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CENTRE FOR A
People-centric Energy Transition

Survey to Understand Impact of Coal Mine Closure and Transitioning Mining Communities to Sustainable Lives

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Impact Assesment Report



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About the Ashoka Centre for a People-centric Energy Transition (ACPET)

ACPET is a research-focused, transdisciplinary centre within Ashoka University, India, established to drive a sustainable, equitable, and "people-centric" shift towards net-zero emissions. It bridges the knowledge gap in energy transition by collaborating with industry and government to create scalable solutions, covering areas like renewable energy, policy, and technology. For further information about ACPET, please visit: acpet.ashoka.edu.in

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This report documents findings from study to understand Impact of Coal Mine Closure/discontinuation of mining operations and Transitioning Mining Communities to Sustainable Lives and Livelihoods. The study aims to understand the different dimensions of impacted and identify the impacted groups/communities, how they are impacted, their needs and aspirations, as well as identify gaps hindering community transition post-mine closure in the context of shifting mineral priorities. The study is conducted under the Trans-Mine project by Ashoka Centre for a People-centric Energy Transition.

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Abbreviations

ACPET	Ashoka Centre for a People-centric Energy Transition
ANM	Auxiliary Nurse Midwife
ASHA	Accredited Social Health Activist
AWC	Anganwadi Centre
AWW	Anganwadi Worker
BIRSA	Block Level Institute for Rural Skill Acquisition
CAPI	Computer-Assisted Personal Interviewing
CBO	Community-Based Organizations
CCL	Central Coalfields Limited
CIL	Coal India Limited
CSR	Corporate Social Responsibility
CSS	Centrally Sponsored Schemes
DDUKK	Deen Dayal Upadhyay Kaushal Kendra
FGD	Focus Group Discussion
FPO	Farmer Producer Organizations
HH	Household
HWC	Health and Wellness Center
IDI	In-Depth Interview
ITI	Industrial Training Institute
JSSK	Janani Shishu Suraksha Karyakram
KII	Key Informant Interview
KUSUM	Kisan Urja Suraksha evam Utthaan Mahabhiyan
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
MLA	Members of Legislative Assembly
MMDR	Mines and Minerals (Development and Regulation)
MP	Members of Parliament
MSME	Micro, Small, and Medium Enterprise
NDHM	National Digital Health Mission

NRLM	National Rural Livelihood Mission
NSDC	National Skill Development Corporation
NTFP	Non-Timber Forest Products
OBCs	Other Backward Classes
ODF	Open Defecation-Free
PDS	Public Distribution System
PHC	Primary Health Centers
PMJAY	Pradhan Mantri Jan Arogya Yojana
PMKK	Pradhan Mantri Kaushal Kendra
PRI	Panchayati Raj Institution
SANKALP	Skill Acquisition and Knowledge Awareness for Livelihood Promotion
SCs	Scheduled Castes
SDGs	Sustainable Development Goals
SHG	Self-Help Group
SJKVY	Saksham Jharkhand Kaushal Vikas Yojana
STs	Scheduled Tribes

Executive Summary

Study background and objectives: Despite ongoing efforts to promote renewable energy sources, coal remains a vital component of India's energy mix, necessitating a careful balance between energy security and environmental sustainability. The report highlights the socio-economic complexities associated with coal mining, emphasizing both the benefits and challenges it brings to local communities, and the impact when coal mining discontinues and how this affects a community thriving on coal mines operations to cope with the loss of the core economic activity and its manifold ramifications. The introduction of the 'Trans-Mine project' by Ashoka Centre for a People-centric Energy Transition (ACPET) underscores a proactive approach towards ensuring sustainable futures for mining communities, aligning with India's commitment to a balanced energy transition and social equity. The project aims to address key research questions concerning the impacts of mine closure, community response and coping behaviour, and the design of effective transition plans, reflecting a holistic approach towards fostering economic viability, social responsibility, and environmental stewardship in mining regions.

Study Methodology: The study employed a mixed-method design, combining qualitative interviews with quantitative surveys to comprehensively analyze the impact of coal mine closure on adjacent communities. The study covered habitations whose community was mostly involved directly and indirectly on coal mine dependent incomes (located round the mine periphery), instead of surveying full revenue villages, which will have part of its area impacted by mine discontinuity. Through structured interviews with households affected directly and indirectly by the mine discontinuity, and qualitative methods such as Focus Group Discussions (FGDs) and Key-Informant Interviews (KIIs), with other village stakeholders and village representatives, diverse stakeholder perspectives were captured. A formative visit preceded primary data collection. The purpose was to understand the multi-dimensional impact of coal mine discontinuity, and to identify the groups impacted directly and indirectly in consultation with the community; in order to understand key indicators and list issues and questions to be included in the designing of the survey tools.

Focused on the discontinued Rajhara Coal mines in Jharkhand's Palamu district, the study assessed post-discontinuation impacts, emphasizing the unique circumstances surrounding Rajhara's mine discontinuity first in 2010 and then again in 2022, after a brief period of mining operations in a part of the mine complex during 2019-2022. The impact of mine discontinuity was more discernable in Rajhara, due to its isolated setting — not amidst a mine cluster, as in the case of other mining areas, which buffer the impact of closure for a group of mines, as part of the employment loss is absorbed.

In each of the impacted habitations, a list of impacted households (direct and indirect) was generated in discussion with community members and village representatives. A systematic random sampling approach was undertaken to select the households from this list. A total of 201 households were covered across 5 study hamlets/habitations — about 40 households in each habitation. The study habitations were a part of two revenue villages — Rajhara and Pandwa, and discussions with PRI members were undertaken for these two villages respectively to get the village level contextual information. Additionally, 10 FGDs were conducted with the community members. In-depth interviews were undertaken with representatives from Central Coalfields Limited (CCL) and various relevant government officials at district and state level.

Study Findings:

Socio-Economic Profile: The 201 sampled households, averaging 5 members each, totaled 962 individuals. With a working population of 46% (people aged 18-55 years), sex ratio in the sampled households was 932 females per 1000 males. The sampled households were predominantly Hindu (88.6%), with a small proportion of Muslim households (11.4%). Most of the sample households (92%) were from socially vulnerable groups, including Scheduled Castes (SCs), Scheduled Tribes (ST), and Other Backward Classes (OBCs). Nearly all households (98.5%) were native residents of the surveyed villages. Educational attainment levels were modest, with 69% of individuals (above the age of 25 years) reporting some educational attainment. This was true for 80% men and 55% women in this age bracket.

Current livelihoods: Only 24% of households possess agricultural land, however, a majority of those with agricultural land (89.8%) are marginal and tiny farmers and most of these farmers cultivate crops during the Kharif season and the crop out is enough for subsistence purposes. Agricultural productivity is hindered by limited access to irrigation facilities and poor soil and climatic conditions.

Animal husbandry is practiced by 28% of households mostly for self-consumption. Most of those rearing animals own a single cow and/or goats. These households have not practiced animal husbandry for income generation as they have not invested in more animals due to high feeding costs and limited market linkages, and therefore the occupation is mostly of a subsistence variety.

Only a small proportion (6.5%) of households engage in collecting NTFPs, as the forests nearby are degraded or cleaned due to mining activity. Dependence on the nearby forests is mostly for collection of firewood.

The survey revealed that most of the sample households have labour-based household income. There is a reliance on non-agricultural unskilled labour, with 33% of men working under the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) and an additional 34% undertaking other forms of non-agricultural labour. Income of most of the households is contributed by the household men. Only 4% of the households own an enterprise/business/shop and about 18% of households have some service-based income. While at some point in time, 61% HHs worked in the Rajhara mines, currently only 3% are currently employed there. Female participation in income-generating activities was notably low, with women of 78% of households reporting no employment. Average number of occupations in such households is two whereas in the households with both men and women working, there is a greater occupational diversity with an average of three occupations.

Amenities and Facilities: Housing arrangements varied, with a substantial portion residing in semi-pucca (37.3%) or kutcha (34.8%) structures, indicative of a lower socio-economic status. Access to essential services remains inadequate following mine closure. While 97% of households have electricity connections Drinking water is accessible mostly at community level, with reliance on tubewells (45.3%) and public taps (42.3%). Only 21% of households have invested in a private water source. Water scarcity persists, forcing some to resort to borewells, reaching depths of over 300 feet due to depleted groundwater resources. Only about half (51%) of the households have toilets. It was found not only households who do not have toilets defecated in the open, but also, households having toilets, as the dearth of water made it difficult to use and maintain the toilets. The connectivity to the habitations was reportedly good, with markets and public transportation.

conveniently located with a bus stand and railway station within a 3 km radius of the sample habitations. facilitating accessibility for residents.

Economic Impact of Mine Discontinuation: The discontinuation of mining activities has resulted in significant economic downturn, characterized by a sharp decline in both income and employment opportunities. Despite 61% of households having past employment ties to Rajhara mines, only 3% are currently employed there, exacerbating job scarcity. Former mine workers, primarily engaged as contractual labourers, have struggled to secure alternative livelihoods, leading to widespread migration. Moreover, the female labour force has been disproportionately affected, with many remaining unemployed following the loss of their primary income source of labour work in the mines. Local businesses and service providers have also felt the impact, experiencing a substantial decline in clientele and income (average decline of 53% and 55% respectively), primarily due to reduced purchasing power within the community as also a decline in the population after mine discontinuity.

Social Impact: The discontinuation of mines has extended its impact beyond the economic realm, giving rise to a multitude of social challenges. Access to essential services like healthcare and education has been severely compromised, with a notable reduction in the availability of facilities post-mine closure. Prior to 2010, on-site health clinics and monthly health camps were commonplace, but since then, 44% of respondents reported a reduction or downsizing of health facilities. Education has also suffered, with shortages of teachers, inadequate infrastructure, and the absence of modern amenities like smart school facilities. Additionally, concerns about women's safety, substance abuse, and security issues have surfaced, with one-third of respondents expressing worries about the security of girls and women, while approximately 19% noted an increase in alcoholism and other substance-related activities.

Livelihood Aspirations: Due to the challenges posed by mine discontinuation, there exists a strong aspiration among community members to pursue alternative livelihoods. The majority (88.6%) expressed interest in entrepreneurship opportunities, particularly in opening grocery stores or tailoring shops. However, the input in skilling the resident population for alternative or additional livelihoods has been minimal - only 3% of households reported any member of their households enrolled in skills training programs, highlighting the need for enhanced access to skilling initiatives.

Issues of Concern: The report encapsulates the multifaceted impact of mine discontinuation on the socio-economic fabric of the Rajhara Colliery area. It illuminates the challenges faced by both directly impacted mine workers and indirectly dependent local businesses and service providers. With the discontinuation of mining operations, significant shifts in employment patterns, migration trends, and economic activities have been observed, resulting in adverse effects on livelihoods and community well-being. Additionally, the social impact of mine closure, including reduced access to healthcare and education, heightened unemployment, and concerns regarding safety and substance abuse, underscores the need for targeted interventions to address these pressing issues. Moreover, the aspirations of individuals for alternative livelihoods and skilling opportunities reveal a potential pathway for sustainable economic development, necessitating concerted efforts to bridge the gap between aspiration and access to resources and support.

Figure 1: Rajhara mines



1. Study Background

1.1. Study Context

Coal production in India has been a cornerstone of the nation's energy sector and economic growth for centuries. The history of coal mining in India traces back to the 18th century when commercial exploitation began in the Raniganj Coalfield in West Bengal. Initially dominated by private players, the industry underwent a significant transformation with the nationalization of coal mines in 1973, leading to the formation of Coal India Limited (CIL). This move consolidated the sector under a single, state-owned entity, making CIL the largest coal producer in India.

Coal India Limited its subsidiaries accounted for 622.63 MT of coal during the financial year 2020-21. This production figure underscores the significant role played by CIL in meeting India's coal demand. The company operates through its subsidiaries across various coal-producing regions in India, including Jharkhand, Odisha, Chhattisgarh, West Bengal, and Madhya Pradesh, among others.

India is gradually diversifying its energy sources by promoting renewable energy, such as solar and wind power, to reduce dependence on coal and mitigate environmental impacts. Nevertheless, coal will continue to play a significant role in ensuring energy security and supporting industrial growth in India for quite some time. The government and industry stakeholders are exploring cleaner and more sustainable coal technologies to address environmental concerns while meeting the country's growing energy needs.

The presence of coal mines significantly impacts on the lives of people residing in the surrounding areas, often bringing both positive and negative consequences. On the positive side, coal mining operations can provide employment opportunities, contribute to local economies, and spur infrastructure development in otherwise remote and often under-developed regions. However, these benefits are often accompanied by various social, economic, and environmental challenges that can adversely affect communities.

Coal mining can have socio-economic implications for local communities beyond the immediate vicinity of the mines. Rapid industrialization and influx of migrant laborers can strain local infrastructure, such as housing, healthcare, and transportation, leading to social tensions and conflicts over resources. Additionally, dependence on coal-based economies can make communities vulnerable to fluctuations in global coal markets, affecting livelihoods and economic stability.

When coal mines reach the end of their productive life or face closure due to economic, environmental, or regulatory reasons, the process of mine closure becomes critical. Mine closure involves a series of activities aimed at decommissioning the mine site and mitigating environmental impacts. Closure plans typically include measures for land reclamation, ecosystem restoration, and rehabilitation of disturbed areas to minimize long-term environmental degradation.

At the same time, mine closure strategies should address the socio-economic needs of affected communities, including retraining and employment opportunities for displaced workers, economic diversification initiatives, and social support programs. Stakeholder engagement and participatory decision-making are essential to ensure that closure plans reflect the interests and concerns of local communities and stakeholders. However, in most of the mine closure plans, the word

community has ambiguity, and the post mine closure work only revolves around the impact around the full-time employees.

The report thus highlights the effect mine discontinuity has on the lives and livelihoods of people who are directly and indirectly dependent on the mines.

1.2. Legal and Policy Landscape

The legal landscape of mines in India is governed by a comprehensive framework of laws, regulations, and policies aimed at ensuring sustainable and responsible mining practices while promoting the efficient utilization of mineral resources.

- **Legislative Framework:** The Mines and Minerals (Development and Regulation) Act, 1957 (MMDR Act), forms the cornerstone of mining regulation in India, governing the grant of mineral concessions, management of mining leases, and conservation of minerals. Additionally, the Mines Act, 1952, focuses on the health, safety, and welfare of workers in mines, while various state-specific mining laws supplement the MMDR Act.
- **Environmental Laws:** Mining activities in India are subject to various environmental laws and regulations, including the Environment (Protection) Act, 1986, the Forest (Conservation) Act, 1980, and the Water (Prevention and Control of Pollution) Act, 1974, among others. These laws regulate environmental impact assessments, pollution control measures, and conservation of natural resources.
- **Other Key Legislation:** The legal framework also includes the Coal Mines (Nationalisation) Act, 1973, which nationalized coal mining operations, and the Coal Bearing Areas (Acquisition and Development) Act 1957, which governs the acquisition and development of coal-bearing areas.
- **Regulatory Authorities**: Regulatory oversight is provided by the Ministry of Mines at the central level and by respective state governments. Regulatory authorities oversee various aspects, including granting leases, environmental clearances, safety standards, and revenue collection.
- **Corporate Social Responsibility (CSR) Guidelines:** Companies engaged in mining operations are mandated to allocate a portion of their profits towards CSR activities under the Companies Act, 2013.
- **Land Acquisition and Rehabilitation:** The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 (LARR Act), governs the process of land acquisition, compensation, and rehabilitation for mining projects involving the acquisition of land.
- **State-Specific Mining Laws:** Various states in India have their own mining laws and regulations, supplementing the central legislation. These laws may include provisions for state-level environmental clearances, revenue sharing, and other regulatory aspects.

This comprehensive legal framework aims to balance the imperatives of mineral resource development with environmental protection, social welfare, and sustainable development goals. Regular updates and amendments to mining laws reflect evolving regulatory priorities and industry best practices.

