

CSR and Sustainable Mining: An Analytical Study of NMDC Ltd Initiatives in Chhattisgarh

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Abstract

This research paper aims to learn about the same and also wants to learn how Corporate Social Responsibility (CSR) is being practiced by NMDC Ltd in Chhattisgarh, how it can be used to promotes sustainable mining practices. Given the size of Public Sector mining unit, NMDC has taken up several CSR activities such as social-economic development programmes and environment conservation programmes in the mining affected areas of Chhattisgarh. The study takes exception of the interventions of NMDC in the education, healthcare, skill development and empowerment of women, infrastructure development, environmental conservation, enhancement of livelihood and others. This research is descriptive and analytical that include both primary and secondary research sources that are Company's reports, Government Publications, and the voice of the stakeholders. The study discusses how these CSR projects impact social, community, economic, and environmental wellbeing, job creation and hiring opportunities for community residents. The responses indicate that NMDC's community development efforts have brought positive change to the lives of the communities including improved access and livelihood opportunities that will lead to sustainable outcomes. Moreover, the company's sustainable environmental management practices such as afforestation, water conservation and conserving biodiversity is an added advantage. Overall, the various conclusions from the CSR implementation are that it can be a strategic approach in inclusive growth, stakeholders association, long term sustainability in the mining sector.

Keywords: Corporate Social Responsibility (CSR), Sustainable Mining, NMDC Ltd, Chhattisgarh, Community Development, Environmental Sustainability, Livelihood Enhancement, Inclusive Growth.

Introduction

Therefore, the sector of mining is one of the major sectors contributing towards the economic development of India as it is contributing to industrial green revolution, infrastructure development, employment generation and foreign exchange earnings of India to a great extent. The metal ores – notably iron ore, coal, bauxite, limestone and manganese – form the foundation of several manufacturing and infrastructure industries, like steel, electricity, cement

and building. Among such, iron ore mining has emerged as a strategic industry due to its contribution to industrial development and steel production as the direct input in the country. A massive economic benefit, however, mining has a dark side, including environmental degradation, deforestation, degradation of local soils, displacement of communities living in mineral-rich areas, loss of biodiversity, water pollution and negative socio-economic impacts on indigenous people. Hence, the incorporation of SD into the activities of the miners has become a great focus to guarantee that, while contributing to the economic development, the mining activities do not affect environmental integrity and social welfare. Responsible resource use is therefore an approach that is important with sustainable mining, balancing the extraction of minerals with protection of environment, and community development.

The concept of Corporate Social Responsibility (CSR) has gradually established its strong foothold on the business agenda as an effective tool for the mining sector to cope with social and environmental challenges induced by its operations. The CSR isn't limited to just running a profitable business and fulfilling legal obligations – it is about businesses considering the majority of the society good and trying to make a contribution that isn't legal, but is still very much considered for the great of the majority of the society. With the introduction of the Companies Act, 2013, in India, there has been a marked increase in the importance of CSR. It imposed the requirement on qualifying companies to allocate two per cent of its average net profits as CSR. This legislation has brought about a paradigm shift, from being a philanthropic one to a business one of CSR, which is now linked to the business objectives and the national development objectives and to the Sustainable Development Goals (SDGs). For the mining industry, CSR is mostly linked to Welfare, Community, Skill Development, Environmental Conservation, Women Empowerment, Rural Infrastructure, Drinking Water Facilities, Sanitation, Healthcare, Education. Any such work will positively affect the lives of local communities as well as establish a social licence for mining companies in this area.

India's biggest PSU under the Ministry of Steel, Government of India, National Mineral Development Corporation Ltd. (NMDC) is an iron ore producer in India. The company's mining activity is in the mineral rich state of Chhattisgarh, notably in the Bastar region, where mining activity is concurrently living alongside tribal people and protecting sensitive ecological areas. These years NMDC has developed a comprehensive Corporate Social Responsibility approach, tailored for an inclusive growth and sustainable development around the mines. The company has initiated many programmes for the development of its communities to enhance their educational infrastructure, skill development and entrepreneurship, empower the women through self help groups, strengthen healthcare services, built up roads and drinking water facility, actively participated in sports and cultural activities and done various environmental conservation activities including afforestation, protection of biodiversity, waste management and development of water resources. Companies' campaigns reveal a call for ecology and the need for a combination of economic efficiency and social responsibility.

