

SUSTAINABILITY FRAMEWORK FOR COAL MINES

**Instituting a Just Transition Plan
for Mine Closure**



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for Mine Closure

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Knowledge partner



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List of Abbreviations

CCO	Coal Controller Organisation
CCL	Central Coalfields Limited
CIL	Coal India Limited
CSO	Civil Society Organisation
FGD	Focus Group Discussion
GoI	Government of India
LARR	Land Acquisition, Rehabilitation and Resettlement Act
MCDR	Mineral Conservation and Development Rules
MMTPA	Million metric tonne per annum
MoC	Ministry of Coal
MSME	Micro, Small and Medium Enterprises
NLCIL	Neyveli Lignite Corporation India Limited
OC	Opencast
PRI	Panchayati Raj Institution
SECL	South Eastern Coalfields Limited
SHG	Self-help group
SIA	Social Impact Assessment
SIMP	Social Impact Management Plan
UG	Underground
ZOI	Zone of Impact

Summary for Stakeholders

Coal mining constitutes an important source of direct, indirect, and induced jobs and livelihoods in various states and districts of India where the mines are located. Therefore, once these mines are closed, there is a possibility of economic and social distress in regions dependent on coal mines. Scientific reclamation and post-closure repurposing of the mining land constitute a crucial opportunity to support economic continuity besides the environmental sustainability of coal-dependent regions.

Over 0.35 million (3.5 lakh) hectares of land is available with currently operational mines in India. Out of this, about 0.2 million (two lakh) hectares can become available in the next 10 years through scientific closure and reclamation of about 297 mines that will exhaust their resources or are currently economically unviable. This land holds enormous promise to create economic opportunities in the coal regions besides enhancing environmental sustainability.

To understand the opportunities of repurposing the land available with coal and lignite mines, and the regulatory reforms that can be necessary to realise it, this report comprehensively analyses the reclamation practices and socio-economic impacts of coal and lignite mine closures in India. The analysis includes three specific case studies, the Piparwar mine in Chatra district of Jharkhand, Bishrampur mine in Surajpur district of Chhattisgarh, and Neyveli Mine I in Cuddalore district of Tamil Nadu. The primary objective of the case studies was to understand the impacts of mine closures on the local communities and to evaluate the effectiveness of reclamation and repurposing strategies.

Based on the observations, the study recommends key policy and regulatory reforms that need to be instituted to make mine closure and reclamation practices aligned with the just transition of the coal regions. The recommendations are intended to inform the Ministry of Coal, Government of India, and the coal/lignite industry's deliberations on developing a comprehensive mine closure framework based on just transition principles.

A. Key Observations

The case studies are based on a primary survey of 450 households residing within a radius of about 10 kilometers from the mines, and stakeholder consultations held with the local community, workers associated with mine reclamation and repurposing activities, labour union representatives, coal industry officials, and district government officials, among others. Besides, official documents related to the concerned mines and other mines in the area were analysed. The observations highlight some common impacts of coal mine closure and reclamation on the local community and the challenges that need to be addressed.

1. Impacts of closure

The impacts of mine closure are more localised in nature, particularly at the block level, where the mining activities are concentrated.

The impact of the transition from coal mines is most pronounced at the block level where the mines are concentrated. The challenge is already significant in the blocks where old and economically unviable mines are located.

For example, in Surajpur block, where the closed Bishrampur mine is located, five additional mines are currently operating. However, most of these mines are likely to close soon. Out of the five mines, four of the low-producing UG mines have been identified to be economically unviable by the coal company. Two of these mines (Bhatgaon and Balrampur) are also very old. All these mines are likely to close by this decade.

Similarly, in Tandwa block two very large mines Ashoka and Amrapali, which are major employment generators, have very limited mine life left. While the Amrapali-Magadh area is slated for expansion, the Ashoka mine nearing the end of its life can create major economic disruptions in the area.

Closure of mines will significantly impact local businesses and economic opportunities necessitating socio-economic interventions.

One of the most significant impacts of mine closure will be on the local businesses and economic opportunities. The survey results in Surajpur block (location of the Bishrampur mine) and Tandwa block (location of the Piparwar mine), show that 64% of businesses in Surajpur and 36% in Tandwa reported a reduced income (at least 25% reduction) over the last three to four years following the closures. A key reason cited in Surajpur, where even the operational mines are low-producing and unprofitable, is people moving out of the colonies and outmigration of the local people.

Outmigration in search of income opportunities is a growing concern in areas like Surajpur block. About 33% of surveyed households around the Bishrampur mines had at least one member who migrated due to a lack of economic opportunities. The fear of reduced income opportunities is prevalent due to the mono-economy dominated by mining jobs.

The informal workers remain highly vulnerable to mine closure without a just transition plan.

While formal workers (both departmental and contractual workers) are often redeployed to other mining sites, the informal workers face significant challenges from mines closing in an area. Although stakeholder consultations at all three sites indicate that it is a well-acknowledged issue, there is poor documentation and understanding of the number of informal workers affected.

The lack of understanding and data also undermines the scope of designing targeted and effective intervention measures for this highly vulnerable group.

2. Impacts of reclamation and repurposing measures**Reclamation efforts primarily focus on plantations, which while environmentally sustainable, limit the scope of employment generation.**

The mine reclamation measures in all the case studies are primarily focused on plantations. The activities are as per the post-mining land use outlined in the mine closure plans and environmental compliance measures. In such plans, the maximum amount of land is earmarked for afforestation and plantation purposes. This also follows the coal mine closure guidelines (since the first issuance of it in 2009 and amendments thereafter) have focused on it as the key objective of mine closure.

Besides plantations, developing eco-parks is the most common activity. In all three cases, an eco-park has been developed for recreational purposes, and also for some local employment generation as in the case of Bishrampur mines.

Overall, the reclamation and repurposing efforts have not sufficiently addressed local employment generation. For example, even in Bishrampur, only about 30 local jobs were created through reclamation activities.

Lack of engagement of affected communities undermines economic opportunities of reclamation and repurposing measures.

There is a notable absence of community involvement in the reclamation activities. These activities are largely seen as company obligations. Therefore, the community had little or no knowledge of the projects when conceived.

However, a lack of community engagement affects the scope of suitable project design that can benefit the locals. For example, successful reclamation projects, such as the eco-park in Bishrampur may have demonstrated environmental benefits, but have delivered limited economic gains due to a lack of local engagement and poor planning.

Employment and livelihood security is a key concern for the local communities related to future closures and reclamation.

Stakeholder consultations exhibit a sense of unease and fear of reduced income opportunities in the future as mines exhaust their resources. All the case studies show that coal mining jobs are among the best-paying jobs in these regions due to the mono-economy in these districts. They also have created induced employment, such as through businesses. Therefore, loss of livelihood and income will create socio-economic instability.

A key expectation shared by respondents during the consultations was local employment generation through future reclamation and repurposing. Locals also expressed the need for skilling and reskilling measures to ensure their employability.

B. Recommendations

The impending exhaustion of coal resources and subsequent mine closures may pose significant challenges in reducing local income opportunities, which could lead to socio-economic instability in regions heavily dependent on mining jobs. Thus, a comprehensive approach to mine closure is required that integrates aspects of environmental sustainability with socio-economic continuity.

The basic philosophy and objective of mine closure should be to ensure the economic continuity of coal regions, along with environmental sustainability.

Mine closure and post-closure measures should be conceptualised and designed to ensure economic continuity in the areas where the mines have been operating, along with environmental sustainability.

To ensure this, the coal mine closure-related laws and guidelines need to be revised. The revisions should institute a mechanism of just transition of the coal mines and the local community, including a well-defined planning process and the costs for the implementation of the plan.

The coal mine closure guidelines need to be revised to remove the chief focus on afforestation activities as post-mining land use.

The mine closure guidelines need to be revised to remove the chief focus on afforestation or bringing back the land to pre-mining conditions. The guidelines should specify that progressive and final mine closure planning should be undertaken to ensure positive social, economic, and environmental outcomes for the local community and the region post-closure. The plans should also be designed in a manner to maximise the land available for repurposing for gainful economic activities.

Regulatory amendments need to be instituted to mandate the development of a just transition plan as part of the final closure plan 10 years before the closure.

The Mineral Conservation and Development Rules (MCDR) 2017 (Sections 22, 24 and 25), and the coal mine closure guidelines currently in force (Section 2), need to be amended to integrate socio-economic considerations for mine closure.

Amendments should be introduced to mandate a Social Impact Assessment (SIA) study before the closure of the mines, and the preparation of a just transition plan based on the SIA study. The plan based on the SIA study should be part of the final mine closure plan that shall be submitted to the concerned authorities by the mining companies.

The final mine closure plan, including the just transition plan, should be prepared 10 years before the scheduled closure of the mine, as opposed to the current requirement of two years.

All mine leaseholders, public or private, shall undertake an SIA study by an accredited agency and prepare a just transition plan.

Every holder of a coal or lignite mining lease will undertake an SIA study for the concerned mine to be closed and prepare a just transition plan as part of the final mine closure plan.

The SIA study should be undertaken by an accredited agency or institution and in consultation with the state and local government and the local community. Based on the SIA, the holder of the mining lease shall develop a just transition plan in partnership with the state and local government.

The objective of the final mine closure plan, including the just transition plan, shall be to enhance the social, economic, and environmental conditions in the zone of impact (ZOI), as identified by the SIA. The final mine closure plan should identify the reuse of land for social, economic, and environmental protection activities. Only the land that cannot be used for social and economic activities should be used specifically for biological reclamation.

The mine closure cost should include the cost of the just transition plan, and the latter can be shared between the state government and the mining company.

The costs for implementing the just transition plan should be integrated into the final mine closure costs. This cost can be shared between the state government and the mining company depending on the costs and the corresponding components and sub-components.

The cost components will primarily include the costs for generating data and undertaking studies, which is essentially the knowledge base (this also includes that SIA study), operational and corporate aspects (such as reskilling, training, communication, etc.), and planning and implementing transition measures (including for monitoring and reporting).

The closure of a mine can mark the beginning of a new phase requiring careful management to address environmental and socio-economic impacts. By prioritising both environmental rehabilitation and socio-economic continuity, India can ensure a just transition of the coal-dependent regions, while promoting long-term prosperity and sustainability.

SECTION I

INTRODUCTION

1.1 Context

India's commitment to the Paris Agreement goals and the target to achieve net-zero emissions by 2070,¹ will require a significant shift away from the production and use of fossil fuels in the coming decades. This transition will impact various industrial sectors, with the coal mining sector being one of the most critical one requiring strategic planning for the future.

The transition of the coal mining sector can have adverse environmental and social impacts if mines are not closed scientifically, and the land is not properly reclaimed and repurposed for alternative economic activities that benefit the local community.

Coal is deeply woven into the social and economic fabric of various coal-bearing regions in India. Poorly planned closures could lead to increased unemployment, economic distress, outmigration, disruption of welfare services, and social instability. Additionally, poor practices of mine reclamation can result in soil and water pollution, adversely affecting public health, agricultural productivity, and other economic activities. Therefore, it is essential to ensure that mine closure practices are both environmentally sound and socially responsible.

Reclamation and repurposing of coal mining land are crucial for the sustainable development of coal mining areas once the mines are closed. By restoring the environment and creating new economic opportunities, these efforts can help mitigate the negative impacts of mine closure. Through a combination of environmental rehabilitation, economic diversification, and community engagement, regions transitioning away from coal can achieve a sustainable and resilient future.

1.2 Transition opportunities in the coal regions

India has approximately 430 operational coal and lignite mines covering 0.35 million hectares (ha) of land. A significant portion of this land could become available in the next 10 years following the closure of end-of-life, low-producing, and economically unviable mines. This land will need to be scientifically reclaimed and repurposed for social, economic, and environmental benefits.

An assessment of coal mines in India (based on responses received from coal companies) reveals that there are at least 188 unprofitable mines, including opencast (OC) and underground (UG) mines, in various states primarily operated by Coal India Limited (CIL) and its subsidiaries. These mines cover approximately 0.13 million ha of lease area and can be transitioned by 2030. Additionally, there are at least 109 mines that will exhaust their resources within the next 10 years and can be closed. Collectively, these end-of-life mines encompass over 90,500 ha of land. In total, considering both unprofitable and end-of-life mines, more than 0.22 million ha of land could become available through scientific closure and reclamation in the next 10 years.

Besides, as per the Government of India (GoI) records, there are an additional 287 mines that have been abandoned or discontinued². Most of these are in seven states- Jharkhand, West Bengal, Chhattisgarh, Madhya Pradesh, Odisha, Maharashtra and Telangana.

