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TOWARDS SUSTAINABLE MINING AND HEALTHIER LIVES IN DHANBAD

October 2026



Acknowledgement

The author expresses sincere gratitude to all individuals and organisations whose active participation and support made this study possible. This report is the result of a collaborative effort to understand and strengthen community engagement in promoting a healthier and more sustainable environment in the coal mining areas of Dhanbad.

We are especially thankful to the residents of Kharikabad and Alkusa, whose insights, observations, and active participation during the focus group discussions provided invaluable guidance. Their enthusiasm and commitment to improving local environmental conditions have been truly inspiring.

A special note of thanks to the survey and field teams from Asha Kiran Yuva Sansthan and Gyan Vigyan Samiti. Their dedication, expertise, and empathetic engagement with local communities ensured that the voices of residents were effectively captured and highlighted in this report.

We also extend our sincere appreciation to Dr. Suresh Pandian Elumalai, Associate Professor, Department of Environmental Science and Engineering, Indian Institute of Technology (Indian School of Mines) Dhanbad, for providing valuable knowledge and technical support to the study, including inputs and review of the report. His expertise and feedback helped strengthen the analysis and overall quality of the report.

This report exemplifies the positive impact of participatory research, showcasing how communities, academic institutions, local authorities, and civil society organisations can come together to generate evidence and identify practical solutions for a cleaner, healthier, and more sustainable environment.

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Foreword

Economic progress and energy security often come with profound environmental and human costs. This reality is nowhere more visible than in Dhanbad, popularly known as the coal capital of India. While the region's sprawling open-cast coal mines and allied industries power the nation, the communities living on the front lines of these operations bear a severe, everyday burden.

Clean air is a fundamental prerequisite for human health and sustainable society. The existence of industrial activities such as mining of coal, transportation of overburden dumps and mined coal, washing of the coal and combustion of the coal by various large, medium and small scale industries have long been linked to affect the ecological balance of the industrial areas. Common public living near these industrial activities get exposed to the high pollution levels. Such exposure to the high levels of air pollutants is likely to influence the economic status of the common public by increasing their hospital expenditures as well as loss in number of working days per annum due to the disease burden.

The continuous generation of heavy coal dust, fly ash, and particulate matter (PM2.5 and PM_{10}) has turned the simple act of breathing into a persistent health hazard for local residents. While ambient air quality indices can monitor the physical degradation of the environment, they often fail to capture the human dimension—the chronic respiratory illnesses, the economic strain of healthcare, and the compromised quality of life experienced by families residing near these industrial clusters.

This research study, titled "Towards Susutainable Mining and Healthier Lives in Dhanbad", was undertaken to bridge the gap between empirical environmental data and community-level perception. By engaging local residents directly through structured surveys, this project investigates how people perceive air quality changes, recognize pollution sources, and experience health or lifestyle impacts in their daily lives.

It meticulously examines the level of community exposure to toxic coal dust, its specific health outcomes, and the community's level of awareness regarding dust control measures and funds available to manage the environmental issues.

The ultimate objective of this work is to enhance the residents living near the coal mine areas to have a better understanding about the exposure to coal mine emissions and dust management. We hope the empirical data and narratives compiled within this report serve as a vital resource for policymakers, environmental regulators, and public health authorities to enforce stricter dust-suppression mandates and establish specialized healthcare infrastructure for Dhanbad's affected populations. The report identified a very low awareness among the residents to the availability of District Mineral Foundation (DMF) fund.

I express my deepest gratitude to the residents of Kharikabad and Alkusa who opened their doors and shared their challenges with the Asar research team, as well as the field researchers and advisors whose dedication brought this study to fruition. The insights gathered through this survey are designed to serve multiple purposes: to inform local policy and urban planning, to highlight vulnerable demographic groups, and to foster community-driven dialogue on effective mitigation strategies.

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Executive Summary

BACKGROUND AND RATIONALE

Dhanbad—known as India's "Coal Capital"—is central to the nation's energy economy. However, decades of open-cast mining have led to deforestation, dust pollution, and deteriorating public health. Residents of mining-adjacent settlements face continuous exposure to dust, unsafe roads, and polluted air, which collectively diminish their quality of life.

India's mining sector operates under a robust regulatory framework—the Mines Act (1952), the Mines and Minerals (Development and Regulation) Amendment Act (2015), and the Mineral Conservation and Development Rules (2017). These provisions establish an important foundation for responsible and sustainable mining practices. However, understanding environmental and health conditions in mining-affected areas also requires consideration of factors beyond the operational boundaries of mining sites.

Against this backdrop, participatory research can provide valuable insights into the environmental conditions experienced by communities residing in proximity to mining operations. This study seeks to understand community perspectives on environmental and health concerns, including how dust generated through mining and associated activities may extend into surrounding areas, the factors contributing to its accumulation, and the potential exposure pathways along mine-access roads, coal transportation routes, connecting roads, and nearby settlements. The study also examines community perceptions of environmental management and air pollution control measures. By integrating local observations with existing environmental management and regulatory frameworks, the study aims to contribute to a more comprehensive understanding of dust exposure and identify opportunities to strengthen environmental management both within mining premises and in surrounding areas.

OBJECTIVES

The study sought to:

1. Assess Environmental Concerns of Communities Residing Near Mining Operations
2. Assess Health Concerns and Healthcare needs Residing Near Mining Operations
3. Examine Community Perceptions of Environmental Management and Air Pollution Control Measures
4. Assess community awareness of DMF and their welfare priorities
5. Document lived experiences of affected communities, providing evidence-based recommendations for improvements

METHODOLOGY

The study was conducted in Khadkabad (Ward 14) and Alkusa (Ward 12)—two settlements located near Bharat Coking Coal Limited's (BCCL) Gondudih Kusunda Colliery. Using a qualitative and participatory approach, six Focus Group Discussions (FGDs) and In-Depth Interviews (IDIs) were organised between April 2025 to July 2025. Participants included homemakers, self-help group (SHG) members, informal labourers, sanitation workers, teachers, and health workers. The process created safe spaces for communities to share their experiences. Ethical standards such as informed consent and confidentiality were maintained throughout.

KEY FINDINGS

1

Demographic Profile and Participation

A total of 169 respondents participated in the FGDs—94 from Kharikabad and 75 from Alkusa. Women constituted nearly 80 percent of the total participants, reflecting their active engagement and strong representation from self-help groups, homemakers, sanitation workers, and health workers. Men accounted for about 20 percent, primarily represented by teachers and informal labourers.

The average age of participants ranged from 20 to 60 years, with the majority belonging to the working-age group (26–45 years). The prominence of women participants underscores both their disproportionate exposure to pollution and their growing role as agents of awareness and change within their communities.

2

Livelihoods and Economic Conditions

Despite living near active collieries, residents reported negligible direct employment in the mining sector. Most households depend on informal work such as coal vending, construction labour, small businesses, and domestic services. Mechanisation and contractual employment practices have limited opportunities, while women face systemic exclusion due to safety concerns and lack of skills. Communities strongly expressed the need for livelihood diversification and skill development supported through DMF or CSR initiatives.

3

Household Cooking and Indoor Pollution

Coal remains the primary cooking fuel for most households despite the availability of LPG connections. The high cost of LPG refills, distant refill centres, and entrenched habits make coal the more practical choice. This leads to a "double burden of exposure"—to outdoor pollution from mining and indoor smoke from coal combustion. Behavioral change, affordability measures, and safety assurance are key to accelerating a transition toward clean cooking.

4

Environmental Management and Dust Control in and Around Mining Areas

Community observations indicate scope for further strengthening the implementation of environmental and air pollution control measures. Respondents highlighted visible dust, road conditions, coal transportation practices, and the need for consistent and effective dust-mitigation measures as areas for further attention. The findings also highlight the importance of extending dust-management considerations beyond mining premises to surrounding roads, transportation routes, and settlements that may experience dust exposure.

Key insights include:

- **Dust suppression:** Water sprinkling is reported to be undertaken primarily along key transport routes. Community observations suggest scope to improve its coverage, frequency, and consistency, along with the use of complementary dust-control measures where appropriate.

- **Road infrastructure:** Community members highlighted the need for further improvement and maintenance of haul and internal roads. During dry periods, road conditions may contribute to dust resuspension, while during the monsoon, improved drainage and road maintenance can help address muddy and potentially unsafe conditions.