The significance of CSR in the state of Chhattisgarh is even more important as the government owns huge minerals rich territories in the state and at the same time it is plagued with development problems like poverty, healthcare facilities in many tribal and rural areas, educational disparity, unemployment etc. The mining industry has definitely contributed to the economic growth of the region and jobs, but it has also raised concerns about environmental sustainability and environmental displacement, as well as inequitable distribution of development benefits. In these circumstances, thoughtfully planned CSR projects can play an important role in helping solve development challenges, contribute to improving a community's socio-economic situation and improve people's community resilience. Good CSR also helps to minimize companies and local communities disagreements and conflicts, as it helps to build trust and transparency.

Sustainable mining is growth-oriented approaches that seek to reconcile the impacts of mining with its economic and social benefits, and minimize mining impacts as far as that is possible. It promotes best practices in environmentally responsible technology, resource usage efficiencies, rehabilitating disturbed land, lowering carbon dioxide emissions, preserving biodiversity and ongoing community consultation and outreach. The principles of CSR can offer an enabling mechanism that can be adopted by energy sector industry to systemic and systemic development plans to benefit current and future generation. In addition, several United Nations Sustainable Development Goals (SDGs) are directly linked with CSR (no, not all of them, just a few): incorporated into the Sustainable Development Goals are several items directly related to CSR, namely Good Health and Well-being (SDG 3), No Poverty (SDG 1), Quality Education (SDG 4), Gender Equality (SDG 5), Clean Water and Sanitation (SDG 6), Decent Work and Economic Growth (SDG 8), Reduced Inequalities (SDG 10), Responsible Consumption and Production (SDG 12), Climate Action (SDG 13) and Partnerships for the Goals (SDG 17).

The current research work is an effort to explore the degree of CSR of NMDC Ltd. in the state of Chhattisgarh and detail analysis of its contribution towards sustainable mining and development of the community. The study can be used for the assessment of CSR programmes in different areas ranging from education, healthcare to livelihood promotion, infrastructure building, environment conservation to welfare of stakeholders. It also focuses on the contribution of these programmes towards the process of achieving an economically developed nation while maintaining the balance amid environment, ecosystems and society. The study is aimed towards bridging this gap and providing lessons on responsible corporate governance in sustainable mining, inclusive regional development through quantifying the impact/outcomes of NMDCs CSR activities. The results from the study will help policy makers, public sector firms and mining companies, researchers and other stakeholders to improve their CSR practices and to move mining towards sustainable development in India.

Literature Review

As a strategic tool for the holistic approach to balancing economic development, environmental sustainability and social well-being, the concept of Corporate Social Responsibility (CSR) has come to the fore, especially in sectors like mining which are high-intensity in terms of resource usage. Current scientific activities focus on responsible mining, natural resources conservation, people engagement and socio-economic development as a way to achieve sustainable development in mining. The review below presents a summary of some of the important policy documents and studies regarding Community and Sustainable Development, Continuous and Sustainable Forestation, Sustainable Mining and Conservation in Chhattisgarh.

The Draft National Forest policy (MoEFCC, 2018) emphasized on sustainable forest management, ecological restoration, protection and conservation of the biodiversity and communities' participation in the forest's management. The policy encourages a balance and integration of the developmental activities and afforestation, ecological compensation and involving stakeholders within the developments to induce an environmental sustainability.

The country level trends in land alienation and acquisition in India has been studied by the Food and Agriculture Organization of the United Nations (2016) which observed that land alienation and acquisition in industrial and mining projects in India have wide-spread impacts on rural and tribal communities. The report suggests guidelines on land acquisition process to be transparent, providing adequate compensation, restoring livelihood and participation of the communities must be considered for equitable and sustainable development.

In recent times, the Government Accounting Standards Advisory Board (GASBoard) had published Natural Resource Account of Chhattisgarh for the FY 2020-21, which showed the quantum of large natural resources in Chhattisgarh and their importance from the Accounting perspective. The report stresses the importance of balancing the interests of mining with environmental protection in order to foster a sustainable economic development and promote rational use of natural resources.

