

MINING AND SUSTAINABLE DEVELOPMENT– SPECIAL REFERENCE TO IRON ORE INDUSTRY.

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Introduction

The “Sustainable Development” concept has gained widespread currency since becoming the cornerstone of the Rio Earth Summit in 1992, and was a central theme to the “World Summit on Sustainable Development in Johannesburg in August 2002.

“Sustainable Development is development that meets the needs of the present without compromising the ability of future generation to meet their own”.

The sustainable development framework is to see that the mineral industry as a whole contributes to human welfare and well-being today without reducing the potential for future generation to do the same. Thus the approach has to be both comprehensive and forward-looking setting out long term as well as short term objectives.

Important Issues for Iron Ore Industry

There are two very important issues that are very vital to address the theme of sustainable development for iron ore mining in India.

First, mining is site specific and mineral deposits are to be mined where they are, *this is an unpalatable geological truth*. If one sees the map of India, one would realize that the occurrence of the remaining forest cover in India and mineral reserves shows considerable overlap, leading to necessity of abundant caution while exploiting minerals.

Second important issue is the globalization with free trade and commerce, which has a tremendous impact on Environment in general and Sustainable Development concept as a whole. The development or economic growth in one country can have a direct impact on sustainable issues in another country. Iron ore mining is a classic example in this regard e.g. China.

Iron ore industry in India is poised for rapid growth in the coming years. Today we are the *third largest* producer of the iron ore after Australia and Brazil.

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Environmental Impact of Mining

Any development activities will have adverse impact on environment. Considering the future development of iron ore sector especially in the States of Orissa, Jharkhand and Chhattisgarh, I would like to summarize major environmental concerns as

The available *biodiversity* is often encountered, only in hitherto undisturbed areas. It has been observed that mineral deposits of iron ore, with thick overburden layers are covered by undisturbed vegetation rich in biodiversity, which needs to be protected. Its imperative, therefore, to ensure the following:-

Opening of new mineral reserve should be preceded by a close evaluation of its impacts on the valuable biodiversity.

Arrangements are to be made for conservation wherever necessary.

Forests are *effective sink* for removing green house gases contributed by industry. The sink potential of the forest cover is likely to be affected due to mining operation, needs evaluation so that compensatory afforestation can be suitably planned for restoring its loss.

Environment Management For Mining

Planning

In my opinion, planning for environment management and mine operation should go hand in hand. Initially mining area has to be fully explored and mine design/plans shall be prepared using computer model. Mine land reclamation should be one of the main criteria while planning for mine development. Computer can design the mine based on geology and geographical features so that mining can be undertaken in sequential manner. This ensures that entire area is not broken open at one time. After mining the exhausted pit could be initially used as a Tailing pond, water reservoir or for reject dumping. Thus reclamation could be undertaken concurrently with mining.

Pollution control

Air

The mining and mineral processing operations contribute air borne dust (suspended material) and oxide of sulphur and nitrogen, hydrocarbon and carbon monoxide, due to the usage of fossil fuels in mining equipment. Air pollution incidentally has both national and international implication because of Tran boundary transport of such pollutants.

Fortunately in iron ore mines air borne dust is only a nuisance and impact is only localized. However, effective dust suppression, during mining, processing and transportation, asphaltting of roads outside the lease area and wherever possible within lease area can effectively reduce the problem.

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Water

Water quality is affected through turbidity, contributed by overburden dumps, and discharge from the tailing ponds. Water is already a *limiting resources* and deserves utmost attention in its management.

Effective tailing management can save water a precious resource. Water management should be a most important strategy in Environment Management. After wet beneficiation process, plant tailings should dispose into worked out pits and can be treated with flocculants to recover water. Recovered water along with rainwater accumulated in working pits could be used for ore beneficiation. This will ensures 100% reuse of water and no discharge of effluents/tailing outside mine. Once the pits are filled with tailing rejection dumping and afforestation could be undertaken.

Alternatively exhausted pits could be converted into man made pond for irrigation, recreation, Pisciculture etc. The water also from the pond could be effectively used for irrigation to "Agri-Horticultural" plantation on dumps.

Land

Mining operation covers extensive areas, which needs to be put back to productive use through effective rehabilitation. The strategy for rehabilitation is to be guided by the end use and local area requirement.

Sustainable Development and Mining

The greatest challenges facing the world today are integrating economic activity with environmental integrity, social concerns, and effective governance systems. The goal of that integration can be seen as 'sustainable development'. In the context of the minerals sector, the goal should be to maximize the contribution to the well-being of the current generation in a way that ensures an equitable distribution of its costs and benefits, without reducing the potential for future generation's to meet their own needs. The approach should be pro active than reactive. It should be voluntary then enforced by statute or Coerced by local Community. Adopting International Environmental Standards (EMS) in the mines is one of the way of addressing many of the environmental and social concerns.

Proactive Communities Relation

Few areas of environment management pose a greater challenge than the relationship between mining companies and local communities. The legacy of abuse and mistrust in the past is posing a bigger problem in community acceptance of mining project. As most of the mines are located in backward and underdeveloped areas, community expectations are very high. It is very important to ensure that the benefits from Mineral Development are sustained beyond the life span of the mines for the communities.

Mining Company can sponsor a "Community Development Foundation/Trust" which could caters to the community needs on sustained basis. School to provide technical education to the local youths, hostels, hospitals, drinking water, professional sports training to the talented youth could be encouraged. Apart from Need Based

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Community Development projects, these initiatives provided an unique opportunity to be recognized as a part of the Community.

The role of large companies is to provide leadership that demonstrates performance beyond compliance. However, one mining company cannot address all the sustainable issues of a region, and the best possible options is to fore a partnership between industry and government and community, so that collective efforts could bring more benefits to the larger community.

The voluntary contribution to Community Development Fund could play important role to address Social and Environmental issues in the mining region, where individual companies are not able to reach. The participation of NGO, Government, Industry and Community representative in any Community Development activity is very important for its success.

Conclusion

It is true that the wheels of progress, in the rapid mobilization of the primary earth resources, cannot be reversed or stopped, even slowing down though possible, will have a wide repression in mineral trade, industry and in the economy of many developing countries like India. It is for this reason that many consider the rigid rules and regulations of environmental protection as hindrance to progress. As, they argue "*The growing population have to be fed*", "*employment has to be generated*" and how many people die due to pollution as compared to malnutrition, hunger, war, famine and diseases?

Admittedly, it is not possible to stop mining activities for the sake of keeping the environment intact. The crux of the task is how one can minimize impact on the environment (ecosystem) and still achieve and advance the industrial development of nation.

A compromise solution to such a dilemma would be sustainable mining and of "Total resources utilization" so that no "Waste" are generated or left over to pollute or damage the ecosystem.

Sustained development is possible only if the projects are planned, executed and followed up with necessary professional inputs at each stage *without interference from vested interests*. The challenge to mining industry is to ensure that the latest skills and techniques are made use of in objective decision making to achieve the optimal utilization of natural resources for achieving sustained development for the present and coming generations.