Mentioned further are the specific acts and rules related to coal mining[1] in India (with community-centric provision highlighted):

[1] Ministry of Coal – Government of India - https://coal.nic.in/en/acts-rules-policies

Table 1: Acts and rules to coal mining in India

Particular	Date of Issue	Source	Brief
Acts			
Policy Guidelines for use of land acquired under the Coal Bearing Areas (Acquisition & Development) Act, 1957	30/09/2022	https://coal.nic.in/sites/default/files/2022-04/22-04-2022-acts.pdf	The policy guidelines are framed to provide a framework for the utilization of land acquired under this act. It focuses on meticulous land utilization planning, environmental considerations, coal mining operations directives, infrastructure development, community engagement, monitoring and enforcement mechanisms, and periodic review and adaptation provisions.
Mineral Concession (Amendment) Rules, 2022	08/09/2022	https://coal.nic.in/sites/default/files/2022-09/08-09-2022a-act.pdf	The Rules, likely introduce amendments to the existing regulations governing mineral concessions in India. These changes may encompass alterations in procedures for granting concessions, modifications to eligibility criteria for applicants, updates to environmental and safety standards, revisions in royalty rates or revenue-sharing mechanisms, and enhancements in transparency and accountability measures.
The Mineral Laws (AMENDMEN T) ACT, 2020	28/08/2020	https://coal.nic.in/sites/default/files/2020-08/gazette%20biil17032020.pdf	The Act, likely introduces reforms to streamline processes, promote investment, and enhance transparency in the mineral sector. It may include provisions for auctioning mineral blocks, revising royalty rates, addressing environmental concerns, and empowering local communities, aiming to modernize and strengthen the regulatory framework.
Mineral Laws (Amendment) Ordinance, 2020	28/08/2020	https://coal.nic.in/sites/default/files/2020-08/Mineral-Laws_Amendment_Ordinance_2020.pdf	The Mineral Laws (Amendment) Ordinance, 2020, is a temporary law aimed at updating mineral regulations in India. It likely focuses on improving procedures, attracting investment, and ensuring environmental and community considerations in the sector. The ordinance may include measures such as auctioning mineral blocks and revising. royalty rates.
The Coal Bearing Areas (Acquisition and Development) Act, 1957	12/05/2017	https://coal.nic.in/sites/default/files/2019-10/acts_1957.pdf	It is a key legislation facilitating the acquisition and development of coal-rich regions in India. This act provides legal mechanisms for land acquisition, compensation, and regulations governing coal mining operations, aiming to support efficient coal resource utilization while addressing socio-economic and environmental concerns.

Particular	Date of Issue	Source	Brief
The Coal Mines (Conservation and Development) Act, 1974	12/05/2017	https://coal.nic.in/sites/default/files/2019-10/acts_1974.pdf	This act provides a framework for the sustainable utilization of coal resources, focusing on conservation measures, environmental protection, and promoting efficient mining practices. It likely includes provisions for regulating coal mining activities, promoting reclamation and rehabilitation of mined-out areas, and ensuring compliance with environmental standards.
The Coal Mines Provident Fund and Miscellaneous Provisions Act, 1948	12/05/2017	https://coal.nic.in/sites/default/files/2019-08/acts_1948.pdf	This act establishes the Coal Mines Provident Fund Organization (CMPFO) and outlines provisions for the creation of a provident fund for coal mine workers, ensuring their financial security and well-being. Additionally, the act likely includes miscellaneous provisions related to benefits, insurance, and other welfare schemes for coal mine employees, aiming to safeguard their interests and improve their living standards.
The Coal Grading Board (Repeal) Act, 1959	12/05/2017	https://coal.nic.in/sites/default/files/2019-10/acts_1959.pdf	This act abolishes the Coal Grading Board and its functions, which were established to standardize the grading of coal in India. By repealing this act, the government seeks to streamline coal grading processes or transfer responsibilities to other agencies or regulatory bodies. This action reflects an effort to modernize and rationalize the regulatory framework governing the coal sector.
The Coal India (Regulation of Transfers and Validation) Act, 2000	12/05/2017	https://coal.nic.in/sites/default/files/2019-10/acts_2000.pdf	This law provides a legal framework for managing personnel transfers within Coal India Limited, ensuring efficiency and accountability within the organization. Additionally, it may include provisions to validate transfers that occurred prior to the enactment of the act, thereby regularizing past actions, and maintaining organizational stability.
The Coal Mines (Special Provisions) Act, 2015	30/03/2015	https://coal.nic.in/sites/default/files/2019-10/cm_acts_2015.pdf	This act likely provides provisions for the allocation of coal blocks through a transparent auction process, replacing the earlier system of allocation that was cancelled by the Supreme Court of India in 2014 due to irregularities. The act may also include provisions for the transfer of rights, leases, and permissions associated with coal mines, ensuring continuity and efficiency in coal production.
Rules			

Coal Blocks Allocation (Amendment) Rules, 2020 (Notified vide Gazette G.S.R. 394(E) dated 29.05.2023).	26/02/2024	https://coal.nic.in/sites/default/files/2024-02/26-02-2024b-rule.pdf	These amendments may aim to enhance transparency, efficiency, and accountability in the allocation process. They could involve changes in eligibility criteria for bidders, procedures for bidding and allocation, mechanisms for monitoring and enforcement, and provisions for community engagement and environmental protection.
Particular	**Date of Issue**	**Source**	**Brief**
Colletry Control (Amendment) Rules, 2021 (Notified Vide Gazette G.S.R. 546(E) dated 09.08.2021)	26/02/2024	https://coal.nic.in/sites/default/files/2024-02/26-02-2024a-rule.pdf	These amendments may include updates to procedures for obtaining licenses, safety standards, environmental regulations, and enforcement mechanisms. Additionally, the amendments might address issues related to labor welfare, community engagement, and sustainable mining practices.
Amendment in the Constitution of Single Bench Revisional Authorities under Section 30 of MMDR Act, 1957	23/10/2023	https://coal.nic.in/sites/default/files/2023-10/23-10-2023-rule.pdf	These amendments may aim to streamline the revisional process, enhance efficiency, and ensure effective adjudication of disputes related to mining activities. They could include modifications to the qualifications or appointment criteria of members, procedures for hearing and deciding cases, and provisions for transparency and accountability.
Amendment in Colliery Control Rules, 2004 - Stakeholders consultation - regarding	01/11/2022	https://coal.nic.in/sites/default/files/2022-11/01-11-2022a-rule.pdf	These amendments may include provisions aimed at enhancing transparency, participation, and accountability in decision-making processes related to colliery activities. They could involve requirements for engaging with local communities, environmental groups, labor unions, and other relevant stakeholders in the planning, implementation, and monitoring of colliery operations. Additionally, the amendments may outline procedures for conducting public hearings, soliciting feedback, and addressing concerns raised by stakeholders.

Guidelines for the Management of Mines discontinued/abandoned/closed before the year 2009	28/10/2022	https://coal.nic.in/sites/default/files/2022-08/mp_guidelines_may2020-80322_0.pdf	These guidelines may include procedures for assessing the environmental impact of abandoned mines, measures for mitigating environmental hazards, and strategies for reclamation and rehabilitation of affected areas. Additionally, they may outline responsibilities for mine owners, regulatory authorities, and other stakeholders in ensuring the safe and sustainable closure of abandoned mines. Overall, these guidelines aim to address the legacy issues associated with abandoned mines and promote responsible mining practices to safeguard the environment and protectlocal communities
The Coal Mines (Special Provisions) Amendment Rules, 2020	29/05/2020	https://coal.nic.in/sites/default/files/2021-07/CM%28SP%29%20Amendment%20Rules%2C%202020.pdf	These amendments may include updates to procedures for allocation, operation, and management of coal mines, aiming to streamline processes, enhance transparency, and promote efficiency in the coal sector. Additionally, the amendments may address issues such as environmental protection, community engagement, and compliance with safety standards, reflecting the government's commitment to sustainable and responsible coal mining practices.
Coal Bearing Areas (Acquisition and Development) Rules, 1957	05/12/2017	https://coal.nic.in/sites/default/files/2019-08/rules_1957.pdf	These rules outline procedures for the acquisition of land with coal deposits, compensation mechanisms for affected landowners and communities, and regulations for the development and utilization of coal resources. Additionally, they may include provisions for environmental protection, rehabilitation of affected areas, and monitoring of coal mining activities.

Source: Secondary research

Overall, the laws are mostly concerned about the coal mine workers — their safety aspects in the mines, labour welfare aspects, and provision of benefits at the time of mine closure. The larger dependent community angle is more on engagement and consultation during land acquisition and compensation, and on the mitigation of adverse environmental impacts. During the mining operations, CSR activities are mentioned for the dependent communities — mostly to provide services like amenities (electricity, water, etc.), housing for employees, health, education, or other services. However, there is no mention about the transition of the mine dependent communities transition to alternate income dependence or how the development support provided to mine dependent communities should continue when the CSR activities stop.

Figure 2: Study hamlet: 'No.3'



2. Study Methodology

2.1. Study Objectives

The Ashoka Centre for a People-centric Energy Transition (ACPET) has initiated the 'Trans-Mine project' to aid mining communities in India toward sustainable futures amidst the nation's shift towards net-zero emissions. The project focuses on several key areas: analyzing current mine closure practices, understanding impacts of coal mine closures, evaluating community response and coping behaviour for their lives and livelihoods beyond the dependence of a coal mining based local economy and aspirations for development including earning opportunities and careers, identify gaps in the focus on people centric and community centric issues — beyond the provision of just for mine workers alone, co-designing closure plans, and influencing policy decisions around the people centric transition requirements and support. It emphasizes community-specific strategies to ensure economic viability, social responsibility, and environmental sustainability in transitioning away from coal mining, aligning with India's commitment to balanced energy transition, economic growth, and social equity.

The Trans-mine project will unfold in sequential phases, and to inaugurate the groundwork, ACPET has forged a strategic partnership with Athena Infonomics to orchestrate a comprehensive 'Study to Understand the Impact of Coal Mine Closure and the Transition of Mining Communities towards Sustainable Lives and Livelihoods.' The specific objective of this study is to answer the following key research questions:

- Who are affected by mine closure?
- In what ways are they affected?
- What support systems do they have?
- What approaches or interventions could reduce or avoid the negative fallouts on them?

2.2. Study design and approach

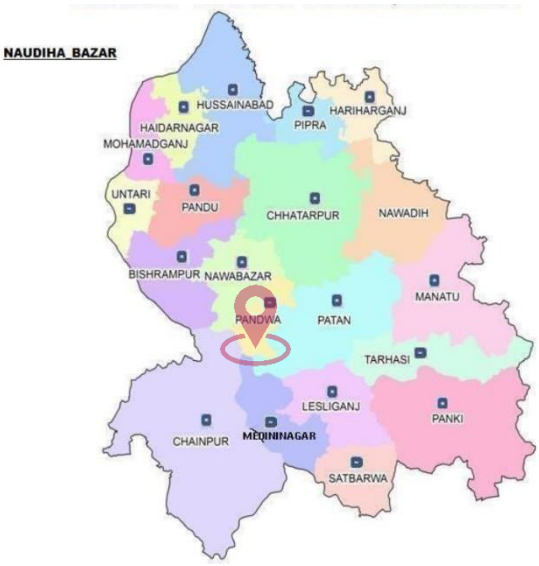
The study followed a ***mixed method design***. This required that qualitative interviews be carried out to further investigate the quantitative findings and capture perspectives of various stakeholders in terms of impact of the mine closure on the communities residing in the vicinity of coal mines. The quantitative data collection method involved administering a structured interview tool to households (HHs) directly or indirectly affected by the mine closure. On the other hand, the qualitative approach included conducting Focus Group Discussions (FGDs), In-depth Interviews (IDIs) and Key-Informant interviews (KIIs) with a range of stakeholders. In addition, *desk review and secondary data analysis of relevant secondary sources concerning the legal and policy landscape* were undertaken to triangulate the information gathered through primary sources.

Before collecting primary data, a *formative visit* was conducted to the project location to identify pertinent stakeholders and relevant indicators for the study. The indicators assisted in refining the study tools used during the research process.

2.2.1. Study site

The study focused on the Rajhara Coal mines under the Central Coalfield Limited (CCL) situated in Palamu district of Jharkhand. The Rajhara mine was started by Bengal Coal Company in the pre-independence period and was nationalized in May 1973. It was an underground mine and later the mine worked on

an open cast method in the remaining reserve of coal in pillars. The Rajhara mine was discontinued in 2010 due to technical and environmental reasons. In 2019, the mine restarted, in some parts, after obtaining all necessary permissions/ environmental clearance. However, soon after, the mines had to be discontinued again in 2022 due to conflict over land acquisition with locals in the area.



The Rajhara mine, located in the Daltonganj Coalfield of Jharkhand, was selected for the study due to its isolated nature and unique circumstances surrounding its discontinuation. This mine was not part of a mine cluster, and therefore there was no buffering for loss of job by adjustment of employment of mine workers (permanent and casual) in adjacent mines. Thus, this was a good site to assess the impact of mine discontinuity. The discontinuation of the mine profoundly affected nearby communities, which relied heavily on coal mining for their livelihoods. Before discontinuation, the mine provided various welfare measures, but these ceased post-discontinuation, significantly impacting the access to facilities and amenities and the socio-economic fabric of the area. A comprehensive research initiative has been carried out to evaluate the pre- and post-2010 and 2022 impacts of mine discontinuation in the Rajhara region, considering the social, economic, and cultural dimensions of the community.

During the study period, the Rajhara mines remained closed, with no clear indication of when or if operations will resume. Various stakeholders have differing views on the possibility of restarting the mines, and responses to the actual discontinuation vary. Notably, historical data suggests that once the mines were closed, they were never restarted. Two major factors contributed to the mines' non-operational status. Firstly, the incomplete physical possession of the land has led to ongoing conflicts, hindering any progress towards reopening. Secondly, the land now falls within the forest periphery and lacks the necessary environmental clearance for mining activities to resume.

The mines encompass a total area of 736 hectares, spanning across two revenue villages, Rajhara and Pandwa, which are further subdivided into 16 hamlets (10 in Pandwa and 6 in Rajhara). For this study, five hamlets were selected based on their distance from the mines and population size. The table below details the chosen hamlets.

Table 2: Sampled hamlets

Name of the sampled hamlets	Name of the revenue village	Approximate distance from the mine	Approximate no. of households
Rajhara colliery school	Pandwa	1.5 Km	70
No. 3	Pandwa	1.5 Km	130
Rajhara Kothi	Rajhara	0.5 Km	120

Rajhara Kurkutia Pati	Rajhara	2.5 Km	150
Rajhara Basti	Rajhara	2 Km	120

2.2.2. Sampling design and sample size

The sample covered under the scope of this study is a representation of the occupation mix of households who were directly and indirectly dependent on coal mine operations. In each of the five hamlets sampled, 40 households were surveyed. In each village, the proportion of households in coal mine jobs and associated jobs, proportion providing trades and services was determined in discussion with community representatives. The list of households in each of these groups (based on the main source of earnings) was compiled with the help of these habitation representatives. The sample households were allocated on a pro-rata basis to each of these lists. Systematic random sampling methodology was followed to select the samples households from the respective lists in each village.

The table provided below outlines the attained final sample size for both quantitative and qualitative data collection methods.