In the Budget Press Communiqué 2021-22 released by the Ministry of Finance, Government of Chhattisgarh, it was revealed that mining is one of the major sources of economic development of the State, while at the same time investing in the rural infrastructure, health, and education, and protecting the environment and the welfare of the tribes. The budget pays tribute to the government's commitment with inclusive development in the mining community.

Indian Minerals Yearbook, 2014 of Indian Bureau of Mines has listed about the huge deposits of iron ore and the reason of its occurrence has led to a major chunk of mineral production in Chhattisgarh. The report also noted environmental issues related to these mining operations such as land degradation, forest loss and environmental disturbance, thus emphasizing the importance of sustainable mining practices.

Meera (2019) spoke about the significance of forests and shared examples of community entitlements which have been canvassed to look after trees and biodiversity. The study highlighted the need for conservation of the environment in the developmental plans and in the industrial process, especially in the mining industry.

Kumar and Kant (2005) noted that participatory governance (CBFM- forests under people) contributes to better conservation of forests and a better livelihood for the local people. The study revealed that human resource management can be achieved through greater community participation to generate better environmental outcomes and greater institutional involvement.

Mathur (2003) addressed some of the related problems of traditional knowledge and indigenous rights while acknowledging the importance of the traditional knowledge and ecological knowledge of the tribal communities with respect to forest management and use of natural resources. The study outcomes highlighted the importance of safeguarding the Indigenous Knowledge Systems and suggested an equitable solution to the problems of benefit sharing in development policies.

The Ministry of Rural Development (2008) recognised that there are a number of programmes to develop the rural society for improving the life of the people, roads and bridges, jobs and social welfare of the people of the Indian villages. The CSR initiatives covering development initiatives by the government can make significant improvements in the socio-economic situation within the mining areas, it suggests in the report.

Building coal mines in the forest areas of the Chhattisgarh's forest region of Hasdeo has resulted in an upsurge of deforestation activities in the region, said Misra (2024). Similarly and importantly, the concern for environmental damage, biodiversity loss and local communities being displaced, was touched upon in the piece, and that this needs to be countered with tougher environmental governance and sustainable mining.

In India, Mukharji (2001) reported on the conservation of biodiversity as an approach of Eco-development and integrated it with the development plan. It underscored the importance of collaborative efforts such as those between conservation organizations (e.g., governments, industry, and communities) in forestry ecosystems conservation.

In the case of Nandi and Garg (2017) in Chhattisgarh being the deforestation started by the state, analysis of the resistance of indigenous women has been carried out. They were the first to showcase the important roles that women play in environmental protection, forest protection and mobilizing a community. The actual recommendations of the research were for policies that would be gender inclusive, and representation for indigenous people in environmental decision making.

The National Forest Policy 1988 laid the groundwork for sustainable forest management in India, placing emphasis on ecological stability, conservation of biodiversity, afforestation and involvement of communities. The policy remains an influencing force in forest-dependent areas' environmental governance and strategies of sustainable development.

Niyogi (2021) analysed environmental issues surrounding expansion of iron ore mines at Chhattisgarh and concluded that iron ore mining caused great degradation of the environment of the area, including soil erosion, deforestation, and degradation of biodiversity. The study suggested tougher environmental regulations, comprehensive rehabilitation works and effective Corporate Social Responsibility initiatives to reduce environmental impacts and benefit to the community during pollution mitigation.

Research Gap

The existing literature provides valuable insights related to forest conservation, land acquisition, conservation of biodiversity, governance of environment and sustainability of forest resources of Chhattisgarh. The effectiveness of NMDC Ltd.'s CSR activities towards safe and sustainable mining practices and socio-economic development in the mining affected areas of Chhattisgarh is limitedly studied empirically. A number of existing studies are either on 'environmental footprint of mining' or 'policy frameworks' with a lack of studies being conducted on a combination of CSR, community development, environmental sustainability and support for the welfare of stakeholders. Thus, the present study aims to fill this gap by analysing NMDC Ltd.'s CSR initiatives and its efforts towards sustainable mining and inclusive development in the state of Chhattisgarh analytically.

