

International Journal of Advance Research in Computer Science and Management Studies

Research Article / Survey Paper / Case Study

Available online at: www.ijarcsms.com

Social Responsibilities of Coal Industry

M.R. Kolhe¹

B.E. (Elect), M.B.A.
R.T.M.Nagpur University,
Nagpur India

Dr. P.G. Khot²

Prof. Dept Of Statistics,
R.T.M.Nagpur University,
Nagpur India

Abstract: Coal is the most important and vital fossil fuel in India for national energy security. It is least-cost source of primary energy and meets two-thirds of our country's energy needs. Coal is available in abundance in India. The major environmental challenges encountering while coal winning are impacts of mine fires, dust suppression & control particularly haul road dust consolidation, treatment of mine waters containing heavy metals/acid mine drainage, restoration of water table and quality of ground and surface water, augmentation of pumped out mine water for drinking purpose, reclamation of mined out areas with pre-determined land use patterns conducive to the local populations etc. The biggest environmental challenges using coal as fuel includes the issue of greenhouse gases, acid rain etc.

A great ongoing social challenge for the coal industry is sustainable development and community acceptance of its role in society. The problem of Mining-Induced Displacement and Resettlement (MIDR) poses major risks to societal sustainability. MIDR is accompanied by the resettlement effect, defined as the loss of physical and non-physical assets, including homes, communities, productive land, income-earning assets and sources, subsistence, resources, cultural sites, social structures, networks and ties, cultural identity and mutual help mechanisms.

In spite of above problems, coal will remain a future mainstay, a foundation and a fundament of our economy, in meeting current needs and it is a resource bridge to meet future goals through the enhancement of knowledge and technology. It is a need of the day and the responsibility of the coal producers and regulating authorities, that the right technologies are applied in the most efficiently and environmental friendly way. Further, when looked at strategically, Corporate Social Responsibilities (CSR) can become tremendous source of social progress as the industry applies its considerable resources, expertise and insights to activities that benefit the society.

I. INTRODUCTION

Corporate Social Responsibility is coming out of the purview of 'doing social good' and is fast becoming a 'business necessity'. This study attempts to highlight the CSR strategy of Coal India Limited. The paper identifies the importance of understanding how and why companies adopt CSR policy for sustainability. After nationalization of coal mines, enhanced investment, and increased share from opencast mining, increased emoluments and welfare amenities for coal workers, etc. resulted in large increase in production. As a consequence of increased demand for coal, more and more coal is being mined and processed. It has resulted in an unprecedented expansion of coal mines in India.

Coal will continue to occupy the centre stage of India's energy scenario due to limited reserve potentiality of petroleum and natural gas and eco-conservation restriction on hydro projects and geo-political perception of nuclear power. Share of coal in world's energy consumption is 27%. The importance of coal in India can be gauged by the fact that it supports about 54.5% of the commercial energy in the country. The coal production in India has risen from 73 Mt in 1972 and is projected to 1061 Mt by the end of 2024-25.

Coal is the most abundant fuel resource available in India. It is the prime source of energy and the largest contributor to the industrial growth of the country. It is a crucial and enduring element in a modern, balanced energy portfolio, providing a fuel for

the future as an important low cost and secure energy solution to sustainability challenges. India is the third largest producer of coal in the world and has largest reserves of coal in the world. However Indian coal has high ash content (15-45%) and low calorific value. With the present rate coal extraction in the country, the reserves are likely to last over 100 years. The energy derived from coal in India is about twice that of energy derived from oil, as against the world, where energy derived from coal is about 30% lower than energy derived from oil. Therefore coal continues to be the major source of primary commercial energy in India and worldwide

Coal India Limited a largest coal producing company of India, affirms its commitment for social responsibility toward environment friendly mining with right mitigation of pollution, reclamation of the degraded land, preservation of biodiversity and proper disposal of waste following the best practices including judicious use of the nonrenewable energy on the path of continual improvement.