Table 1.1: Potential availability of land for repurposing in the next 10 years

Mine status	No. of mines			Land area (in ha)		
	OC	UG	Total	OC	UG	Total
Unprofitable	66	122	188	39,437	90,820.4	130,257.4
Reaching end-of-life by 2030	86	13	99	76,161	5,776.8	81,937
Reaching end-of-life by 2035	10	0	10	8,611	0	8,611
Total	162	135	297	124,209	96,597.2	220,806

Sources: iFOREST analysis. Mines data as per the Ministry of Coal, 2022, Parliamentary response in Rajya Sabha, Information as obtained through RTI from coal PSUs, 2023.

Overall, a state-wise analysis indicates that the top five states where most of the land will become available due to the possible closure of mines by 2035 are Jharkhand, Chhattisgarh, West Bengal, Madhya Pradesh, and Maharashtra. Although Odisha is currently India's largest coal producer, due to newer mining operations, less land will become available in the state, at least in the next 10 years.

The scientific reclamation and repurposing of these mines present a significant opportunity to support economic diversification and job creation in these coal-dependent states, facilitating just transition measures in the immediate future.

Table 1.2: State-wise potential land to be available in the next 10 years

State	Total operational mines	Total operational mines types		Number of Unprofitable mines		Land with unprofitable mines (ha)		Number of mines reaching 33 years by 2030		Land (ha) with mines reaching 33 years by 2030		Number of mines reaching 33 years by 2035		Land (ha) with mines reaching 33 years by 2035	
		OC	UG	OC	UG	OC	UG	OC	UG	OC	UG	OC	UG	OC	UG
Odisha	22	19	3		3		3,323	9		11,715.3		3		2,911.9	
Chhattisgarh	49	24	25	7	24	5,032	23,055.1	6		8,542.9		1		1,999.3	
Jharkhand	120	94	26	38	17	19,139.2	6,725.8	24	1	8137.8	NA	3		1,765.2	
Madhya Pradesh	52	18	34	4	26	2,648.9	16,414.3	6	3	12,276.3	933.9				
Uttar Pradesh	3	3		0	0			1		200		0			
Maharashtra	50	35	15	11	10	9,682.4	7,746.7	4	3	4,173.5	633.3	1		449.6	
West Bengal	72	27	45	6	42	2,935	33,555.5	12	2	5,835.9	1,761.2	1		669	
Assam	1	1						1		174					
Telangana	43	20	23					17	4	7,980.2	2,448.4	1		816.1	
Gujarat	9	9						3		3,640					
Rajasthan	6	6						1		2,655.7					
Tamil Nadu	3	3						2		10,829.4					
Total	430	259	171	66	122	39,437	90,820.4	86	13	76,161	5,776.8	10	0	8,611	0

Sources: iFOREST analysis. Mines data as per the Ministry of Coal, 2022, Parliamentary response in Rajya Sabha, Information as obtained through RTI from coal PSUs, 2023. Note: Mixed mines also have been considered under OC mines for simplicity of representation. NA=Not available

1.3 Study objective

To ensure environmentally and socially responsible mine closure practices, it is important to have the necessary regulatory framework in place. However, the concept of systematic mine closure is relatively new to the regulatory landscape governing mining activities in India considering the country's long mining history. The Ministry of Coal, GoI had first developed a set of guidelines for coal mine closure in 2009. The guidelines have been subsequently amended (the May 2020 amendment currently in force), with a key focus on the method of developing the mine closure plans (including both progressive and final closure), and correspondingly the amount that should be deposited as an escrow by the mining companies towards the mine closure costs.³ Recently the Ministry of Coal along with CIL has also started deliberation on developing a comprehensive mine closure framework based on just transition principles.⁴

In the context of the ongoing deliberations on a comprehensive framework for coal mine closure based on just transition principles, this study examines the current practices of coal mine closure to understand what are the key aspects that need to be considered to make closure practices aligned with just transition of the coal regions.

1.4 Study approach

The study on mine closure and reclamation experiences is based on the evaluation of three coal/lignite mines to assess the best practices for mine closure and reclamation, and its impacts and benefits for the local community. Based on the observations from these case studies, the report outlines policy reform measures for mine reclamation and repurposing which is socially responsible and can support the just transition of local communities.

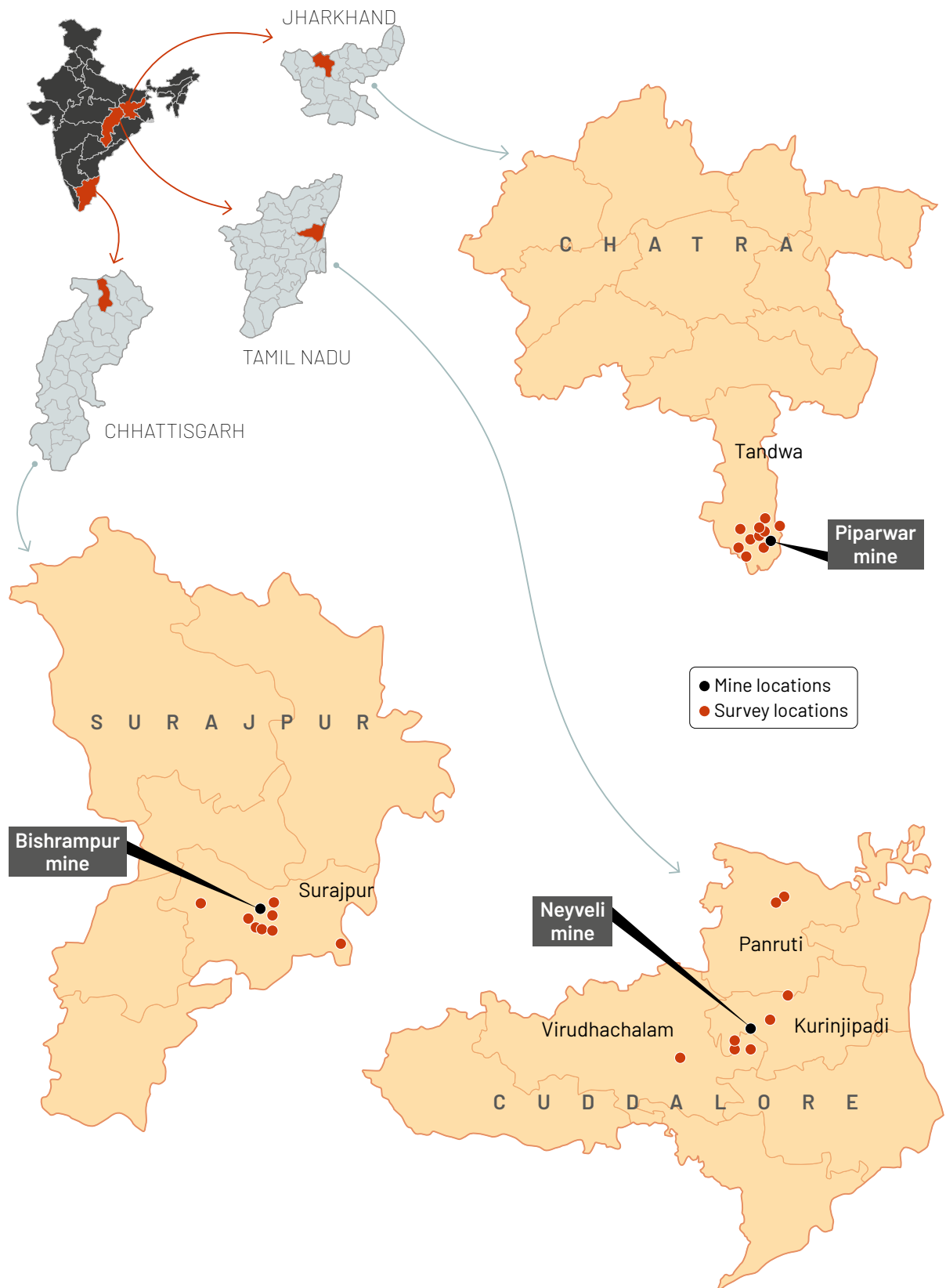
The case studies were chosen based on reports from the Ministry of Coal on best practices of mine closure, and inputs from CIL and its subsidiaries, with these mines being highly ranked for their mine closure practices. The selection of the case studies also considered the following aspects:

- (i) **Regional diversity:** The mines are situated in Jharkhand, Chhattisgarh, and Tamil Nadu, three key coal and lignite mining states in India. They represent diversity in coal/lignite mining practices and thus provide insights into future mine closure and reclamation practices across different regions.
- (ii) **Mine closure stage:** The case studies capture mine closure practices at two stages of reclamation and repurposing. This includes mines that have been completely closed (the Bishrampur mine in Chhattisgarh and the Piparwar mine in Jharkhand) and mines where progressive closure has largely occurred, with complete closure imminent (Neyveli Mine I in Tamil Nadu).

To evaluate the impact (positive and negative), the study has undertaken a primary survey of about 450 households. The sample size at each of the sites was based on a purposive random sampling method to cover a population likely to be most impacted by the closure of the mine and subsequent reclamation and repurposing activities. Considering this, a total of 26 survey locations including villages and few municipality areas were selected within a radius of 10 kilometers from the mine. The majority of the survey locations were within a five kilometers radius of the mine boundary in each of the sites, which is considered the area to be experiencing the most pronounced and direct impacts of mine closure and reclamation as per the company officials and community representatives.



Map 1.1: Study locations



Sources: iFOREST analysis.

Besides, stakeholder consultations were conducted at the block and district levels for each of the study areas. The stakeholder consultation involved interviews with government officials, coal company officials, Panchayati Raj Institution (PRI) representatives, labour unions, coal workers and civil society organisation (CSO) members, and focus group discussions (FGDs) with communities working in the reclaimed areas (such as women groups, members of fisherman co-operative), displaced communities, and local businesses.

The case studies assess the dependence of the local community on coal mining, the impact of the closure of the concerned mine(s), specifically in terms of employment and local economic activities, the impact/benefits of the reclamation and repurposing activities for the local community, and overall community perception on such activities in the future. The studies also examine the engagement of the local community in the decision-making process of mine reclamation and repurposing.

Besides the primary survey, the study also relied on secondary research, involving the review of government and mining company data, scholarly articles, and research papers. The secondary research helped to deep dive into the current status of mining, the reclamation, and repurposing trends in the closed mines.

Based on the analysis and observations, the study recommends key regulatory reforms required to make mine closure practices aligned to the just transition of the coal regions.

SECTION II

EXPERIENCES OF MINE RECLAMATION AND REPURPOSING



Piparwar Opencast Mine, Jharkhand

2.1 Piparwar mine reclamation project

2.1.1 Background

The Piparwar mine is located in Tandwa block of Chatra district of Jharkhand. The district is primarily rural (94% rural population) with a population of slightly over one million.¹ Chatra is also one of the most under-developed districts of the state with over 37% of the population being multidimensionally poor (which is 2.5 times India's average), signifying poor access to healthcare, education, clean energy, and other basic amenities.²

The Piparwar mine is part of the North Karanpura coalfields, one of the oldest coalfields in the state. The mine was operated by the Public Sector Undertaking (PSU) Central Coalfields Limited (CCL). Apart from Piparwar, Tandwa block also has three mines operated by CCL, which are Amrapali, Ashoka, and Purnadih. Besides, the Magadh mine, one of the largest in the state, also partly falls within Tandwa block of the district (while a significant part of this mine also falls in neighbouring Latehar district).³

Initially granted environmental clearance (EC) in 1993 for a capacity of 6.5 million metric tonnes per annum (MMTPA) coal production, Piparwar mine underwent expansions over the years with capacity expansion from 6.5 to 10 MMTPA in 2007, and further increase in production capacity from 10 up to 12.5 MMTPA (with a peak capacity of 14.4 MMTPA) in year 2014.⁴ The mine ceased coal production on June 2020, after approximately 30 years of active mining operations.⁵

Table 2.1: Mines in Tandwa block

Mine name*	Production capacity (MMTPA)	Approximate age of mine in years (as of 2024)
Ashoka	14	29
Amrapali	20.2	18
Purnadih	3.4	14

*Note: Magadh mine which started in 2015 and partly falls in the block, has a production capacity of 20 MMTPA, and is one of the largest mines covering both Chatra and Latehar districts

