

AN ANALYTICAL STUDY OF INDIAN MINING SECTOR AND ITS CORRESPONDING IMPACT ON ENVIRONMENT

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CHAPTER – 1 INTRODUCTION

Mining and metallurgical activities cause great perturbation and devastation of both terrestrial and aquatic environments which has large scale ramifications. Operations, whether small or large scale, are extremely disruptive and damaging to the environment, producing large quantities of waste that can have deleterious impacts for decades. Although mining activities directly affects a relatively limited area of terrestrial land, its impacts on the environment, as well as on public health, may be found at greater distances from the source and for a long period. Mining is achieved through several activities from exploration through exploitation to processing and finally to the consumer. Through every phase of the mining activity, extensive man-made damage is caused to the environment. Due to improper planning and negligence of regulations, mining activities results in an appreciable damage, degradation and deterioration of the environment and ecological damage to water, air and soil occurs. The problems caused by mining activities are land degradation, disposal of over burden, deforestation, washing rejects, subsidence, water pollution due to wash off, discharge of mine water, acid mine drainage, coal washing operation, air pollution due to release of gases and dust, noise pollution, mine fires, damage to forest flora and fauna, wildlife habitat destruction and occupational health hazards.¹

Mining involves rock drilling, related milling operations and dredging. These processes generate copious amounts of dust, which is mainly made up of crystalline silica. Exposure to respirable dust is an important risk factor for many respiratory diseases. Short-term exposure to respirable dust can cause irritation of the upper respiratory tract. Long-term cumulative exposure in workers is likely to develop into silicosis, silico-tuberculosis, pulmonary tuberculosis (PTB), obstructive airways disease and occupational asthma. Moreover, it has been found that human immunodeficiency virus (HIV) with silicosis exacerbates PTB² and other infectious diseases, including bacterial pneumonia, cryptococcosis, enteritis, bronchitis, urinary tract infections and soft tissue infections. Despite efforts to reduce exposure to chemical hazards in mines prevalence of occupational diseases have been persistently high among miners. A 33-year study has shown no reduction in the proportion of miners coming to autopsy with pathologic evidence of silicosis. In addition to silicosis in gold and platinum mines due to exposure to silica, there is coal workers' pneumoconiosis (CWP) among coal mine workers and asbestosis among workers and individuals who live in areas surrounding asbestos mines. There is also a risk of asbestosis, lung cancer and mesothelioma in diamond mines since asbestos and asbestos-like deposits exist very close to diamond deposits. In addition, there

¹ Singh A.K., Mahato M.K., Neogi B., Mondal G.C. and Singh T.B., Hydrogeochemistry, elemental flux and quality assessment of mine water in the Pootkee-Balihari mining area, Jharia coalfield, India, *Mine water and the environment*, **30(3)**, 197-207 (2011)

could also be occupational exposure to dusts from industrial mining of clay, limestone, sand, gypsum, gravel, and so on, important materials in the manufacture of cement. Cement dusts have been observed to, among other effects, cause indirect haematological damage resulting in abnormal blood cell counts, minor chromosomal aberrations, decrease in mitotic index and increased frequency of sister chromatid exchanges²

CHAPTER - 2

LEGISLATIVE FRAMEWORK, MINING POLICIES AND THEIR IMPLEMENTATION

In the federal structure of India, the State governments are the owners of minerals located within their respective boundaries. The Central Govt. is the owner of the minerals underlying the ocean within the territorial waters upto the Exclusive Economic Zone of India.

In this context, the entry at serial no. 23 of the List II (State List) to the Constitution of India states that – “Regulation of mines and minerals development subject to the provisions of list I with respect to the regulation and development under the control of the Union.”

The entry at serial no. 54 of List I (Central List) to the Constitution of India states that – “Regulation of mines and minerals development to the extent to which such regulation and development under the control of the Union is declared by Parliament by law to be expedient in the public interest.” In pursuance to the entry at serial no 54 of list I the Central Government have framed **Mines and Minerals (Development and Regulation) Act, 1957** to provide for the development and regulation of mines and minerals.