II. CORPORATE SOCIAL RESPONSIBILITY (CSR)

The World Business Council for Sustainable Development (WBCSD) has defined corporate social responsibility as “the commitment of business to contribute to sustainable economic development, working with employees, their families, the local community and society at large to improve their quality of life.” Corporate social responsibility (CSR) is at heart a process of managing the costs and benefits of business activity to both internal. CSR is the term used to describe the way that a business takes into account the financial, environmental and social impacts of decisions and actions it is involved in. It is an increasingly important issue in business, as managers, consumers, investors and employees have begun to understand how economic growth is linked to social and environmental well-being. CSR is a key issue for any organization aiming for long term sustainability. Whilst it is a mostly voluntary concept, there is increasing pressure on organizations to make a positive contribution to society, or at the least, reduce their negative impact. Internationally, governments are also moving towards the enforcement of certain elements of corporate social responsibility, particularly in regards to the protection of the environment. Responsible businesses may not necessarily be able to measure the positive impact their behavior has on their performance, however, irresponsible businesses are likely to notice the negative impact their decisions have on their bottom line. Business sustainability now and in the future depends on organizations taking into account the social and environmental consequences of their decisions and actions. In the past, many businesses and managers were primarily concerned with increasing shareholders' value who are the people those own part of a business and share in its profits.

The concept of CSR has gained prominence from all avenues. The organization has realized that Government alone will not be able to success in its endeavor to uplift the downtrodden of society. With rapidly changing corporate environment more functional autonomy, operational freedom etc. have been entrusted on the organizations. Coal India limited has adopted CSR as a strategic tool for its sustainable growth. For Coal India Limited in present context CSR mean not only investment of fund for social activities but also for business processes with social processes.

III. CHALLENGES OF SOCIALLY RESPONSIBLE BUSINESS

There is much debate and criticism surrounding the concept of corporate social responsibility. Some people believe that the actual responsibility of a business is only to its owners and shareholders. Others believe that a business should be held accountable for all of its actions (past, present and future) that impact the environment and community. One of the common criticisms of corporate social responsibility is that there is a conflict between the purpose of business and the concept of social responsibility. It is necessary that consumers and shareholders begin to expect a business to act in a responsible way so as to share their responsibilities towards society as a whole.

Another criticism of corporate social responsibility is that the actual benefit received by the community is negligible or non-existent. Social responsibility should result in positive outcomes for both the business and the community. However, often the results fall heavily in favors of the business involved. Businesses invest a comparatively small amount into community

projects and then use their efforts to promote their brand and gain access to markets all around the world. The public relations and brand building they receive far outweighs their investment in socially responsible projects.

One of the serious challenges that businesses face when becoming involved in corporate social responsibility is growing consumer cynicism. Consumers now recognize that for many organizations, social responsibility is simply a public relations campaign in disguise. They are sceptical about the true motivation behind corporate social responsibility and are not easily convinced that a business is acting in the best interests of the community and environment.

Even businesses that are genuine in their commitment to social responsibility face the challenge of winning over customers. Businesses need to be careful to not be seen boasting about their socially responsible endeavors. Basically, consumers view this as a marketing ploy and often disregard what is being said to drum up good public relations. This is especially apparent when businesses has made profits from irresponsible behavior of many years and then expect praise from consumers when they suddenly start to make small changes to their practices.

Another significant challenge that results from socially responsible behavior is that it can negatively affect business profit margins. How can a business justify spending on activities that provide no measurable returns for the business? Of course, the solution is to find socially responsible projects that do offer some tangible benefits; however, many consider this to corrupt the motivation behind responsible business practices. It is debatable as to how much a business should sacrifice in its pursuit of social responsibility.

Corporate social responsibility also comes under criticism because it is disposable or reversible. Many businesses get involved in sustainable projects when economic conditions are excellent and they have plenty of disposable resources, however, as soon as conditions worsen, their community projects are the first thing to go. This can be detrimental to groups who were reliant on the assistance they were receiving from the organization.

