, of the public sector (expenditures).
Financing costs	Interest on short-term and/or long loans	Domestic financial sector development
The shareholders' profit	Dividends (both private and public authorities)	National ownership of the mining sector

Table 4: The components of Production Value in Mining Industries  
 Source: The Role of Mining in National Economies by Ioana, Cristina and Dan Ioan

**I. Illegal Mining**

Illegal Mining is a major issue in India. From controversial scams by corrupt functionaries to stealing of resources due to lax enforcement. The problems include encroachment of protected forested areas, underpayment of government taxes, and conflict with tribal. Some of the prominent cases include the iron ore scams in Karnataka and Madhya Pradesh, illegal Mining of sand, and degrading the environment in Maharashtra, Madhya Pradesh, Goa, and Karnataka and more.

These are mostly controlled by organized crime syndicates, mining the several minerals in unsafe conditions like Rat hole mining in Meghalaya for Coal. Also, in areas prone to insurgencies, the illegal miners have to pay fees levied by them. This thus funds the terrorist activity which goes on in the heart of India.

Moreover, while the government has done a brilliant job of levying 100% against these illegal miners, the amount recovered is far less than the value of natural resources siphoned off from the area. Furthermore, even that number is underestimated. The government, however, has brilliant suggestions of tackling this by using Satellite imagery and other forms of technology, including the usage of drones like Coal India plans to for boosting the monitoring to tackle this situation.

**J. Environmental Impact**

There are several environmental hazards that are related to the Mining Sector in India. Environmental hazards such as Pollution, Loss of Biodiversity, Water Adulteration, and Contamination are very common when we look at the situation of the current mining scenario in India.

There has been widespread environmental pollution caused by the Makrana Marble Mines in Rajasthan; not only this, Granite mining in Karnataka has left a large hole on the earth's surface causing soil erosion and depletion of the water table in the affected areas. The Damodar river and

valley have been severely polluted by coal mining staking the environment and, in turn, causing harm to the human population.

Examples of common environmental impacts from mining operations

Activity	Common environmental impacts
Water discharge	Acid Mine Drainage Heavy metals overloading
Dewatering	Ecological impacts Sediment runoff Effluent contamination Impacts upon water resources
Smelting	Air pollution Acidic deposition Heavy metals contamination
Transportation	Noise pollution Dust and sediment Gaseous emissions Oil and fuel spills Soil contamination
Mineral extraction	Erosion Landform changes Alteration of water tables Dust Vegetation and habitat destruction Aesthetics

Figure 9: Environmental Impacts from Mining Operations  
 (Source: Sustainable development in the mining industry: clarifying the corporate perspective by Gavin Hilson and Barbara Murck)

In the previous year, loss of biodiversity has been a major concern when we talk about the Mining Sector. The prevalence of mining in an area causes various diseases like fibrosis, Pneumoconiosis, and silicosis in workers as well as locals.

Water from streams and rivers in mining areas has become acidic and unfit for drinking, causing harm to flora and fauna of the area, Eg: Damodar River, Meghalaya's Kopili river.

Mining and its processing deal with a lot of processes, during which the air gets contaminated. Contaminated air with high particulate matters is also a major problem in mining rich regions. During the blasting, transporting, spraying, and crushing of coal, a lot of dust and particulates get suspended in the air, causing a variety of respiratory diseases.

#### K. Political Impact

All Indian industries face political challenges. This is the drawback of the socialist outlook of India. The primary problem in this domain is the Public Sector Undertakings (PSUs). PSUs are essentially deadweight, which indulge in non-commercial mining and, in some areas, are present to ensure employment. Added to this is the corruption which promotes illegal mining and leads to numerous human rights violations.

According to Human Rights Watch, the industry generates political chaos enough to bring down two governments in 2011 and 2012. Lastly, there exists the tendency of most miners to procure political capital in the Indian mining industry to expedite the process of getting the license, permits and land leases. This political capital serves as a financial burden on the miners who choose to do so.