- **Coal transportation:** Community observations indicate scope to further strengthen the consistent covering of coal-carrying vehicles, particularly during night-time transportation, along with appropriate monitoring to support adherence to prescribed requirements.

- **Green cover and buffer areas:** There is an opportunity to strengthen the development and maintenance of green belts and buffer areas around mining operations. Sustained maintenance and follow-up of plantation initiatives can help support their long-term effectiveness.

- **Overburden management:** Community observations highlight the importance of strengthening the management and stabilisation of exposed overburden (OB) dumps located near residential areas, including appropriate measures to minimise dust generation and potential fire and safety risks.

- **Community-level air-quality monitoring:** Establishing air-quality monitoring stations at suitable locations accessible to surrounding communities can improve understanding of local air-quality conditions and enhance public awareness.

Community perspectives indicate scope for further strengthening the implementation of air pollution control measures. While regulatory frameworks and prescribed measures are in place, residents highlighted the importance of translating these measures into consistent and observable improvements in local environmental conditions. The findings underscore the value of transparent monitoring, regular communication, and appropriate community engagement to support effective implementation and strengthen environmental management in mining-affected areas.

5

Health Impacts and Access to Healthcare

Frequent respiratory ailments, asthma, hypertension, and diabetes were reported across both sites. The elderly and children are the most affected. Families spend 1,500–2,000 monthly on healthcare, often without access to proper facilities. Primary health centres are 2–3 kilometres away, and emergency care requires longer travel. There is limited trust in government health services due to irregular staffing and medicine shortages. Respondents called for regular health camps, mobile health units, and upgraded local healthcare infrastructure.

6

Awareness of the District Mineral Foundation (DMF)

Awareness of the DMF fund was found to be very low. Most residents had not heard of it or did not know its purpose. However, when informed, they prioritised investments in:

- Clean drinking water and sanitation
- Improved health infrastructure
- All-weather roads and street lighting
- Livelihood and skill programmes
- Quality education facilities

This shows that while awareness is limited, communities have a clear sense of local priorities, reinforcing the importance of participatory planning and social accountability in DMF utilisation.

CONCLUSIONS AND RECOMMENDATIONS

The study indicates that communities living in and around mining areas continue to experience environmental and health concerns associated with dust exposure, road and transport conditions, access to healthcare and livelihood opportunities. Community perspectives also indicate scope for further strengthening the implementation of air pollution control measures. While regulatory frameworks and prescribed environmental management measures are in place, residents highlighted the importance of translating these measures into consistent and observable improvements in local environmental conditions.

The findings point to the need for a comprehensive approach that complements environmental management within mining operations with measures addressing community-level exposure. Strengthening dust management along roads and coal transportation routes, improving local infrastructure and healthcare access, enhancing DMF participation, and supporting livelihood and clean-energy transitions can contribute to healthier and more resilient mining-affected areas.

Key Recommendations

1. STRENGTHEN ENVIRONMENTAL MANAGEMENT AND COMMUNITY-LEVEL DUST MITIGATION

- Continue strengthening dust-control measures within mining areas, including water sprinkling, road maintenance, green-belt development, and appropriate management of overburden dumps, in accordance with applicable regulatory requirements.
- Extend dust-management planning to roads, coal transportation routes, and other areas connecting mining operations with surrounding settlements.
- Ensure appropriate covering of coal-carrying vehicles and strengthen maintenance of roads and transport corridors to minimise dust generation.
- Identify priority stretches and locations around mining operations based on proximity to settlements, transportation intensity, observed dust levels, and population exposure.
- Develop customised environmental and dust-management plans for priority settlements, with clearly defined measures, responsibilities, monitoring mechanisms, and timelines.
- Strengthen air-quality monitoring at community exposure locations and make relevant health advisories.
- Establish regular mechanisms for community feedback and incorporate local observations into periodic environmental management reviews.

2. STRENGTHEN HEALTH INFRASTRUCTURE AND ACCESS

- Strengthen PHCs and CHCs serving mining-affected settlements through improved staffing, availability of medicines, diagnostic facilities, and essential services.
- Introduce periodic health camps and mobile medical services, with particular attention to respiratory conditions and other health concerns reported by residents.
- Strengthen health awareness and preventive-care initiatives for vulnerable groups, including children and older persons.

3. STRENGTHEN DMF GOVERNANCE AND COMMUNITY PARTICIPATION

- Increase awareness among residents regarding the purpose, functioning, and utilisation of DMF funds.
- Promote participatory planning processes that enable local communities to contribute to the identification and prioritisation of development needs.
- Align DMF investments with locally identified priorities, including healthcare, clean water and sanitation, roads and basic infrastructure, education, and livelihood development.

4. SUPPORT LIVELIHOOD DIVERSIFICATION AND CLEAN ENERGY TRANSITIONS

- Expand opportunities for skill development, livelihood diversification, and local employment for households dependent on informal or coal-related livelihoods.
- Explore convergence of DMF, CSR, and relevant government programmes to support locally appropriate livelihood and enterprise development.
- Encourage livelihood opportunities linked to environmental management, waste management, green infrastructure, and other emerging local needs where feasible.

OVERALL CONCLUSION

The study demonstrates the value of complementing regulatory and technical approaches to sustainable mining with local perspectives and community-level environmental management. While environmental management measures are being implemented within mining operations, there is an opportunity to strengthen their connection with the environmental conditions experienced by settlements located along mining roads, coal transportation routes, and other exposure pathways.

Integrating community observations with environmental monitoring, health planning, and DMF processes can support more responsive and locally relevant decision-making.

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CHAPTER ONE

1. Introduction

1.1 BACKGROUND

Jharkhand is widely recognised as the mineral hub of India, endowed with abundant reserves of coal, iron ore, mica, bauxite, and other key minerals (Planning Commission, 2011). These resources have long made the state a cornerstone of India's industrial and energy security, supplying raw materials to core industries nationwide (Ministry of Mines, 2020). Mining has contributed to employment, local economic growth, and infrastructure development. However, this progress has come at a cost, large-scale extraction has resulted in deforestation, land degradation, and serious air and water pollution, disrupting livelihoods and threatening the ecological balance (TERI, 2018).

Within Jharkhand, Dhanbad occupies a central role in India's coal economy. The district's mines have sustained industrial activity for decades. Yet, the scale and intensity of mining have created environmental and social impacts. Open-cast operations produce heavy dust from blasting, drilling, transport, and coal handling, while underground mine fires emit harmful gases (Ghose & Majee, 2007). Communities living nearby face daily consequences—respiratory illnesses, water contamination, loss of farmland productivity, and fragile livelihoods (Singh et al., 2019). Vulnerable groups such as women, children, and the elderly bear a disproportionate burden due to higher exposure and limited access to healthcare (World Bank, 2021).

While the economic contribution of mining is well established, these impacts underline the need for a balanced approach—one that sustains mining's developmental role while ensuring environmental protection and the health and well-being of local communities. India already has an extensive regulatory framework in place to check air pollution from mining operations, including The Mines Act, 1952, Coal Mines Conservation and Development Act 1974, National Mineral Policy 1993; revised in 2008, Mines and Minerals (Development and Regulation) Amendment Act, 2015 (MMDR Act), Mineral Conservation and Development Rules (MCDR) 2017, Model District Mineral Foundation (Trust) Rules, 2015 etc. Specific measures such as dust suppression systems, water sprinkling, proper coal handling, and green belt development are mandated for mining units to reduce particulate emissions.

A comprehensive approach to sustainable mining should therefore consider both the management of environmental impacts within operational areas and the conditions experienced in surrounding settlements. Understanding local exposure patterns and environmental conditions can help inform targeted measures beyond mining boundaries and strengthen the overall environmental and health outcomes of mining-affected areas.

1.2 NEED FOR THE STUDY

The Dhanbad Municipal Corporation and IIT (ISM) Dhanbad undertook a technical compliance study titled Improving Air Quality Through Sustainable Mining. This study evaluates key pollution sources, and the extent of adherence to environmental standards across different mining sites in the city. At the same time, it also tries to evaluate the functioning of practical measures such as regular water sprinkling on haul roads, mechanised and covered coal handling, proper maintenance of machinery, development of green belts, and the adoption of advanced dust suppression technologies. The report offers a constructive framework for collaboration between industry and regulators to reduce dust pollution and move toward cleaner, more sustainable mining.