Table 3: Quantitative and qualitative sample size

S. No.	Stakeholders	Data Collection Tool	Sample Size
1	Households - directly and indirectly impacted due to coal mines' discontinuity	Structured interview	201 (5 hamlets * ~40 HHs)
2	Community members*	FGD	10 (5 hamlets * 2)
3	Panchayati Raj Institution (PRI) members	IDI	2 (1 for each revenue village)
4	Representatives from CCL	KII	01
5	Concerned govt. officials (District Commissioner (DC) office, District Mining Officer (DMO))	KII	02
6	Other experts in the field (CMPDL, ISM Dhanbad)	KII	02

*This included separate FGDs with men and women

2.3. Development of research tools

The research tools for this study were meticulously developed to align with the study objectives and capture the diverse perspectives of the communities and stakeholders involved. These tools included a structured interview tool tailored for the households that were directly/indirectly impacted by the discontinuation of mines, separate FGD guides for men and women, an IDI guide for PRI members, and various KII guides targeting government stakeholders and representatives from CCL. The development process commenced following a formative visit to the study site, where initial insights were gathered. Subsequently, multiple rounds of consultations were conducted with the ACPET team to refine and finalize the tools. Furthermore, to ensure accessibility and cultural appropriateness, the finalized tools were translated into the local language before implementation.

2.4. Field Preparations

2.4.1. Pre-testing of the questionnaires

Pre-testing of the structured interview questionnaires was carried out to ascertain its feasibility on the field. The learnings of the pre-testing proved to be essential in making appropriate modifications to the study tools and to give instructions to field investigators about how to correctly administer specific questions.

2.4.2. CAPI development

A mobile application was used for the purpose of quantitative data collection. A computer-assisted personal interviewing (CAPI) questionnaire was developed on Kobo Toolbox post the final pre-testing of questionnaires. This android application was used by the enumerators to capture quantitative answers to structured questionnaires.

Each enumerator and supervisor were given password protected access to it so that only the authorized person can enter and access the data in the system. The use of electronic devices for data collection helped Athena Infonomics in the concurrent monitoring of field data and the progress of research vis-à-vis the study timelines in real-time.

2.4.3. Training

A team of eight field enumerators was locally recruited for the purpose of data collection. All these enumerators had prior experience of data collection for social research. The study team was led by a state coordinator with extensive experience in the field of social research, and documentation and reporting. To ensure the quality of the information collected from the field, an extensive two-day training of field interviewers was organized by the Athena team members and field supervisor. The training schedule was designed such that the first day was devoted to classroom training to provide a conceptual understanding of the study and study tools. The second day was dedicated to mock practice, hands-on experience of CAPI application, data quality assurance mechanism and the ethical protocols to be adhered to during the data collection process.

2.4.4. Data quality assurance

In addition to pre-testing of the questionnaire and CAPI development prior to the commencement of data collection, daily quality checks of the data was conducted by the research team at the backend. This helped giving daily feedback to the field team, who could go back to the data source and rectify mistakes/ collect additional information if required. Sufficient validation checks were carried out for the elimination of inconsistent records due to any data entry error.

2.5. Data Analysis

The analysis of quantitative data was conducted using appropriate statistical tools. Following a thorough examination to of the data and undertaking data cleaning protocols through various checks at all levels, the data analysis and tabulation plan was collaboratively finalized with the ACPET team.

Quantitative data: Utilizing SPSS, the required output tables were meticulously generated. The results are desegregated across the study locations/hamlets. This desegregation framework enabled a comprehensive examination of the data, providing insights into various sub-populations.

Qualitative data: A structured analysis framework was utilised to effectively incorporate qualitative data insights. These qualitative insights enrich and reinforce the findings presented in the report.

The rigorous analysis and integration of qualitative and quantitative data are essential for providing a comprehensive understanding of the key study indicators. By leveraging both types of data, the report offers valuable insights and recommendations aimed at enhancing the effectiveness of the implementation of the program by ACPET.

2.6. Ethical Considerations

The data collection team got consent from all study respondents before starting any interview. This included explaining the purpose and nature of the study and duly informing them that they are under no obligation to participate in the study and there are no negative consequences if they chose not to participate/ or participate. Complete confidentiality and anonymity of participants was ensured.

2.7. Limitations of the Study

- One of the major impacts of the mine discontinuation is the resulting permanent and seasonal migration of households. Due to this phenomenon, families often reside in various cities and only return to Rajhara/Palamu village approximately once every one or two years. Consequently, our study team did not have the opportunity to engage with any such families during the study period.
- Even though the study aims to assess the purchasing power of the households in the wake of the mine discontinuation, it is important to acknowledge that income levels are typically under reported.

Figure 3: FGD with community members (men)



3. Understanding the Impact of Coal Mine Discontinuation and Transitioning Mining Communities: Primary Research Insights

Chapter 3 delineates the key findings resulting from the analysis of data across the study site. Findings emerging from various respondents have been triangulated, wherever possible, from inferences derived via qualitative tools and other stakeholder interactions.

3.1. Socio-economic profile of the village and its inhabitants

The section outlines the findings regarding the respondents' profiles. It is imperative to analyze the beneficiary profiles to understand their socio-economic status. This profiling offers insights into the target demographic and guides future interventions.

According to the PRI members of the respective villages, Pandwa village comprises approximately 800-1000 households (HHs) and is served by 7 Anganwadi centres (AWCs). The village is primarily inhabited by three castes (in addition to a few others): *Chauhan and Mehto* (other backward class (OBC)) and *Paswan* (Schedule Caste (SC)). There is apparently no discernible difference in the standard of living based on caste. However, it is noted that the *Bhuiyan* caste (SC) are more financially vulnerable. In Rajhara village, which has a population of over 1400 HHs, the caste composition is more heterogenous — there are 10-12 different castes, but a similar pattern of homogeneity in terms of standard of living is reported. The *Bhuiyan* and other Harijan communities (SCs) are identified as the most financially disadvantaged. They majorly relied on sorting through coal from discarded mine waste and selling this for income. Presently, these community members engage in wage labour.

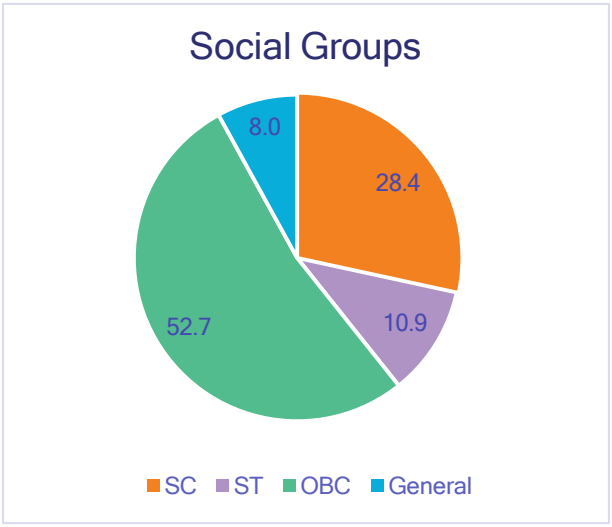
The structured interview schedule was administered to a total of 201 HHs across 5 hamlets of these two revenue villages.

Figure 4: FGD with community members (women)



3.1.1. Household profile

Figure 5: Social groups of the households



The demographic profile of the sampled HHs reveals that the majority (88.6%) are Hindu, while the remaining (11.4%) were Muslims.

The social group composition shows that the majority of sample HHs belonged to socially disadvantaged groups (SCs, Scheduled Tribes (ST), and OBCs), with more than half the sample of OBC households. The second largest social group were the SC households. Almost all the households (98.5%) are native residents of these villages.

Figure 6: Type of household structure

In terms of housing, a significant portion of the sampled HHs resided in *semi-pucca* (37.3%) or *kutcha* (34.8%) structures, with almost all of them owning their homes. This is indicative of a low socio-economic standing of these HHs.

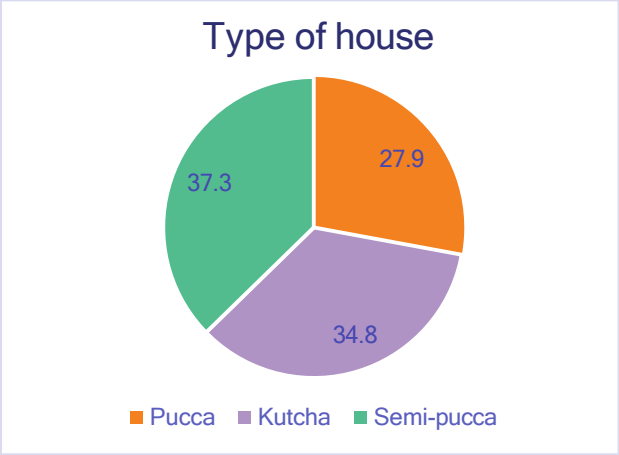
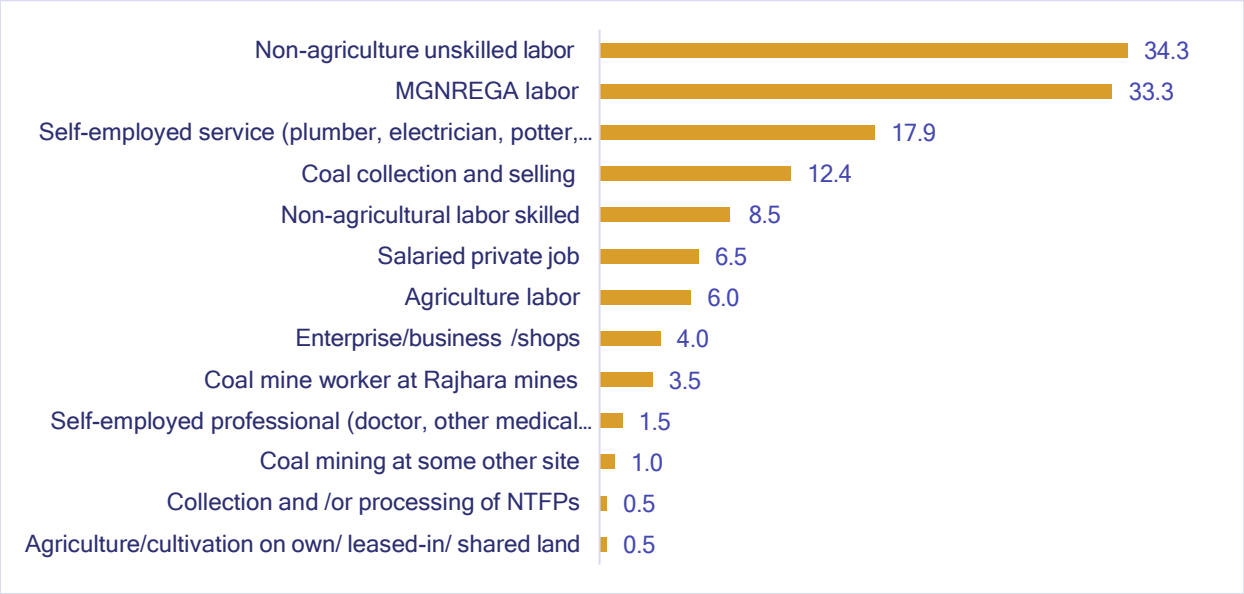


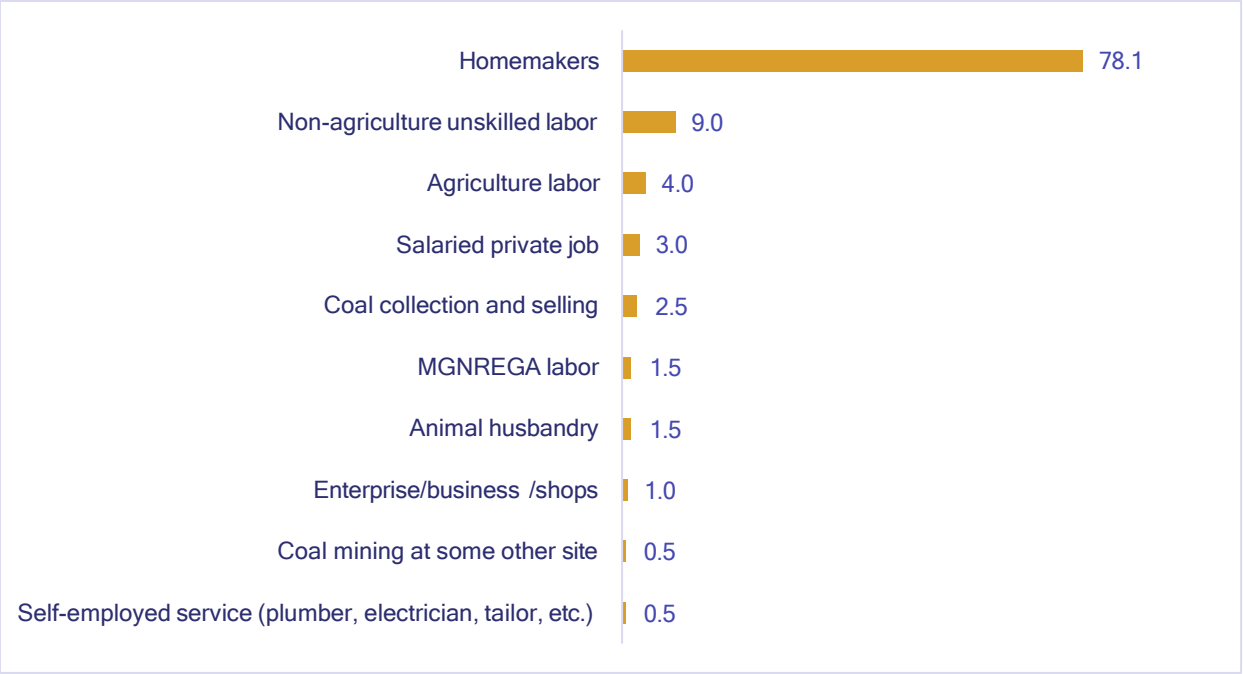
Figure 7: Occupational profile of men in the households.



Source: Primary data analysis

The men of about two thirds of the households reportedly worked as non-agricultural unskilled labour, with almost equal proportion distributed between Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) (33.3%) or and other non-agricultural unskilled labour (34.3%). These HHs often seek casual labor opportunities in Daltonganj, but employment is inconsistent, sometimes as little as 4-5 days per month. Travel costs via bus or tempo range from ₹60-₹100, while the average daily earnings are ₹300. Although the Jharkhand Government announced the Mukhyamantri Gram Gaadi Yojna in October 2023, to provide free or cheaper travel, it remains unimplemented in the study area. While at some point in time, 61% HHs worked in the Rajhara mines, currently only 3% are currently employed there. At present, only 4% of households own an enterprise/ shop/ business and about 18% households have some service-based income.

Figure 8: Occupational profile of women in the households



Source: Primary data analysis

In 78% of the HHs, women did not engage in any income generating activities. Average number of occupations in such households is two whereas in the households with both men and women working, there is a greater occupational diversity with an average of three occupations.

Qualitative discussions with women revealed that they were keen to get some kind of income generation opportunities. Of the remaining, majority worked as unskilled non-agricultural labour. Around 20-30 Self-Help Groups (SHGs) operate in Rajhara, but women often utilize loans for personal consumption rather than income-generating activities. District records indicate 381 households are linked to SHGs, with 32 active groups in Rajhara Colliery.

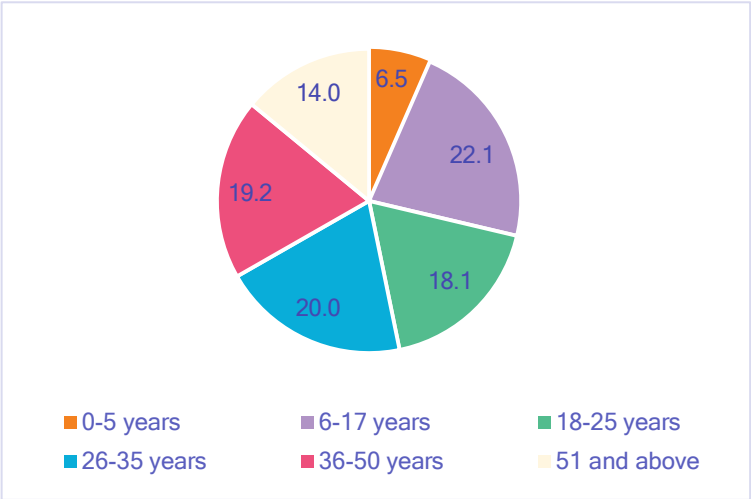
The reported average annual income of the HHs is ₹1,61,553. Presently, 55% of the sampled HHs carry debt burdens, primarily sourced from SHGs (60.4%) and formal banks (32.4%).