#### L. Administrative Issue

This process often leads to the usage of illegal channels, deriving governments of revenue, and building up costs for miners.

Self-assertive and arbitrary allocation of coal mines is a serious issue that needs to be addressed urgently. It leads to long lawsuits that take years to be resolved and eventually cancellation of allocations. Corruption is also the main problem in these block allocations.

When we look into the past, we always see a delay in environmental clearance to start the project mainly because of the bureaucratic hindrances.

The interventions of the Judiciary leads to a long delay and losses for the investors. For example, The Hon'ble Supreme Court of India imposed a heavy penalty on illegal mining without green clearances in Andhra Pradesh, Telangana, Karnataka, and Odisha in 2017. Banning of a Multi-National Corporation in Odisha and shutting down of 88 illegal mining leases in Goa in 2018 are also great examples.

#### M. Sustainability in the Mining Industry

Mining and the associated minerals processing are not sustainable, because the resource it is based on is finite and because of the very large negative environmental impacts. However, the sustainability performance of the minerals industry can be improved.

It is like Jeremy Gibberd said, “a contradiction in terms. The mineral industry is about the extraction of finite resources, and when the resource is depleted, the miners need to find another finite resource to extract and profit

from. Sustainability for the mining industry is about doing it in a more ecologically responsible way. It is also about putting a better face on the industry so they can defeat opposition to new mining projects more easily”.

Here is what Canadian Mining & Energy magazine says about it-

“Over the years, mining and exploration companies have been highly criticized for their destruction of the environment and unsustainable practices. But these days, companies are winning awards for operating within stricter regulations that mean a lower carbon footprint—and are taking pride in successful reclamation projects that help support their social license to operate.”

Firstly, the mineral industry's sustainability performance could be improved by reducing mining through thorough reuse and recycling of minerals, as this has a far lower negative impact than mining virgin material.

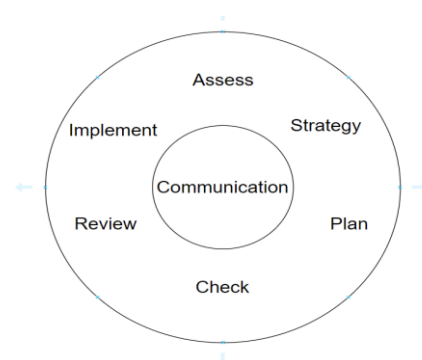


Figure 10: Management System Framework Source: Rio Algom's Environment, Health and Safety (EHS) Management System Framework. (Source: Rio Algom, 2000)

Secondly, integrating sustainable concepts into mining and mineral processing should be carried out. This has a focus on minimizing negative environmental impacts and maximizing beneficial social and economic impacts. In the minerals industry, this includes avoiding or minimizing processes that have negative environmental effects, including mining, materials, transportation, etc., and selecting and developing less harmful processes. It also includes ensuring that local communities benefit from the minerals industry and levels of health, education, employment, social cohesion, etc. improves.

Thirdly, a large proportion of the mineral industry has been developed to produce products that are not directly useful for improving the quality of life or developing sustainable systems. For instance, many products such as jewelry, toys, and office and home consumables are not necessary and are used a few times and then thrown away. The production of these products consume very large amounts of resources and energy and produces noxious emissions and waste. The minerals industry would become more sustainable if they focused on products that supported sustainability more directly, such as photovoltaic cells that generate energy from the sun rather than wasteful and unnecessary products.

**IV. CONCLUSION**

The Indian Mining Industry has come a long way since its beginnings in ancient times. While it has undergone modernization since its formal inception in 1947, the inward-looking socialist outlook, required then, still exists and hampers the future development and potential of the industry. The Mining sector has to have a more commercial outlook on mining minerals.

To improve the profitability and survival of mining companies, the harsh taxes which often measure up to 60% should be combined into one single entity that is GST and restricts it to a maximum of 40%. Also, other kinds of licenses and auctioning should be centralized to eliminate the requirement for political capital, which deprives both miners of capital and the government of revenue.