While these technical studies provide important scientific data, they only tell part of the story. They often do not capture the daily realities of people living near mining areas, who face dust settling on their homes and farmland, contaminated water, and recurring health problems—challenges that affect their everyday lives (TERI, 2018).

Although quantitative research has established links between mining operations and public health outcomes, less attention has been paid to understanding these impacts from the perspective of affected communities. By combining technical assessments with community experiences, the study offers a more complete picture, ensuring that compliance is not just about meeting regulations, but also about achieving tangible improvements in air quality, health, and livelihoods (World Bank, 2021; UNDP, 2019).

Recognising the importance of understanding both operational environmental management and conditions in surrounding areas, the present study was undertaken to complement technical assessments with community-level perspectives. The study uses qualitative methods, including Focus Group Discussions (FGDs) and In-Depth Interviews (IDIs), to document the perceptions, experiences, concerns, and priorities of diverse groups residing in proximity to mining operations. These include homemakers, self-help group members, health workers, informal workers, sanitation workers, teachers, and senior citizens.

By bringing together these perspectives, the study provides a more comprehensive understanding of local environmental and health conditions, including community-level dust exposure, healthcare access, livelihoods, and development priorities. The findings are intended to inform locally relevant and responsive approaches to environmental management and sustainable development in mining-affected areas.

Further, the study also explores community perceptions and understanding of the District Mineral Foundation (DMF), a mechanism established to ensure that revenues generated from mining are reinvested into the welfare of affected communities (Government of India, 2015). While DMF was created to address local needs in areas such as health, education, and livelihoods, many affected households remain unaware of its existence or of their rights to benefit from it (Centre for Science and Environment, 2021). Limited awareness, combined with weak community participation in planning and monitoring, has often resulted in projects that do not align with people's immediate priorities (Mukhopadhyay, 2020).

1.3 OBJECTIVES

The study specifically aims to understand the following:

1. Assess Environmental Concerns of Communities Residing Near Mining Operations
2. Assess Health Concerns and Healthcare needs Residing Near Mining Operations
3. Examine Community Perceptions of Environmental Management and Air Pollution Control Measures
4. Assess community awareness of DMF and their welfare priorities
5. Document lived experiences of affected communities, providing evidence-based recommendations for improvements

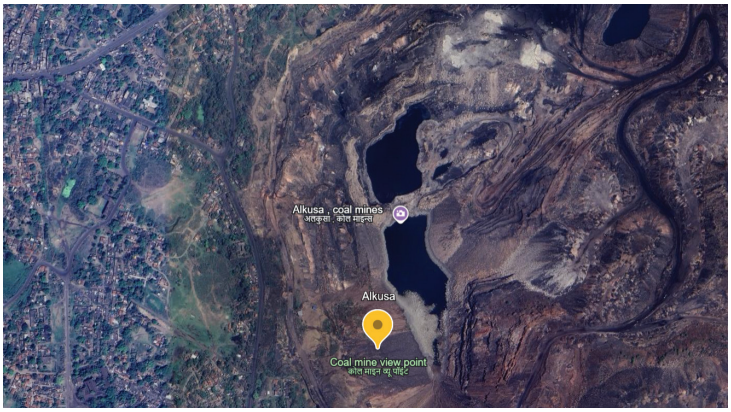
CHAPTER TWO

2. Methodology

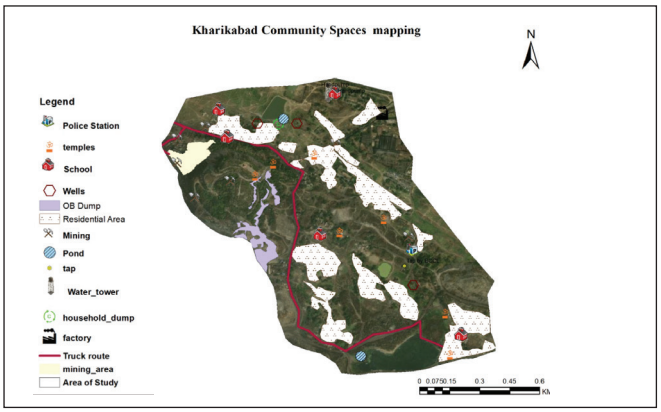
2.1 STUDY AREA

The study was conducted within the jurisdiction of the Dhanbad Municipal Corporation (DMC), focusing on two neighborhoods—Kharikabad (Ward No. 14) and Alkusa (Ward No. 12)—located in close proximity to active coal mines operated by Bharat Coking Coal Limited (BCCL)'s Gondudih Kusunda Colliery. The colliery has an estimated annual production capacity of approximately 5.87 million tonnes per annum (MTPA) (Detailed site descriptions are provided in Appendix A). Both neighbourhoods are surrounded by open-pit mining operations that significantly shape the local environment and economy. These areas were also included in the technical assessment study *Improving Air Quality Through Sustainable Mining.*

Figure 1 : Study Area Sample Image



I: Alkusa Neighbourhood



II: Kharikabad Neighbourhood

Kharikabad and Alkusa were selected in the study as they represent the ground realities of mining-affected communities in Dhanbad. Both settlements share a direct boundary with operational mine units, placing residents in immediate proximity to mining activities. This location exposes the communities to high levels of dust, noise and environmental degradation on a daily basis.

Further, the socio-economic profile of these neighborhoods—marked by low income, informal employment, low literacy levels, and inadequate access to healthcare, education, and basic civic amenities—reflects the broader vulnerabilities of mining-dependent populations across the district.

Profile of Kharikabad

Kharikabad Community, situated in Ward No. 14 of Dhanbad Municipal Corporation, lies in close proximity to Bharat Coking Coal Limited's (BCCL) Gondudih Kusunda Colliery. The settlement is only about 2.5 km from the active mining unit. Home to nearly 18,600 residents, Kharikabad is predominantly inhabited by coal miners, daily wage earners, and informal sector workers.

Profile of Alkusa

Alkusa Community is located approximately 5.3 km from the Gondudih Kusunda Colliery. Like Kharikabad, it is vulnerable to mining-related impacts such as dust pollution, health risks, and unstable livelihoods, though it differs in population composition and settlement patterns. The total population is estimated at 1,800–2,000. Employment opportunities are limited, with only a small share of residents in stable jobs, some engaged in small businesses, many dependent on daily wage labour, and very few employed in mining-related activities.

2.2 STUDY DESIGN

The study employed a qualitative research approach to better understand the perspectives of communities living in close proximity to mining operations. This approach, which relies on open-ended and conversational methods, allowed participants to express their experiences in their own words, bringing out insights that might remain hidden in purely technical assessments. Purposive sampling was used to select participants across different age groups, occupations, and levels of exposure to mining-related challenges, ensuring a diverse and representative set of voices.

Focus group discussions (FGDs) were conducted to provide participants with a platform to share and validate their experiences, while highlighting community-level concerns. A structured questionnaire was designed to guide the discussions. The questionnaire covered a wide array of themes, including livelihood challenges, access to welfare measures under the District Mineral Fund (DMF), and community observations on mining units' compliance with air pollution control measures.

The questionnaire was organised into four sections: the first collected demographic information; the second addressed air pollution and regulatory compliance; the third assessed healthcare facilities and their effectiveness; and the fourth examined awareness of and engagement with the DMF. To ensure clarity, accessibility, and cultural relevance, the final version was translated into Hindi.

The process of developing the questionnaire began with a formative visit to the study sites to gather initial insights and get a better understanding of the local context. This was followed by several rounds of discussions within the research team, as well as consultations with a local community contact, to refine and finalise the questions.

A total of six focus group discussions (FGDs) were conducted in both Kharikabad and Alkusa areas between May 2025 to July 2025. The FGDs included six distinct groups: homemakers, informal labourers, self-help group members, health workers, sanitation workers, and school teachers. These groups were specifically selected to ensure diverse representation in the study, reflecting differences in educational background, lived experiences, and exposure to mining-related challenges.

Each FGD lasted approximately two hours and was conducted in Hindi, moderated by a team member experienced in focus group facilitation and community mobilisation. Three process facilitators were present in each session to take detailed notes and record thorough observations. To ensure the accuracy and reliability of the notes, the facilitators discussed and compared their observations immediately after each session and again during the compilation of results. Following the conclusion of each FGD, the team held a debriefing session to review and process the findings. The open-ended responses were also documented in a notebook register.