3.1.2. Individual profile

The sampled households, averaging 5 members each, totaled 962 individuals, with 52% male and 48% female (sex ratio: 932).

The sampled population exhibits a diverse age distribution, with significant representation in the 6-17 years age group (22.1%), followed by substantial segments in the 18-35 years range (18.1% and 20% respectively), and a significant middle-aged cohort (19.2%). Overall, the working age group of 18 to 55-year-olds constitute 46% of the population. The older population aged 51 and above constitutes a smaller yet notable segment (14%).

Figure 9: Age distribution of the sampled individuals



Source: Primary data analysis

Table 4: Age-wise educational attainment of the sampled individuals

	0-5 years		6-17 years		18-25 years		26-35 years		36-50 years		51 and above	
	N	%	N	%	N	%	N	%	N	%	N	%
Illiterate	50	79.4	6	2.8	12	6.9	27	14.1	62	33.5	79	58.5
Basic Literacy (Class 1-4)	13	20.6	61	28.6	1	0.6	7	3.6	15	8.1	7	5.2
Primary (Class 5-7)	0	0.0	62	29.1	5	2.9	28	14.6	28	15.1	17	12.6
Secondary (Class 8-9)	0	0.0	44	20.7	27	15.5	22	11.5	25	13.5	12	8.9
Higher secondary (Class 10-11)	0	0.0	32	15.0	50	28.7	43	22.4	37	20.0	16	11.9
Completed schooling (Class 12th)	0	0.0	8	3.8	53	30.5	30	15.6	12	6.5	2	1.5
Graduation	0	0.0	0	0.0	19	10.9	29	15.1	5	2.7	2	1.5
Post-graduation	0	0.0	0	0.0	2	1.1	0	0.0	0	0.0	0	0.0
Technical courses	0	0.0	0	0.0	5	2.9	6	3.1	1	0.5	0	0.0
Total	**63**	**100**	**213**	**100**	**174**	**100**	**192**	**100**	**185**	**100**	**135**	**100**

Source: Primary data analysis

The table above shows age-wise educational attainment of all the 962 individuals across the sampled 201 HHs. Among individuals aged 25 and above, 31% had never attended school, revealing a notable gender disparity with 20% men and 45% women falling into this category. Considerable proportion of individuals in the age group of 18-25 years and 26-35 have completed their school education/ graduation, in comparison to individuals aged 36 and above, Majority (58.5%) of the individuals aged 51 and above have had no formal education.

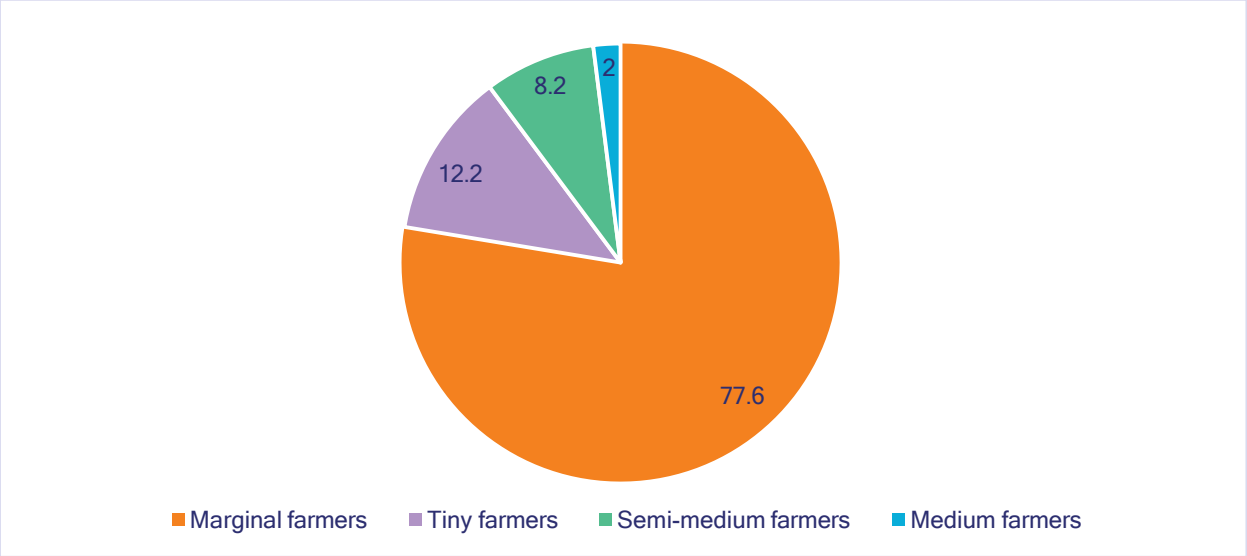
3.2. Dependence on Agriculture, Animal Husbandry and Non-Timber Forest Products (NTFPs) and Animal Husbandry

This section includes dependence on agriculture, animal husbandry and non-timber forest products (NTFPs). It has been found that neither of these activities are significant sources of income. At present, these livelihood avenues are not the primary sources of income and are rather part of the subsistence coping strategies of the HHs.

3.2.1. Agriculture

In the Rajhara Colliery area, there is no active presence of Farmer Producer Organizations (FPOs) or Community-Based Organizations (CBOs). Out of the sampled households, 24% possessed agricultural land, with only 29% of them stating that their land had fertile soil.

Figure 10: Type of farmers (by size of agricultural land)



Source: Primary data analysis

Given the reported size of their agricultural lands, farmers have been divided into the following categories: Marginal farmers (less than 1 hectare of land), Tiny farmers (1-2 hectares of land); Semi-medium farmers (2-4 hectares of land) and medium farmers (4-10 hectares of land). Most of the farmers in the study area fall under the category of marginal farmers with small landholdings.

Irrigation was mostly not practiced by the farmers - only 3 out of 49 farmers have reported some form of irrigation. Agriculture is limited due to unfavorable climatic and soil conditions, other than the lack of irrigation facilities. Moreover, men of Kurkutia Pati hamlet reported the issue of *Nilgai* destroying the crops.

> *"There is some agriculture that is practiced here but due to lack of sufficient rainfall, the entire crops are ruined. Also, in patches where crops do grow successfully, nilgai creates menace and destroys crops."*
> *– A male community member, Rajhara Kurkutia Pati*

"The water that is pumped out of the CCL mines is completely wasted. Instead, if this water was directed towards the nearby lake/ directly to the agricultural lands, it would facilitate the much-needed irrigation facilities that would, in turn, lead to increased agricultural output."
– A PRI member, Rajhara

Among the households owning agricultural land, 47% cultivated crops, primarily consisting of pulses (73.9%), rice (30.4%), maize, and oilseeds (26.1% each), all of which were utilized for self-consumption. No households are covered under the PM-Kisan Scheme.

3.2.2. Animal husbandry

District record indicates approximately 290 households engaging in goat rearing/poultry in the Rajhara colliery area as an alternate income source. In the study conducted, 28% of the sampled HHs reported ownership of animals. Predominantly, these HHs own cows (64.9%), followed by goats (43.9%) and chicken (17.5%). Majority (91.2%) of the HHs utilise animal products solely for self-consumption. Challenges such as limited space availability, high feeding costs of animals, lack of adequate knowledge to prevent animal mortality and lack of market linkages deter the commercialization of animal husbandry.

Of the 5 HHs that do engage in animal husbandry for commercial purposes, three sell milk while two sell whole animal (chicken). The average monthly income of these 5 HHs has been reported to decrease from ₹6,000 before 2010 (when the mines were first discontinued) to ₹3,900 currently.

3.2.3. Non-Timber Forest Products (NTFPs)

Palamu district derives its name from Palash, Lac, and Mahua, emblematic of its abundant natural resources. Historically nestled amidst dense forests, Palamu has long depended on NTFPs for sustenance. Kundari Lac Bagaan, once sprawling over 421 acres near Palamu, was formerly acclaimed as one of Asia's largest Lac forests. However, today, this once-dense forest has dwindled to scattered patches, housing only 60,000 Palash trees and 100 Kusum trees. Designated as a forest conservation project in 2017, efforts aimed to augment the plantation area of Palash and Kusum trees. Previously disregarded Palash flowers, particularly abundant during spring, are now harvested by women from various local SHGs and transformed into herbal *gulaal* (colored powder). The installation of processing machines in May 2017 yielded the inaugural batch of *gulaal*, weighing 400 kg, sold in 50 gm and 100 gm packets on a pilot basis.[2]

Lac production holds particular significance, especially for tribal communities. Traditionally, Palamu has been renowned for its Lac production, primarily sourced from Palash, Kusum, and Ber trees. A recent (2023) success story highlighted by Krishi Vigyan Kendra, Palamu, reveals that each household, on average, possesses around 8 trees, yielding approximately 65-70 kg of raw lac per tree. At prevailing prices of Rs. 400-450 per kg, this translates to an annual income of Rs. 35,000-40,000 per household. [3]

Despite the prevalence of *Mahua*, typically associated with an alcoholic beverage popular in the state, tribals utilize the plant for various other purposes. Mahua tree bark provides relief from

[2] *https://abhinavpahal.nic.in/uploads/aezGF0cCrQ1.pdf*

itching and other skin ailments when applied as a paste. Its root mitigates the venomous effects of scorpion stings and can heal ulcers. Mahua seed oil serves as a cost-effective fuel for lighting lamps and treating skin ailments and fungal infections resulting from excessive water exposure. Tribals use the oil cake as manure and for fishing. Despite its multifaceted utilities, Mahua remains largely unexplored as a livelihood option.[4]

The study findings reveal that only 6% of the HHs collected any NTFPs from nearby forests. All but one of these HHs only collect firewood for self-consumption — and there is no income generation activity based on non-timber forest products. In the Rajhara mines area, neither of the three predominant NTFPs (*palash, lac* and *mahua*) are considered viable livelihood options due to various factors:

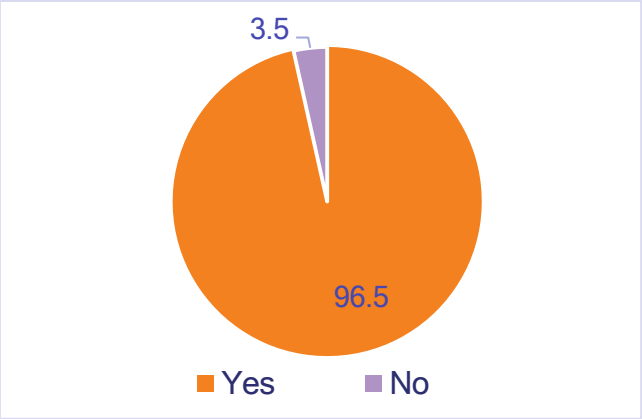
- Lack of exposure/training in utilizing these resources as raw materials to develop finished products.
- Challenges such as storage constraints, theft, and inadequate market linkage hinder larger-scale district production.

3.3. Amenities and Facilities

Understanding the current status of amenities and facilities such as electricity, drinking water, and sanitation infrastructure is crucial for assessing the impact of mine discontinuation on community well-being. This section compares the availability and accessibility of these essential services now to their status during the operational phase of the mines. By examining changes in infrastructure and service provision, insights can be gained into the challenges faced by the community post-mine discontinuation and identify areas for improvement and intervention. Through this analysis, the study aims to capture a comprehensive picture of the evolving socio-economic landscape and infrastructure development in the wake of the mine discontinuation.

3.3.1. Electricity

Figure 11: Households with active electricity



Source: Primary data analysis

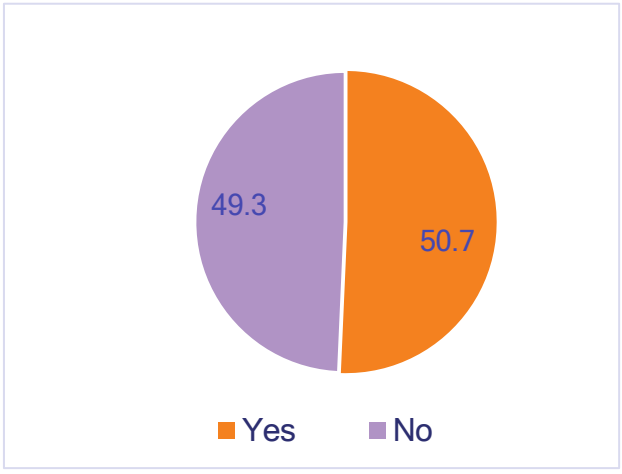
Almost all (96.5%) of the HHs currently have an electricity connection. However, 3% of HHs who do not have an electricity connection (all of whom resided in Rajhara Kothi), resort to illegal means such as electricity theft due to lack of legal electric connection. Prior to the mines discontinuation

in 2010, approximately 75% of households received free electricity from CCL, a service that is still available in only two of the five study hamlets, namely 'No. 3' and 'Rajhara Colliery School', encompassing 40% of the sampled households.

The remaining households are responsible for meeting their electricity expenses, although the Government of Jharkhand offers 125 units of free electricity, with additional usage billed to households. Solar power adoption is currently absent, with schemes like PM-Kusum deemed inapplicable. Solar rooftops are limited to specific facilities such as block offices, schools, staff quarters, CHCs/ PHCs etc. Moreover, the solar grid is located 80km away**,** resulting in no solar streetlights in the area.

3.3.2. Toilets

Figure 12: Availability of toilets



Source: Primary data analysis

In the sampled households, a little over half the households (50.7%) were equipped with toilet facilities. Among these, 53% were installed under government initiatives, with the remaining constructed independently by the households. Further analysis of this data unveils notable socio-economic disparities. Among kutcha households, the majority (64.3%) lack access to toilets, and of those that do, the reliance on government-provided facilities is high (72%). In comparison, pucca households exhibit a higher rate of toilet access (62.5%), with a significant proportion (71.4%) opting for self-construction. Moreover, in terms of social groups, it is noted that that toilet ownership is low - only 49% of the combined SC, ST, OBC households have access to toilets, compared to 76% of households in the general category. Only 17% HHs have a *pucca* structure with a toilet, of which, 67% HHs worked at Rajhara mines at some point in time. This disparity underscores the importance of targeted interventions to address sanitation inequalities and ensure equitable access to essential facilities across diverse socio-economic strata.

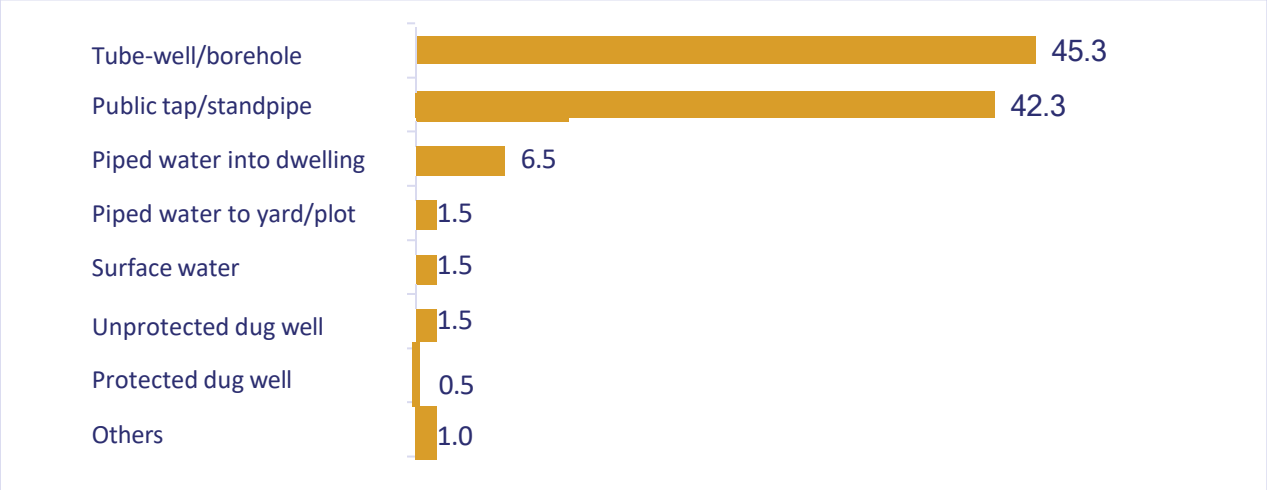
Qualitative findings indicate that of the ~51% of the HHs that did have toilets, majority still defecated in open. Reasons cited for the same included: lack of maintenance of the toilets, no supply of water in these toilets and people being “used to” open defecation. There has apparently been no effective communication on the importance of using and maintaining toilets and on the importance of stopping open defecation.

