

**STUDY OF GEOETHICS AND ENVIRONMENTALLY SUSTAINABLE PRACTICES FOR  
MINING MINERALS IN INDIA**

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**Abstract:**

*The increasing incorporation of moral concerns and ethical values into industry practices could be a recent trend in mining governance, often enclosed underneath the umbrella term 'responsible mining'. The effects of anthropogenic change require a strengthening of the socio-political and socio-economic anchoring of geoethical thinking. Geosciences are more than just technical and scientific disciplines. Geoscientific expertise connects geosciences and people's social life. The earth sciences are relevant to the functioning of societies, namely the operation of a techno sphere at local, regional and planetary scales. Therefore, expertise in geosciences includes a school of philosophical thought called Geoethics. Although originally conceived for professional use, geoethics should support the individual, professional and civil society actions of every citizen. India is blessed with important and large amounts of various natural resources that are primarily divided into 5 categories: fuel, metallic, non-metallic, atomic and minor minerals. The mining sites are generally in faraway and underdeveloped places along with indigenous lands and territories which are frequently ecologically sensitive. Mining enterprises have the ability to effect the Sustainable Development Goals (SDGs) set up in 2015 by the United Nations General Assembly, though historically a poor effect has been recorded that works against the fulfilment of the goals. We discuss a few suggestions for responsible mining that are all ethical practices to be followed by the mining sector in India.*

**Keywords:** *Geoethics, Sustainable Practices and Minerals.*

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**Introduction:**

Geoethics is conceptualized as expert ethics that addresses the duties geoscientists have because of their particular know-how and skills, and the capacity for environmental and social influences in their day-to-day decision-making practices (Peppoloni and Di Capua, 2012; Bobrowsky et al., 2017). In its cutting-edge information geoethics was delivered around 2009 through Italian geoscientists (Bobrowsky et al., 2017; Bohle and Di Capua, 2019). Since then geoethics has been taking shape as an area of research. A milestone in this regard became the inspiration of the International Association for Promoting Geoethics (IAPG), an affiliated enterprise of the International Union of Geological Sciences (IUGS), in 2012. Its number one pursuits are the institutionalization of geoethics as a systematic discipline (Bobrowsky et al., 2017), and the established order of strategic collaborations and partnerships to implement geoethical concepts inside universities and expert education. In both the affiliation became pretty successful because the developing numbers of research papers and the mixing of geoethical concepts into the

governance systems and rules of geoscientific professions through geoscientific institutions around the globe shows (Bohle and Di Capua, 2019; IAPG, 2020). In spite of the growing recognition for geoethics, the idea is not yet settled. What precisely it encompasses and on which issues it should focus, whom it addresses, and the way it relates with and distinguishes itself from different moral domains (e.g. environmental-, sustainability-, or engineering ethics), is an ongoing clinical debate (Bohle and Di Capua, 2019).

The apparent disconnect between geoscience and sustainability could be a result of the United Nation's (2015) Sustainable Development Goals (SDGs) that don't appear, at initial glance, to be overtly geoscience (Fig. 1). And yet, not solely is geoscience necessary to several of the SDGs (Gill, 2016a) however underpinning the full notion of the sustainability agenda is that the broad acceptance that humans are currently a dominant geological force on the planet, warranting our own custom-made epoch: the Anthropocene.

The normal purpose of the SDGs is to pave the path for a sustainable globe and geoscience is on the center of this mission. This area has the capacity to understand the complex interconnections among the atmosphere, hydrosphere, cryosphere, biosphere, and lithosphere giving a completely unique whole-planet angle of the Earth system. However, it suffers from inherent limitations - incomplete data, lack of experimental control or the incapability to make direct measurements - which can be associated with the fact that geoscience researches a 4.6 billion year old planet in which maximum occasions arise at temporal scales much larger than the human lifetime. These challenges are very much like the ones confronted through sustainability science. It consequently becomes evident that geoscience is paramount for the fruitful implementation of the Sustainable Development Goals.



Figure.1. the UN Sustainable Development Goals (United Nations, 2015).