In addition to FGDs, in-depth interviews (IDIs) were conducted with teachers and unorganised labourers to gather personal insights. IDIs are one-on-one, open-ended conversations that allow participants to share their experiences, perceptions, and opinions in greater depth.

Before data collection began, field researchers underwent thorough training on the study objectives, ethical considerations, interview techniques, and proper use of the data collection tools to ensure consistency and reliability. The questionnaire and FGD guides were pre-tested with a small group of participants from similar communities to identify any issues, check for clarity, and make necessary adjustments.

Ethical considerations were central to the study. Participation was entirely voluntary, informed consent was obtained from all respondents, and strict measures were taken to maintain confidentiality.

2.3 LIMITATIONS TO THE STUDY

While a robust methodology was followed throughout the study, several limitations were identified:

A

Limited representation of certain groups: Some specific sections of the nearby residing communities, such as organised labourers and local vendors/ hawkers, could not participate in the FGDs. Additionally, certain groups that did participate were not able to provide substantial or relevant information.

B

Reluctance to speak openly:
In some cases, participants appeared hesitant to speak against coal companies or authorities due to fear of potential repercussions. This may have influenced the depth and openness of some responses.

C

Discussion of unrelated issues:
As the communities face a wide range of challenges, they often raised other local problems during the FGDs, even when these were not directly related to the broader theme of the discussion.

D

Questionnaire limitations:
While the tool captured a wide range of themes, some questions proved too technical or unfamiliar for certain groups to respond to.

E

Scope of environmental concerns:
Communities expressed various environmental concerns beyond air pollution, which they wanted to discuss, but these were not adequately captured in the current questionnaire design.

CHAPTER THREE

3. Results & Observations

3.1 RESPONDENT PROFILE, LIVELIHOOD AND HOUSEHOLD COOKING PATTERN

This section presents the responses of the participants to key demographic, livelihood and cooking fuel related questions explored during the focus group discussions (FGDs). At the outset, respondents were asked about:

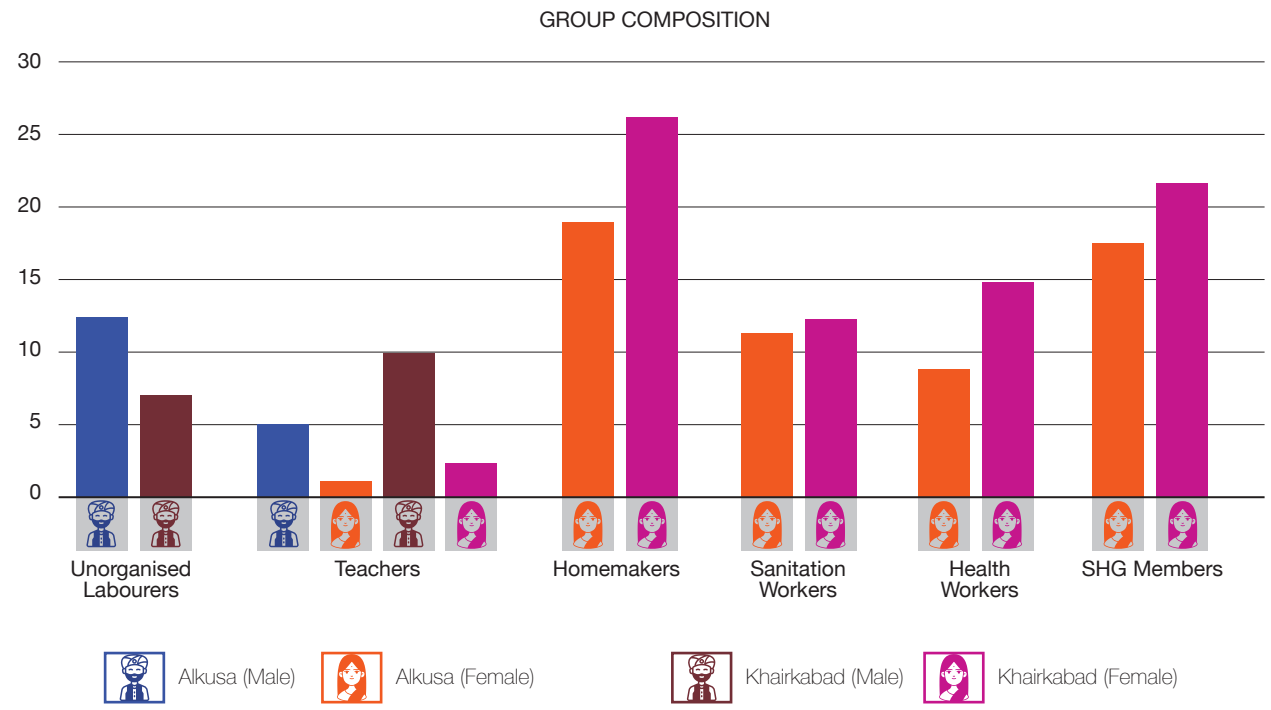
1. Typical family size in their community
2. Main sources of household income
3. Availability of livelihood opportunities through mining units
4. Commonly used cooking fuels & Access to LPG connections
5. Duration of residence in the community

3.1.1 Respondent Profile

The study engaged a diverse set of respondents in the study area, organised into six social and occupational groups: housewives, school teachers, self-help group (SHG) members, health workers, sanitation workers, senior citizens/ retired people, and unorganised labourers. Each group provided insights into household structures, livelihood practices, income sources, and their experiences or interactions—direct or indirect—with mining activities.

The study engaged a total of 169 respondents across Alkusa and Khadkabad. Of these, 94 participants were from Khadkabad and 75 from Alkusa, representing a heterogeneous mix of age, gender, and livelihoods. Female participants predominated in both areas, making up approximately 80% of respondents, while males accounted for around 20%. In Alkusa (n=75), male participants were primarily represented by unorganised labourers and school teachers, whereas females dominated self-help groups (SHGs), homemakers, health workers, and sanitation worker groups.

Figure 2: FGD Participant Composition in Alkusa and Khadkabad



Mean ages per group in Alkusa ranged from 33.5 years for unorganised workers to 46.5 years for teachers, with an overall n of 39.7 years. In Khadkabad (n=94), males were primarily among unorganised labourers and teachers, and females dominated the other groups, with mean ages ranging from 35 years for homemakers to 42.5 years for sanitation workers, and an overall n of 38.7 years. Overall, participants' ages ranged from 20 to 60 years, reflecting a broad cross-section of the community.

Most participants in both study areas belonged to the working-age group (26–45 years), reflecting the active labour force within these communities. Household sizes in Khadkabad ranged from 3 to 10 members on average. In Alpusa, households were comparatively smaller, typically ranging between 3 and 9 members, with fewer cases of extended families.

3.1.2 Livelihood

The primary sources of livelihood varied across respondent groups in both areas but showed a common pattern of dependence on informal work. In Kharikabad, housewives, SHG members, and unorganised labourers were largely engaged in daily wage work, coal vending, construction activities, transport-related work (drivers, taxi services), and small businesses. Teachers reported teaching as their primary source of livelihood and represented the most stable occupational group. Since sanitation workers were contractual, they supported their families not only through sanitation work but also through domestic help, cooking, coal vending, and construction. Health workers, on the other hand, reported that their households also relied on daily wage labor, small businesses, construction work, and migrant labor.



In Alkusa, the livelihood profile reflected similar patterns but with some additional diversification. SHG members reported not only daily wage work, driving, carpentry, sanitation work, and small businesses but also involvement in local politics, factory-based work, and sales-related occupations, pointing to slightly broader opportunities compared to Kharikabad. Homemakers in Alkusa reported dependence on private jobs, daily wage work, and small-scale business, while sanitation workers and health workers largely mirrored the livelihood sources identified in Kharikabad.

Across both study areas, employment opportunities from mining units were negligible. Respondents consistently reported that neither they nor their family members had secured sustainable livelihoods directly from mining operations. The limited mining-related employment that did exist was described as temporary, insecure, poorly compensated, and difficult to access without personal connections, financial inducements, or specific technical skills. Participants also highlighted systemic barriers, including:

- Mechanisation reducing human labour demand (e.g., coal loading)
- Long shifts of up to 12 hours with low pay
- Lack of health, safety, and welfare benefits
- High risks of pollution-related exposure
- The temporary and contract-based nature of mining jobs

Women participants, especially SHG members in Alkusa, emphasised the exclusion of women from mining jobs due to a lack of skills, unsafe working conditions, and systemic gender barriers. Interestingly, Alkusa's SHG members also highlighted a stronger role in politics and collective decision-making, which was less pronounced in Kharikabad.