Objectives of the Study

1. **To examine the various CSR initiatives implemented by NMDC Ltd. in the mining-affected regions of Chhattisgarh.**
2. **To assess the impact of NMDC Ltd.'s CSR programmes on the socio-economic development of local communities**, particularly in the areas of education, healthcare, livelihood generation, skill development, women empowerment, and infrastructure development.
3. **To evaluate the effectiveness of NMDC Ltd.'s environmental conservation initiatives** in promoting sustainable mining practices, including afforestation, biodiversity conservation, water resource management, and land reclamation.

Null Hypothesis (H₀) - NMDC Ltd.'s CSR programmes have no significant impact on the socio-economic development of local communities in Chhattisgarh with respect to education, healthcare, livelihood generation, skill development, women empowerment, and infrastructure development.

Alternative Hypothesis (H₁) - NMDC Ltd.'s CSR programmes have a significant positive impact on the socio-economic development of local communities in Chhattisgarh with respect

to education, healthcare, livelihood generation, skill development, women empowerment, and infrastructure development.

Research Methodology

The method of the present study is Descriptive method and Analytical method in which analysis was carried on responsible topic/s for the Corporate Social Responsibility (CSR) programme Implemented by NMDC Ltd. and its role in Sustainable Mining and Socio-economic development of Chhattisgarh, India. Both Primary and secondary data is used to fulfill the aims of the study. Primary data are gathered with a structured questionnaire from various beneficiaries of the CSR programmes of NMDC, such as local people, tribal people, self help groups, students, beneficiaries of healthcare programmes and other stakeholders in the mining affected areas. The study employed a questionnaire having two section – (Demographic section & statements) which were assessed through Likert Scale by the respondents regarding the effectiveness of CSR in the eleven areas such as Education, Healthcare, Livelihood creation, Skill development, Women empowerment, Infrastructure development and Environmental concern. The data has been collected from the Secondary sources such as Ministry of Environment, Forest and Climate Change report, CSR report, Ministry of Steel report, the Annual Reports of NMDC, Indian Bureau of Mines report, Research Journal, book etc. and other verified information sources available on online. To select the respondents for the study, purposive/sampling (convenience sampling technique) is used and study population size has been proposed as 300 [304] from mining dominated communities of Chhattisgarh. Descriptive statistical tools that measure frequency distribution, percentage, mean, and standard variation are used to summarise data and inferential statistical tools such as Chi-square test, Independent Sample t-test, One-way ANOVA, Pearson correlation, Multiple regression analysis are used to test the research hypotheses and to examine relationships. Cronbach's alpha is used to test the reliability of the questionnaire, and experts test it, in addition to an in-depth literature review, in order to ensure the content of the questionnaire is valid. All hypotheses are tested at the level of significance of 5% ($p < 0.05$) i.e. all the data analysed is done at the level of significance of 5% ($p < 0.05$). Results achieved are compared with the result obtained by other NMDC Ltd. surveys to see the effectiveness of achieving the objective of CSR Programmes for sustainable mining and socio-economic development of the communities in Chhattisgarh.

Table 1: Descriptive Statistics of Respondents' Perceptions on the Impact of NMDC Ltd.'s CSR Programmes on Socio-Economic Development (N = 300)

CSR Dimension	Mean	Standard Deviation	Interpretation
CSR initiatives have improved educational facilities in the local community.	4.18	0.71	High Agreement
CSR programmes have enhanced access to quality healthcare services.	4.12	0.76	High Agreement

CSR Dimension	Mean	Standard Deviation	Interpretation
CSR initiatives have created sustainable livelihood opportunities.	4.05	0.81	High Agreement
Skill development programmes have improved employment prospects.	4.21	0.68	High Agreement
Women empowerment programmes have increased social and economic participation.	4.09	0.74	High Agreement
CSR initiatives have improved village infrastructure (roads, drinking water, sanitation, etc.).	4.24	0.65	High Agreement
Overall CSR programmes have improved the socio-economic conditions of local communities.	4.17	0.69	High Agreement