**Objectives:**

1. The aim of the research work is to bring into play strategies and tools to encourage and progress interaction between the mining industry, society and governments.
2. The true objective is to develop a real and transparent relationship between the mining company and the indigenous people.

**Methodology:**

Exploration as well as exploitation activities related to mineral resources will always cause some impact to the environment and society. To analyse the method a mining company enforced its sustainable mining practices; we've focused on the different sustainable development reports created by various organizations such as Indian Chamber of Commerce (ICC), as well as examining a number of the reports mandated by the company from different consulting organizations. We analysed the various sections of those reports that were connected with the spheres of sustainable development. In this way we inspected the responses and opinions of the community with respect to the mining project. We have followed Elkington's (1997) idea of triple bottom line which debates that it is situated towards making values involving economy, society and environment. The created values in which organizations are

required to lock in activities that is financially productive; as well as valuable and pleasing for the community and life of individuals and the natural environment. Corporate Social Responsibility (CSR) in this case considered consisting of three primary components: social, environmental and financial responsibility. Today, the triple bottom line-view is maybe the foremost prevailing hypothesis within the field of CSR (see Figure2).

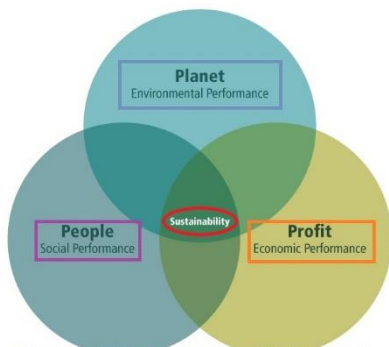


Figure 2 : Elkington's triple bottom line view on CSR

### **Geoscientists on the Way to Sustainability:**

Geoethics objective is to create more aware, moral and accountable geoscientists. To attain this objective, geoethics makes a specialty of four categories of responsibilities: responsibility towards the self, responsibility

towards colleagues, responsibility towards society and responsibility towards the Earth system.

Education in geoethics, for all students and professionals within the Earth and environmental sciences, is critical. Geoethics education should begin in introductory courses and extend throughout the continued professional development of operating scientists. Coaching ought to prepare students and lecturers to: acknowledge moral dilemmas as they arise; develop the methods and skills required to address these dilemmas; prepare to hitch the community of apply by adhering to the norms, standards and expectations of the profession; and gain expertise in ethical decision-making, to forestall dangerous situations from occurring in the initial instance, and to be ready to act to mitigate moral dilemmas as they arise. The processes of ethical decision-making are well-defined: determine the problem, check the facts, identify relevant factors, develop an inventory of options, take a look at the options, create a choice, and act.

### **The study of the environment involves understanding two main groups of conditions:**

(i) Physical conditions and (ii) social and cultural conditions.

Physical conditions represent principally the abiotic attributes of the setting comparable to the world material, minerals, soils, water, landforms, air that along has an effect on growth and development of man.

The social and cultural conditions embrace environmental parameters such as the ethics, economics, aesthetics, etc. that affect the behaviour of people or a community.

Environmental geological appraisals of a terrain acknowledge the potential hazards and resource utilization pattern. These investigations are either site specific or problem specific respectively.

### **Sustainable Development Framework (SDF) For Indian Mining Sector:**

The extraction of mineral reserves has perpetually resulted in variable degrees of environmental resource degradation and social impacts, as well as displacement, all across the globe. The Indian mining sector has been facing severe criticism on many problems regarding its performance with respect to sustainable development. The Ministry of Mines (MoM) had formulated National Mineral Policy (NMP-2008) which states that “All the Mining shall be undertaken within the parameters of a comprehensive Sustainable Development Framework (SDF). The guiding principle shall be that a miner shall leave the mining area in better ecological shape than he found it”. Accordingly, the SDF has been incorporated in the draft Mines and Minerals (Development and Regulation) Bill (MMDR) Bill 2011 under section 46 which states that “sustainable development framework” means the National sustainable development framework contains guidelines enabling formulation of project level practices for sustainable mining. The Sustainable Development Framework (SDF) was specially tailored to Indian context taking under consideration the work done and being done in the International Council of Mining and Metals (ICMM) and International Union for the Conservation of Nature and Natural Resources (IUCN). The SDF was to comprise principles, reporting

initiatives and sensible practice guidelines which were having a similar sustainability agenda as the broader SDGs established by the UN in 2015.