The MMDRA, 1957 recognizes a substantial role for the State Governments. As per the Section 15 of the act State Govts. have complete powers for making rules for grant of concessions in respect of minor minerals, and levy and collection of royalty on minor minerals. Also, as per Sec. 23C of MMDRA, 1957 the State Govt has complete powers to make rules for prevention of illegal mining and for purposes connected therewith. Therefore, matters relating to regulation of mining of minor minerals and control of illegal mining of all the minerals are in the domain of State Govts. the total no. of minerals notified as minor minerals are 55.

The other minerals are popularly known as the major minerals. In the case of major minerals, states substantially regulate and develop minerals subject to provisions of the Act. In the case of Minerals covered under Part – A coal and Lignite and Part- B Atomic minerals in the First Schedule to the Act, states are required to take prior approval of the Central Govt. to grant concessions. The Central Govt. retains the power of revision, fixation of royalty etc. in respect of major minerals. The Ministry of Coal exercises all powers of the Central Govt. With respect to Coal and Lignite under the Act. The Department of Atomic Energy similarly exercises all powers for Atomic Minerals.

The **Offshore Areas Mineral (Development and Regulation) Act, 2002** was enacted to provide for the development and regulation of mineral resources in the offshore areas which means the territorial waters, continental shelf, EEZ, and other maritime zones of India under the Territorial Waters, Continental Shelf, Exclusive Economic Zone and Other Maritime Zones ACT, 1976 and to provide for incidental matters thereto.

² W Utembe, EM Faustman, P Matatiele, *Hazards identified and the need for health risk assessment in the South African mining industry*, HET(Apr.07, 2019, 12:23 PM), <https://journals.sagepub.com/doi/full/10.1177/0960327115600370>.

NATIONAL MINERAL POLICY, 2008

The NMP was notified in 2008. It recommends measures like assured right to next stage mineral concession, transferability of mineral concessions and transparency in allotment of concessions in order to reduce delays which are seen as impediments to investment and technology flow in the mining sector in India. The mineral policy seeks to attain a sustainable development framework for optimum utilization of the country's natural mineral resources for the industrial growth in the country and at the same time improving the life of people living in the mining areas, which are generally located in the backward and tribal regions of the country.

The Ministry of Mines has constituted a committee on 14.08.2017 to review the National Mineral Policy 2008, as per directions of Hon'ble Supreme Court in its judgment sated 02.08.2017 in the matter of Common Cause vs. Union of India and others (writ petition civil no. 114 of 2014).

The NMP 2008 provided for a change in the role of the Central Govt. and the State Govt. to incentivize private sector investment in exploration and mining and for ensuring level playing field and transparency in the grant of concession and promotion of scientific mining within a sustainable development framework to protect the interest of local population in mining areas.

Reforms in the mining sector have been initiated through the amendment to the MMDR act, 1957 through the MMDR (amendment) Act, 2015 which came into effect from 12.01.2015. it has ushered in a regime of transparent and non-discretionary grant of mineral concession. The salient features of the MMDR Amendment Act, 2015 are as follows -:

1. All mineral concessions will be granted only through auction.
2. Transition provisions for extension of leases to obviate disruptions in supply of ore and to ensure regular supply of raw material to the industry.
3. Uniform lease period of 50 years, no renewal at the end of lease period and all such leases will be put up for auction.
4. Assured tenure and easy transferability of concessions granted through auctions so as to attract private investments and FDI.
5. No mineral concession in respect of any mineral specified in Part in respect of any mineral specified in Part A and Part B of the First Schedule of MMDR Act, 1957, shall be granted except with the previous approval of the Central Government
6. District Mineral Foundation (DMF) to work for the welfare of people and areas affected by mining related operations.
7. National Mineral Exploration Trust to be set up to give impetus for regional and detailed exploration.
8. Stricter punitive provisions to deter illegal mining; Higher penalties or imprisonment or both for offences; special courts may be constituted, if necessary.