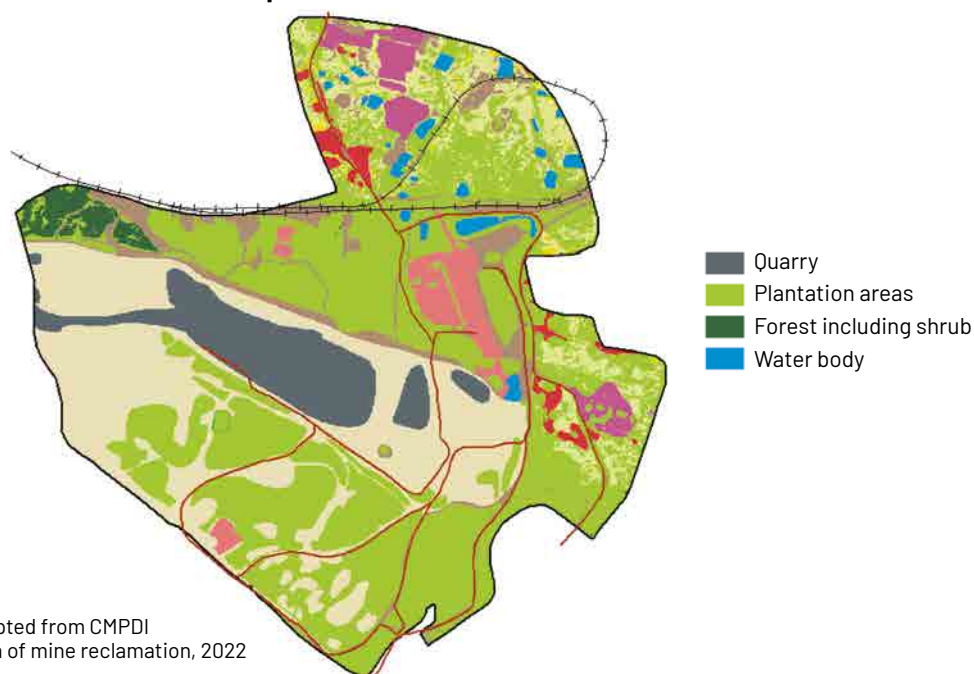
2.1.2 Mine closure and reclamation planning

Piparwar mine has a lease area of 1,120 ha. The analysis of the post-mining land use plan of the mine shows that plantation is the primary activity that is planned in the reclaimed area. Out of the total lease area, over 52% (579.3 ha) is earmarked for plantation. Besides, over 5.3% will be left as void. Over 33% (about 373 ha) of the area has also been earmarked for industrial activities.⁶

Table 2.2: Post-closure land use plan

Particulars	Area (ha)	Share of total area (%)
Plantation on backfilled area	481.3	43.4
Plantation (others)	98	8.8
Industrial area	372.9	33.6
Decoaled void	58.7	5.3
Road	7	0.6
Nala	5	0.5
Settlement	45	4.1
Undisturbed area	38.6	3.5
Lagoon	3.8	0.3
Total	1,110.3	100

Source: iFOREST analysis based on EC letter and post-closure land use plan of CCL for Piparwar mine

Map 2.1: Land reclamation in Piparwar mines

Source: Adopted from CMPDI
Satellite data of mine reclamation, 2022

2.1.3 Reclamation and repurposing activities

Following the closure of mining activities in Piparwar, CCL started its final mine closure and reclamation activities as per the closure plan. Regular reclamation efforts are being carried out, with biological reclamation of the technically reclaimed areas undertaken in collaboration with the state forest department of Jharkhand.

As per current reclamation activities, backfilling has happened in the quarry area through technical reclamation (of the total leasehold area, the quarry area is 540 ha, of which 310 ha has been technically reclaimed).⁷ Biological reclamation work is also underway, and till the time of the case study about 293 ha has been reclaimed. The biological reclamation activities include plantation initiatives (0.693 million saplings have been planted), the development of an eco-park (Kayakalp Vatika), and the creation of water bodies.

RECLAMATION AND REPURPOSING ACTIVITIES IN PIPARWAR

Status of mine: Closed in 2020

Total lease mine lease area: 1,120 ha

Key reclamation activities in the biologically reclaimed area: An eco-park, apart from plantations in the reclaimed area. The primary reclamation activities include plantation and an eco-park. As per company officials, the reclamation activity is happening in coordination with the forest department.

The eco-park (Kayakalp Vatika) initially covered five hectares of land area (including 1.5 ha for plantation). There are plans to expand the eco-park project to 20 ha through reclamation of the quarry area. For this, CCL has signed a memorandum of understanding with the Water and Power Consultancy Services Limited (WAPCOS).

Table 2.3: Reclamation details in Piparwar

Reclamation details	Area (ha)
Leasehold area	1,120
Quarry area	540
Backfilled area of quarry	310
Biologically reclaimed area (until May 2024) of total lease area	293

Source: Central Coalfields Limited, 2024

2.1.4 Impact of mine closure, reclamation, and repurposing

A primary survey was conducted covering 150 households in 10 villages in Tandwa block surrounding the mine area. As noted earlier, the purpose of the survey was to assess the impact of the mine closure on the local community and the benefits of the subsequent reclamation project. The survey also aimed to gauge the community's overall perception of the project and their involvement in the decision-making process for reclamation and repurposing activities. The survey locations were determined in consultation with the local community and CSOs active in the region.

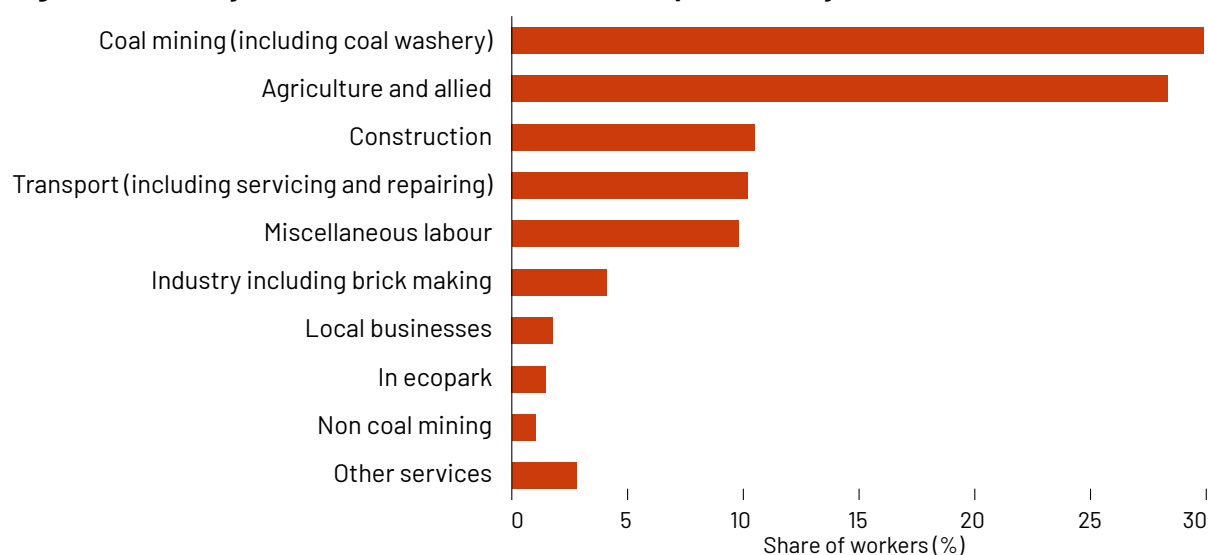
In addition to the survey, stakeholder perceptions were also captured through interviews and FGDs (see box *Stakeholder perception on mine closure, reclamation and repurposing activities in Piparwar*, page 25).

a. Employment and income status

The results of the household survey show that about 73% of the people (out of 264 people) within the working age group (15–59 years) are workers. The rest 27% are non-workers. Among the non-working members, the proportion of females is about 68%.

The analysis of workers in the study area reveals that residents around the Piparwar mine are predominantly engaged in two types of economic activities: working in the coal mines located in Tandwa block and participating in agricultural activities. Among the households surveyed, coal mining (about 30%) and agriculture and allied activities (above 28%) are the most common sources of income for the earning members of the family.

Figure 2.1: Primary income source of workers in the Piparwar study area



Source: iFOREST analysis

An analysis of household income in the area, based on the total disclosed income of all earning members, indicates that about one-third (36%) of households earn below ₹10,000 per month. These households primarily rely on miscellaneous labour, casual work, and agricultural labour. The low-income levels correspond with the high proportion of informal workers among the surveyed households, with over 70% of the workers identified as informal.

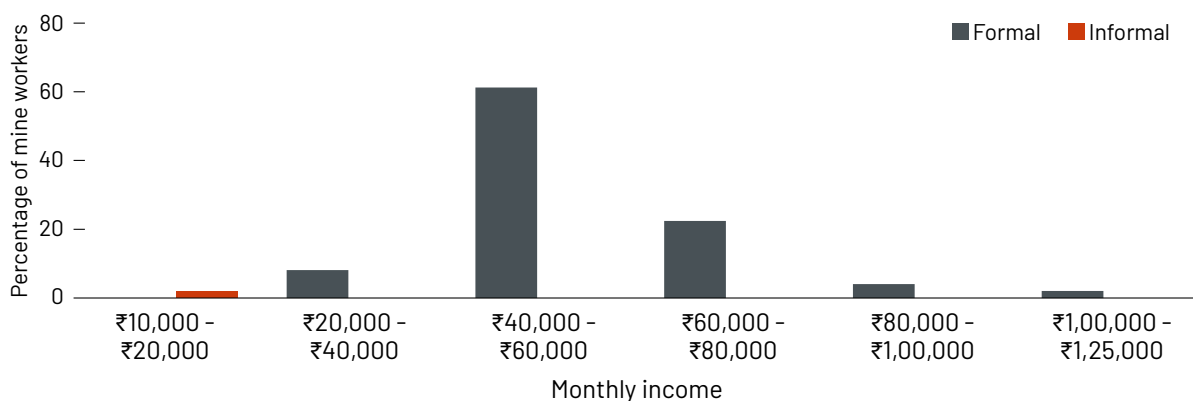
In contrast, income levels among coal mining workers are significantly higher. The survey reveals that over 61% of workers employed in the coal mines, either as departmental employees or through formal contracts, earn between ₹40,000 and ₹60,000 per month.

Table 2.4: Household income around Piparwar mines

Monthly income (₹)	Share of households (%)
Below 5,000	4
5,000 to 10,000	32
10,000 to 20,000	17
20,000 to 40,000	13
40,000 to 60,000	20
60,000 to 80,000	7
Above 1,00,000	3
Not disclosed	4

Source: iFOREST analysis

Figure 2.2: Income levels among coal workers in Piparwar area



Source: iFOREST analysis

b. Impact of mine closure

The impact of the mine closure has been evaluated considering the following key aspects:

- (i) On jobs;
- (ii) On local businesses;
- (iii) On closure-induced migration; and,
- (iv) On access to social infrastructure and services.

To evaluate the impact of the mine closure, the study has relied on the information shared by the mining companies, as well as the results of the household survey and interaction with stakeholders.

(i) Impact on jobs: The Piparwar mines when in operation employed about 2,300 workers as per estimates provided by the officials. This included both departmental and contractual workers. Ground interactions suggest that many of the contract workers did not belong to the local community.

As per information provided by officials of CCL, the closure of the mine has not impacted the departmental and also contractual workers due to the presence of other large operational mines in the vicinity and adjoining Latehar district, such as Ashoka, Magadh, and Amrapali. The departmental workers of Piparwar have been redeployed in these mines or other mines in the North Karanpura coalfield. These mines have also absorbed the contractual and informal workers of Piparwar.

The observations also align with the survey results. The results show that only four people reported loss of job due to the closure of the mine.

Interactions with the community suggest that while the closure of one mine has not yet resulted in significant job losses now, this situation may become uncertain in the future. For instance, the Ashoka mine is also old and can face a decline in manpower requirements in the coming years. Therefore, to prevent future unemployment, it has been suggested that once the mine is reclaimed, the land should be returned to those who lost it due to mining. This would allow them to resume agricultural or other traditional economic activities. Overall, approximately 68% of the surveyed households have experienced land loss directly attributable to mining activities.

(ii) Impact on local businesses: The survey indicates that mine closures have impacted small businesses in the area. Approximately one-third of these businesses reported a decline in income over the past four to five years, coinciding with the mine closures (this period also includes the COVID-19 pandemic). Specifically, 18% of the businesses experienced over 50% decline in income, while another 20% reported a 25-30% decline, attributing the losses to a reduction in local buyers. The remaining businesses did not report any loss in business due to the mine closure.

(iii) Closure-induced migration: The impact of mine closures on migration has been minimal due to the ongoing operation and expansion of other mines in the area. Only about 4% of the households reported that at least one person migrated out of the district due to a lack of opportunities following the mine closures.