A functional definition for 'Sustainable Development' in the mining sector was outlined, with support and Consultation with sector experts, secondary sources on the topic and also the Indian context. "Mining that is Financially viable; socially responsible; environmentally, technically and scientifically sound; with a long term view of development; uses mineral resources optimally; and, ensures sustainable post-closure land uses. Also one based on creating long-term, genuine, mutually beneficial partnerships between government, communities and miners, based on integrity, cooperation and transparency". The SDF report that has been created on behalf of the Ministry of Mines, Government of India is for all concerned stakeholders in the mining sector (non-coal, non-fuel, non-atomic minerals, not covering off-shore mining).

The following eight principles form the core of the Sustainable Development Framework (SDF) for India:

1. Incorporating environmental and social sensitivities in decisions on leases.
2. Strategic assessment in key mining regions.
3. Managing impacts at the mine level impact through sound management systems.
4. Addressing land, resettlement and other social impacts.
5. Community engagement, benefit sharing and contribution to socio-economic development.
6. Mine closure and post closure process.
7. Ethical functioning and responsible business practices.
8. Assurance and reporting performance as a SDF report.

#### **Discussions:**

Mineral Exploration Cooperation Limited (MECL) under the CSR stands for raising and improving the socio-economic status of women and weaker section. For the purpose it provides training to acquire new skills for the career development etc. MECL also provides sewing machines for the use of Mahila Mandal of the village, stitching training classes for improving the socio-economic condition of women belonging to weaker section in the rural areas near to MECL mining projects.

Hindustan Zinc Limited is a subsidiary of Vedanta Limited-one of the largest mining companies in the world. Most mining operation uses open pit and underground mining practices using state of the art technology. At Rampura Agucha Zinc Mine, in the Bhilwara district of Rajasthan, India the disposal and reuse of the waste by-product of mining after mineral extraction process (tailings) has adopted highly efficient and environment-friendly way of storing the tailings in specially constructed tailing dam whose base fully sealed by the application of a layer of impervious soil at bottom. After settling, the tailings water gets recycled and is fully utilized in the facility for various purposes, thereby ensuring zero waste discharge.

#### **Conclusions:**

According to a United Nations report, around 2.5 billion more people will be living in cities by 2050. This enlarged population will place additional demand on mineral and energy resources therefore we should adopt mining in an ethical manner. Assuring stock of natural resources for future generations needs recognition that individual natural resources deposits are exhaustible and that their identification, delineation, extraction, and processing have social and environmental consequences whose mitigation should be balanced with increasing the recovery of the precious minerals required by society from every deposit.

Geoethics is projected as an international ethics for a complex world, supported on the principles of dignity, freedom and responsibility. SDF is a concept developed as a guiding principle for Indian mining industry at national level by the Ministry of Mines, Government of India, encompassing the critical issues, vital for development of mining in

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India, as a contributor to the inclusive growth, without adversely affecting the social, financial and environmental well-being, at present and also in future, of fellow countrymen in accordance with section 46(2) of New MMDR Bill 2011.

Apart from the current SDF principles for responsible mining, there are few other practices which can be recommended to newer government policies like the mining corporations need to pay compensation to the project affected individuals right from the day a mining lease is allocated. The mining activity should aim to recover all valuable minerals and reduce waste. The mining corporations should provide access to clean water for the community. Mining activity should be very transparent so that all stakeholders are aware of the activities taking place at the mining site through proper mineral development agreements and Corporate Social Responsibility (CSR) voluntary guidelines should be followed so that well-being of indigenous people living close to the mining site are not affected in the absence of local government policies. The existing voluntary guidelines need to improve so that there is a qualitative development in the health, education, local culture and environment sectors. Deep-sea mining has the potential to damage deep-sea ecosystems and cause pollution, so it deserves careful discussion and should have separate policies. Large scale mining operations need to manage artisanal and small scale mining by offering training, access to technology and enhancing the overall governance of raw materials.

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