District Mineral Foundation (DMF) and Pradhan Mantri Khanij Kshetra Kalyan Yojana (PMKKKY)

To ensure that the welfare of host population are protected and the benefit of the economic activity in the mining sector equitably flows to those directly affected, provision has been made in the MMDR (Amendment) Act, 2015 for the establishment of District Mineral Foundation (DMF) in any district affected by mining related operations. The objective of DMF is to work for the interest and benefit of persons in and areas affected by mining related operations. DMF is funded by way of contributions at the prescribed rates from holders of mining lease.

The rates of contribution to the DMF have been laid down as following -

1. For leases granted before date 12.01.2015 – the rate is 30% of royalty to be paid to DMF
2. For leases granted after date 12.01.2015 – the rate is 10% of royalty to be paid to DMF

The mode of operation with regards to the protection of interest of the persons and regions affected by mining shall be prescribed by the State Govt. Also the composition of DMF and its functions shall be decided by the State Govt. of the respective states.

Directions have also been issued to all the states to incorporate the PMKKKY in the rules framed by them for the DMF.

Measures taken to control illegal mining:

1. The Shah Commission of enquiry was set up as reports had been received on illegal mining of minerals in particular Iron and Manganese.
2. State Governments were asked to frame rules to control illegal mining as per Section 23(c) of MMDR Act, 1957 (so far 23 States have framed Rules).
3. State Governments were requested to setup Task Forces at State and District levels to control illegal mining since the year 2005 (so far 22 States have reported to have setup Task Forces).
4. State Governments were advised to setup State Coordination-cum-Empowered Committee (SCEC) to coordinate efforts to control illegal mining by including representatives of Railways, Customs and Port authorities (13 State Governments have setup such committees).
5. All State Governments have been advised to adopt an Action Plan with specific measures to detect and control illegal mining including use of remote sensing, control on traffic, gather market intelligence, registration of end-users and setting up of special cells, etc.
6. Railways have instituted a mechanism for control to allow transportation of iron ore only against permits issued rake wise and verified by State Governments, apart from taking measures to fence and setup check posts at the railway sidings.

Space Technology for checking illegal Mining - Indian Bureau of Mines (IBM) has entered into a Mou with National Remote Sensing Centre (NRSC), for a pilot project "Sudoor Drushti" to demonstrate the feasibility of using High Resolution Satellite imagery and Digital Elevation Model (DEM) in monitoring mining activities/ changes over a period of time, for select a group of mines.

Mining Surveillance System (MSS) – The Project was undertaken by the Indian Bureau of Mines, Ministry of Mines and BISAG (Bhaskaracharya Institute for Space Applications and Geo-informatics) of Ministry of Electronics and Information Technology (MEITY) to develop a system for detect on of incidence of illegal mining by use of space technology and surveillance of are a upto 500m beyond the lease boundary to check incidences of illegal mining.

National Mineral Exploration Trust (NMET)

The National Mineral Exploration Trust (NMET) was established on 14th August 2015, in pursuance of subsection (1) of Section 9C of the Mines and Minerals (Development and Regulation) Amendment Act, 2015 with the objective to expedite mineral exploration in the country. NMET has a two tier structure, the Governing Body, of the Trust is chaired by Hon'ble Minister of Mines and the Executive Committee, chaired by Secretary, Ministry of Mines, which administers and manages the activities of NMET.

Besides, a Technical Committee has also been constituted to evaluate the mineral exploration proposals submitted by exploration agencies. The Technical Committee has evaluated and recommended 58 mineral exploration projects on non-coal and coal minerals for implementation and they are under various stages of progress. The National Aero-geophysical Mapping Programme of GSI is also being supported by NMET.