Clearly, organizations that want to be socially responsible must face many challenges and overcome a number of barriers and criticisms. It has to be weighed up whether all of the advantages and disadvantages that are associated with corporate social responsibility and determine what are best for the sustainability of the business.

IV. ENVIRONMENTAL ISSUES

In Earlier days, coal mining was performed manually, but due to steep rise in demand, the intense mechanization has taken place which has increased the production many fold but at the same time it created various impacts on environment. The mining operations involve exploration, drilling, blasting, extraction, transportation, crushing and other associated activities which are carried out in underground and opencast mines. These operations are responsible to damage the environment and ecology to an unacceptable degree, unless carefully planned and controlled. There is a need for balance between mining and environmental requirements and their mitigation measures are as follows:

a) Impact of Mining on Land:

Mining invariably results in enormous land disturbance irrespective of the type of mining used for extracting coal, - e.g. large scale excavation, removal of top soil, dumping of solid wastes, cutting of roads, creation of derelict land etc. The mining industry has to plan to re-handle the material to fill the voids created at the end of mining, and it is expected that the practice will become more widespread in future. Opencast mining has more potential impact on land than underground mining. With improved technology, opencast coal mining is being used extensively because of its cost effectiveness and productivity though it results in large-scale land disturbance. Although underground mining has considerably less impact than opencast mining on land, it causes enough damage through subsidence as observed in Jharia and Raniganj Coalfields. The surface subsidence inflicts severe damages to engineering structures such as highways, buildings, bridges and drainage besides interfering with ground water regime.

b) Impact of Mining on Air Quality:

Air pollution in mining areas is mainly due to the fugitive emissions of particulate matter and gases including methane, sulphur dioxide, oxides of nitrogen and carbon monoxide. Most of the mining operations produce dust. The major operations producing dust are drilling, blasting, hauling, loading, transporting and crushing. Basically, dust sources in mines can be categorized as primary sources that generate the dust and secondary sources, which disperse the dust and carry it from place to place called as fugitive dust. Opencast mining is more severe an air pollution problem in comparison to underground mining. High levels of suspended particulate matter increase respiratory diseases such as chronic bronchitis and asthma cases while gaseous emissions contribute towards global warming besides causing health hazards to the exposed population. The uncontrolled dust not only creates serious accidents, health hazard but also affects the productivity through poor visibility, breakdown of equipment, increased maintenance cost and ultimately deteriorates the ambient air quality in and around the mining site. The dust can also pollute nearby surface waters and stunt crop growth by shading and clogging the pores of the plants. Besides polluting the environment, the generation of dust means the loss of fines, which act as road surface binders.

The key environmental challenges facing the coal industry are related to both coal mining and the use of coal – greenhouse gases, acid rain and ground level ozone, issues which can be local, regional and global in their impacts. The greenhouse effect is a natural phenomenon which refers to the increase in the earth's surface temperature due to the presence of certain gases in the atmosphere. There is concern that this natural phenomenon is being altered by a greater build up of gases caused by human activity. This is known as the enhanced greenhouse effect. The combustion of coal, like that of other fossil fuels, produces CO₂, a gas that is linked to global warming through the greenhouse effect. The combustion of coal produces gaseous emissions of sulphur dioxide (SO₂) and nitrous oxides (NO_x) that are responsible for the production of 'acid rain' and 'ground level ozone'. Acid rain occurs when SO₂ and NO_x gases react in the atmosphere with water, oxygen and other chemicals to form acidic compounds. Ground level ozone (O₃) is mainly responsible for smog that forms a brown haze over cities. Ground level ozone is formed when NO_x gases react with other chemicals in the atmosphere and is enhanced by strong sunlight. Emissions of SO₂ and NO_x are termed trans-boundary air pollution because the environmental impacts from the production of these gases are not restricted by geographical boundaries.

c) Impact of Coal Mine Fires:

A number of coal mines in the country are affected by fires leading to steady destruction of precious energy resource. The reason for mine fires presumably involves the phenomenon of spontaneous heating through two interrelated processes viz., the oxygen coal interaction or oxidative process and the thermal process. If remains uncontrolled, the fire could spread further through interconnected pathways and fissures in the strata. It is estimated that about 10% of total national coal resources are in the fire-affected areas. Mine fires give rise to several environmental problems besides safety hazards and economic losses.