"Toilets provided by the government have only 2-3 feet deep pits. How is that sufficient? In a house of 5 members, at least 6-7 feet deep pit is required. We are asked to build it on our own. We don't have enough money to provide for our families, how can we invest in building toilets? Hence, we follow the traditional practice of defecating in open."
– A male community member, Rajhara Kothi

3.3.3. Drinking water

Similar to the provisioning of free electricity, safe source of drinking water was available for free for over half the households (57.7%) of the sampled HHs before discontinuation of mines in 2010. The drinking water facilities were mostly provided by CCL at community level through piped water supply delivered through community standposts (37.8%). For a few households, water was delivered at household level through tap connection (6.5%). In pockets, the supply was through handpumps (13.4%). Till date, CCL provides this service to about half the HHs in Rajhara colliery school hamlet (overall 19%).

Figure 13: Current primary source of drinking water



Source: Primary data analysis

Almost all the households (96%) have access to safe drinking water. Currently, the majority of the HHs are either dependent on tubewell/borehole (45.3%) or on public tap (42.3%) for drinking water and 21% of the households have invested in a private water source. Acute water scarcity is prevalent, with reliance on the nearby river, which often dries up in warmer seasons. Those with financial means resort to installing borewells and motors, reaching depths of up to 300 feet due to depleted and polluted groundwater. Jal Jeevan Mission has not reached the households of Rajhara Colliery.

"There are no facilities for water provisioning here. Leave aside water for agriculture purposes, there is even scarcity of drinking water. We are quite stressed because of it. The hamlet has one public handpump on which 30

households are dependent for their water needs. One usually must wait for at least 30 minutes for even a bucket of water."
– A male community member, Rajhara Kurkutia Pati

3.3.4. Proximity to markets and public transports

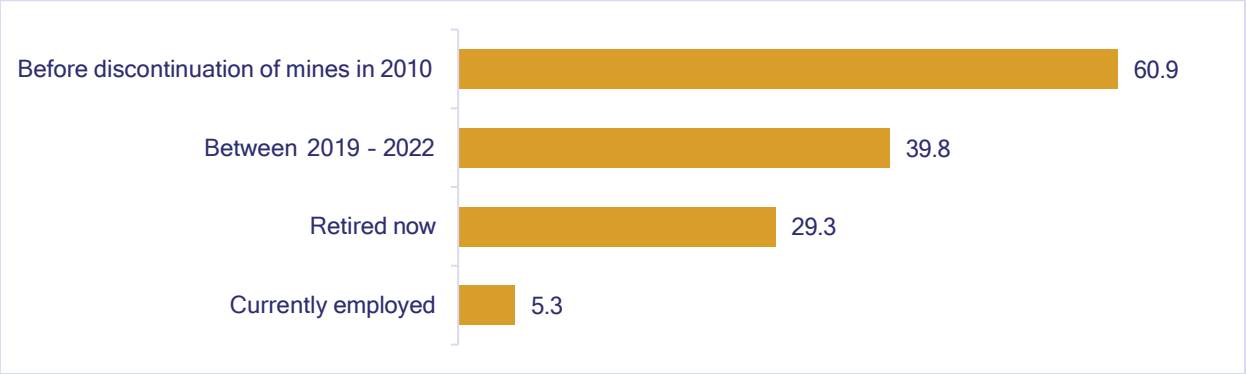
The hamlets are conveniently located near markets and have access to public transport, with a bus stand situated approximately 1 km from the mine site and a railway station just 3 km away. Additionally, markets are easily accessible, also being within a 1 km radius. Moreover, bi-weekly *haats* are held on Thursdays and Sundays.

3.4. Economic impact of the mine discontinuation

The discontinuation of mining operations at Rajhara Mines has had significant economic repercussions, affecting both those directly employed in the mines and those indirectly reliant on its activities. This section examines the economic impact on former mine workers and local businesses/service providers.

3.4.1. Mine workers

Figure 14: Employment period at Rajhara mines



Source: Primary data analysis

While 61% of sample households reported past employment at Rajhara mines, almost 40% of these HH worked when the mines functioned between 2019-2022, while only about 5% are currently employed there. Among those who worked at the mines previously, approximately 61% did so before the mines closed in 2010.

The majority of mine workers, accounting for 61%, were employed as contractual workers, often hired by transportation contractors. Most of these workers, both on the payroll and contractual, were men, constituting 85% and 91%, respectively. While 48% of the permanent employees have a *pucca* HH structure, the same is true for only 14% of the contractual workers. Furthermore, while a majority (73%) of the workers on payroll have a toilet in their house, this was true for only a little over one-third (35.8%) of the contractual workers. These findings underscore the comparatively disadvantaged financial position of contractual workers.

Educational attainment among mine workers varied, with a significant portion having never attended school (37.6%), followed by those with a higher secondary education (class 10th-11th) (21.1%), and those with primary schooling completion (15.8%). Nearly all contractual labourers (97.5%) received no employment benefits from CCL, while payroll employees received additional benefits such as Employment Provident Fund (EPF) (61.5%), gratuity, insurance (59.6% each), and travel allowance (36.5%).

As a result of mine discontinuation, many people lost their means of livelihood resulting in permanent and seasonal migration. Youth, particularly males, are prominent migrants, with entire families relocating in some cases, leaving houses vacant for extended periods, with occasional returns lasting only a few days annually or biannually. Female labour force participation rate declined as most of the women who lost their means of livelihood due to mine discontinuation, continue to be unemployed.

> *"We are permanent employees under CCL and hence we continued to receive our salaries. However, people who worked as contractual workers were in a financially critical position. Many of them were unemployed. Some drove auto-rickshaws. Many people migrated to cities like Delhi, Chennai, Bangalore, Mumbai, and Rajasthan to find employment."*
> *– A male community member, Rajhara Kothi*

In the wake of the mine discontinuation, the average income of mine workers decreased from ₹9,769 in 2010 to ₹7,717 in 2019-2022 but has since risen to ₹11,643. Notably, contractual labourers experienced a similar decline initially, from ₹7,633 in 2010 to ₹6,830 in 2019-2022, but their income has since increased to ₹10,000 currently due to higher labour wages and increased contractual work opportunities. According to discussions with the CCL Manager on-site, when Rajhara Colliery discontinued operations in 2010, a significant portion of the workforce (of those who did not migrate), around 150 workers, transitioned to nearby Hindalco mine, primarily employed for plantation, security, and transportation tasks. However, many later moved to the private sector, with former security personnel joining companies like SIS. Presently, approximately 60 individuals are employed at Hindalco mines, working 15 days a month, and engaging in part-time labour for the remainder.

However, many middle-aged men and youth are unemployed for most part of the month and have transitioned to seeking casual unskilled labour work for which they have to travel to Daltonganj.

3.4.2. Businesses

Of the surveyed households, 15% were engaged in entrepreneurial ventures, ranging from grocery shops, hotels, teashops to dairies, with the majority (58.1%) operating home-based establishments. Presently, 84% of these enterprises remain active. However, during FGDs, community members asserted that many shops like that of laundry, barbers, etc., have shut down since 2010. Additionally, the frequency of local markets in the study area has shifted from regular occurrences to weekly or bi-weekly setups, indicating a notable transformation in local economic activities post mine discontinuation.

Post-mine discontinuation, 74% of these businesses noted significant shifts, citing declines in customer footfall and revenue due to decreased purchasing power and the outmigration of unemployed individuals. On average, these businesses experienced a 53% decline in income. Challenges encountered included a dwindling customer base (91.3%), reduced earnings from the business (82.6%), diminished workforce (30.4%), decreased sales volume (26.1%), and limited product diversity (21.7%). Interestingly, only 2 out of the 23 operational businesses implemented strategies such as price reduction to mitigate these challenges, while the remainder maintained the status quo.

3.4.3. Services

Merely 3% of the surveyed households engage in service-related occupations like electrical repair and laundry, with four out of these six households still actively offering such services. These households uniformly cited negative repercussions stemming from mine discontinuation, witnessing an average income decline of 55% attributed to the diminished purchasing capacity of their clientele.

3.5. Social impact of the mine close

The discontinuation of mining operations has wide-ranging social consequences that go beyond economic considerations. This section examines the social impact on communities following mine discontinuation, focusing on various thematic areas such as health, education, women's safety, and substance abuse. By analyzing these factors, we aim to understand the practical challenges faced by communities in the post-mining transition and explore potential strategies to address them effectively.

3.5.1. Health

As per the sampled HHs, before the discontinuation of mines in 2010, on-site health clinics (36.8%) and monthly health camps (30.3%) were regularly conducted. However, 44% of respondents reported a reduction or downsizing of health facilities following the discontinuation. The households report low incidence respiratory illnesses in households (6.5%). This could be indicative of limited access to diagnostic services and lack of knowledge about the symptoms of common respiratory illnesses.

Qualitative interactions with various stakeholders reveal that the nearest Community Health Center (CHC) is 15 km away in Patan, the block headquarters. Primary Health Centers (PHC) and Health and Wellness Center (HWC) are located at distances of 12 km and 10 km respectively. Men and women resort to private healthcare facilities due to the lack of accessibility to government ones. In emergencies, local population travels through private transportation to Daltonganj as there are only three ambulances at the CHC, one of which is designated for 108 emergency services.

> *"In case of emergency cases/ serious cases, the patient has to be taken to Daltonganj (which is about 25 kms away from here). It can be problematic to find a vehicle for transportation timely. Thus, it is important to have a medical professional in the health centre nearby so that such cases can be catered to." – A male community member, Rajhara Kothi*

Maternal health schemes like Janani Shishu Suraksha Karyakram (JSSK), Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA), and Surakshit Matritva Aashwasan (SUMAN) are available at the CHC, with limited coverage under JSSK in the Rajhara area. Child health initiatives such as Rashtriya Kishor Swasthya Karyakram (RKSK) and Mission Indradhanush lack coverage. Women during FGDs have reported that there was active engagement of Auxiliary Nurse Midwives (ANMs), ensuring timely child immunization. Although family planning receives attention in adolescent health, there are no specific efforts regarding menstrual hygiene, anemia, nutrition, or Aayushman Bharat coverage. Iron and vitamin A tablets are distributed, but awareness is low and the respondents could not tell us whether the IFA tablets were regularly consumed.

Pollution awareness and medical checkups related to the same were not noticed in the area, as informed by the district office there were no specific health initiatives addressing respiratory illnesses. Furthermore, there is no Ear, Nose and Throat (ENT) doctor available at the CHC Patan.

Overall, there are significant gaps and challenges in the study area pertaining to availability of and accessibility of health services.

3.5.2. Education

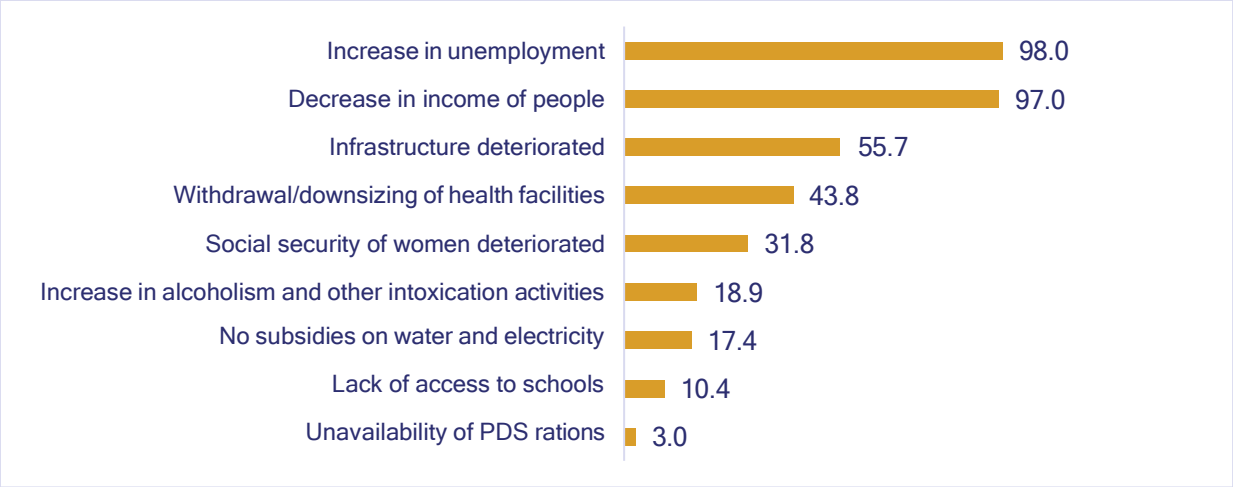
Near Rajhara Colliery, there are two government schools: one middle school (grades 1-8) and one primary school (grades 1-5). The middle school has 215 students and 2 teachers, while the primary school has 65 students and 1 teacher. Both schools participate in government schemes including the Mid-Day Meal scheme, CM Scholarship scheme, and Mukhyamantri Medha Chatravritti Yojana. The nearest private school, Genius Public School, is approximately 4 km away from the village.

Key issues discussed at the district level and in FGDs include shortage of teachers, lack of playgrounds, and absence of smart school facilities. Community members express concerns about quality of education, emphasizing the need for more qualified teachers and accountability for regular classes. No gender-based discrimination was reported in terms of enrollment in schools.

Interaction with the PRI members reflect that among the seven Anganwadi Centers (AWCs) in Rajhara, two operate in separate buildings while the remaining five are run from homes with no provision of essential services like drinking water, child-friendly toilets, play area for children, toys, etc., in any of these. This suboptimal provisioning of necessary infrastructure at AWCs negatively impacts early childhood education outcomes for children in the dependent communities.

3.5.3. Other challenges faced by the communities

Figure 15: Challenges faced by the community post mine discontinuation



Source: Primary data analysis

The biggest challenge faced by the communities post mine discontinuation is that of increase in unemployment and decrease in income of people (as discussed in the preceding section). This is followed by deterioration of infrastructure which refers to general water, housing, and health infrastructure of the hamlets.

About one-third of the respondents raise concerns about the rise in issues pertaining to security of girls and women while about 19% state that there has been an increase in alcoholism and other intoxication activities. During one of the FGDs with men, participants point out there has been that most of the unemployed young boys and youth are addicted to smoking weed and other cannabis and usually "*just loiter around*".

While 3% respondents cited unavailability of ration at Public Distribution System (PDS) shops, all the qualitative interactions suggest that almost every HH in the study hamlets is dependent on the PDS shops and gets 5kg of ration per person.

Figure 16: Development needs of the communities



Source: Primary data analysis

Additionally, on being asked about the development needs of the village, development of roads (90%), access to health facilities (80.6%), piped drinking water supply (74.6%) and household toilets (54.2%) were the most cited requirements.

Qualitative findings further suggest inadequate sewage systems and waste disposal mechanisms in the study area. Household waste is reportedly disposed of in agricultural fields and nearby open areas due to the absence of proper waste management infrastructure.