Mineral Concession System

The State Governments used to grant the mineral concessions [Reconnaissance Permit(RP), Prospecting License (PL) and Mining Lease (ML)] under the provisions of the pre-amended Mines and Minerals (Development and Regulation) (MMDR) Act, 1957. Prior approval of the Central Government was required under Section 5(1) of the Act for grant of RPPL and ML in respect of Atomic and Metallic & Non Metallic Minerals specified in Parts 'B' and 'C' of the First Schedule to the Act. Subsequent to the prior approval of the Central Government, mining leases etc. are executed by the State Governments in favour of the applicants with the mining agencies after they obtain all statutory clearances and approvals as specified in the principal as the case may be. *The* metallic minerals which figure in Part 'C' of the First Schedule to the Act in which prior approval is required are Asbestos, Bauxite, Chrome Ore, Copper ore, Gold, Iron ore, Lead, Manganese ore, Zinc and precious stones. *The* Central Government amended the existing MMDR Act and brought the amended Act into force w.e.f 12.1.2015. The State Government will continue to grant mineral concession but all these grants would be through auctions, thereby bringing greater transparency and removing discretion. The tenure of the mineral concession has been increased from the existing 30 years to 50 years. Thereafter, the mining lease would be put up for auction.

All mineral concessions will be granted only through auction as per Section 10 B and 11 of the amended MMDR Act, 2015. However the provisions of this section shall not be applicable to cases covered under Section 10A or Section 17 A or to minerals specified in Part A or Part B of the First Schedule or to land in respect of which the minerals do not vest in the Govt. this is a major initiative taken to infuse greater transparency.

CHAPTER - 3

MINING – TYPES, STAGES OF PROCEDURE

There are four main mining methods: underground, open surface (pit), placer, and in-situ mining.

- Underground mines are more expensive and are often used to reach deeper deposits.
- Surface mines are typically used for more shallow and less valuable deposits.
- Placer mining is used to sift out valuable metals from sediments in river channels, beach sands, or other environments.

In-situ mining, which is primarily used in mining uranium, involves dissolving the mineral resource in place then processing it at the surface without moving rock from the ground.³

The method used depends on the type of mineral resource that is mined, its location at or beneath the surface, and whether the resource is worth enough money to justify extracting it. Each mining method also has varying degrees of impact on the surrounding landscape and environment.⁴

³ <http://envfor.nic.in/division/procedure-obtaining-environment-clearance-mining-projects>

⁴ What are the main methods of mining? AGI (Apr. 4, 2019, 11:15 PM),
<https://www.americangeosciences.org/critical-issues/faq/what-are-main-mining-methods>.

CHAPTER - 4

DETERIORATING ENVIRONMENTAL IMPACTS DUE TO MINING

Mining operations have environmental responsibility include the protection of land, water, and air. In the United States, mines operated for years before strict environmental controls were implemented, as information on environmental conservation was either unknown or underestimated.

Air

All mining methods affect the quality of air, as unrefined materials are released to the surface when mineral deposits are exposed from the site. Mining requires soil to be removed and when that happens vegetation is also removed which eventually exposes the soil to weather, causing the particles to become airborne through road traffic and wind erosion. The unrefined particles can be composed of toxic materials such as lead, cadmium, and arsenic. Such particles can adversely affect the health of humans thus contributing to illnesses related to the spiratory systems such as emphysema. However, the particles can also be absorbed through the skin or ingested.⁵

Land

Mining can cause physical destruction to the surrounding land by creating landscape blots such as open pits and piles of waste rock. Such disruptions can contribute to the deterioration of the area's flora and fauna. There is also a huge possibility that many of the surface features that were present before mining activities cannot be replaced after the process has ended. Landscape declination caused by ground movements on the surface of the earth as a result of collapsing overlaying sheets can cause damage to roads and buildings. About 500 subsidence collapse features contributed to the abandonment of underground metal mines which were discovered in the Galena, Kansas area between the years of 1980 to 1985 where lead ore mining took place from 1850 to 1970. The whole mining area was later restored between 1994 and 1995.⁶

Water

Water pollution is also caused by mining and can include metal contamination, increased sediment levels in streams, and acid mine drainage. The sources of water pollution as a result of mining can include processing plants, tailing ponds, underground mines, waste-disposal areas, active or abandoned surface or haulage roads. The sediments are most likely from increased soil erosion causing siltation or the smothering of stream beds. Siltification caused by mining affects irrigation, swimming, fisheries, domestic water supply, and other uses of streams. Mining results in unnaturally high concentrations of chemicals such as mercury, arsenic and sulfuric acid over a significant area surrounding the mine.