Apart from direct losses due to burning of coal, the other associated hazards encountered are:

- i) Gas poisoning,
- ii) Difficult geo-mining conditions,
- iii) Sterilization of coal,
- iv) Hindrance to production
- v) Explosions,
- vi) Damage to structure and adjacent properties, etc.

d) Impact of Mining on Water regime:

Disturbance to hydrologic regime Mining and its associated activities not only uses a lot of water but also affects the hydrological regime of the district and often affects the water quality. Large and deep opencast mines usually have great impact on the hydrologic regime of the region. The major hydrological impact of a large and deep opencast mine, is on the ground water regime of the region. The water seeping into the mine and collected in the mine sump is partly used up in the mine and the excess amount is discharged into the surface drainage system. The water used up in the mine for spraying on haul roads, conveyors, at loading and unloading points, bunkers etc. are lost by evaporation. A deep mine is likely to have longer haul roads requiring more spraying water. The water used for green belts and plantation areas are also lost by evapo-transpiration. Many areas of the country are faced with the problem of over exploitation of ground water resources resulting in alarming lowering of water table. Therefore a lot of care has to be taken in estimating the water need and the mines of future are likely to be subjected to a lot of constraints on water use and discharge.

Acid Mine Drainage: Acidic water results in severe water pollution problems. Acid Mine Drainage (AMD) refers to distinctive types of waste bodies that originate from the weathering and leaching of sulphide minerals present in coal and associated strata. Environmental effects of AMD include contamination of drinking water and disrupted growth and reproduction of aquatic plants and animals. Effects of AMD related to water pollution include the killing of fish and loss of aquatic life and corrosion of mining equipments and structures such as barges, bridges and concrete materials. Generally, water quality characteristics of acidic mine water reflect high acidity and high hardness along with high iron and sulphate contents. AMD cripples the economy of mines due to compliance of stringent environmental standards and involves huge cost burden in its management.

e) Impact of Noise and Vibrations from Mining:

A cumulative effect of all mining activities produces enormous noise and vibrations in the mining area, which constitutes a source of disturbance. The availability of large diameter, high capacity pneumatic drills, blasting of hundreds of tonnes of explosive etc. is identified as noise prone activities. In pit crushing system with mobile crusher and large capacity materials handling plants are being installed to facilitate speedy handling of large quantities. All these activities are major sources of noise & vibrations in and around the mining complexes. The obvious implication of noise is, of course, the potential for noise-induced hearing loss. In addition, noise produces other health effects, influences work performance and makes communications more difficult. Besides, the fauna in the forests and other areas surrounding the mines/industrial complexes is also affected by noise and it has generally been believed that wildlife is more sensitive to noise and vibrations than the human beings.

V. ACTION TAKEN/TO BE TAKEN TO SORT ENVIRONMENTAL ISSUE BY MANAGEMENT PRACTICES

Coal India Limited (CIL) is the largest public sector undertaking company in India and in the world in terms of coal production. Mining-Induced Displacement and Resettlement (MIDR) increased substantially since the 1970s as the country's coal production shifted from underground to opencast mining. By the mid-90s, Resettlement and Rehabilitation (R&R) Policy of CIL has been designed to ensure that affected people improve or at least regain their former standard of living and earning capacity after a reasonable transition period. Coal India Limited implemented the Environmental and Social Mitigation Project (ESMP) in selected opencast mines with World Bank funding during 1996 to 2002. Environmental and Social Mitigation Project (ESMP) aimed to mitigate adverse effect of coal mining on environment and people affected by such activities.