The comparative picture of group insight is presented in the table below:

Table 1: Community Group Insights on Livelihood – Alkusa

GROUP NAME	MAIN LIVELIHOOD ACTIVITIES	MINING-LINKED EMPLOYMENT
Unorganised Labourers	Sanitation worker, daily worker, laborer, driver	None reported
Teachers	Teaching	None reported
Homemakers	Private bank, labour work, driver, private job, taxi driver	None reported
Sanitation Workers	Daily wage workers, business, labour work	None reported
Health Workers	Daily wage workers, shopkeeper	None reported
SHG Members	Politics, daily wage workers, driver, carpenter, sanitation worker, factory labourer, business, salesman	None reported

Table 2: Community Group Insights on Livelihood – Kharikabad

GROUP NAME	MAIN LIVELIHOOD ACTIVITIES	MINING-LINKED EMPLOYMENT
SHG Members	Daily wage workers, coal selling, masonry work, driver, business, domestic work	None reported
Unorganised Labourers	Daily wage workers, coal selling, carpenter, construction worker, business	None reported
Health Workers	Inter-state labour work, construction worker, daily wage workers, coal selling, driver, business	None reported
Homemakers	Daily wage workers, shopkeeper, painter, private jobs	None reported
Teachers	Teaching	None reported
Sanitation Workers	Domestic help, daily wage workers, cooking, coal selling, business	None reported

The findings highlight an opportunity to further strengthen the relationship between mining operations and the socio-economic well-being of local communities. While households in these areas continue to engage in a range of informal livelihoods, there is scope to expand opportunities for local employment and livelihood development, particularly by addressing the barriers that communities may face in accessing mining-related opportunities.

These findings point towards the potential for mining companies and local authorities to deepen community engagement and strengthen livelihood support in ways that create greater and more inclusive benefits for communities living in mining-affected areas

District Mineral Foundation (DMF) funds, corporate social responsibility (CSR) initiatives, and targeted skill development programmes could play a pivotal role in addressing these livelihood gaps.

3.1.3 Household Cooking Pattern

This study examines household cooking patterns to gain a deeper understanding of the compounded challenges faced by communities residing near mining units. By analyzing cooking fuel choices, the study captures the “double burden” of exposure—residents face health and environmental risks both from living adjacent to mining operations and from the indoor pollution generated by coal use. While LPG connections are increasingly available, their uptake as a primary cooking fuel remains limited.

An analysis of cooking fuel usage across the two study sites reveals a significant disconnect between the availability of LPG connections and their actual usage as a primary cooking fuel.

In Kharikabad, the barriers to LPG use are pronounced. While some respondents report LPG use, the majority rely on coal due to its affordability and easy availability. A key infrastructural barrier is the distance to the nearest LPG refill center, which is reported to be approximately four kilometers away, further discouraging regular usage. Affordability remains a central concern, particularly among households engaged in informal or low-income occupations. Although a few households use a combination of fuels—including electricity or gas—coal remains the primary choice due to its low cost and integration into daily routines.

In Alkusa, despite nearly 80% of households reporting access to LPG, coal remains the dominant fuel across all respondent groups. Households primarily use LPG for emergency or occasional cooking, while daily needs continue to be met through coal, which is significantly more affordable and accessible. The average cost of coal is approximately 120 per 50 kg bag, resulting in monthly household expenditure of 600–700, compared to an upfront cost of 1,000 for an LPG cylinder.



Other barriers that limit the effective uptake of LPG include fear of gas-related accidents, and documentation or procedural issues in government schemes. Additionally, in some cases, coal is not only a source of cooking fuel but also an economic livelihood, particularly among SHG members and informal laborers who engage in coal vending.

Overall Summary of Household Cooking pattern is presented below in table:

Table 3: Cost Comparison (Coal vs LPG)

FUEL TYPE	COST ESTIMATE	NOTES
Coal	120 per 50kg bag (600–700/month for most households)	Easily available locally; used in bulk
LPG	1,000 per refill (14.2 kg cylinder)	High upfront cost; refill delays; sometimes not locally available

Table 4 : Common Barriers to LPG usage

BARRIER TYPE	DETAILS
Economic	High refill cost (1,000) vs cheaper coal (120/bag)
Accessibility	Refill centers far (e.g., 4 km in Kharikabad); no doorstep delivery
Livelihood Linkages	Coal vending is a source of income (especially in Alkusa)
Cultural & Behavioural	Habitual use of coal; fear of LPG accidents
Policy & Administrative	Issues with gas programme enrollment, documentation, limited awareness

Across both sites, the persistence of coal as the dominant cooking fuel underscores a complex interplay of economic, logistical, behavioural, and institutional factors. Merely providing LPG connections is insufficient to ensure sustained adoption. Without addressing affordability, improving last-mile delivery systems, mitigating fears around LPG safety, and behavioural change, the shift toward clean cooking fuels is unlikely to be realised. Moreover, coal's deep connection to local livelihoods adds further complexity, calling for interventions that address both energy access and economic stability.

3.2 ENVIRONMENTAL MANAGEMENT AND DUST CONTROL IN AND AROUND MINING AREAS

The study sought to understand environmental management and air pollution control practices associated with mining operations, as well as community perspectives on their implementation and effectiveness. To inform this assessment, a series of questions were discussed with residents of Kharikabad and Alkusa, focusing on conditions observed within and around the mining areas and measures undertaken to manage potential dust exposure. The assessment covered key dimensions including dust-control practices, road and transportation infrastructure, covering of coal-carrying vehicles, green cover and buffer areas, fire incidents, overburden (OB) dump management, safety measures, and air-quality monitoring.

The findings provide community-level insights that can complement technical assessments and help identify opportunities to further strengthen environmental management within and around Kharikabad and Alkusa.

The findings presented below are derived from qualitative insights captured during focus group discussions (FGDs) across different respondent groups.

Table: Community Perspectives on Environmental Management and Air Pollution Control

QUESTION	COMMUNITY RESPONSE (BOTH AREAS)
Are the mines still operational?	Yes, mines are operational in both areas, and dust levels are reported to be worse compared to earlier times.
Dust control measures during coal transportation	Water sprinkling is carried out but is highly irregular, limited in scope, and largely ineffective.
Dust control measures inside the mines	Communities are unaware due to restricted access; no visible or communicated measures reported.
Condition of approach and internal roads	Roads are largely unpaved and poorly maintained, with potholes and dust in summer, and mud/waterlogging in monsoon.
Are trucks covered during transport?	Most trucks are uncovered; in some cases, they are partially covered but not adequately.
Presence of green belt/vegetation buffer	No effective green belt exists. Previous efforts like seed bombing (Kharikabad) and plantation drives (Alkusa) failed due to poor maintenance.
Incidents of uncontrolled fires	Frequent fires reported in Overburden (OB) dumps, especially at night, causing smoke and health hazards.
Status of OB dumps	OB dumps remain exposed, often extending close to human habitation.
Safety measures in place	No effective safety measures observed; communities face continuous exposure to dust and pollution.
Air quality monitoring or information sharing	No air quality monitoring or publicly available information in either area.

3.2.1 Observations on Mining Activity and Dust Pollution

During the Focus Group Discussions (FGDs), respondents confirmed that mining operations are active in both Kharikabad and Alkusa. Participants observed that dust levels in and around the settlements have increased over time, with dust frequently experienced along residential areas, roads, and other public spaces. The persistence of dust was identified as an important environmental concern, with respondents highlighting its implications for everyday living conditions and community health.

Community observations also highlighted the importance of continuing to strengthen dust-management and environmental mitigation measures associated with mining and related transportation activities. Residents expressed the need for greater consistency in dust-control measures. These perspectives underscore the value of complementing existing environmental management practices within mining areas with measures addressing dust exposure in surrounding settlements.





3.2.2 Dust Management during Coal Transportation

During the FGDs, respondents across the different groups identified water sprinkling as the primary dust-control measure they observed in and around mining-related areas. Participants in both Kharikabad and Alkusa noted that sprinkling is undertaken mainly along major transport routes, particularly in areas associated with coal loading and transportation. At the same time, respondents highlighted the scope to further strengthen the frequency, coverage, and consistency of water sprinkling, particularly along internal roads and residential areas where dust exposure is also experienced.