Types of water pollution as a result of mining include acid rock drainage and the dissolution or transportation of heavy metals by ground water. The United States has enforced federal and state mining laws that require companies to meet and adhere to the standards put in place for the protection of surface and groundwater from contamination. The process of bioleaching is the best option for protecting the water from mining pollution by using non-toxic extractions. If the Mining site is already contaminated, then mitigation techniques such as acid mine drainage

⁵ *What Is The Environmental Impact Of The Mining Industry?* World atlas, (Apr. 08, 2019, 12:05 AM), <https://www.worldatlas.com/articles/what-is-the-environmental-impact-of-the-mining-industry.html>.

⁶ Supra note 4.

(AMD) is performed. There are five main techniques used in the monitoring and controlling of water flow at mining sites. The five techniques include subsurface drainage systems, groundwater pumping systems, diversion systems, subsurface barriers, and contamination ponds. When the process of AMD is used the contaminated water is pumped into a facility for treatment that eventually neutralizes the contaminants.

Biodiversity

The effects of mining activities are observed after the mining process has ceased. The destruction or drastic modification of the pre-mined landscape can have an enormous impact on the biodiversity of that area. Mining is a significant threat to biodiversity as it leads to a large massive habitat losses which affects microorganisms, vegetation, and animals. Temperature modifications or PH as a result of mining can disrupt the livelihood of the communities that live in proximity to the site. Endemic plant and animal species are most affected since they are very sensitive and they require specific environmental conditions, even the slightest disruption of their habitats can result in extinction or put them at high risk of being wiped out.

The effects of mining activities on the biodiversity of an area is determined by the level of concentration, extent, and the nature of the contaminant. There are species that are resistant to such disturbances while others are adversely affected to the extent of completely disappearing from the mining zone. A landscape affected by contaminants from mining sites can take a long time before they completely recover. Remediation processes do not offer any guarantees that the biodiversity of the land will recover as it were before the mining activity. Aquatic organisms are also affected by the mining industry by direct poisoning.

CHAPTER - 5

SUPREME COURT JUDGMENTS

1. Rural litigation and entitlement Kendra vs state of U.P.

In this case the relevant issue for the purpose of Apex Court discussion is whether the limestone mining activities in the Mussorie-Dehradun region caused ecological disturbance and thus violated the right to life of the people in that region. The Supreme Court declared that these activities polluted the environment and thus violated the right to life of the people. In this case carrying haphazard and dangerous limestone quarrying practices in Mussorie hill range of the Himalayas, mines blasting out the hills with dynamite, extracting lime stone from thousand of acres had upset the hydrological system of the valley. The S.C. ordered the closing down of limestone quarrying the valley and observed. This would undoubtedly cause hardship to them, but it is a price that has to be paid for protecting and safeguarding the right of the people to live in healthy environment with minimum disturbance of ecological balance and without avoidable hazard to them and their cattle, homes and agricultural land and under affection of air, water and environment.⁷

2. The Supreme Court also emphasized the importance of forest conservation in the **Ambica Quarry Works v. State of Gujarat and others**. In this case, the petitioner appealed to the Court when the State Government rejected an application for renewal of a mining lease under Section 2 of the Forest (Conservation) Act of 1980, which requires permission to be obtained from the Central Government for using forest areas for non-forest purposes. The State government rejected the application of the appellant for renewal of lease on the ground that the land fell under the Reserved Forest area and hence the Forest Conservation Act, 1980 applied to the forests. The contention of the petitioner was that by the order dated 29 th November, 1971, the said lands were dereserved from the forest by the forest department and allotted the land for the quarrying purpose to the appellant. The appeal in the Supreme Court centred on the question of a proper balance between the need of exploitation of the mineral resources lying within forest areas, the preservation of ecological balance, and curbing the growing environmental deterioration.