3.6. Livelihood Aspirations

This section delves into the livelihood aspirations of individuals within mining communities and their access to skilling opportunities. By exploring community members' economic prospects and aspirations for the future alongside the current landscape of skill development programs, the study aims to identify gaps and challenges in the transition towards alternative livelihoods post-mine discontinuation.

Most of the sampled households (88.6%) expressed interest in pursuing additional or alternative livelihoods. Among them, the majority (75.3%) aspire to open their own grocery store or another type of shop. This is closely followed by aspirations for tailoring (49.4%), computer training (41%), animal husbandry (34.8%) and electrical/plumbing (24.2%).

During FGDs, women voiced a keen interest in acquiring skills such as tailoring, as well as in pickle, *papad*, and incense stick making. Meanwhile, men participating in the FGDs showed a preference for local industries, highlighting sectors like cement production, pipeline manufacturing, bulb production, and bottle manufacturing as potential avenues of employment**.**

Figure 17: Support required by households to take up additional/ alternate livelihoods



Source: Primary data analysis

The primary assistance desired by these households includes technical skills training (61.7%), access to financial resources to start businesses (60.7%) and understanding the production process (50.7%).

Only 3% of the households reported any members enrolled in skills training programs. This included computer training and skills training for tailoring and electrical/ plumbing. According to district records, the nearest Industrial Training Institute (ITI) is approximately 10 km from Rajhara, while the nearest Pradhan Mantri Kaushal Kendra (PMKK) center is less than 10 km away. Currently, three skilling schemes are operational in the district — Saksham Jharkhand Kaushal Vikas Yojana (SJKVY), Deen Dayal Upadhyay Kaushal Kendra (DDUKK), and Block Level Institute for Rural Skill Acquisition (BIRSA). However, none of these schemes have candidates registered from Rajhara Colliery.

3.7. Assessment of government programs and schemes

As per the Union budget of 2022, there are a total of 740 Central Schemes in India and 65 (+/-7) centrally sponsored schemes (CSS). In the expenditure budget profile of 2024-25, there are 659 central schemes and 56 CSS under various departments. The description below captures the most relevant schemes along with the scope, current status in Rajhara Colliery, and the applicability of the same in the future.

Table 5: Relevant government programs and schemes

Name of the Scheme	Ministry	Scope	Applicability
Education			
Samagra Shiksha Abhiyan	Ministry of Education	It aims to ensure inclusive and equitable quality education for all, focusing on improving school infrastructure, teacher quality, and learning outcomes	Could help develop playgrounds at school and provide good quality teachers.
Rashtriya Uchchatar Shiksha Abhiyan	Ministry of Education	It aims to improve access, equity, and quality in higher education institutions by providing financial assistance for infrastructure development, faculty recruitment, and academic reforms.	As there is no high school in the area, this scheme could help the local authorities to establish the same.
Kasturba Gandhi Balika Vidyalaya	Ministry of Education	It provides quality education to girls from disadvantaged communities, with a focus on rural areas.	Could be explored as there is a large proportion of vulnerable social groups in the community
Eklavya Model Residential School	Ministry of Tribal Affairs	It provides quality education to tribal children in remote areas through residential schools equipped with modern facilities.	Could be explored
Mid-Day Meal Scheme	Ministry of Education	It aims to improve the nutritional status of school children and encourage attendance and retention in schools by providing free mid-day meals.	This scheme run through the schools and AWCs already, and the quality of the same could be checked
National Means Cum Merit Scholarship Scheme	Ministry of Education	It provides scholarships to meritorious students from economically weaker sections to continue their education beyond class VIII.	With the support of the scholarship, students can go out to pursue higher education.
Skilling			

Pradhan Mantri Kaushal Vikas Yojana (PMKVY)	Ministry of Skill Development and Entrepreneurship	It aims to provide skill development training to youth across India, enhancing their employability and promoting entrepreneurship.	A centre close to the proximity area could be established from where all the skilling programs could be implemented.
Name of the Scheme	**Ministry**	**Scope**	**Applicability**
			Alternatively, extension services in the village can be explored through training a core group and increasing the skills in the village with people who can become master trainers.
National Apprenticeship Promotion Scheme (NAPS)	Ministry of Skill Development and Entrepreneurship	It promotes apprenticeship training by providing financial incentives to employers and apprentices.	This scheme could support job seekers who have undergone some training and are looking for a job.
Skill Acquisition and Knowledge Awareness for Livelihood Promotion (SANKALP)	Ministry of Skill Development and Entrepreneurship	It aims to enhance the institutional capacity of states and union territories to implement skill development programs effectively.	For the state skilling schemes, SANKALP could further enhance the capacity of the programme to expand it in Rajhara area
Skill Strengthening for Industrial Value Enhancement (STRIVE):	Ministry of Skill Development and Entrepreneurship	It focuses on improving the quality and relevance of skill development programs in India.	Could be explored.
Deen Dayal Upadhyaya Grameen Kaushalya Yojana (DDU-GKY)	Ministry of Rural Development	It provides skill training and placement opportunities to rural youth from poor families.	A centre close to the proximity area could be established/linked.The livelihoods focused in different skill development programmes could be explored to explore both specialization (to set up a group of specialized entreprises), or a variation of skills to ensure diversification in employment/self-employment.

National Skill Development Corporation (NSDC) Schemes	Ministry of Skill Development and Entrepreneurship	NSDC implements various skill development schemes and initiatives in partnership with private sector organizations.	Could be explored for employment generation.
Rajiv Gandhi Scheme for Empowerment of Adolescent Boys	Ministry of Women and Child Development	It aims to provide holistic support and guidance to adolescent boys, addressing their health, education, vocational training, and social well-being needs to empower them for a successful transition to adulthood.	For the Youth in the area, this scheme is proposed to be implemented for holistic personality development
Name of the Scheme	**Ministry**	**Scope**	**Applicability**
Rajiv Gandhi Scheme for Empowerment of Adolescent Girls	Ministry of Women and Child Development	It aims to empower adolescent girls in the age group of 11-18 years by providing them with education, life skills, and support for improved health and nutrition, thereby enabling their holistic development and social inclusion	For the Youth in the area, this scheme is proposed to be implemented for holistic personality development
Health			
Family Welfare Schemes	Ministry of Health and Family Welfare	These schemes encompass various programs aimed at promoting family planning, maternal and child health, reproductive healthcare, and population stabilization.	A dedicated programme on menstrual health could be implemented in the area, as this is not accomplished yet
Pradhan Mantri Ayushman Bharat Health Infrastructure Mission	Ministry of Health and Family Welfare	This mission focuses on strengthening healthcare infrastructure in India, including establishing health and wellness centers, upgrading district hospitals, and improving primary healthcare facilities.	Existing HWC, PHC and CHC shall be upgraded, providing better facilities

National Digital Health Mission - NDHM	Ministry of Health and Family Welfare	NDHM aims to create a digital health ecosystem in India by establishing health ID for citizens, digital health records, and a national health data exchange platform to improve access, efficiency, and quality of healthcare services.	This scheme could help citizens to get support online if they do not have the required facilities nearby. If the population can be tested for possible lung disorders — both the elderly and adult population who were exposed to environmental pollution during the times when the mines were functional, any remnant impact can be monitored and treated.
PM Poshan Shakti Nirman Abhiyaan	Ministry of Women and Child Development	This scheme aims to address malnutrition by promoting maternal and child health, breastfeeding, and optimal nutrition practices, ensuring the overall well-being of women and children.	The right applicability of the scheme in due time is to be monitored and recorded
Name of the Scheme	**Ministry**	**Scope**	**Applicability**
Ayushman Bharat Yojana	Ministry of Health and Family Welfare	Also known as Pradhan Mantri Jan Arogya Yojana (PMJAY), aims to provide health insurance coverage of up to ₹5 lakh per family per year to over 10 crore vulnerable families, offering cashless and paperless access to secondary and tertiary healthcare services.	Ayushmaan cards could be made for all the citizens, through camps, door to door service.
Women and Child			
PM Matritva Vandana Yojana	Ministry of Women and Child Development	It provides financial assistance to pregnant and lactating mothers to support their health and nutrition needs during pregnancy and the first six months after childbirth.	If the scheme is not implemented yet, the same could be done with immediate effect and be monitored
Sukanya Samridhi Yojana	Ministry of Finance	It is a small savings scheme aimed at promoting savings for the girl child's education and marriage expenses, offering attractive interest rates and tax benefits.	Based on the applicability in the area, the scheme could be implemented, provisioning a future for young girls

Janani Shishu Suraksha Yojana	Ministry of Health and Family Welfare	It aims to ensure free maternal and child healthcare services, including antenatal care, delivery, and postnatal care, to pregnant women and newborns at government health facilities.	The scheme is already being implemented in the area. The progress of the same is to be measured.
Swadhar Greh Scheme	Ministry of Women and Child Development	It provides temporary shelter, rehabilitation, and support services to women in distress, including victims of domestic violence, trafficking, and other forms of abuse.	Could be explored
National Child Labour Projects	Ministry of Labour and Employment	These projects aim to eliminate child labor by rescuing and rehabilitating child laborers and providing education, vocational training, and support to their families.	This scheme could also be applicable in households where a young member of the family is a bread earner
Integrated Child Development Services	Ministry of Women and Child Development	ICDS is a flagship program aimed at improving the nutritional and health status of children under six years of age and pregnant and lactating mothers, offering services like supplementary nutrition,	The scheme is already being implemented in the area. The progress of the same is to be measured. Separate Anganwadi buildings for centres which are currently operational
Name of the Scheme	**Ministry**	**Scope**	**Applicability**
		immunization, and health check-ups.	from the AWW's house can be explored.
Pradhan Mantri Poshan Shakti Nirman (PM POSHAN)	Ministry of Women and Child Development	It focuses on improving the nutritional status of women and children through a comprehensive approach that includes health and nutrition interventions, behavioural change communication, and monitoring.	As there is no health facility in the mines area, the constant support under the scheme does not reach the women
Mission Indradhanush	Ministry of Health and Family Welfare	It aims to achieve full immunization coverage for all children and pregnant women by intensifying routine immunization efforts and reaching underserved areas with vaccination services.	The scheme is already being implemented in the area. The progress of the same is to be measured.
Facilities			

Svamitva Yojana	Ministry of Panchayati Raj	It aims to provide property rights to rural households by issuing property cards, thereby facilitating transparent land records management, and enabling access to credit and other government services.	Could be explored, concerning the land disputes and matters of ownership
Jal Jeevan Mission	Ministry of Jal Shakti	It aims to provide piped water supply to all rural households by 2024, focusing on the sustainable management of water resources, source sustainability, and demand-side management.	The mission has not reached the Rajhara mines area and shall be implemented on priority. The water delivery through piped water schemes where the water source is from a location of sustainable water reserves, and water delivered at household level can be explored.
Atal Bhujal Yojana	Ministry of Jal Shakti	It aims to improve groundwater management in priority areas through community participation, demand-side management, and promoting water-use efficiency.	In the mining areas where there is less groundwater and misconduct of water utilization, the scheme is especially applicable to recharge the ground water reserves. This will not only impact the water availability in the
Name of the Scheme	**Ministry**	**Scope**	**Applicability**
			current drinking water sources like wells, borewells, tubewells and handpumps, but could also improve the irrigation of the farms.
PM Jan Vikas Karyakaram	Ministry of Rural Development	It is a convergence-based rural development program focusing on providing infrastructure and livelihood opportunities to rural communities through participatory planning and implementation.	Could be explored

Rashtriya Gram Swaraj Abhiyan	Ministry of Panchayati Raj	It aims to strengthen Panchayati Raj institutions and improve governance in rural areas by enhancing their capacity, resources, and effectiveness.	Better governance, could voice the concerns of the area better, hence the scheme could provide better exposure to the PRI members
National Hydrology Project	Ministry of Jal Shakti	It aims to improve the institutional capacity for water resources management and enhance the quality, reliability, and availability of hydrological data for informed decision-making.	Could be explored
Unnat Jyoti by Affordable LEDs for All	Ministry of Power	It aims to promote energy efficiency by distributing LED bulbs at subsidized rates, reducing energy consumption and carbon emissions.	As electricity is one of the concerning issues, this scheme could provide assistance
Deendayal Upadhyaya Gram Jyoti Yojana	Ministry of Power	It aims to provide round-the-clock electricity supply to rural households and agricultural consumers by strengthening rural electricity infrastructure.	The implication of this scheme shall be explored urgently and must be implemented on priority, electricity availability is a game changer for lives and livelihoods.
Swachh Bharat Abhiyan - Rural	Ministry of Drinking Water and Sanitation	It is a nationwide cleanliness campaign launched in 2014 to achieve universal sanitation coverage and make rural India open defecation-free (ODF) by promoting toilet construction, solid waste management, and behaviour change towards	Sanitation and cleanliness shall be prioritised in the area through this scheme, and there can a be a focus on toilets for all, as well as a focus on use and maintenance.
Name of the Scheme	**Ministry**	**Scope**	**Applicability**
		sanitation and hygiene practices.	
Sansad Adarsh Gram Yojana	Ministry of Rural Development	It aims to develop model villages by providing basic amenities, promoting sustainable development practices, and fostering community participation.	The scheme is already being implemented in the area. The progress of the same is to be measured.

PM Adarsh Gram Yojana	Ministry of Rural Development	It aims to develop Adarsh Grams (model villages) by addressing infrastructure gaps, promoting social inclusion, and fostering holistic development.	Could be explored and implemented as applicable
Members of Parliament Local Area Development Scheme	Ministry of Statistics and Programme Implementation	It enables MPs to recommend developmental works in their constituencies using funds allocated for local area development	The initiative must come from Hon. MPs and MLAs in the area, for better implementation the funds.
Livelihood			
Pradhan Mantri Shram Yogi Maandhan	Ministry of Labour and Employment	It is a pension scheme for unorganized sector workers, providing them with a monthly pension after attaining the age of 60.	Could check the applicability of the same
Pradhan Mantri Karam Yogi Maandhan	Ministry of Labour and Employment	It is a pension scheme for small traders and retail businessmen, providing them with a monthly pension after attaining the age of 60.	Could check the applicability of the same
Aatmanirbhar Bharat Rojgar Yojana	Ministry of Labour and Employment	It aims to incentivize the creation of new employment opportunities and promote formal employment through financial incentives for employers and employees.	Could check the applicability of the same
National database for Unorganized Workers	Ministry of Labour and Employment	It aims to create a comprehensive database of unorganized sector workers to facilitate the formulation and implementation of welfare schemes for their benefit.	This scheme could be implemented immediately for the benefit of youth, which will also support in arresting migration
PM Matsya Sampada Yojana	Ministry of Fisheries, Animal Husbandry and Dairying	It aims to promote sustainable development of the fisheries sector by enhancing fish production, improving fisheries infrastructure, and modernizing fishing practices.	As fishery could be a livelihood option explored in the water bodies of mining area, the applicability this scheme could be explored further
Name of the Scheme	**Ministry**	**Scope**	**Applicability**
PM Kisan Samman Nidhi	Ministry of Agriculture and Farmers Welfare	It provides direct income support to small and marginal farmers by transferring ₹6,000 per year in three equal instalments directly into their bank accounts.	As there is no farming, no information available in the area regarding the same.