In Kharikabad, homemakers reported observing water sprinkling primarily along main transport roads, while internal community roads and residential areas continue to experience dust accumulation. School teachers and health workers indicated that their direct knowledge of dust-control measures within mining premises is limited due to restricted access to operational areas. Labourers, however, confirmed that water sprinkling is undertaken within mining areas and suggested that greater consistency could further support dust management.

Self-help group (SHG) members highlighted the importance of addressing dust exposure in residential and public areas and suggested that better separation of mining-related transport routes from local roads could help reduce exposure. Informal workers also highlighted the importance of consistent dust-control measures, particularly in areas where occupational and community exposure may overlap.

Similar observations were reported in Alkusa. Homemakers noted that water sprinkling is primarily visible along major transport routes, while dust continues to be experienced along community roads and around residential areas. SHG members and health workers emphasised the importance of maintaining a balanced approach that supports both mining operations and environmental and health considerations, particularly in areas located close to transportation routes.

Overall, across Kharikabad and Alkusa, water sprinkling emerged as the primary dust-management measure observed by respondents. The findings indicate an opportunity to further strengthen the coverage, frequency, and consistency of sprinkling, particularly along routes and locations with higher community exposure. Complementary measures such as improved road maintenance, appropriate covering of coal-carrying vehicles, green buffers, and community-level monitoring could further support effective dust management and contribute to improved environmental conditions in surrounding settlements.

3.2.3 Road Infrastructure

The study examined internal and approach road infrastructure to understand its role in dust generation, mobility, and environmental exposure in mining-affected areas. Road maintenance is an important component of safe and environmentally responsible mining operations.

Field observations and community perspectives from Kharikabad and Alkusa indicate that road conditions vary across locations. While some internal roads have been paved, respondents highlighted the need for continued maintenance and improvement of both internal and approach roads, particularly in areas experiencing frequent movement of mining and other heavy vehicles. Participants noted that sections of unpaved or deteriorated roads can contribute to dust generation during dry periods and may become muddy or waterlogged during the monsoon.

In Kharikabad, homemakers highlighted the presence of potholes and loose materials along some roads, which can make everyday movement more difficult. School teachers and health workers observed that road conditions can contribute to dust generation and may affect the safety and convenience of pedestrians and vehicles. SHG members noted that seasonal conditions influence road-related challenges: during summer, dry road surfaces can generate dust with vehicle movement, while during the monsoon, waterlogging and muddy surfaces can affect mobility. Sanitation workers and informal labourers also highlighted the frequent movement of heavy mining vehicles along these routes and the importance of maintaining roads used by both mining and local traffic.

Similar concerns were reported in Alkusa, where respondents emphasised the importance of regular road maintenance, appropriate paving, drainage, and dust-management measures. Participants also highlighted the potential benefits of better planning and management of routes used by mining-related traffic, particularly where these overlap with local roads and residential areas.



3.2.4 Truck Covering



Appropriate covering of vehicles transporting mined material is an important dust-management measure intended to minimise material spillage and dust dispersion during transportation. The study examined community observations regarding the implementation of this measure along transportation routes in Kharikabad and Alkusa.

Respondents across the different groups observed that coal-carrying vehicles are frequently seen without full covering in both Kharikabad and Alkusa. Informal labourers and sanitation workers reported observing occasional partial covering during daytime transportation, while they perceived that vehicles were more frequently uncovered during night-time movement. These observations indicate an opportunity to further strengthen the consistent implementation of vehicle-covering practices across transportation periods.

Some respondents perceived that operational considerations, including the time required for covering vehicles and transportation schedules, may influence the consistency of this practice. Participants also highlighted the importance of regular monitoring of coal transportation routes to support adherence to prescribed requirements and minimise potential dust exposure along routes passing through or near residential areas.

Overall, the findings highlight the value of strengthening consistent vehicle-covering practices, supported by appropriate monitoring and awareness among transport operators. Ensuring that coal-carrying vehicles remain adequately covered throughout transportation, including during night-time movement, can help reduce material spillage and dust dispersion and complement other dust-management measures along mining-related transportation routes.

3.2.5. Green Cover or Buffer Zone

Respondents across all groups reported that green belts or vegetation buffers around the mines are currently limited in both Kharikabad and Alkusa. Participants recalled earlier initiatives, including seed bombing on portions of over-burden (OB) dumps in Kharikabad and plantation drives in Alkusa, and highlighted the importance of continued maintenance and follow-up to support their long-term effectiveness.



Housewives and SHG members noted that existing vegetation has had limited visible impact on dust mitigation, while school teachers and health workers highlighted the potential role of vegetation in reducing dust and improving local environmental conditions. Labourers and sanitation workers also emphasised the importance of sustained green cover around mining areas to help reduce dust exposure and enhance the ecological and visual environment of surrounding settlements.

Overall, the findings indicate scope to strengthen the development, maintenance, and monitoring of green belts and vegetation buffers in and around mining areas.

3.2.6 Management of OB Dump

All groups in both study areas confirmed that mining waste is regularly dumped openly in non-designated spaces near homes and community spaces. Continuous dumping has led to the formation of large mounds near residential areas, and this activity continues unchecked.

According to respondents, dust from these open dumps pollutes the air, damages vegetation, and causes serious health problems for residents living nearby. Communities also raised concerns that these unattended dumping sites have become hotspots for criminal activities. With the dumps located so close to their homes, respondents emphasised that both health and safety risks have increased significantly.



3.2.7 Safety Measures

Respondents across all groups indicated that practical safety measures to protect communities from mining hazards are largely absent in both Alkusa and Kharikabad.

A few symbolic initiatives, such as warning signboards and wall messages, exist but are limited in scope. Housewives and SHG members suggested that the government should organize awareness programmes to inform residents about safety practices. Labourers and teachers reported that existing regulations like covering of trucks, ill maintained road, no green bu are poorly enforced, leaving residents vulnerable.

Respondents also recommended organising awareness sessions for affected people to better inform them about safety measures and precautionary practices.

When asked about rehabilitation, opinions were mixed. Some respondents expressed willingness to relocate if it ensured greater safety, while others preferred improvements in safety measures that would allow them to continue living in their current habitations.

3.2.8 AQ Monitors

Respondents across all groups reported that they had not observed air-quality monitoring in or around mining areas in either Kharikabad or Alkusa. Participants highlighted the importance of greater access to information on local air-quality conditions and opportunities for communities to share observations and concerns. Labourers also emphasised the value of greater transparency around environmental management and avenues for community participation in monitoring and mitigation efforts.

Participants broadly felt that addressing air pollution was beyond their individual capacity and highlighted the important role of mining operators and relevant authorities in implementing and monitoring appropriate environmental management measures. The findings indicate an opportunity to strengthen community-level air-quality monitoring, access to information, and mechanisms for community engagement, which can support more informed and responsive environmental management.

The analysis highlights the importance of a comprehensive approach to strengthening environmental management practices, including effective implementation of dust-control measures, regular infrastructure maintenance, development and maintenance of green belts, appropriate management of overburden (OB) dumps, and transparent air-quality monitoring. While mining remains an important contributor to economic activity, strengthening these measures can help minimize potential environmental and health impacts on nearby communities. Continued coordination among regulatory authorities, mining operators, and local stakeholders will be important to support compliance, improve environmental performance, and promote healthier living conditions in mining-affected areas.

3.3 HEALTH IMPACT AND HEALTHCARE INFRASTRUCTURE

This section provides a summary of the perspectives of different respondent groups in Kharikabad and Alkusa concerning health issues, the incidence of illnesses within households, and the accessibility to and quality of healthcare services.

3.3.1 Health Impacts

Participants across all groups identified several prevalent health issues affecting their communities. The most commonly reported ailments include tuberculosis (TB), asthma, respiratory diseases, eye infections, gastric problems, skin conditions, and allergies. These illnesses have been ranked from most to least reported to provide a clearer picture of community health priorities, with prevalence levels indicated as High (common), Medium (moderate), and Low (less common). Respondents unanimously linked these health problems to the pollution caused by mining activities, noting a noticeable increase in illness frequency compared to previous years.

Children and the elderly were identified as the most vulnerable members of households, often falling ill more frequently than others. Families typically spend between 1,500 and 2,000 each month on healthcare to manage these illnesses.