In dismissing the appeals, the Supreme Court said that the rationale underlying the Forest (Conservation) Act, 1980 was recognition of the serious consequences of deforestation, including ecological imbalances, and the prevention of further deforestation. This was an Act passed by the Parliament to provide for the conservation of forest and for matters connected therewith or ancillary thereto. The Court observed that in this case the renewal of the mining leases will lead to further deforestation or at least will not help reclaiming the areas where deforestation has taken place. The court also held that if the permission had been granted before coming into operation of the 1980 Act and the forest land has been cleared or broken up, Section 2 of the 1980 Act would not have been applied in such a case. In this way, the court dismissed the applicants' demand for a renewal of the quarry leases and emphasized the implementation of Forest Act of 1980, in order to prevent further deforestation.⁸

3. In **Subash Kumar vs. state of Bihar**, the apex court observed: right to life is a fundamental right under Art 21 of the constitution and it includes the right to enjoyment of pollution free water and air for full enjoyment of life. If any thing endangers or impairs that quality of life in derogation of laws a citizen has right to have resource to art 32 of the constitution for removing the pollution of water or air, which may be, deter mental to the quality of life. while restraining 400 licensees who had mining licenses granted in Rajasthan to mine lime and dolomite stones in the sariska Tiger Park the Supreme Court, in **Tarun Bharat Sangh, Alwar vs. Union of India AIR 1992 SC**

⁷ RR Tehra, *Decision of Apex Court On Ecology & Air Pollution*, LegalservicesIndia (Apr. 09, 2019, 03:36 PM), <http://www.legalservicesindia.com/article/978/Decision-of-Apex-Court-on-Ecology-&-Air-Pollution.html>.

⁸ *Supra note*

514, observed that this kind of litigation should not be treated as the usual adversarial litigation. Petitioners were acting in aid of a purpose, high on the national agenda. Petitioners concern for the environment, ecology and the wild life should be shared by the Government. Holding that the Government had no power to sanction lease of the land vested in the Municipality for being used as open space for public use the Supreme Court in **Virulent Gar vs. State of Haryana 1995(2) SCC 577** observed, after referring to the Stockholm Declaration of 1972 and Principle 1 laid down in that Conference and after referring to Art. 48-A, Art. 47 and Art 51A(g), and Art. 21, as follows:

“The word environment is of broad spectrum which brings within its ambit, hygienic atmosphere and ecological balance It is, therefore, not only the duty of the State but also the duty of every citizen to maintain hygienic environment. The State, in particular has duty in that behalf and to shed its extravagant unbridled sovereign power and to forge in its policy to maintain ecological balance and hygienic environment. Art. 21 protects right to life as a fundamental right. Enjoyment of life and its attainment including their right to life with human dignity encompasses within its ambit, the protection and preservation of environment, ecological balance free from pollution of air and water, sanitation without which life cannot be enjoyed. Any contra acts or actions would cause environmental pollution. Environmental, ecological, air, water, pollution etc should be regarded as amounting to violation of Art. 21. Therefore, hygienic environment is an integral facet of right to healthy life and it would be impossible to live with human dignity without a humane and healthy environment. Environmental protection, therefore, has now become a matter of grave concern for human existence. Promoting environmental protection implies maintenance of the environment as a whole comprising the man-made and the natural environment. Therefore, there is a constitutional imperative on the State Government and the municipalities, not only to ensure and safeguard proper environment but also an imperative duty to take adequate measures to promote, protect and improve both the man-made and the natural environment.”⁹



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⁹ *Supra note*