The factor of profitability remains the most important aspect of a company, and that applies to mining companies too. One of the main solutions for boosting revenue would be to export more, even if we have to import. The logic for this would be to export in the international market where prices are high and entering into bilateral talks with countries like Venezuela and Myanmar, where the situation is unstable, and prices of minerals are low.

The option for paying in rupee too would then be an option, as seen with our crude oil trading with Iran. The next step towards the development of this sector would be to increase productivity per miner, which is ridiculously low when compared to countries like the USA and Australia. This can be done by setting up training and mining skill development centers in areas where people’s livelihood depends on it.

All this is important as the mining sector has a significant impact on not only India's GDP but as it also helps existing industries, including the five core industries.

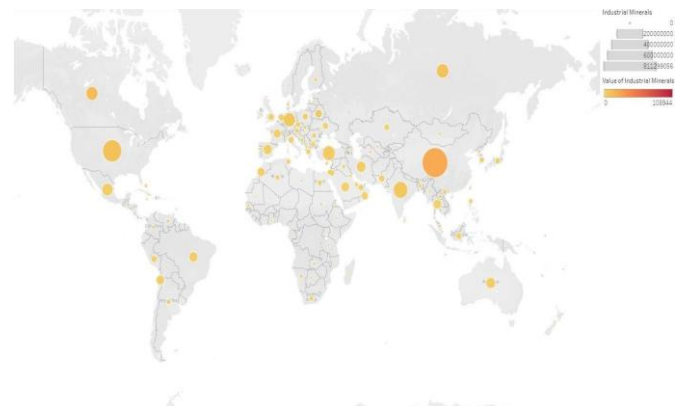
There is a need to understand the different parameters of the mining in terms of production, productivity, and the value of production. This would certainly help in the illustration of the main benefits the mining sector can generate and also help to know the possible ways we can explore to increase the density of these benefits. Moreover, it would also help us to focus on the challenges encountered during the production of the minerals, which may be connected to the policies implemented by the Government and Administration to tackle these challenges on the ground level.

We definitely cannot ignore the socio-economic challenges that India's Mining sector faces, which are continuously obstructing its future progression. However, we cannot deny India's mineral wealth caliber, which, if utilized properly, can be the biggest contributor to poverty reduction, employment generation, and the growth of the national economy.

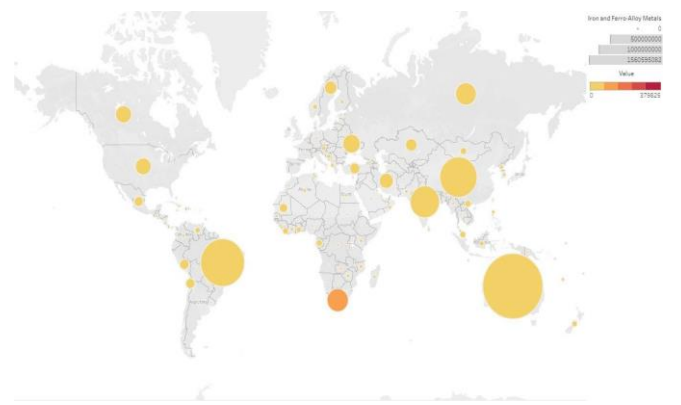
The mining sector's vision must be clear, sound, and efficient, and this should also be supported by the government, authorities, and people.

Without using this model and vision to the mining sector, we cannot think of it to bloom at its peak. Moreover, it may potentially also cause harm due to ecological debt, environmental degradation, climate change, unemployment, poverty, and human rights, as it is happening in many mining areas and national on a larger level.

**Appendix A:**



Map 1: Distribution and Value of Industrial Mineral in the World



Map 2: Distribution and Value of Iron and Ferro-Alloy Metals in the World



Map 3: Distribution and Value of Mineral Fuels in the World





Map 4: Distribution and Value of Non-Ferrous Metals in the World



Map 5: Distribution and Value of Precious Metals in the World

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