Table 5: Prevalence of Key Health Issues in Kharikabad and Alkusa

RANK	HEALTH ISSUE	PREVALENCE IN KHARIKABAD	PREVALENCE IN ALKUSA
1	Respiratory diseases / Asthma / Breathing problems	High	High
2	Diabetes	High	High
3	Blood Pressure / Hypertension	High	High
4	Kidney stones	Medium	Medium
5	Tuberculosis (TB)	Low	Low
6	Eye diseases	Low	Low
7	Skin diseases / Allergies	Low	Low
8	Other conditions	Low	Low

High prevalence – common; Medium prevalence – moderate; Low prevalence – less common

3.3.2 Healthcare Infrastructure and Accessibility

The availability and accessibility of healthcare services remain significant concerns in both Kharikabad and Alkusa. Primary Health Centers (PHCs) are located at least 3 kilometers away, while Community Health Centers (CHCs) are 6–7 kilometers away, requiring travel times of 40 minutes to an hour for routine medical care. Accessing emergency healthcare is even more challenging, as residents often need to travel 13–14 kilometers to reach district hospitals or private facilities.

In Alkusa, respondents said to access a PHC they usually go to Karken which is 2 km away, while for CHC-level care they travel to Kendua which is 2.5-3 KM away. For emergencies, they have to go to Sadar Hospital or private hospitals located around 6-7 km away, as no emergency care is available locally.

Community members also expressed limited trust in government health services, citing frequent shortages of medicines, absentee doctors, inadequate treatment, and general negligence. Routine immunisation remains the main health service regularly provided, primarily through anganwadi centers.

3.3.3 Health Programmes and Check up

Respondents indicated that routine immunisation at an anganwadi center occurs only once a month. Beyond this, health camps are extremely limited. In Kharikabad, community members reported that only two health camps have been organised in recent years, either by private or government hospitals and focused solely on eye checkups. There used to be a colliery hospital about 2-3 km away from Kharikabad, managed by BCCL, which the community found useful, but it has now been closed.

In Alkusa, the situation is similar, with few healthcare services available to the community outside of routine immunisation.

3.4 AWARENESS AND PERCEPTION OF DISTRICT MINERAL FOUNDATION (DMF) FUNDS

This section delves into how communities perceive and understand the District Mineral Foundation (DMF) fund. Although the DMF was established to promote the welfare and development of populations in mining-affected areas, residents in both Alkusa and Kharikabad reported limited awareness of the fund. Many expressed that its objectives and benefits remain largely invisible at the community level, highlighting a disconnect between policy intent and on-the-ground impact.

3.4.1 Awareness and Understanding of DMF

Across both study sites, awareness of the DMF fund was very low. Most respondents—particularly homemakers, sanitation workers, and unorganised labourers—had never heard of the fund before. Even among relatively more informed groups such as school teachers and SHG members, the understanding of the objectives of fund, structure, and benefits was limited or lacking entirely. Several participants mentioned that they were encountering the term “DMF” for the first time during the focus group discussions.

In Alkusa, very few respondents could identify any tangible linkage between local development works and DMF funding. In Kharikabad, some participants speculated that infrastructure works such as roads or electrification might be linked to DMF, but they lacked concrete knowledge. Overall, the intent, mechanisms, and accountability structures of the fund were not commonly understood in either place.

3.4.2 Perceived Benefits and Community Participation

None of the respondent groups reported receiving direct benefits from DMF-funded projects, and participants generally found it difficult to identify any community asset or service clearly linked to the fund. Many noted that there had been no consultations in their areas regarding DMF planning or implementation, highlighting an important gap in participation and visibility given the fund's mandate for inclusive, need-based development.

At the same time, these discussions reflect a growing awareness and interest among community members in understanding and engaging with the DMF, suggesting opportunities to strengthen outreach, transparency, and participatory planning.

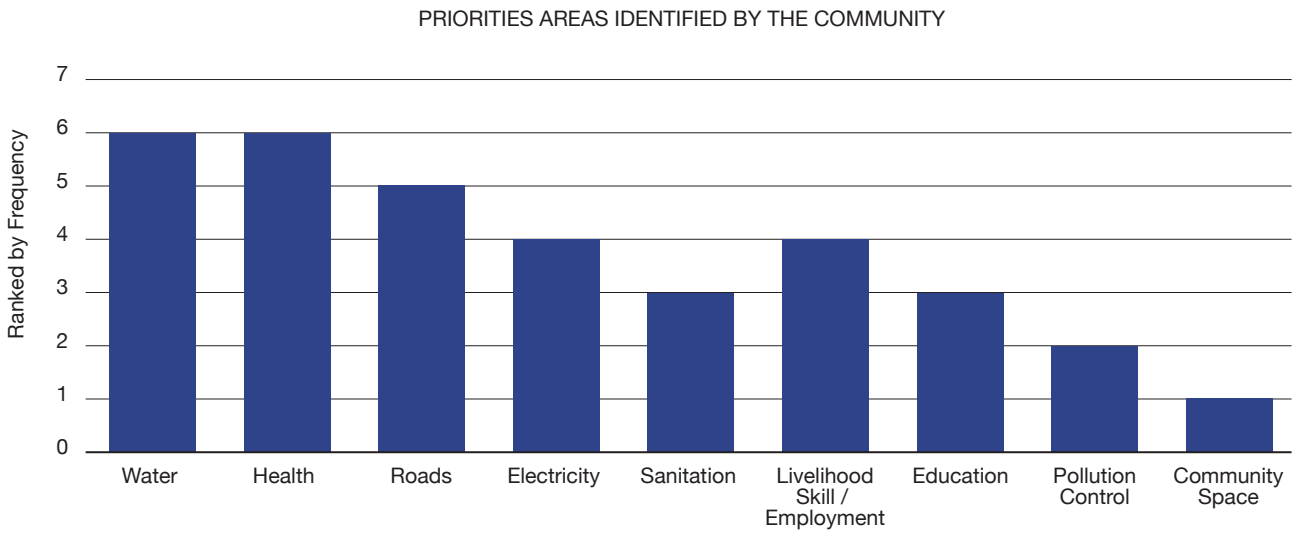
3.4.3 Community Priorities for DMF Utilisation

During the focus group discussions (FGDs), participants were first introduced to the concept of the District Mineral Foundation (DMF) and its mandated sectors of intervention, such as health, education, infrastructure, and environmental protection. Once the purpose of the fund was explained, even those who had not previously heard of DMF were able to articulate thoughtful and context-specific suggestions for its utilisation. This clearly indicates that while awareness is low, the understanding of local needs is strong across both Alkusa and Kharikabad.

Despite limited or no direct benefits from DMF so far, respondents expressed a high level of engagement when asked about community development priorities. The discussion revealed a convergence across respondent groups and geographies around core areas that require urgent attention. These include:

- Access to clean drinking water
- Improved health infrastructure and services
- All-weather roads and internal pathways
- Reliable electricity and street lighting
- Sanitation and proper drainage systems
- Employment and livelihood support
- Education facilities and school infrastructure
- Pollution control and environmental improvements
- Development of community spaces (e.g., parks, community centers)

Figure 3: Priority Areas Identified by the Community (Ranked by Frequency)



These community development priorities were consistently mentioned by all occupational groups—whether housewives, SHG members, teachers, sanitation workers, or unorganised labourers. Groups like the SHG members and health workers also emphasised the need for livelihood support and public health infrastructure, which reflects both their lived experiences and occupational vulnerabilities.

> **If this fund is meant for us, why don't we even know it exists?**
>
> **- SHG member participant, Kharikabad**

> **We don't need promises. We need water, roads, and hospitals that actually work.**
>
> **- Health worker participant, Alkusa**

Table 6: Summary of Respondents' Awareness and Perceptions of the DMF Fund

RESPONDENT GROUP	AWARE OF DMF	CAN IDENTIFY BENEFITS	KNOW DMF-FUNDED PROJECTS?	SUGGESTED PRIORITY AREAS
Housewives	No	No	No	Water, Employment, Health, Electricity, Education
School Teachers	No	No	No	Health, Education, Employment, Pollution Control
SHG Members	Minimal	No	Few assumptions	Health, Road, Water, Livelihood
Health Workers	No	No	No	Health Infra, Livelihood, Road, Water, Electricity
Sanitation Workers	No	No	No	Drainage, Roads, Health, Employment, Water
Unorganised Labourers	No	No	No	Drainage, Community Centers, Electricity, Road

The findings present a timely opportunity to strengthen the impact of the District Mineral Foundation (DMF) in mining-affected communities. While current awareness and visibility of DMF remain limited across both Alkusa and Kharikabad—with many participants learning about it for the first time during discussions—this also highlights significant untapped potential. The DMF, as a legally mandated mechanism to direct mining revenues into local development, holds immense promise for transforming the lives of affected populations.