Overall Descriptive Statistics

Variable	Mean	Standard Deviation	Interpretation
Socio-Economic Development through NMDC CSR Programmes	4.15	0.72	High Positive Perception

Interpretation

It is observed from descriptive statistics that more than 50 % respondents whether male/female have positive attitude towards the CSR programme of NMDC Ltd. for socio-economic development in the mining affected community of Chhattisgarh. The overall mean score of 4.15(with SD = 0.72) is indicative of very high level of agreement that CSR programmes of the company have been instrumental to the improvement in skills and livelihood generation, infrastructure development, healthcare, women empowerment and education. In terms of the various dimensions, three of the areas were perceived as very effective in terms of the mean score, infrastructure development (M = 4.24, SD = 0.65), skill development (M = 4.21, SD = 0.68) and youth empowerment (M = 4.20, SD = 0.75). A relatively small standard deviation may indicate that opinion among respondents was quite consistent. In broad terms, the descriptive results support the alternative hypothesis that there has been a positive effect of the NMDC Ltd.'s CSR programme in terms of socio-economic development of the local communities in Chhattisgarh.

Table: One-Sample Z-Test for the Impact of NMDC Ltd.'s CSR Programmes on Socio-Economic Development

Test Value = 3.00 (Neutral Point on 5-Point Likert Scale)

Variable	N	Mean	Std. Deviation	Z-value	p-value	Decision
Socio-Economic Development through NMDC CSR Programmes	300	4.15	0.72	27.67	0.000	Reject H_0

The results obtained from One Sample Z-test reveal that the response givers hold very positive perception of contribution of CSR programmes of NMDC Ltd. towards the socio-economic development in Chhattisgarh in the state. The overall mean score of 4.15 is quite significantly higher than the neutral benchmark (three), on a five-point Likert scale, showing that overall beneficiaries feel that the company's CSR activities have helped to enhance their quality of life. The calculated value of $Z >$ its critical value at 5% level of significance and $p > 0.05$ which is statistically significant. Therefore, we reject the null hypothesis (H_0) and do accept the alternative hypothesis (H_1). The outcomes confirm NMDC Ltd's CSR programs that can have a meaningful and positive contribution towards socio-economic development of the population residing in the area as a result of better education, health-care facility, livelihoods, skills development, empowerment of women and also for the infrastructure development. The Standard deviation (SD) of the respondents answers was relatively moderate (0.72) indicating the consistency of the opinions as to effectiveness of CSR works of the business. Taking a broader perspective, the statistical data shows that NMDC Ltd.'s CSR initiatives have been impactful in fostering inclusive growth and sustainable development in the regions where its operations are located in Chhattisgarh.

Overall Conclusion

Finally, the present study concludes that Corporate Social Responsibility (CSR) program of NMDC Ltd. is playing an important and significant role in the field of sustainable mining and hence to enhance the socio-economic development of its neighbouring areas of Chhattisgarh, Madhya Pradesh and Maharashtra. The analysis suggests that the company's CSR initiatives have positively impacted the following aspects of the development: Education, Healthcare, Livelihood Generation, Skill Development, Women Empowerment, Infrastructure Development and Conservation of Environment. These have promoted the improved QOL of beneficiaries and improved relationship with mining affected communities in the region. The results derived from the descriptive analysis and the hypothesis testing show that respondents have positive perception about the CSR activities carried out by NMDC and the hypothesis was supported using One-Sample Z-test with a significant relationship with p-value of 0.000, which is less than the significance level of p-value 0.05. Further, the study highlights the initiatives NMDC has undertaken to include environmental sustainability in its CSR framework, such as its afforestation program, water management initiatives, efforts to conserve biodiversity and its responsible use of resources, which all support sustainable mining

practices. Despite these achievements, continued monitoring, more interaction with staff, transparency of implementation and regular reviews of the impact are key factors in Maximising the Long-term Value of CSR programmes. The study has proven CSR a mere function of legislation and much more; a tool for inclusive growth, environment protection and sustainable development. The results presented important policy lessons for both the public and private sector as well as the mining companies for developing the strategy and execution of CSR projects which not only ensure responsible and sustainable mining practice in India but also provide long lasting socio-economic and environmental benefits to the people concerned.

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