PM Kisan Urja Suraksha Evam Utthan Mahabhiyan	Ministry of New and Renewable Energy	It aims to promote the use of solar energy in agriculture by installing solar pumps, solarization of existing grid-connected agriculture pumps, and setting up solar power plants on barren lands to generate additional income for farmers.	There is no installation of solar devices in the area. This scheme could be explored further, along with watershed development, rain water harvesting and other programmes to recharge the aquifers.
PM Annadata Aay Sanrakshan Abhiyan	Ministry of Agriculture and Farmers Welfare	It aims to ensure food security and income support to farmers by providing minimum support prices for agricultural produce and implementing various welfare schemes.	As there is no farming, no information available in the area regarding the same.
Krishonnati Yojana	Ministry of Agriculture and Farmers Welfare	It aims to promote sustainable agriculture practices, increase farm productivity, and enhance farmers' income through various interventions, including research and development, market linkages, and infrastructure development.	As there is no farming, no information available in the area regarding the same. But this could be explored further for any initiative in future, for crops that grow on minimum water requirements. Mushroom cultivation for instance can be explored, along with other hardy crops
PM Fasal Bima Yojana	Ministry of Agriculture and Farmers Welfare	It provides crop insurance coverage and financial support to farmers in case of crop loss due to natural calamities, pests, or diseases, ensuring their financial stability and risk mitigation.	If agriculture is introduced back in the area, the scheme could be applicable. Crops affected by Neelgai attack can be protected
Stand-Up India	Ministry of Finance	It aims to promote entrepreneurship among women, SCs, and STs by facilitating bank loans between ₹10 lakh and ₹1 crore to set up greenfield enterprises, fostering	The scheme could be explored with respect to any income generating activities that will be implemented in the area specifically for women, maybe through SHGs
Name of the Scheme	**Ministry**	**Scope**	**Applicability**
		economic empowerment and job creation.	

PM Krishi Sinchai Yojana	Ministry of Jal Shakti	It aims to promote water conservation, efficient water use, and sustainable agriculture practices by enhancing irrigation infrastructure, promoting micro-irrigation, and optimizing water resources management.	If agriculture is introduced back in the area, the scheme could be applicable
PM Mudra Yojana	Ministry of Finance	It provides loans up to ₹10 lakh to non-corporate, non-farm small/micro-enterprises, enabling them to access credit for business activities and fostering entrepreneurship and self-employment.	The scheme could be explored with respect to any income generating activities that will be implemented in the area. This could be linked to skilling initiatives in the area.
National Career Service	Ministry of Labour and Employment	It provides an online platform for job seekers, employers, and skill seekers to connect, facilitating job search, skill development, and career counselling services across various sectors.	This scheme could be implemented immediately for the benefit of youth, which will also support in migration control
PM Jan Dhan Yojana	Ministry of Finance	It aims to provide universal access to banking services by ensuring the availability of bank accounts to all households, promoting financial inclusion, and facilitating direct benefit transfer schemes.	The scheme is already being implemented in the area. The progress of the same is to be measured.
PM's Employment Generation Programme	Ministry of Micro, Small and Medium Enterprises	It aims to promote entrepreneurship and generate employment opportunities in the micro, small, and medium enterprise (MSME) sector by providing financial assistance for setting up new enterprises.	If there is any MSME developed in the area, the scheme benefits could be utilised for the same
Gramin Bhandaran Yojana	Ministry of Agriculture and Farmers Welfare	It aims to strengthen agricultural marketing infrastructure in rural areas by providing financial assistance for the construction of storage facilities like warehouses and cold storage units, reducing post-harvest losses and improving farmers' income.	As there is no farming, no information available in the area regarding the same. But this could be explored further for any initiative in future.
Name of the Scheme	**Ministry**	**Scope**	**Applicability**

Rashtriya Krishi Vikas Yojana	Ministry of Agriculture and Farmers Welfare	It aims to promote holistic development of agriculture and allied sectors by providing financial support for various agricultural development activities, including infrastructure development, research and development, and capacity building.	Could be explored further
Mahatma Gandhi National Rural Employment Guarantee Act	Ministry of Rural Development	It guarantees 100 days of wage employment per household per year to rural households, promoting livelihood security and creating durable assets in rural areas.	The scheme is already being implemented in the area. The progress of the same is to be measured, including the number of days of employment generated per household.
Livestock Insurance Scheme	Ministry of Agriculture and Farmers Welfare	It provides insurance coverage to livestock farmers against the risk of death of animals due to natural calamities, diseases, or accidents, safeguarding their livelihood and reducing economic losses.	As there are a few households in the area having livestock, the insurance will cover the risk and attract more household in the area to practice the same
Sampoorna Grameen Rozgar Yojana	Ministry of Rural Development	It aims to generate wage employment opportunities in rural areas through the creation of infrastructure assets like roads, water conservation structures, and rural connectivity, promoting rural development and poverty alleviation.	Could be explored further
National Scheme on Welfare of Fishermen	Ministry of Fisheries, Animal Husbandry and Dairying	It provides financial assistance and welfare measures to fishermen and their families, including insurance coverage, skill development, and infrastructure support, enhancing their socio-economic status and well-being.	As fishery could be a livelihood option explored in the water bodies of mining area, the applicability this scheme could be explored further
Scheme for Fund for Regeneration of Traditional Industries (SFURTI)	Ministry of Micro, Small and Medium Enterprises	It aims to promote the competitiveness of traditional industries by enhancing their productivity, quality, and market access through cluster-based development interventions and capacity building.	Could be explored further. If this scheme is actively promoted in the region, the fallout will be employment generation.

Name of the Scheme	Ministry	Scope	Applicability
Gramodyog Vikas Yojana	Ministry of Micro, Small and Medium Enterprises	It focuses on the development of village industries and rural entrepreneurship by providing financial assistance, technology support, and market linkage opportunities, fostering economic growth and employment generation in rural areas.	Could be explored further and linked to the skilling programmes that can be implemented in the area.
ASPIRE (Promotion of Innovation, Rural Industry and Entrepreneurship)	Ministry of Micro, Small and Medium Enterprises	It aims to promote innovation and entrepreneurship in rural areas by supporting incubation centers, rural startups, and skill development initiatives, fostering rural economic development and job creation.	Could be explored further
Credit Linked Capital Subsidy and Technology Upgradation Scheme	Ministry of Micro, Small and Medium Enterprises	It provides capital subsidy and incentives to micro, small, and medium enterprises (MSMEs) for technology upgradation and modernization, enhancing their competitiveness and productivity.	Could be explored further
Mahatma Gandhi Institute for Rural Industrialisation	Ministry of Micro, Small and Medium Enterprises	It focuses on research, training, and capacity building in the field of rural industrialization, promoting sustainable development and inclusive growth in rural areas.	Setting up of this institute could provide better opportunity of income generation in the area
Entrepreneurship cum Skill Development Programme (ESDP)	Ministry of Micro, Small and Medium Enterprises	It aims to foster entrepreneurship and skill development among youth by providing training, mentoring, and handholding support to potential entrepreneurs, enabling them to set up and manage successful enterprises.	Could be explored further

Micro and Small Enterprise-Cluster Development Programme (MSE-CDP)	Ministry of Micro, Small and Medium Enterprises	It promotes the development of micro and small enterprise clusters by providing infrastructure support, technology upgradation, and marketing assistance, enhancing their competitiveness and growth prospects.	Could be explored further
Name of the Scheme	**Ministry**	**Scope**	**Applicability**
PM Vishwakarma	Ministry of Micro, Small and Medium Enterprises	This scheme aims to promote technological innovation and entrepreneurship among MSMEs by providing financial assistance for the adoption of innovative technologies and best practices, fostering their growth and competitiveness.	Could be explored further
PM SVANidhi	Ministry of Housing and Urban Affairs	It provides working capital loans to street vendors to resume their livelihood activities affected by the COVID-19 pandemic, promoting financial inclusion and economic resilience among urban street vendors.	The Scheme is currently active till Dec 2024, and this can support the local community members in the area
Solar Energy			
Solar Power (Off-Grid)	Ministry of New and Renewable Energy	This scheme focuses on promoting the adoption of off-grid solar power systems, including solar lanterns, home lighting systems, and solar pumps, to provide electricity in remote and rural areas where grid connectivity is not feasible.	No solar programme is implemented in the area; hence the scheme can facilitate the development of the area in multiple ways.

Kisan Urja Suraksha evam Utthaan Mahabhiyan (KUSUM)	Ministry of New and Renewable Energy	KUSUM aims to promote the use of solar energy in agriculture by installing solar pumps, solarization of existing grid-connected agriculture pumps, and setting up solar power plants on barren lands to generate additional income for farmers.	No solar programme is implemented in the area; hence the scheme can facilitate the development of the area in multiple ways. The scheme can be implemented as linked to aquifer recharge programmes, supporting much needed irrigation interventions to support agricultural innovations.
Solar Power (Grid)	Ministry of New and Renewable Energy	his scheme focuses on promoting the generation of solar power through grid-connected solar power plants, rooftop solar installations, and solar parks to increase the share of renewable energy in the overall energy mix and reduce carbon emissions.	No solar programme is implemented in the area; hence the scheme can facilitate the development of the area in multiple ways.

Source: Secondary research and analysis

Jharkhand, like many Indian states, has implemented several schemes tailored to address the specific socio-economic challenges faced by its population. These schemes do pertain to education, fellowship, agriculture, health etc. These schemes could be further explored in their applicability to the area of implementation. As we have learnt from the district no major scheme is implemented in the area in full force.

3.7.1 Aspirational District Programme

It is to be mentioned, that Jharkhand state has one of the highest numbers of aspirational districts in the country. Palamu district is one of the aspirational districts and comes under the preview of NITI Aayog to monitor. As per the assessment report of Aspirational District Programme, 2022 — Palamu falls in Tier III category i.e. districts that are 11-15 percent away from their target. As per the UNDP assessment of Aspiration Districts, Palamu ranked 60th out of 112 districts (Ranking of districts based on change in net resilience from March 2018 to March 2020). As per the latest Aspirational Districts Programme, Champions of Change Dashboard, Palamu is ranked 110th under District Overall Performance Based on Monthly Delta Ranking which is alarming and needs focus for change. Considering its poor performance, the field is ripe to target many interventions through the multiplicity of development schemes available. Under the Transmine project, establishing a model village in the project area could b envisaged. This will bring in targeted interventions in the area in a holistic manner, and match the local community's idvidual and group aspirations for sustainable development beyond coal mining opportunities.

Figure 18: Rajhara coal mine



4. Conclusion and Recommendations

4.1. Summary and implications of key findings

Socio-economic profile: The socio-economic profile of the respondents provides valuable insights into the demographic composition and economic status of the communities residing in Pandwa and Rajhara villages. It is evident from the analysis that these communities face various socio-economic challenges, including financial disparities, limited access to education and employment opportunities. Most households belong to socially disadvantaged groups, emphasizing the importance of targeted interventions to address inequality and improve livelihood prospects. Additionally, the data highlights the prevalent reliance on non-agricultural unskilled labour, with a significant decline in employment opportunities within the mining sector post-mine discontinuation. Women's participation in income-generating activities remains limited, with the utilization of loans generated from SHGs primarily for personal consumption rather than entrepreneurial endeavours. Furthermore, the high prevalence of household indebtedness underscores the need for financial inclusion and support mechanisms to alleviate economic burdens.

Who are affected by the mine discontinuation?

- Directly Affected Individuals: Former mine workers, including both permanent and contractual employees, constitute a significant portion of those directly affected by mine discontinuation. About 61% of households reported past employment at the mines, with a notable decline in current employment (to 3%). Most of these workers were employed as contractual labourers, often hired by transportation contractors.
- Local Businesses: Around 15% of surveyed households were engaged in entrepreneurial ventures, with the majority operating home-based establishments. Post-mine discontinuation, many businesses noted significant shifts, with a 53% decline in income on average, primarily due to reduced customer footfall and purchasing power.
- Community Members: The broader community, including households relying indirectly on mine activities, also experiences the repercussions of mine discontinuation, such as decreased income opportunities and deteriorating infrastructure.

In what ways are they affected?

- Economic Impact**:** The economic landscape in the aftermath of Rajhara Mines' discontinuation reveals significant ramifications for both directly affected mine workers and indirectly dependent local businesses and service providers. Even though some of the workforce transitioned to a nearby coal mine, discontinuation of the mines prompted migration, particularly among the youth and resulted in a decline in female labor force participation. Local businesses faced challenges post-mine discontinuation, with a notable decline in customer footfall and revenue. The frequency of holding local markets also declined, reflecting changes in economic activities. Despite these challenges, only a few businesses adopted strategies to address the challenges to sustain and grow differently, while most maintained the status quo. Similarly, service providers witnessed a decline in income, attributed to reduced purchasing power among clients as well as a decline in the overall clientele. Despite offering essential services like electrical repair and laundry, opportunities for these essential services also decreased.

- Social Impact: The discontinuation of mining operations has resulted in significant social impacts on the communities, spanning various thematic areas such as health, education, and safety. The downsizing of operations at the on-site health clinic and reduction in health facilities post-mine discontinuation have adversely affected access to healthcare services. Limited coverage of maternal and child health schemes, along with inadequate awareness and infrastructure, pose challenges to maternal and child well-being. In terms of education, challenges such as teacher shortages, lack of facilities, and increased transportation costs for parents have emerged. Additionally, the rise in unemployment and income decline has been a major concern for the communities, exacerbating issues related to women's safety, and substance abuse. The findings underscore the need for targeted interventions to address these challenges and improve the overall well-being of the affected communities, including investment in healthcare infrastructure, education facilities, employment opportunities, and social support systems. Additionally, addressing infrastructure needs such as roads, water supply, and waste management is crucial for enhancing the living conditions and resilience of the communities in the post-mining transition phase.

What support systems do they have?

- Amenities and Facilities: The evaluation of amenities and facilities reveals significant shifts in service provision since the cessation of mine operations and the CSR activities. While electricity access remains relatively stable, the cessation of free electricity services by CCL has notably impacted households. Furthermore, water scarcity emerges as a pressing concern, with dwindling groundwater levels necessitating increased reliance on borewells and public taps. This scarcity underscores broader environmental challenges and the urgent need for sustainable water management solutions. Additionally, sanitation facilities, while present in a significant portion of households, suffer from underutilization, with open defecation persisting due to infrastructure limitations and financial constraints. However, the accessibility of markets and transportation infrastructure remains robust, facilitating trade and mobility for the community. Moreover, PDS shops are available in the vicinity ensuring food security to some extent. These findings emphasize the necessity for targeted interventions to enhance access to essential services and mitigate the underlying issues contributing to their decline following mine discontinuation.

- Existing Programs: There is implementation of multiple basic programs in the area. People are getting benefit from PDS scheme, there are AWWs in the area, Programs such as JSSY and mid-day meal are applicable. Also, facilitation and registration for Aadhar Card has been active in the area.