Encouragingly, even without formal knowledge of the DMF, community members showed a clear and consistent understanding of their local development priorities. This indicates a strong potential for participatory planning if institutional frameworks are made more inclusive and transparent. By improving communication, raising awareness, and creating opportunities for community involvement in DMF decision-making, it is possible to foster meaningful, bottom-up development that addresses the real needs of communities on the ground.


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CHAPTER FOUR

Conclusions and Recommendations

The findings of this study highlight several opportunities to further strengthen environmental management, healthcare access, community participation, and livelihood development in mining-affected areas. The recommendations are intended to build on existing regulatory frameworks, ongoing compliance efforts, and initiatives being undertaken by mining operators, government agencies, and other stakeholders.

Environmental compliance and dust-management measures within mining premises form an important part of ongoing environmental management. Measures such as dust suppression, road maintenance, green-cover development, overburden management, and air-quality monitoring contribute to managing dust emissions within operational areas and can continue to be strengthened in accordance with applicable requirements.

At the same time, community exposure to dust may extend beyond mining premises, particularly along mine-access roads, coal transportation routes, connecting roads, and settlements located in close proximity to mining activities. Therefore, air pollution management can be further strengthened by complementing measures within mining premises with appropriate dust-management measures in surrounding areas. This could include identifying priority exposure locations, strengthening dust control along transport and access routes, undertaking community-level air-quality monitoring, and developing locally appropriate dust-management plans for settlements located near mining and transportation activities.

- Continue strengthening dust-control measures within mining areas, including effective water sprinkling, maintenance of haul roads, appropriate coal transportation practices, green-belt development, and responsible overburden management, in line with applicable regulatory requirements.
- Extend dust-management planning to roads, transport corridors, and other areas surrounding mining operations that may influence community-level exposure.
- Draw on relevant CPCB guidelines and established dust-management practices for roads, transportation, construction, and other applicable activities to inform measures outside mining premises.
- Identify priority areas or stretches around mining operations based on proximity to settlements, transportation intensity, prevailing environmental conditions, and community exposure.
- Develop customised community-level dust-management plans for settlements located in close proximity to mining and coal-transport activities. These plans could identify key sources, priority locations, mitigation measures, responsible stakeholders, and monitoring indicators.
- Strengthen air-quality monitoring at locations that are representative of community exposure, alongside monitoring within operational areas.
- Facilitate transparent sharing of relevant air-quality information with local communities through accessible reporting mechanisms.

- Establish community feedback mechanisms through which residents can share observations and inputs on dust levels and the effectiveness of mitigation measures.

- Periodically review mitigation measures using air-quality data, field observations, and community feedback to support continuous improvement.

This approach can help build a stronger connection between regulatory compliance within mining areas and environmental management in surrounding communities, ensuring that dust-reduction efforts are responsive to local exposure conditions.

2

Enhance Healthcare Services

The study also highlights opportunities to strengthen healthcare services in mining-affected communities and improve their responsiveness to local needs.

- Strengthen primary and community health centres serving mining-affected populations.

- Explore mobile medical units and periodic health camps for settlements where access to healthcare services may be limited.

- Organise regular health camps with an appropriate focus on respiratory and occupational health concerns. Give particular attention to vulnerable groups, including women, children, and older persons.

- Strengthen documentation of respiratory and other environment-related health concerns to support evidence-based health planning.

- Explore opportunities to connect community health information with local environmental and air-quality data to better inform preventive interventions.

3

Strengthen DMF Governance and Community Participation

The findings indicate considerable potential to strengthen community awareness and participation in the planning and implementation of District Mineral Foundation (DMF) initiatives.

- Expand awareness among residents regarding DMF, its objectives, and the development initiatives it can support.

- Encourage participatory planning processes that incorporate community priorities while identifying and prioritising DMF projects.

- Strengthen opportunities for community participation in monitoring the implementation and outcomes of DMF-funded initiatives.

  Promote greater transparency around the identification, funding, implementation, and progress of DMF projects.

- Align DMF investments with locally identified priorities, including clean water, healthcare, roads, electricity, sanitation, education, and environmental improvement.

- Consider developing community-specific DMF priorities for settlements experiencing higher levels of mining-related environmental and socio-economic impacts.

4

Support Livelihood and Energy Transitions

There is also an opportunity to strengthen livelihood resilience and access to cleaner energy options among households in mining-affected areas.

- Promote affordable and accessible clean cooking solutions for households that continue to depend on solid fuels.
- Support skill development and livelihood diversification for households dependent on informal or coal-linked livelihoods.
- Explore opportunities for local employment and enterprise development linked to environmental services, waste management, green infrastructure, and other emerging sectors.

  Strengthen convergence between livelihood initiatives, DMF investments, and relevant government programmes to support sustained economic opportunities.

5

Develop Community-Specific Environmental Management Plans

A key opportunity emerging from the study is to complement broader environmental management frameworks with localised plans that reflect the specific conditions of individual mining-affected settlements.

- Mapping of major pollution sources and potential exposure pathways;
- Identification of priority dust-control locations and transport corridors;
- Community-level air-quality monitoring;
- Road and dust-management measures;
- Green-belt and local environmental improvement initiatives;
- Health and environmental awareness activities;
- Community feedback and grievance-redress mechanisms; and
- Clearly defined responsibilities, timelines, and indicators for monitoring progress.

A community-specific approach can help translate existing regulatory and environmental management frameworks into locally relevant actions, while creating stronger linkages between mining operations, government programmes, and community priorities. Ultimately, this can support continuous improvement in environmental performance and contribute to healthier and more resilient mining-affected communities.

Resident Voices from the Ground

Living near coal mines has been tough.
Every day, I cross mining areas to reach my school, facing dust, stones, and safety risks. My mother has asthma and diabetes, and we spend ₹3,000–5,000 each month on her treatment. Despite financial struggles, I chose to work and educate myself, hoping to inspire other girls in my community. I wish the government and coal companies would focus on improving education, healthcare, clean water, electricity, and roads, and seriously reduce pollution that affects our health.

- Renu Kumari (Teacher, Private School)

Coal mining has severely affected our environment and health. Open-cast mining has increased pollution, and access to clean water, electricity, roads, and healthcare is inadequate. Despite these challenges, I continue to run my school and advocate for community welfare. Mining should support national development but must not harm the local people's well-being. The government and companies need to prioritise infrastructure, health, education, and livelihoods.

- Kailashpati Madheshia (School Principal)

I lost my father in a mining accident at a young age and had to leave school to support my family. Living near the coalfields exposes us to explosions, underground fires, subsidence, and polluted air. Basic facilities like water and healthcare are scarce. I hope authorities will reduce pollution, improve basic facilities, and provide stable jobs for residents. Our childhoods and lives are shaped by these struggles, but with proper support, we can build safer, healthier futures.

- Dinesh Dhari (Daily Wage Labourer)

I have seen Dhanbad change drastically over the decades. Earlier, mining was safer, but today open-cast mining, underground fires, and uncontrolled pollution make life hazardous. Almost every household faces health problems, especially the elderly, and many spend ₹4,000–5,000 monthly on medical treatment. People are frustrated with the lack of basic infrastructure, clean water, electricity, and safe jobs. Mining companies should rehabilitate those in hazardous zones and ensure pollution control and free, accessible healthcare.

- Nepal Chandra Pramanik (Retired Employee)



Annexures

ANNEXURE I

Details of Gondudih Kusunda Colliery (BCCL Cluster:
Part of BCCL's Cluster 6, which includes other mines like Bassuriya, East Bassuriya, and Godhur. The cluster has a combined annual production capacity of 5.87 million tonnes per annum (MTPA).

Mining Type:
Open Cast (surface mining).

Status:
Operational.

Ownership:
Bharat Coking Coal Limited (BCCL), a subsidiary of Coal India Limited, nationalised in 1971-72.

Production Capacity:
5.87 MTPA.

Mining Lease Area:
410 Ha

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