(iv) Access to social infrastructure and services: The evaluation of access to social infrastructure and its availability was conducted to understand the local community's dependence on coal-company-supported infrastructure and resources and subsequent impact from mine closure. The parameters evaluated include healthcare, education infrastructure, and housing, as these are typically supported by mining companies in their areas of operation.

The survey results indicate a moderate dependence on social infrastructure and services provided by the mining companies. Regarding healthcare, about 29% of the households reported relying on mining company-supported healthcare facilities, primarily workers associated with the CCL mines. However, a greater proportion of households, 46%, depend on government-supported healthcare facilities. Besides, about 18.8% of households reported availing Ayushman Bharat facilities, and an additional 6.7% availing of private hospitals and clinics.

In terms of educational facilities, the survey shows that the primary reliance is on government schools, with over 54% of households sending their children to them. Additionally, 39% of households send their children to private schools, while a small percentage, about 5.4%, send their children to CCL-supported schools.

Regarding dependence on housing facilities provided by the mining company, about 16% of households live in accommodation provided by CCL. The rest either own their homes or live in rental properties.

Overall, the results indicate that there is not a very high dependence on coal company-provided infrastructure among the general population. Dependence is primarily seen in households where a member is formally employed by the company.

Furthermore, the closure of the Piparwar mine has not impacted social infrastructure and services for the local community. This is primarily due to ongoing mining operations in the area, which have kept coal company-supported schools and facilities operational. As a result, there have been no closures of schools, healthcare facilities, or other services provided by the company during the time of the study.

c. Community benefits from reclamation activity

The reclamation activity in the Piparwar mines primarily focuses on biological reclamation, with most of the reclaimed area devoted to plantations, along with areas left as waterbodies and a small eco-park. So far, the reclamation and repurposing work has not focused on generating employment.

Regarding employment generation during the reclamation phase, company officials indicated that all reclamation was primarily carried out by the existing workforce as it was an in-house project. Consequently, no external employment was created from this reclamation work, except for the engagement of a few people for material movement.

During the primary survey, only 10% of respondent households reported obtaining some miscellaneous work during the mine reclamation. The types of work they were involved in included afforestation activities, material movement in trucks, and construction.

As for employment in the eco-park, only three workers among the surveyed households stated that they were employed in the park. FGDs conducted with PRI members of villages around the mines revealed similar trends, with only seven or eight people to be reported working in the reclaimed area.

Given the low employment generated by the reclamation and repurposing activities, the impact on the local community has been minimal. Overall, 87% of surveyed households reported no discernible impact on local income or employment generation from the reclamation activity or the eco-park.

STAKEHOLDER PERCEPTION ON MINE CLOSURE, RECLAMATION AND REPURPOSING ACTIVITIES IN PIPARWAR

During the process of the primary survey, stakeholder perceptions were also captured through individual interviews and FGDs. This included interactions with coal company officials, PRI members, local community members including CSOs, eco-park workers, and labour union representatives. The key takeaways from the interactions are outlined below.

Stakeholders	Key issues highlighted
CCL officials, Piparwar Circle	<ul style="list-style-type: none"> Bio-reclamation in the Piparwar area has helped to restore the degraded land and improve ecological conditions. The company plans to develop the floating solar project in the reclaimed area water bodies. This will also be a sustainable use of the area. Reclamation activities are mainly handled by company workers.
Members of the local community, including CSOs	<ul style="list-style-type: none"> There has been no proactive engagement by the company on closure and reclamation decisions. The eco-park is a positive initiative for the environment; however, the income generation from it has not happened for the locals. Loss of employment, especially among informal workers, post-closure has led many to seek jobs in nearby mines. Local employment generation is important.
PRI members	<ul style="list-style-type: none"> Several families in the area have lost land, or livelihood has suffered due to land acquired for mining in the past. While compensation was provided, having a secure livelihood has been a challenge. Returning of land, or reutilisation of the land for agricultural or similar economic purposes involving the local community can generate local livelihood opportunities. The eco-park has not generated employment for the local people. Only few people have got some small work.
Eco-park workers	<ul style="list-style-type: none"> Development of the eco-park has the promise of creating some local employment. Few people got engaged in park maintenance work, etc. However, there are challenges with the park maintenance, and more so with people visiting the park. This can create problems in the future.
Labour unions	<ul style="list-style-type: none"> Closure of the mine has not affected the departmental employees as they have been placed in other mine sites. However, for informal workers, it can be a challenge. A just transition planning of coal mines will be important for workers and the community.

However, there is potential for future employment generation if the repurposing work also focuses on creating jobs. The most important among these is developing green industries, including micro, small and medium enterprises (MSMEs) in the area earmarked for industrial activities as per the closure plan. This is a substantial area of nearly 373 ha. Besides, the waterbody in the reclaimed area could potentially support fisheries activities or ecotourism, which could generate local employment opportunities.



2.1.5 Conclusion

Overall, the case study provides valuable insights into the complexities of mine closure and land reclamation, particularly in the context of Jharkhand's coal mining regions. The following conclusions emerged from an examination of community experiences, socio-economic impacts, and environmental restoration efforts:

- **Proactive social dialogue and community engagement:** The study highlights the crucial role of effective communication between companies and communities. Proactive social dialogue ensures that community needs and priorities are aligned with company initiatives. However, at Piparwar, the local community was not informed about the final mine closure plans, and there was no dialogue with the community regarding mine closure.
- **Moderate socio-economic impacts:** The socio-economic impacts of mine closure have been moderate and primarily affecting small local businesses. This is largely because workers have been redeployed to other mines. However, the impact is expected to escalate as more mines close in the Tandwa block in the coming years.
- **Challenges for informal workers:** The major challenge will be faced by informal workers and those dependent on the induced economy as mine closure happens. While the formal employees of the coal companies may find alternative employment, informal workers often face job insecurity. Mitigating these effects will require economic diversification, comprehensive socio-economic planning, and the creation of alternative employment opportunities.
- **Long-term livelihood security:** The community's demand to have their land returned for cultivation underscores the importance of long-term livelihood security. Ensuring that the reclaimed land supports sustainable livelihoods is critical for future considerations of planning and investments in the area.

-
- **Employment and socio-economic considerations in reclamation:** Mine reclamation and repurposing efforts have not adequately considered employment and socio-economic impacts so far. Consequently, there are very few job opportunities on the reclaimed land, including the eco-park. However, in the future, the situation can be substantially improved by developing green industries in the area earmarked for industrial activities. The CCL along with the state government, the district administration, and representatives of the local community (PRI members) can collectively engage in planning the appropriate industry investment to enhance sustainable livelihood and green job potential in the area.
 - **Collaborative efforts for successful reclamation and repurposing:** Moving forward, collaborative efforts between mining companies, government agencies, and local communities are necessary to ensure successful mine reclamation and repurposing. Such collaboration can support sustainable environmental and socio-economic outcomes for the local community.

The conclusions of the case study emphasise the need for a holistic approach to mine closure and land reclamation, considering both environmental restoration and the socio-economic well-being of the affected communities.



Bishrampur Opencast Mine, Chhattisgarh

2.2 Bishrampur mine reclamation project

2.2.1 Background

Bishrampur coal mine operated by the PSU South Eastern Coalfields Limited (SECL), offers another important learning for reclamation and repurposing. The closed mine is located in Surajpur block of Surajpur district in Chhattisgarh. As per the district administration, district has a population of about 0.8 million, with around 90% of the population being rural.

Mining constitutes a key component of the Surajpur district's economy with 11 mines currently operational in the district, combining OC and UG mines. All the mines are operated by SECL. Out of these 11 mines, five are in Surajpur block, which is the block where the closed Bishrampur mine is located. All of these five mines are UG mines and four of them (except Kumda) have been identified as economically unviable.⁸ This indicates that the block will face major challenges of mine closure in the near future as these mines will close.

Table 2.5: Mines in Surajpur block

Mine name	Production capacity (MMTPA)	Approximate age of mine in years (as of 2024)
Bhatgaon	0.2	50
Balrampur	0.84	30
Nawapara	0.18	18
Ketki	0.42	15
Kumda 7&8 (new)	0.6	6

Source: iFOREST analysis based on respective EC letters

The Bishrampur mine started operation in 1961. At the time of opening, the mine had 36.8 MMT of coal reserves. After operating for about 58 years, the mines shut down in August 2018 due to exhaustion of reserves.⁹ Before closing, the mine had a production capacity of 1.02 MMTPA. Overall, the mine covers a lease area of 1,472 ha.

2.2.2 Mine closure and reclamation planning

Bishrampur mine has a lease area of 1,472 ha. The analysis of the post-mining land use plan of the mine shows that afforestation is the primary activity that is planned in the reclaimed area. Out of the total lease area, 1,395 ha is for afforestation and green belt, and 77 ha will be left as final void. The targeted number of plantations in the post-mine closure period is 1,239,375.¹⁰

Table 2.6: Post-closure land use plan in Bishrampur

Particulars	Area (ha)	Share of total area (%)
Afforestation in reclaimed external and internal dumps	1,145.8	77.8
Green belt/safety zone	249.2	17
Final void/water body	77	5.2
Total	1,110.3	100

Source: Information as shared by SECL

Map 2.2: Land reclamation in Bishrampur mines



Source: Adopted from CMPDI
Satellite data of mine reclamation, 2019

2.2.3 Reclamation and repurposing activities

At Bishrampur, a final mine closure has been completed at the site spanning 1,472 ha lease area. Overall, within the leasehold area, about 907 ha has been biologically reclaimed and 319 ha has been designated as reclaimed diverted forest land. Additionally, around 40 ha has been allocated for setting up a solar plant in the future.

Aligning with the mine closure plan, the biologically reclaimed area primarily includes a plantation that spans 798 ha. As per SECL officials, 1,994,970 plantations have been done in the biologically reclaimed area. Besides, the area also includes an eco-park of 11 ha.

RECLAMATION AND REPURPOSING ACTIVITIES IN BISHRAMPUR

Status of mine: Closed in 2018

Total lease mine lease area: 1,470 ha

Key reclamation activities in the biologically reclaimed area: An eco-park in 11 hectares; the rest is primarily plantation which covers 798 ha. The eco-park includes a restaurant, a boating facility, and also fisheries activities in the waterbodies.

Table 2.7: Reclamation details in Bishrampur

Reclamation details	Area (ha)
Leasehold area	1,470
Biologically reclaimed area (until May 2024) of total lease area	938
Plantation area as part of biological reclamation	798
Water bodies	120
Eco-park	11

Source: SECL, 2024

The eco-park is the only component that until now has created opportunities for income generation among the local community. The park was set up in 2018 by the PSU in consultation with the District Collectorate. It was handed over to the government after its completion. The eco-park includes a boating facility, a floating restaurant, and a pisciculture facility.

A cooperative society of farmers - 'Mahamaya Fisheries Society' for pisciculture and a women's organisation 'Shiv Shakti Mahila Gram Sanghathan' was engaged to manage the boating facility. Their members received training for the same.

Once set up, the floating restaurant was contracted out initially to an external agency for operation. The restaurant generated a revenue of ₹5,000 per day. On an average six people were employed throughout the season. However, the restaurant is currently non-operational due to a lapse in tender duration. There has been no revival of the contract till the time of the study. It has been handed over to the district authority.

For the boating facility, the women's organisation (Shiv Shakti Mahila Gram Sanghathan), was engaged to manage the facility. A total of 13 women members were engaged in the facility from nearby Kenapara village. Their earning from the activity was about ₹250 per day. However, the closing of the restaurant has also impacted the boating business, and thus the income of the women workers.

The pisciculture activity is comparatively more stable and is facilitated by the fisheries department of Surajpur. A total of 32 fish-breeding cages were put in place in the mine void. A cooperative society of farmers, the Mahamaya Fisheries Society was engaged in the fisheries activity. The group has a 10-year



lease with the fisheries department to do the fish cultivation. Overall, 12 people were reported to be involved in the project, and most of them were earlier doing casual labour work.

In the first year, a revenue of ₹2.4 million was generated through the harvest of 16 tonnes of fish cultivation. The department remains hopeful about the sustenance of the project.

Overall, the economic activities in the Bishrampur mine have generated some local employment, including providing income opportunities for women and casual labourers. There was also a deliberate effort to train these people before they were engaged in these facilities. While the boating and the restaurant have suffered a downturn, locals remain hopeful of their revival which can also bring back the income from these facilities.

2.2.4 Impact of mine closure, reclamation, and repurposing

A primary survey covering 148 households covering a total of six villages and two urban settlements/town centers around the mine area was carried out to capture the impact of the mine closure on the local community, and subsequently, how the reclamation project is benefitting the community and their overall perception of the project. Out of these, six locations were within a distance of five kilometers of the closed mine, which can be considered as the area to be most impacted by closure and reclamation.