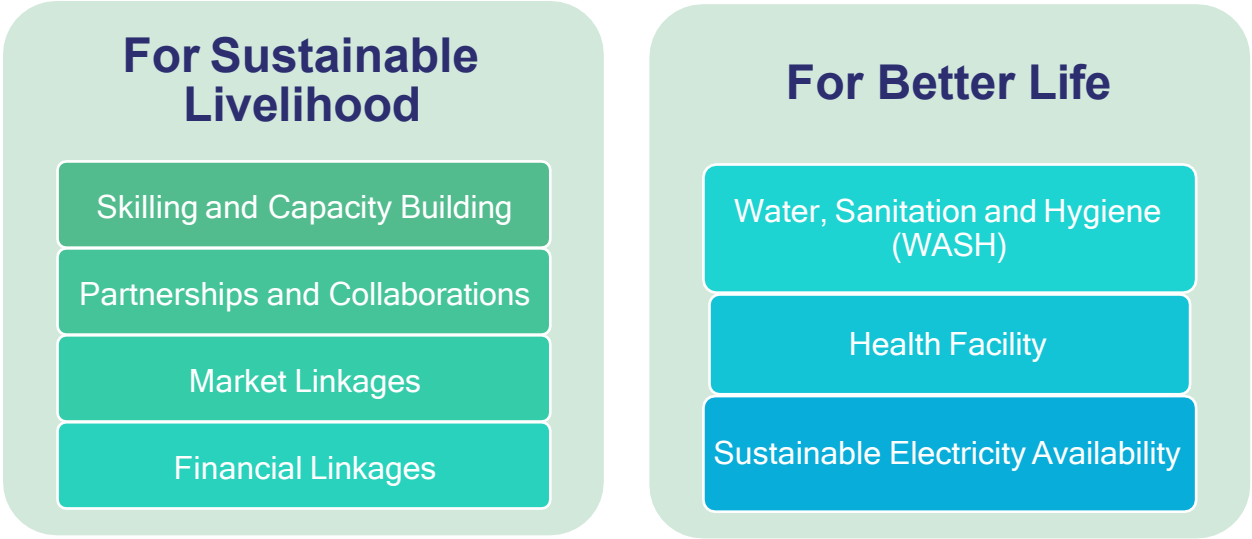
- Subsistence livelihoods: In examining the current status of agriculture and animal husbandry within the Rajhara Colliery area, it is evident that these livelihood avenues serve predominantly as subsistence coping strategies for households rather than primary sources of income, although a fourth or more of the households pursue it. Dependence on forests for NTFP is practiced by a very small proportion of households, and the dependence is primarily for firewood for the home. Agriculture faces several challenges, including small holdings, limited access to irrigation facilities and unfavourable climatic and soil conditions, which hinder agricultural productivity. The absence of active FPOs or CBOs further intensifies these challenges, underscoring the need for enhanced support and infrastructure development in this sector. Similarly, the once

flourishing NTFP sector (at district level), particularly Lac production and Palash flower harvesting, hasn't been adopted in the study area due to factors such as reducing forest cover, lack of awareness

and training on NTFPs and their usage potential and processing requirements, storage constraints, and inadequate market linkages. Despite the multifaceted utilities of Mahua, its potential as a livelihood option remains largely untapped. Moreover, animal husbandry faces constraints such as limited space availability, high feeding costs, and inadequate market linkages, hindering its commercialization. While a small proportion of households engage in animal husbandry for commercial purposes, their reported incomes have decreased over time, reflecting the economic challenges faced by the community post mines discontinuation. Overall, addressing these challenges and revitalizing these livelihood sectors will be essential for promoting sustainable economic development and improving the well-being of the communities in the Rajhara Colliery area.

Livelihood Aspirations: In conclusion, the findings from this section shed light on the livelihood aspirations of individuals within mining communities and their access to skilling opportunities in the wake of mine discontinuation. A significant proportion of sampled households expressed a strong interest in pursuing additional or alternative livelihoods, with aspirations ranging from entrepreneurship in grocery stores to acquiring skills in tailoring, computer training, and animal husbandry. Women particularly emphasized the importance of acquiring skills such as tailoring and engaging in small-scale production activities like pickle and *papad* making. Men, on the other hand, expressed interest in jobs and employment from local industries such as cement production and bulb manufacturing, etc. Despite these aspirations, the study revealed a notable gap between aspiration and access to skilling and self-employment and job opportunities, with only a small percentage of households reporting members enrolled in skills training programs. Challenges in accessing technical skills training, financial resources, and understanding the production process were highlighted as primary barriers. While various skilling schemes are operational in the district, none currently have candidates registered from Rajhara Colliery, indicating a need for targeted interventions to bridge this gap and support the transition towards alternative livelihoods in the post-mining phase.

4.2. Evidence based recommendations



For Sustainable Livelihood

Skilling and Capacity Building

Evidence:

- Only 3% of households reported any members enrolled in skills training programs. Despite this, 89% expressed keen interest in pursuing additional or alternative livelihoods.
- 78% of households reported that women did not engage in any income-generating activities. Among the remaining households, most women worked as unskilled non-agricultural laborers.
- 28% of households own animals, however, 91% only use animal products for self-consumption.
- 24% of households possess agricultural land, with only 3 out of 49 farmers having some form of irrigation systems in place.

Recommendations:

Community Engagement and Awareness Campaigns:

- Engage with community leaders to identify and reach potential candidates for skilling programs, leveraging their influence to encourage participation.
- Conduct targeted awareness campaigns to inform residents about available skilling schemes, highlighting the benefits and enrolment process to maximize participation and uptake.

Strengthening SHGs:

- Strengthen existing SHGs in the village by providing comprehensive training programs aimed at empowering women within these groups.
- Offer specific training sessions covering financial literacy, entrepreneurship, and basic business management to equip women with essential skills for managing group enterprises effectively.
- Conduct skill development workshops focused on locally viable income-generating activities, enabling women to explore alternative livelihood options and enhance their economic resilience.
- Facilitate the formation of group enterprises based on the resources, interests and capabilities of SHG members (can include agriculture and animal husbandry based enterprises), encouraging diversification of economic activities and maximizing opportunities for income generation.

Improved Animal Husbandry

- Provide comprehensive training and resources on improved animal management practices, covering feeding, breeding, healthcare, and disease prevention.
- Address existing knowledge gaps among farmers to foster sustainable livestock-rearing practices and enhance economic prospects for the community.

Agriculture Revival

- Explore educational initiatives aimed at empowering farmers with knowledge of comprehensive regenerative agricultural practices, including effective land preparation techniques, soil health management, and weed management strategies.
- Provide training and technical support on holistic farming methods to enhance crop productivity, resilience to environmental challenges, and overall agricultural sustainability.
- Introduce efficient irrigation methods such as drip irrigation, sprinkler systems, and mulching to optimize water use and enable cultivation in areas with limited water resources.
- Enhance water efficiency in agriculture, ensuring sustainable water management practices to mitigate the impact of water scarcity on crop production.

Partnerships and Collaborations

Evidence:

- According to district records, the nearest Industrial Training Institute (ITI) is approximately 10 km from Rajhara, while the closest Pradhan Mantri Kaushal Kendra (PMKK) center is less than 10 km away. Currently, three skilling schemes are operational in the district — Saksham Jharkhand Kaushal Vikas Yojana (SJKVY), Deen Dayal Upadhyay Kaushal Kendra (DDUKK), and Block Level Institute for Rural Skill Acquisition (BIRSA). However, none of these schemes have candidates registered from Rajhara Colliery.
- District records indicate that 381 households are linked to Self Help Groups (SHGs), with 32 active groups in Rajhara Colliery. However, women often utilize loans for personal consumption rather than for income-generating activities.
- 90% of farmers can be categorized as marginal or tiny farmers, yet none of them are covered under the PM-Kisan Scheme.

Recommendations:

Linking people to relevant government schemes:

- Link eligible candidates to the nearest ITI and PMKK center to facilitate access to existing training programs.
- Link farmers and SHG groups to relevant government schemes (many of which have been listed in the report) to facilitate income generating activities.

Collaboration with domain experts:

- Animal husbandry and agriculture promotion initiatives need to be carried out in collaboration with specialized agencies that possess expertise in the domain.
- Collaborate with government agencies, NGOs, and other stakeholders to provide support and resources for SHG capacity building and enterprise development.

Collaboration with relevant government departments:

- Animal husbandry and agriculture promotion should also involve the agriculture department and Kisan Seva Kendras to ensure comprehensive support and guidance for farmers.

Market Linkages

Evidence:

- Currently, there is a notable absence of market linkage and a well-structured supply chain for any of the produce in the vicinity of Rajhara Colliery.
- Moreover, there is a lack of initiative documented from any source regarding market linkages, given the absence of specific income generation activities identified in the area.

Recommendations:

Establishment of Designated Supply Chain:

- Establish a designated supply chain for agricultural produce, dairy and poultry collection to streamline distribution and maximize market access.
- Raise awareness among the population about the importance of the supply chain, emphasizing its role in improving income generation opportunities and promoting economic growth in the community.

Thorough Market Mapping:

- Conduct thorough market mapping before engaging in any income-generating activity, identifying key stakeholders, market dynamics, and relevant factors.
- Assess the viability of income derived from each product through market research and analysis, ensuring informed decision-making and maximizing returns on investment.

Implementation Strategy:

- Develop a comprehensive implementation strategy for establishing the designated supply chain and conducting market mapping activities.
- Engage local stakeholders, including farmers, producers, traders, and relevant government agencies, to collaborate on the implementation process and ensure its success.

Capacity Building:

- Provide training and capacity-building programs to local entrepreneurs and producers on market linkages, value chain development, and business management.
- Equip participants with the skills and knowledge necessary to navigate the market effectively and capitalize on income-generating opportunities.

Financial Linkages

Recommendations:

Access to finance and credit:

- Enable access to microfinance schemes and credit for investment for farmers, SHGs, and other households (for income generating activities).

Support for small scale enterprises:

- Encourage the establishment of small-scale livestock enterprises by providing support for infrastructure development, such as the construction of low-cost shelters and feeding troughs.
- Empower farmers to diversify their income sources and increase resilience through the development of sustainable livestock businesses.
- Facilitate access to financial resources for infrastructure development and investment in agricultural enterprises.

Value addition:

- Facilitate value addition (in terms of packaging and products — like ghee, paneer, curd, khoya) and marketing initiatives to increase the profitability of livestock products and improve income generation opportunities for farmers.
- Enhance on-farm value addition within the village to optimize profitability and livelihood opportunities.

For Better Life

Water, Sanitation and Hygiene (WASH)

Evidence:

- The majority of households (45.3%) rely on tubewells/boreholes, while 42% depend on public taps for drinking water.
- There is acute water scarcity, especially during warmer seasons, with reliance on a nearby river that often dries up.
- The Jal Jeevan Mission (JJM) has not yet reached households in Rajhara Colliery.
- Among the sampled households, 51% possessed toilet facilities. However, even within this subset, a significant majority continued to resort to open defecation. Reasons for this preference included inadequate maintenance of existing toilets, lack of water supply, and entrenched habits favoring open defecation.
- The study area suffers from inadequate sewage systems and waste disposal mechanisms. Household waste is often indiscriminately disposed of in agricultural fields and nearby open areas due to the absence of proper waste management infrastructure.

Recommendations:

Collaboration with Government Authorities:

- Forge strategic partnerships with pertinent government agencies to spearhead the implementation of a comprehensive piped water supply system, aligning with the objectives outlined in the JJM.
- Coordinate closely with local municipalities, water boards, and regulatory bodies to ensure regulatory compliance, streamline permitting processes, and optimize resource allocation for efficient project execution.

Promotion of Rainwater Harvesting Systems:

- Launch a community-wide awareness campaign to promote the adoption of rainwater harvesting systems, emphasizing their potential to mitigate water scarcity challenges.
- Facilitate the design, installation, and maintenance of rainwater harvesting infrastructure in households, public institutions, and community spaces, leveraging local expertise and resources.
- Provide technical assistance and financial incentives to incentivize rainwater harvesting and storage adoption, empowering residents to harness this untapped water resource for domestic use, storage for some months, groundwater replenishment, and agricultural irrigation.

Promotion of Watershed Management:

- Prioritize the restoration and protection of groundwater sources to ensure their long-term sustainability for drinking and domestic purposes. Implement measures such as rainwater harvesting, contour bunding, and check dams and percolation tanks to recharge the ground level aquifer, enhancing groundwater resources over time.
- Implement integrated land and water management practices such as crop rotation, crop diversification, soil treatment and rotational grazing to improve soil fertility and water retention.
- Facilitate community-based initiatives for afforestation and sustainable water resource management to promote holistic watershed conservation.
- Provide training and capacity building programs to empower communities with the knowledge and skills needed to sustainably manage their watershed resources.
- Explore feasibility of establishing water ATMs.

Toilet Construction and Behaviour Change Campaign:

- Roll out a comprehensive program under the Swachh Bharat Mission to ensure the construction of good quality toilets in all households, addressing the pressing need for improved sanitation facilities. Encourage households to upgrade their existing toilets and to get them into use.
- Launch a behaviour change communication campaign targeting community members, emphasizing the importance of using toilets and adopting proper sanitation practices to mitigate health risks associated with open defecation.

- Utilize a mix of traditional and innovative communication channels, including community meetings, door-to-door outreach, and multimedia campaigns, to effectively engage and mobilize residents towards behaviour change.

Waste Management Infrastructure and Promotional Initiatives:

- Establish designated waste collection points equipped with segregation bins for biodegradable, non-biodegradable, and recyclable waste, promoting responsible waste disposal practices and facilitating efficient waste management.
- Implement community-led initiatives to promote waste segregation at the source and reduce littering practices, fostering a culture of environmental stewardship and sustainable waste management.
- Install community composting units to facilitate organic waste recycling, turning waste into valuable compost for agricultural use and promoting circular economy principles.

Health Facility

Evidence:

- Approximately 44% of respondents indicated a reduction or downsizing of health facilities subsequent to the discontinuation of the coal mines.
- Reported low incidence of respiratory illnesses in households (6.5%).
- The nearest Community Health Center (CHC) is situated 15 km away in Patan, the block headquarters. Primary Health Centers (PHC) and Health and Wellness Centers (HWC) are located at distances of 12 km and 10 km respectively.
- In emergency situations, local residents are compelled to travel to Daltonganj through private transport or public transport, as there are only three ambulances available at the CHC, one of which is designated for 108 emergency services.
- There is a lack of specific efforts concerning menstrual hygiene, anemia, nutrition, or coverage under the Aayushman Bharat scheme.
- Although iron and vitamin A tablets are distributed, awareness and consumption records are inadequately maintained.
- There is limited coverage under the Janani Shishu Suraksha Karyakram (JSSK) in the Rajhara area. Child health initiatives such as the Rashtriya Kishor Swasthya Karyakram (RKSK) and Mission Indradhanush also lack adequate coverage.

Recommendations:

Establishment of Health and Wellness Centers:

- Collaborate with relevant government departments to establish a sub-centre or Health and Wellness Centre (HWC) in the vicinity, ensuring convenient access to essential medical services for residents and promoting overall well-being.
- Ensure these facilities are well-equipped with diagnostic services for respiratory illnesses (which can investigate and ascertain that there is no damage from coal dust and other pollutants) and

other common ailments, enabling timely and accurate diagnosis and treatment.

Operationalizing Mobile Medical Units:

- Operationalize a mobile medical unit, either under a government scheme or through collaboration with a non-governmental organization (NGO), to facilitate healthcare delivery in underserved areas lacking fixed healthcare infrastructure.
- Mobilize medical assistance directly to communities, ensuring accessibility and inclusivity in healthcare service delivery.

Capacity Building for Frontline Workers:

- Capacitate frontline workers to conduct regular check-ups and screenings, identifying women and children at risk of nutritional deficiencies and providing appropriate interventions and referrals.
- Provide training on menstrual hygiene, anaemia prevention, nutrition, and the benefits of Aayushman Bharat coverage to frontline workers, ensuring effective dissemination of vital health information to the community.

Awareness Initiatives:

- Initiate awareness campaigns on chronic obstructive pulmonary diseases (COPDs), educating residents about symptoms, treatment options, and the importance of seeking timely medical care.

Sustainable Electricity Availability

Evidence:

- Solar power adoption is currently nonexistent, as schemes like PM-Kusum are deemed inapplicable.
- Solar rooftops are primarily limited to specific facilities such as block offices, schools, staff quarters, and CHCs/PHCs.
- Additionally, the solar grid is situated 80 km away, contributing to the absence of solar streetlights in the area.

Recommendations:

Assessing Feasibility and Collaboration:

- Collaborate with local authorities and energy companies to conduct a feasibility study on establishing local solar grids or mini-grids in the area.
- Assess the technical, economic, and environmental viability of such systems to determine their suitability for reducing dependency on distant solar grids and enhancing energy access in the community.

Implementation of Solar Infrastructure:

- Implement local solar grids or mini-grids to reduce reliance on distant solar grids and provide reliable and sustainable electricity access to the community.

- Install solar streetlights and other community solar projects to enhance lighting infrastructure and improve safety and security in the area.

Community Engagement and Empowerment:

- Engage community members in the planning and implementation of solar energy projects, ensuring their participation and ownership in decision-making processes.
- Provide training and capacity-building programs to empower community members to maintain and operate solar infrastructure, promoting sustainability and self-reliance in energy management.



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