5.1 ESMP consisted of two components:

- » **Environmental component** - Implemented through Environmental Action Plan (EAP).
- » **Social component** - Implemented through Rehabilitation Action Plan (RAP) and Indigenous Peoples' Development Plan (IPDP).

- » **Environmental Action Plan (EAP)** includes Domestic Effluent Treatment Plant, Workshop Effluent Treatment Plant, Mine Water Discharge Sedimentation Plant, Dust Suppression Majors, Tree Plantation, OB Dump Reclamation, Top Soil Storage and Spreading for Bio Reclamation, Environmental Monitoring.

5.2 Environmental Measures Adopted

1) Rehabilitation Action Plan (RAP)

RAP includes Shifting of villagers affected by mining, Resettlement and rehabilitation of project affected families (PAFs) by giving a plot of land in well developed resettlement sites or a lump-sum package to settle at a place at their choice. The PAFs are also trained in different trades for their economic rehabilitation. Under Indigenous People Development Plan (IPDP) villages falling within one kilometer area from the leasehold of the mines are considered.

Activities under IPDP include:

- » Development of Community infrastructure like School Building, Community Hall, Dispensary Building, Village Roads, School Furniture, Wells, and Tube wells etc.
- » Community Activities like Mahila Mandal, Youth Club, Self Help Groups, Sports, and Cultural Programmes etc.
- » Training & Capacity Building, Training for self-employment, Non-formal Education etc.

2) Air Pollution Control Measures

- » Water spraying on haul roads by mobile and fixed sprinklers: The coal transport road was covered under water spraying scheme either with the help of road side static water sprinklers or mobile sprinklers.
- » Dust extractors in the Coal Handling Plants and drilling equipment: All the excavation drills have been equipped with dust extractors.
- » Black topping of service roads: The coal transportation roads have been black topped with arrangement of collection of the coal dusts and removing the same periodically. Besides, the coal transportation contractors have been cautioned not to overload the truck which may cause spillage generating dusts due to crushing by running trucks.
- » Avenue plantation: Forest Department has been engaged for plantation on roadsides besides plantation on the OB dumps and other empty lands.
- » Dust masks: The excavation equipment operators have been issued with dust masks.

3) Water Pollution Control Measures

- » Industrial effluent treatment plants: Effluent Treatment Plants (ETPs) have been constructed in the down flow line of the workshop as well as mine discharges so that pollution parameters in the effluents are well within acceptable norm. Many of the mines could reach the 'zero discharge' arrangement targeted for.
- » Silt arrestors/Siltation ponds/Sedimentation ponds: Catch drains terminating at sedimentation ponds have been constructed garlanding the OB dumps to arrest flow of silts to the rivers/ nalas.
- » Sewage Treatment Plants (STPs): STPs have been constructed to take care of the domestic effluents in all the mine colonies of the project replacing the conventional safety tanks. The treated effluents are being utilized for dust suppression and being supplied to the agreeable villagers for irrigation.

4) Noise & Ground Vibration Control Measures

Following actions are adopted to keep the noise level within the statutory limit in day as well as nighttime.

- » Use of Controlled blasting techniques.
- » Green belts around colonies and mine areas.
- » Proper maintenance of Heavy Earth Moving Machinery (HEMM).
- » Issue of earmuffs to the excavation workmen.