Like the Piparwar survey, the survey around the Bishrampur mines also aimed to capture the engagement of the local community in the decision-making process of the reclamation and repurposing activities that are being undertaken. The survey locations were determined in consultation with the local community and CSOs active in the region.

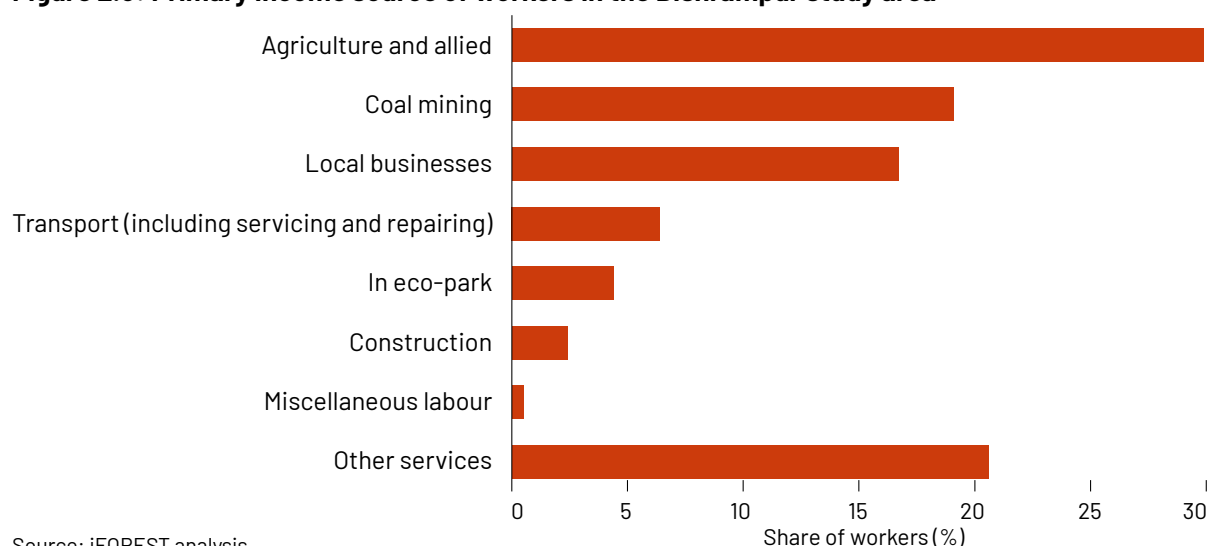
In addition to the survey, stakeholder perceptions were also captured through interviews and FGDs (see box *Stakeholder perception on mine closure, reclamation and repurposing activities in Bishrampur*, page 35).

a. Employment and income status

The results of the household survey show that slightly above 49% of the people (out of 380 people) within the working age group (15–59 years) are workers. The rest 51% are non-workers, signifying a major challenge in employment opportunities in the area. Among the non-working members, the proportion of females is over 71%.

The analysis of the workers shows that overall people in the study areas primarily are engaged in agricultural activities, which is the most predominant source of income among earning members of the family. About 30% of the workers reported being engaged in agricultural and allied activities. Engagement in the coal mines operated by SECL still constitutes a significant employment source with over 19% of workers engaged in such activities. Besides, other services, such as government and private jobs in various sectors (such as information technology, computers, schools, etc.) and businesses are significant sources of local employment accounting for 20.6% and 16.7% respectively.

Figure 2.3: Primary income source of workers in the Bishrampur study area



Source: iFOREST analysis

Overall, a concerning trend in the area is the prevalence of informal employment, with 63% of respondents reported being engaged informally in various activities. These primarily include workers in sectors such as agriculture and agroforestry, construction, businesses and retail, alongside casual and daily wage workers.

Concerning income levels, there are a significant number of households earning below ₹20,000 per month. The results show that over 37% of the households have a monthly income below ₹20,000. Besides, about 26% were found to be earning between ₹20,000 to ₹40,000. The low income among a significant number of households brings to the fore the economic vulnerability of the local population.

Table 2.8: Household income around Bishrampur mines

Monthly income (₹)	Share of households (%)
Below 5,000	0.6
5,000 to 10,000	8
10,000 to 20,000	28.7
20,000 to 40,000	26
40,000 to 60,000	18.7
60,000 to 80,000	14
80,000 to 100,000	1
Above 1,00,000	3

Source: iFOREST analysis

However, the coal mining workers in the area have much better income, as also observed in the Piparwar case study. Coal mining is one of the best-paid jobs in the area. The assessment of income among the coal workers shows that, overall, about 46% of them earn between ₹40,000- ₹60,000 and similar proportions between ₹60,000- ₹80,000 per month. The workers within the later income category are largely formal (permanent employees) with the coal company.

The low-income category include the informal workers. Among the surveyed coal mine workers (total 38), slightly over 10% were informal workers. These workers earn between ₹10,000-20,000 per month.

Figure 2.4: Income levels among coal workers in Bishrampur area



Source: iFOREST analysis

b. Impact of mine closure

As in the case of the Piparwar mines, the impact of the mine closure in Bishrampur has been evaluated by considering the following key aspects:

- (i) On jobs;
- (ii) On local businesses;
- (iii) On closure-induced migration; and,
- (iv) On access to social infrastructure and services.

(i) Impact on jobs: The Bishrampur mine when in operation employed about 180 workers as per estimates provided by the officials. This included both departmental and registered contractual workers. However, the officials could not provide any estimates of informal workers employed by the mine.

The impact of the closing of the mine has not been discernible among the formal workers. As per the company officials, the formal employees have all been employed in other SECL mines. Also, about 45 permanent employees are engaged in post-closure maintenance. However, for the informal workers, the officials acknowledged that there would be some impact on their livelihood that goes unaccounted for.

Interactions with labour union representatives suggested that the closure of the mine has not affected the employment of the formal workforce, corroborating the inputs of the company officials. The employees have been redeployed to other mines of SECL, such as those operating in the Korba and Surguja districts.

(ii) Impact on local businesses: One of the most discernible impacts of the mine closure has been on local businesses in Surajpur block. The primary survey shows that with the transfer of employees and the decrease in the number of people residing in the colonies, small businesses around the mine have suffered a decline in earnings.

The results show that around 64% of the respondents whose primary earning source is business, reported a decrease in the number of customers over the past five years since the closure of the mine. This had at least impacted 25% of their earnings. Out of them, about 15.4% reported a reduction in over 50% of income.

(iii) Closure-induced migration: The impact of mine closure-induced migration has been significant in the case of Bishrampur. Among the surveyed households, 33% of them had at least one member who had migrated due to lack of economic opportunities in the area.

As per interactions with the labour unions and local CSOs, outmigration from the area is likely to increase in the coming years. This is primarily because nearly all mines in the block are unprofitable, and are also very old. The engagement of local workers in the mines have already stagnated, and will only decline in the coming years.

(iv) Access to social infrastructure and services: The evaluation of access to social infrastructure and services was undertaken to understand the local community's dependence on coal-company-supported infrastructure and resources, and the impact of mine closure. As in the Piparwar case study, the parameters evaluated include healthcare, education infrastructure, and housing, which are typically supported by mining companies in their areas of operation.

The survey results indicate a moderate to low dependence on social infrastructure and services provided by the mining company. For example, out of the 148 households surveyed, only 26.5% were found to be dependent on SECL hospitals as their primary source of healthcare. A majority of households, about 66%, reported availing government facilities. Besides, over 4% reported availing Ayushman Bharat empanelled health clinics, and an additional 4% reported availing of private facilities.

Considering education facilities too, the reliance on government schools is most significant. About 50.4% of the households responded that they send their children to such facilities. Some of these schools do benefit from welfare investments of coal companies said some of the respondents (about 8%). The reliance on SECL supported schools is about 24.5%. Besides, about 17.3% of the surveyed households send their children to private schools.

Regarding dependence on housing facilities provided by the mining company, slightly over 18% of households live in accommodation provided by SECL. The rest either own their homes or live in rental properties.

Overall, the results of the primary survey suggest that due to other ongoing mining operations in the area, the coal company-supported schools and facilities continue to remain operational. There has been no closure of schools, healthcare facilities, or other services provided by the company recorded at the time of the study.

c. Community benefits from reclamation activity

The repurposing of the closed Bishrampur mine have been a decision of the mining company, in consultation with the District Collector. The community was not involved in the decision-making, as it is considered to be a company initiative.

Regarding the overall perception of the local community about the reclamation and repurposing activities, the survey indicates that over 82% of the households perceive that the establishment of the eco-park in the reclaimed mine area has brought benefits in some way to the local community. The most positive impact is in terms of environmental conditions.

Concerning economic benefits, only six out of the 148 households surveyed reported active engagement in the eco-park, with five households reported being engaged in boating activities and one engaged in plantation activities. Four out of the six households engaged in the eco-park reported earnings of less than ₹5,000 per month from the activities. A key disappointment with the local community is also the current non-operational status of the restaurant. However, about 45% of the households said that recreational activities in the eco-park, if revived, can create some employment opportunities in the future.

STAKEHOLDER PERCEPTION ON MINE CLOSURE, RECLAMATION AND REPURPOSING ACTIVITIES IN BISHRAMPUR

During the process of the primary survey, stakeholder perceptions were also captured through individual interviews and FGDs. This included interactions with coal company officials, the district fisheries department, eco-park workers including women self-help groups (SHG), and labour union representatives. The key takeaways from the interactions are outlined below.

Stakeholders	Key issues highlighted
SECL officials, Surajpur	<ul style="list-style-type: none"> The closure of the mine has not affected the permanent employees. They have been transferred to the other SECL mines that are still operational, and some have been retained for the maintenance of reclaimed mine. However, there has certainly been an impact on the informal workers as demand for them has gone down. The reclamation activities in the mine has been irregular as it is an old mine. However, the mine area has been reclaimed, including creating economic opportunities for the locals. The reclamation activity is considered a successful initiative and is now being used as a model to repurpose other SECL mines. There are challenges in the maintenance of the eco-park created after mine reclamation. While the facility has now been handed over to the district administration, there is need for a dedicated unit to maintain it in the coming years.
Women members including workers in the eco-park boating facility	<ul style="list-style-type: none"> There have been challenges with employment in the area. The engagement in boating has helped to create a source of income for the local women, as they did not have an income of their own. At the beginning, the footfall of tourists was high as were the year-round earnings, though there was seasonal variability. The women workers on an average earned ₹250 per day. With the closure of the floating restaurant, the main tourist attraction was not there anymore. Consequently, the tourist footfall also declined affecting their income.
Women SHG members engaged in the fisheries project	<ul style="list-style-type: none"> The fisheries project has created a source of stable income for the members. Earlier the women workers were primarily involved as casual labourers with no income security. The group has a 10-year lease which started in 2022. To continue with the business, they have to pay the Fisheries Department about ₹0.24 million per year (₹2.4 lakhs). However, with a good fish harvest, they consider the model to be profitable. With 32 cages rearing 3,000 fish each, the members expect a profit of around 0.2 million from each cage per year. The women consider that such initiatives can help in local employment generation if proper support is provided.
Fisheries department, Surajpur	<ul style="list-style-type: none"> The fisheries project has helped to create local employment, especially for women. In rural areas, such measures are important for employment generation. The fish harvest has been good in the first year. On an average, around 1500-2000 kilograms of fish was produced per cage. This has also given confidence to the women workers engaged in the project.
Labour unions	<ul style="list-style-type: none"> The permanent employees are secured in the coal companies. There has been no impact on the employees of the company due to mine closure. They have been transferred to nearby mines. There has been, however, an impact on the local businesses in the area with the transfer of mining company employees. Creating local economic opportunities through reclamation activities will be important in the coming years. Many of the mines in the area are very old.

2.2.5 Conclusion

The closure and reclamation of the Bishrampur mine highlight the complexities of transitioning of coal mining-dependent areas to sustainable land use and community development. While the company has made efforts for environmental reclamation while also creating some new economic opportunities, challenges remain in ensuring broader employment and income opportunities, social stability, and community engagement. Overall, the case study highlights the following aspects:

- **Transition is an imminent challenge in the old mining area:** The Bishrampur OC mine have closed down due to resource exhaustion in Surajpur block. Although five other UG mines are still operational, out of them four are unprofitable. Besides, Bhatgaon and Balrampur mines are already old, with current ages being 50 and 30 years respectively. Both of these are likely to close down soon. Collectively, the presence of old and unprofitable mines in the block indicates that the area will face major transition challenges in the near future.
- **Significant economic distress in the local community:** The Bishrampur case study elucidates the case of economic distress in the local community that has been induced by the sub-optimal operation of unprofitable mines and the closure of the Bishrampur mine. The impacts are most discernible in terms of a high proportion of non-workers, outmigration from the area, and the slow-down for local businesses.
- **High proportion of non-workers and outmigration:** The survey in Surajpur block shows that a high proportion of people, about 52% within the working age group are non-workers. Moreover, people have been moving out of the area in search of work. As the results show, about 33% of households reported at least one member migrating in the past five years due to a lack of economic opportunities.
- **Impact on the induced economy:** Interaction with the local community suggested that there has been a decrease in the population residing in the mining colonies. This has been affecting local businesses. The outmigration of people is further affecting them. Over 15% of the businesses have suffered more than 50% decline in monthly earnings.
- **Proactive social dialogue and community engagement:** The study once again highlights the need for proactive engagement with local communities for reclamation and repurposing to ensure a sustainable transition. For example, while the company had made some effort to create local economic opportunities, the poor engagement of the local community in the decision-making process has undermined the scope of an effective project design. This has affected the employment generated through the floating restaurant and the boating facilities.
- **Socio-economic considerations in reclamation:** Overall, the case study of the Bishrampur mines and the impacts highlight the significance of socio-economic considerations in mine reclamation. It is important to integrate livelihood generation opportunities in the planning of mine reclamation and repurposing, which also provides livelihood security. The example of the fisheries project (although a small effort as compared to the needs of the local community), suggests that a well-planned project can generate local employment. This will also create community confidence in the transition of coal mines. The successful projects can also become models for scaling up such activities and boost income opportunities.



Neyveli Opencast Lignite Mine I, Tamil Nadu

2.3 Neyveli mine reclamation project

2.3.1 Background

The Neyveli lignite mine (Mine I) is located in the Kurinjipadi block of Cuddalore district in Tamil Nadu. The district has a population of about 2.6 million with a rural population of about 66 %, and the rest being urban population.¹¹ The district is famous for the presence of the lignite mines which are a key source of fuel to the power plants in the state.

The Neyveli coal mines are operated by Neyveli Lignite Corporation India Limited (NLCIL). In Tamil Nadu, the company operates three OC lignite mines with a production capacity of 32.5 MMTPA. Among them, Neyveli Mine I, the point of the case study, is the oldest mine operated by the company which started operation in 1962 with a production capacity of 6.5 MMTPA. The mine later underwent expansion in 2003 with an increase in 4 MMTPA production capacity, and in 1989 expanding to 10.5 MMTPA capacity.¹² The total lease area of the mine is 3635.4 ha.¹³

The other two mines, Mine II and Mine-IA, are also operational in the block. These mines commenced operation in 1993 and 2003 respectively.¹⁴

Table 2.9: Mines in Kurinjipadi block, Cuddalore

Mine name	Production capacity (MMTPA)	Approximate age of mine in years (as of 2024)
Mine I (including expansion)	10.5	62
Mine II (including expansion)	15	31
Mine I A	7	21
Total	32.5	

Source: iFOREST analysis based on information of the NLCIL, 2024

2.3.2 Mine closure and reclamation planning

The reclamation activities in Neyveli I mine is part of the progressive closure. The activities at the site are aligned with the company's mine closure plan as informed by the officials. The key activity that is being undertaken in the area is plantation. An analysis of the post-closure land use plan prepared for the mine shows that the company plans to undertake afforestation activities in 93% (about 3,382 ha) of the lease area. The rest of the area will be left as a water body.

Further, the review of the last environmental compliance and mines management report submitted by the mining company to the Ministry of Environment, Forest and Climate Change (MoEFCC) in June 2023, suggests that the company is required to implement a progressive afforestation plan covering the mine lease area at the end of mining. The company should also undertake agricultural activities in the degraded area as part of mines management. As per company reports the measures are being complied with.¹⁵

Table 2.10: Post-closure land use plan in Neyveli I

Particulars	Area (ha)	Share of total area (%)
Plantation on backfilled area	2,795.56	77
Plantation on external overburden dump	478.14	13
Plantation in the greenbelt area	108.22	3
Waterbody	253.48	7
Total	3,635.4	100

Source: iFOREST analysis based on post-closure land use plan and compliance report by NLCIL

2.3.3 Reclamation and repurposing activities

In Neyveli Mine I, a significant area has already undergone progressive closure and has been reclaimed. As of May 2024, over 1,144 ha of the lease area has been biologically reclaimed.

Aligning with the company's post-closure land use plan, afforestation has been done in 99% of the total reclaimed area (1,134 ha).

The key repurposing activity in the reclaimed mine area includes the development of an eco-park, which is also the income generation component of the reclamation work. The eco-park covers an area of 10 ha and includes a children's play area, boating facilities, and a zoo. As per company officials, a total of 13 people are engaged in the eco-park, including three executive officials and 10 staff/workers. The plantation areas are maintained by the company staff.¹⁶ The company is also planning to undertake measures of agricultural activities in the reclaimed areas.

The company has been undertaking agricultural activities in degraded land around the mine quarry area according to the officials. This includes the cultivation of vegetables, fruits, etc. Officials also noted that there are also plans to set up solar plant in the future. However, at the time of the research, there was no concrete plan for setting up such facility in Mine I.

RECLAMATION AND REPURPOSING ACTIVITIES IN NEYVELI MINE I

Status of mine: Mine is 62 years old, progressive closure and reclamation is happening

Total lease mine lease area: 3635.4 ha

Key reclamation activities in the biologically reclaimed area: Plantation activities, and an eco-park covering 10 ha of the reclaimed area. The eco-park includes a restaurant, a boating facility, and a zoo.

Table 2.11: Reclamation details in Neyveli 1

Reclamation details	Area (ha)
Leasehold area	3,635.4
Biologically reclaimed area (as of May 2024) of total lease area	1,144
Afforestation area	1,134
Eco-park	10

Source: Information as provided by officials of NLCIL, 2024

2.3.4 Impact of mine closure, reclamation, and repurposing

A primary survey covering 150 households in eight villages around the mine area was carried out to capture the impact of the mine closure on the local community, and subsequently, how the reclamation project is benefitting the community. Out of these, five locations were within a distance of five kilometers of the mine, which can be considered as the area to be most impacted by closure and reclamation, and the others within about 10 kilometers radius. It is to be noted that the Neyveli mines I,II and IA are continuous, and thus, three villages while located a little further were considered for the survey as these include resettlement areas and have households engaged in the mines. The survey locations were determined in consultation with the local community and CSOs active in the region.

In addition to the survey, stakeholder perceptions were also captured through interviews and FGDs (see box *Stakeholder perception on mine closure, reclamation and repurposing activities in Neyveli Mine I*, page 43).

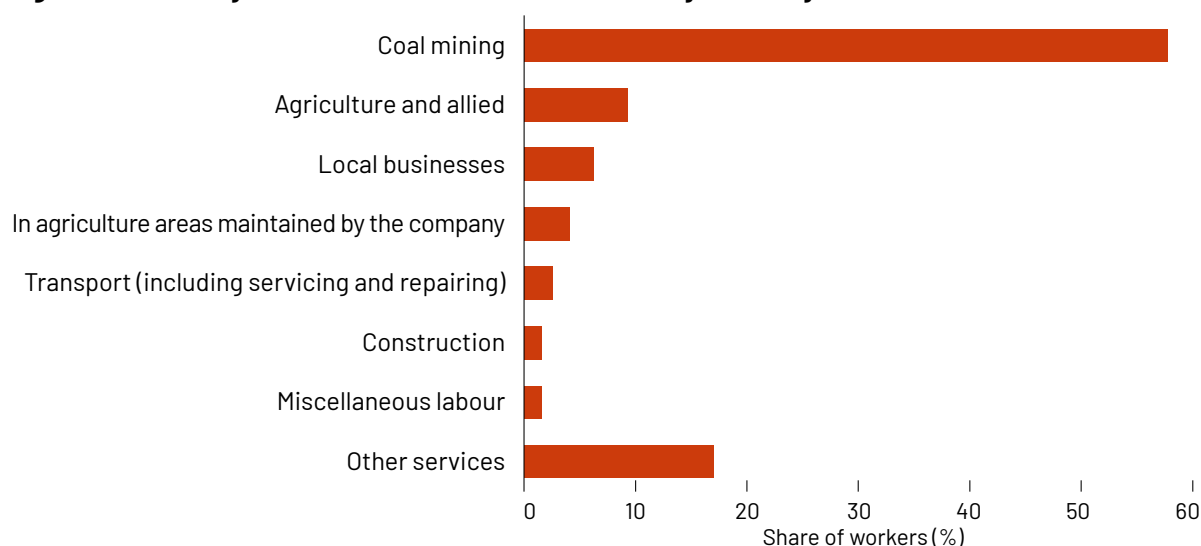
a. Employment and income status

The results of the household survey show that about 72% of the people (out of 272 people) within the working age group (15-59 years) are workers. The rest 28% are non-workers. Among the non-working members, the proportion of females is about 91%.

The analysis of the workers further show that there is a very high level of income dependence on the Neyveli mines. While the production of Mine I (the point in case) has been on a decline (production recorded in 2023-24 was 3.9 MMT as compared to 7 MMT in 2021-22),¹⁷ operation of the other mines IA and II close to Mine I create large-scale income dependence.¹⁸

The results show that over 57% of the workers among the surveyed households are dependent on the lignite mines for income. This is followed by employment in various government offices and private companies which is noted as other services (17%), and agriculture and allied activities (13.4%), including in areas managed by NLCIL.

Figure 2.5: Primary income source of workers in the Neyveli study area



Source: iFOREST analysis

The overall income levels among households in the area show that there are challenges for low-income households in the villages despite large-scale mining operations. About 41% of the households reported a monthly income below ₹20,000. Besides, another 29% of households earn below ₹40,000 per month. The low-income families are primarily those whose primary income source remains informal work in the mines, agricultural workers, construction workers, and small mechanics, among others.

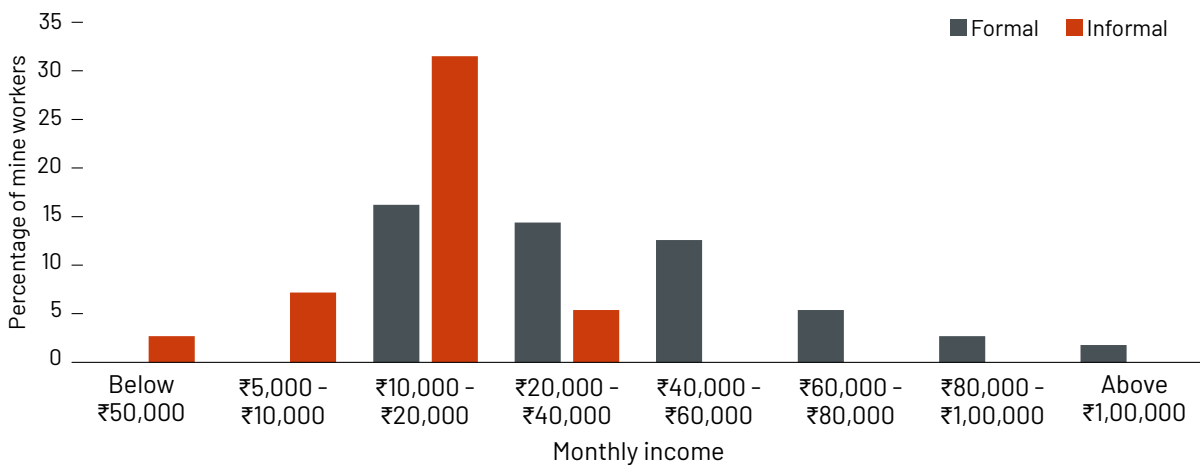
Table 2.12: Household income around Neyveli mines

Monthly income (₹)	Share of households (%)
5,000 to 10,000	2
10,000 to 20,000	39
20,000 to 40,000	29
40,000 to 60,000	14
60,000 to 80,000	10
80,000 to 1,00,000	5
Above 1,00,000	2

Source: iFOREST analysis

An assessment of income levels among coal mining workers shows that over 42% of the workers earn over ₹40,000 per month. These are primarily the formal workers, who constituted about 53% of the coal workers in the survey. The low-paid workers are primarily the informal workers (Overall 47% as per the survey response). Overall, most of the coal workers earning below ₹20,000 per month are informal workers.

Figure 2.6: Income levels among coal workers in Neyveli area



Source: iFOREST analysis

b. Impacts of mine closure

While Neyveli Mine I have been undergoing progressive closure, the decline in production has started impacting income opportunities in the local community. Ground interactions further suggest that Mine I, with nearly 70% of its area reclaimed, is nearing the end of its operational lifespan.