VI. CONCLUSION

Corporate Social Responsibility (CSR) is a process in which the companies come together as one and take part in the welfare of the society. In 1980, Mr. Gro Harlem Brundtland, Norwegian PM, defined sustainable development as “meeting the needs of the present without compromising the ability of future generation to meet their own needs”. Public Sector Undertakings like CIL have key role in the socio-economic development of the country. The focus is on facilitating a balance between social responsibility, civil society and corporate goals. CIL serve the interest of society by taking responsibility for the impact of their activities on customers, employees, shareholders, communities and the environment in all aspects of their operations. Public sector enterprises are expected to have knowledge about their important stakeholders and be aware of their expectations of how business should be conducted. Moreover, the ultimate selection and implementation of CSR largely depend on organizational capability, resource capacity and core competence of the enterprise. CSR practices are essential for sustainable business. It generates long-term value to all its shareholders and other stakeholders. CSR policy should be reviewed time to time based on changing needs and aspirations of the target beneficiaries and make suitable modification as may be necessary. Consumers increasingly don't accept unethical business practices or organizations who act irresponsibly. A socially responsible company can enhanced reputation with the public, its reputation within the business community as well as increase its ability to attract capital and trading partners.

Regarding Coal , it would continue to serve as the primary energy source for present and near future, as India is endowed with considerable coal reserves. However, the increased demand would result in increased coal mining and consequently the concern over its environmental and social impacts. From the preliminary survey to final consumption stage, coal mining affects environment through land degradation, de-forestation, pollution of both surface and underground water regimes, air pollution, noise, vibration and its effect on plants and wild life. The intensity of mining impact largely depends on the method of mining, stage and size of the operation. Surface mining, in particular, causes severe damage on the environment. Even though subsidence and mine safety are important factors affecting underground mining, it does not have any of immediate adverse effects on environment. Hence choice of technology becomes crucial for guaranteeing the protection of the environment. The negative impact of mining on health, land, water, air, plants and animals, and other aspects of society can be reduced by careful planning and implementation of mining. Even though mining brings in its wake several disasters, it is required for survival & beneficial to society. It is essential to strike a balance between mineral developments on the one hand and the restoration of the environment on the other. Overall environmental management improvement has to be taken place with the implementation of state-of-art CSR and environmental management schemes under ESMP by coal producing companies.

The corporation should have moral purpose of their business to provide jobs; invest capital and do business every day with having profound & positive influence on society and most important thing, the corporation can do for society and community, is to contribute to a prosperous economy.

References

1. Public Sector Roles in Strengthening Corporate Social Responsibility: A Base Line Study Prepared for the Corporate Social Responsibility Practice Private Sector Advisory Services Department, The World Bank.
2. Environmental Issues with best management practices of Coal Mining in India and Mitigating environmental and social impacts of coal mining in India, Dr. Gurdeep Singh Strategy and society, by Michael Porter and Mark R Kramer CSR Practices among in India with special reference to CCL Ranchi by PALLAVI KUMARI http://www.ncl.nic.in/csr/Modified_CSR_Policy_as_per_FDs_040313.pdf

LIST OF ABBREVIATIONS

CIL- Coal India Limited

MIDR - Mining-Induced Displacement and Resettlement

CH₄- Methane, SO₂- Sulphur dioxide, NO_x-Oxides of nitrogen, CO- Carbon Monoxide, O₃- ozone

AMD- Acid Mine Drainage

NGOs, such as, ORG- Operations Research Group

R&R- Resettlement and Rehabilitation

ESMP- Environmental and Social Mitigation Project

RAP- Rehabilitation Action Plan

IPDP- Indigenous Peoples' Development Plan

PAP- Project Affected Families

EAP- Environmental Action Plan

OB- Over Burden

ETP - Effluent Treatment Plants

STP- Sewage Treatment Plants

HEMM- Heavy Earth Moving Machinery

AUTHOR(S) PROFILE

M.R. Kolhe, received the Bachelor of Engineering degree in Electrical Engineering from Visvesvaraya Regional College of Engineering Nagpur (now VNIT: Visvesvaraya National Institute of Technology, Nagpur) and M.B.A. degree from GS College of Commerce, Nagpur in 1974 and 1990, respectively. During 1975-2013, he worked in Western Coalfields Limited (Government of India Undertaking) and retired in 2013 as General Manager (Electrical & Mechanical).