Like the other case studies, the impact of the mine closure has been evaluated considering the following key aspects:

- (i) On jobs;
- (ii) On local businesses;
- (iii) On closure-induced migration; and,
- (iv) On access to social infrastructure and services.

(i) Impact on jobs: The number of employees/workers in the Neyveli mines was not shared by the authorities during the study. However, applying an employment factor approach (considering the production versus manpower ratio of other NLCIL-operated mines)¹⁹, and the production of Mine I in 2020-21 and 2023-24 (about 7 MMTPA and 3.9 MMTPA respectively), the employment of formal workers (including departmental and contractual workers) in the mine has been estimated.

As per the estimates, Mine I engaged an estimated 3,100 workers in 2020-21, while at current production the worker requirement remains approximately slightly above 1,700.

However, as per company officials, there has been no job loss for the permanent workers due to progressive closure. The workers are being redeployed to other operations of the company, including in other states (such as Odisha).

Interaction with other stakeholders, such as representatives of CSOs and the labour union members, however, suggested that the decline in production has impacted the informal workers and also those who have been engaged in coal transportation.

(ii) Impact on local businesses: As compared to the two other case studies, the impact on local businesses around the Neyveli mines was found to be much less as the local community is primarily dependent on coal mining and other government and private jobs. People dependent on business within 10 km of the mine is less (about 4.6% among surveyed households). Overall, about 77% of the businesses reported no change in business due to progressive closure.

(iii) Closure-induced migration: The decline in coal production in recent years and the lack of suitable income opportunities have started to influence outmigration from the area in search of jobs. Overall, about 17% of the surveyed households reported at least one person from the family migrating in the last five years for better employment opportunities.

FGDs with CSOs and the local community suggested that while it cannot be strictly related to declining lignite production, in the last three to four years there are people who have moved out of the area in search of jobs. However, the correlation cannot be discounted as they also suggested that there has been a slowdown in employment opportunities in the area in recent years.

(iv) Access to social infrastructure and services: The impact on access to social infrastructure and services due to the progressive closure has been evaluated in terms of healthcare, education infrastructure, and housing, like for the other case studies.

The survey results provide a mixed understanding of dependence on the company-provided infrastructure and services, which depend on the type of service.

For example, the results show that for healthcare services, there is a significant reliance on the company. While about 56% of the households reported availing of private clinics or healthcare facilities, a considerable 40% rely on mining company-supported healthcare facilities. Only about 4% reported availing government-supported healthcare facilities.

On the contrary, for education, the reliance is high on government schools beside the private schools. For example, while about 38% of the respondents said that they send their children to private schools, about 32% reported sending their children to the government schools. About 30% of the households were found to rely on NLC-supported schools.

The reliance on company-provided housing is also not very significant. Only 25% of the households were found to avail company provided accommodation. Most households have their own houses (nearly 70% of the surveyed households).

None of the social infrastructure and services provided by the company have been impacted by the progressive closure.

c. Community benefits from reclamation activity

The progressive closure and reclamation ongoing in Neyveli Mine I primarily focus on biological reclamation, with afforestation measures being undertaken in most of the reclaimed area. Besides, an eco-park has been developed on 10 ha of reclaimed land. So far, the reclamation work in the mine area specifically has not focused on generating employment.

As per FGDs with local communities in the Seplanatham and Arasakuzhi villages, it is estimated that around 10-15 individuals from the villages were engaged in the reclamation activities. Interactions in Kattukollai and Neyveli villages also indicated similar numbers (15-20 people).

Overall, the local community feels that so far the main benefits of the reclamation activities have been improvement in environmental conditions, particularly air pollution. The survey results showed that about 40% of households perceive positive environmental effects following the progressive closure.

However, in the future income generation remains a key issue. During FGDs, people said that mining activities in the area have led to displacement and livelihood loss. Therefore, they should not suffer once again when the mine closes. Overall, 50% of the surveyed households prioritised employment and income-generation activities on the mining land once it was closed.

STAKEHOLDER PERCEPTION ON PROGRESSIVE CLOSURE AND RECLAMATION ACTIVITIES IN NEYVELI MINE I

During the process of the primary survey, stakeholder perceptions were also captured through individual interviews and a few FGDs. This included interactions with coal company officials, district administration (including the District Collector), local community members, women groups, and CSO representatives. The key takeaways from the interactions are outlined below.

Stakeholders	Key issues highlighted
NLCIL officials, Cuddalore	<ul style="list-style-type: none"> • Mining land is being reclaimed in an environmentally sustainable manner, as per the environmental clearance and other mining-related permits issued to the company. • Overall, NLCIL has been cognizant of creating livelihood opportunities for local communities. However, they suggested they would consider engaging the project-affected people in the eco-parks, etc. • Concerning current impacts on local employment from progressive closure, the officials said that it has not affected the employees. As a process, redeployment to other sites is happening.
District administration	<ul style="list-style-type: none"> • The reclamation efforts have been a matter of the company. There is no engagement with district authorities on the matter.
Local community/ villagers (in Seplanatham and Arasakuzhi)	<ul style="list-style-type: none"> • The eco-park(s) being developed by the company is of little use to the local community. The reclamation projects have not employed the project-affected persons or generated much local employment. • Some people have been engaged in agricultural activities supported by the mining companies. • There is much potential for good agricultural activities in the area. These have been agricultural land. Many of the local villagers were earlier farmers in their land. Now many of them work as agricultural labourers. Some are also employed through small businesses. • The local people can be employed if proper investments are made for agricultural activities. Creating livelihood for the local people will be important. • Overall, there is a need for local employment generation. The area is highly dependent on employment in mines. However, the opportunities are becoming limited. Some people have started leaving the villages for jobs.
Women members in Seplanatham and Arasakuzhi	<ul style="list-style-type: none"> • The women specifically highlighted the limited income opportunities for them in decently paid jobs. In the villages they are primarily involved in rearing of cattle, and doing miscellaneous causal work related to agriculture. • They emphasised on the need for skilling/ skill development programmes which can help them to get employed in other types of jobs. They also suggested that these skilling programmes should be tied to local employment prospects as they will not be able to travel long distances given family reasons.
CSOs	<ul style="list-style-type: none"> • A key issue for the local community is employment generation. The reclamation activities have not created much scope. • There has also been no engagement with the local community in planning the reclamation activities. The work is planned and undertaken by the companies. It will be important for the company to engage with the local people to understand their needs.

2.3.5 Conclusion

The Neyveli case study highlights the practices of progressive mine closure, and the reclamation and repurposing considerations that the final mine closure should consider. The following conclusions emerged from an examination of the reclamation measures, socioeconomic impacts, and community experiences.

- **Moderate socio-economic impacts:** Since the mine is undergoing a progressive closure, the socio-economic impacts have been fairly moderate. The decline in production over the past three years has not impacted the local community significantly, but there are emerging concerns about declining employment opportunities and outmigration in search of work. Stakeholder interactions through FGDs and interviews shows there is a concern about the declining prospects of economic opportunities in the future.
- **Challenges for informal workers:** There are a large number of low-paid informal workers who are engaged in lignite mining activities. The stakeholder interactions suggest that the declining production in the mines has impacted the informal workers, including those engaged in coal transportation from the area. In the coming years as production further declines from these mines, and NLCIL expands its business in other states, such as Rajasthan and Odisha (as shown in the company's annual report of 2023), the situation of these workers will further worsen. Therefore, creating local employment opportunities as a part of mine reclamation and repurposing is highly important.
- **Long-term livelihood security:** There is a clear concern of ensuring livelihood security for the local community. The concern of the local villagers about losing their agricultural land for mining, which has in turn affected their livelihood security, and the demand for the avoidance of such a situation in the future suggests so.
- **Employment of local people and creating opportunities for women and vulnerable groups:** A key aspect of employment generation will be to ensure that the local people can be employed. This should also include women. As shared by the women members during the FGDs, skill development programmes can be developed for them to increase their employability. Local employment generation and increasing the employability of the local community will help in supporting gender-responsive transition measures, limit outmigration, and continue to support the local economy.
- **Engaging the local community in mine closure and repurposing planning:** Going ahead, collaborative efforts are required between mining companies, government agencies, and the local communities for successful mine reclamation and repurposing measures, which also can create economic opportunities besides environmental benefits. The mining company can develop a plan for continuous engagement with the local community, including consultations and feedback mechanisms. Involving community members in decision-making processes can help identify their needs and preferences for future land use and employment opportunities.

The above observations underscore the need for developing a plan for mine reclamation and repurposing, in consultation with the local community and the local government. By adopting such an approach, the Neyveli region can ensure a just transition that minimises economic distress, creates new opportunities and promotes sustainable development of the mining area.

2.4 Overall observations on the case studies

Mine reclamation and repurposing constitute a major opportunity for a sustainable transition of the coal mines and the local community once the mines cease operation. As more and more mines start exhausting their resources or become economically unviable to continue with the operations, many coal mining-dependent areas will start facing socio-economic challenges. The impacts will be more localised in nature (particularly at the block level), where the mining activities are concentrated. Unless mine closure and reclamation planning takes into account socio-economic considerations, major economic and social disruptions will happen in these areas.

The three case studies in different coal mining regions of Jharkhand, Chhattisgarh, and Tamil Nadu, elucidate this challenge. For example, in Surajpur block, where the closed Bishrampur mine is located, most of the other mines are also likely to close soon. Out of the five operational mines, four of the low-producing UG mines have been identified to be economically unviable by the coal company. Two of these mines (Bhatgaon and Balrampur) are also very old. All these mines may close by this decade.

Similarly, in Tandwa block both Ashoka and Amrapali mines have very limited mine life left. While the Amrapali-Magadh area is slated for expansion, but even Ashoka mine nearing the end of its life can create major economic disruptions in the area.

Table 2.13: Tentative closure schedule of mines in the study area

Block/State name	Mine name	Reserve (MMT)*	Production capacity (MMTPA)	Years in operation (as of 2024)	Estimated mine life left as per reserve (year)	Economic status	Tentative closure schedule (year)
Tandwa, Jharkhand	Ashoka	186	14	29	6	Profitable	2030
	Purnadih	57.5	3.5	14	16	Profitable	2040
	Amrapali**	79.5	20.2	18	5	Profitable	2028
Surajpur, Chhattisgarh	Bhatgaon	3.1	0.2	50	15	Unprofitable	By 2030 considering low production and unprofitability
	Balrampur	6.5	0.8	30	8	Unprofitable	
	Nawapara	5	0.2	18	25	Unprofitable	
	Ketki	11	0.4	15	27	Unprofitable	
	Kumda 7&8 (new)	Not available	0.6	6		Profitable	-
Kurinjipadi, Cuddalore	Mine I	154.3	10.5	62	15	Profitable	
	Mine II	595.7	15	31	40	Profitable	
	Mine IA	211.3	7	21	30	Profitable	

*Estimates as of 2022-23

** Reserves of Amrapali are being re-estimated as part of Amrapali-Magadh coal block

The three case studies as outlined, provide important insights into the reclamation practices of coal and lignite mines, and the impacts of the mine closure and specifically the reclamation and repurposing activities (as the case may be) on the local community.

Concerning the impacts of mine closure, the case studies show that:

- The closure of the mines has primarily impacted the induced economy. Local businesses suffer considerably particularly in vicinity to the mines. For instance, 64% of the businesses in Surajpur and 36% of businesses in Piparwar have suffered a reduced income following closures.
- The impact on departmental workers (and overall formal workers) is not pronounced due to their redeployment to other mining sites operated by the company or due to the other ongoing mining

operations in the region. However, the challenge with informal workers is evident from all case studies. Also, there is very poor documentation and understanding of the number of informal workers who get impacted by such closures.

- A significant impact is also in the reduction of local economic opportunities. As observed in the case of Bishrampur mines where the economy has suffered the most, and where most other operating mines are unprofitable, about 33% of the surveyed households had at least one member who had migrated due to lack of economic opportunities.
- There is also a palpable fear of a reduction in income opportunities in the future with mines exhausting resources. All the case studies show that the coal mining jobs are some of the best-paying jobs in these regions due to a mono-economy in these districts. Therefore, a loss of livelihood and income will create socio-economic instability.

Concerning the reclamation and repurposing measures, the studies show that:

- The reclamation efforts related to the complete closure or progressive closure of mines are primarily focused on plantations. The analysis of the post-mining land use plans showed that in all cases maximum land area had been earmarked for plantation/afforestation purposes, prioritising environmental restoration post-closure. This aligns with the existing coal mine closure guidelines, that has a chief focus on afforestation and plantation as reclamation measures, and most OC mines in India are following this practice.²⁰
- The common economic activity is developing eco-parks. There is also consideration of establishing ground-mounted solar in the reclaimed land in the future.
- Overall, the reclamation and repurposing activities have limited consideration for local employment generation and maintaining the economic vitality of the areas once the mine(s) closes. For example, in Bishrampur where there has been a deliberate measure of generating local employment, overall, only about 30 people have been employed. In other cases, the opportunity is far less.
- The Bishrampur case study also shows that the absence of community engagement and poor planning can make projects unviable. The engagement of women SHGs in the eco-park though was a thoughtful measure, but the project failed because no local ownership was created. Further, a floating restaurant and boating facilities in a remote mining area do not have a sustained source of client and income generation potential.
- In all cases, the local community has not been involved in the reclamation and repurposing activities. This is primarily because such activities are considered to be an obligation of the mining companies.

The observations, therefore, suggest that regulatory changes need to be instituted to ensure mine reclamation and repurposing in a manner that not only benefits the environment but creates economic and livelihood opportunities for the local community. At that same time, it will be important to engage the impacted community in the planning process of mine reclamation and repurposing, so that economic and livelihood opportunities can be designed as per the needs of the impacted workers and the local communities.

SECTION III

A JUST TRANSITION APPROACH FOR MINE RECLAMATION AND REPURPOSING

3.1 Introduction

Coal mine closure, reclamation and repurposing is a complex and multifaceted issue that involves various considerations, including environmental, social, economic, and safety concerns. Coal mining and subsequent mine closure does not only impact the local communities and their livelihoods, but the broader social fabric of the regions where these mines are located.

However, until now, the basic philosophy that has underpinned coal mine closure guidelines and practices is bringing back the mining land, as much as possible to pre-mining conditions. Since the pre-mining land use types predominantly include forest, agriculture, grazing, and wasteland, therefore, the mine closure planning and post-mining land use is focused on raising plantations, along with other activities, such as the development of eco-parks and recreational areas, etc. Besides, there is emphasis on undertaking afforestation measures on the closed mine land. The lack of holistic consideration in planning for mine closure and reclamation may lead to long-term social and economic stagnation for decades after the mining operation ceases.

The case studies examined in this report show that some of the best practices of mine land reclamation and repurposing are highly focused on ecological restoration, which primarily include activities such as afforestation measures and plantations. While such activities have restored greenery in the broken-up mining land, however, such focus has undermined the scope of creating alternative economic opportunities for the local communities who have direct, indirect or induced dependence on these mines.

As the energy transition progresses and the phasedown of coal mining activities happens in the coming years, socio-economic factors will emerge as a key issue. Therefore, regulations for mine closure needs to be revised to integrate the concerns of socio-economic transition of the local community, besides environmental and ecological restoration. A comprehensive approach of mine closure, reclamation, and repurposing needs to be adopted to support the just transition of local communities.

EXISTING GUIDELINES FOR COAL MINE CLOSURE AND RECLAMATION

The closure guidelines for coal mines were first promulgated in August 2009 by the Ministry of Coal (MoC). The guidelines have been subsequently amended with the guidelines of 2020 being currently in effect.

Concerning mine reclamation, the guidelines of 2009 and the subsequent amendments have primarily focused on afforestation activities in the mine-out area. The 2009 guidelines specified that “Mining is to be carried out in a phased manner initiating afforestation work in the mined-out area”. The subsequent amendments also have a similar focus. The guidelines of 2020 (the one currently in force) specify that “The mine closure details of the mining plan should be oriented towards the restoration of land back to its original form as far as practicable or further improved condition”.

The emphasis on afforestation and restoration of the mining land to its original form means that reclamation and subsequent repurposing activities will be limited to afforestation/plantation measures, some prepromotion of horticulture, and similar activities.

Sources:

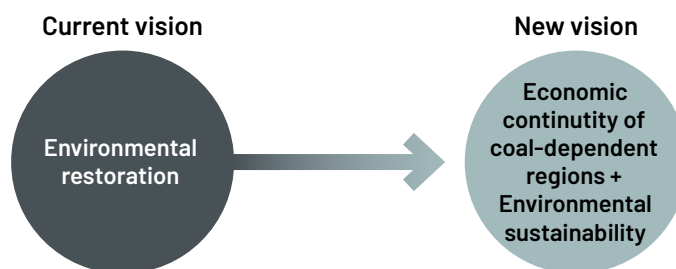
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3.2 Revised mine closure philosophy for just transition

To develop a comprehensive mine closure framework based on just transition principles, the basic philosophy of mine closure should change. Mine closure and post-closure measures should be conceptualised and designed to ensure economic continuity of the areas where these mines have been operating, along with environmental sustainability.

To realise this philosophy, the coal mine closure-related laws and guidelines need to be revised. The revisions should institute a mechanism of just transition, including a well-defined planning process and outlining the costs to implement the plan.

Figure 3.1: Vision of mine closure to support just transition



Global best practice guidelines on mine closure are also emphasising social transition (which is essential to support a just transition) as an integral part of mine closure planning and repurposing of the mining land. The integrated mine closure framework outlined by the International Council on Mining and Metals (ICMM), insists on social transition as a core component of mine reclamation and post-closure land use. The post-closure land use needs to be determined considering aspects of both environmental sustainability and social transition. Potential land use activities need to be identified by using the local knowledge base, considering local conditions (such as land capability and mapping the potential land use options), involving stakeholders, and identifying beneficial uses, among others.¹

Some of the world's top mining nations have also revised their mine closure frameworks to support a socially-responsibility closure practice and transition. For example, the Government of Western Australia have developed a comprehensive set of guidelines under the country's Mining Act (1978). The guidelines cover several environmental, social, and economic components as part of mine closure. These include, determining the legal obligations, stakeholder engagement, analysis of baseline information, determining post-mine land use, undertaking a closure risk assessment, determining closure outcomes and completion criteria, and implementation of closure measures, among others.²

In Germany, on the other hand mine (lignite) planning and post-mining land uses are guided by both spatial development and land planning policies. Following the country's Spatial Planning Act (initially enacted in 1965), mining land use plans are jointly developed as part of municipal and regional spatial plans to ensure an integrated regional land use framework.³

India with its long history of coal mining also need to institute necessary regulatory reforms. Besides, CIL being the largest coal company in the world and with a commitment to public welfare (as a PSU), can lead the way in implementing a just transition planning process as part of mine closure, reclamation, and repurposing to support a sustainable and just transition of the coal-dependent regions.

3.3 Just transition plan for mine closure

To ensure mine closure, reclamation, and repurposing practices that can support both environmental sustainability and economic continuity of coal mining regions, a just transition plan must be developed and implemented. This will involve undertaking a social impact assessment (SIA) study in the event of mine closure through a process of social dialogue, developing a just transition plan (as a component of final mine closure plan development) based on the study, and implementing the plan through the utmost principles of transparency and accountability.

This section outlines the following aspects concerning just transition planning as a component of final mine closure:

- Legal basis for SIA;
- Regulatory amendments required to institute just transition planning as part of mine closure;
- The process of developing a just transition plan based on the SIA study; and,
- Accountability mechanisms.

3.3.1 Legal basis for SIA

The consideration of socially responsible practices in mining is not new to India's regulatory landscape. The GoI has developed important regulations and regulatory guidelines to ensure such practices.

A key one in this respect is the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 (LARR Act). Under the LARR Act Social Impact Assessment (SIA) is a requirement during the involuntary acquisition of land. The Act mandates conducting a SIA study and preparing a Social Impact Management Plan (SIMP) for the acquisition of land by the government for its use, hold, and control or by a public-private partnership or by private acquisition for public purposes (Chapter II, Section 4).⁴

The overall objective of the Act is to make the land acquisition process participatory, humane, informed, and transparent. The Act also stipulates that the SIA study for land acquisition shall demonstrate or justify the following:

- a. That the land to be acquired serves a public purpose.
- b. That the extent of the land to be acquired for public purpose is the absolute bare minimum.
- c. Whether land acquisition at the alternative place has been considered and not found feasible.
- d. Whether overall potential benefits outweigh the social impacts and assessment costs.
- e. Inventory of movable and immovable properties likely to be impacted.
- f. Number of affected families and the number of families likely to be displaced.

The SIA is therefore an instrument to assess and determine the impacts of land acquisition on the local community and people. The process of SIA and the development of a SIMP minimises the risks involved in displacement, rehabilitation, compensation, and resettlement. It also guides the land acquiring agency to plan formally, thus reducing the risks involved in delays and saving costs.

Considering the prospective impacts of mine closure on the local communities in various coal regions, a legal requirement for undertaking a SIA should be established and subsequently, the development of a just transition plan should be mandated as a part of developing the final mine closure plan.

3.3.2 Amendments to MCDR Rules and coal mine closure guidelines

To mandate an SIA study for mine closure and a just transition plan, regulatory reforms need to be instituted by introducing amendments to the Mineral Conservation and Development (MCDR) Rules, 2017⁵, and the coal mine closure guidelines⁶ developed under the aegis of the rules.

Amendments in MCDR Rules 2017: The following amendments need to be introduced in the Rules.

- i. Under Section 22 of the MCDR Rules, which stipulates the requirements of a mine closure plan, the following subsection (3) may be introduced:
 - a. Every holder of a mining lease (coal, lignite, and other major minerals as the case may be), shall take steps to prepare a just transition plan as part of the final mine closure plan development process. The just transition plan should be based on a SIA study.
 - b. The SIA study should be commenced 10 years before the date of closure.
 - c. The SIA study should be undertaken by an accredited agency or institution and in consultation with the state and local government and the local community.
 - d. Based on the SIA, the holder of the mining lease shall develop the just transition plan in partnership with the state and local government.
 - e. The objective of the final mine closure plan, including the just transition plan, shall be as follows:
 - (i) The final closure of the mine shall enhance the social, economic, and environmental conditions in the zone of impact (ZOI), as identified by the SIA.
 - (ii) The final mine closure plan should identify the reuse of land for social, economic, and environmental protection activities.
 - (iii) That the land that cannot be used for social and economic activities should be used specifically for biological reclamation.
 - (iv) Efforts should be made to minimise land left for void and overburden dumps. The maximum area should be recovered for repurposing.
 - f. The cost of the mine closure should include the cost of the just transition plan. The cost of implementing the just transition plan can be shared between the state government and the mining company.
 - g. The escrow amount for mine closure should include the contribution of the mining company for the just transition plan.
 - h. The implementation of the just transition plan should start at least five years before the final mine closure.
- ii. Section 24(1), which specifies the submission timeline of the final mine closure plan, may be amended as follows to revise the timeline.

The holder of a mining lease shall submit a final mine closure plan (including the just transition plan) to the competent authority for approval ten years before the proposed closure of the mine.
- iii. Section 25(1) that specifies the scope of modification of the mine closure plan may be amended as follows to allow revisions in an existing mine closure plan to integrate a just transition plan.

The holder of a mining lease desirous of seeking modifications in the approved mine closure plan shall submit to the competent authority for approval of the just transition plan setting forth the intended modifications and explaining the reasons for such modifications.

Amendments in coal mine closure guidelines: The coal mine closure guidelines should be revised to integrate the following aspects.

- a. The mine closure guidelines need to be revised to remove the specific focus on afforestation or bringing back the land to pre-mining conditions. The guidelines should specify that mine closure planning should be undertaken to ensure positive social, economic, and environmental outcomes for the local community and the region post-closure.
- b. The guidelines should mandate undertaking the SIA study and developing a just transition plan. The steps for developing the just transition plan should be outlined in the coal mine closure guidelines.
- c. The guidelines should specify the requirement for the submission of a detailed just transition plan as part of the final mine closure plan.

3.3.3 Process for developing a just transition plan

There are six steps for developing a just transition plan as a component of the final mine closure. These include:

- a. Developing a stakeholder engagement strategy.
- b. Determining the ZOI of the mine closure.
- c. Identifying affected workers and communities.
- d. Undertaking a SIA study of mine closure by adopting a participatory appraisal process and social dialogue.
- e. Developing a just transition plan based on the SIA.
- f. Determining the transition costs, including outlining potential resources.

The process involved in each of these steps is elaborated below for inclusion in the coal mine closure guidelines.

a. Developing a stakeholder engagement strategy

A stakeholder engagement strategy should be developed in the beginning to ensure that:

- i. All stakeholders are informed in an appropriate capacity on the mine closure.
- ii. All stakeholders, particularly the local community, are consulted during the SIA study and development of the just transition plan.
- iii. Stakeholders are engaged in appropriate capacities for the implementation of the plan.

The stakeholder engagement process should be especially sensitive to engaging with the local community, with a clear strategy for engagement with women, marginalised communities, and the youth. The engagement strategy should include the method and frequency of engagement, communication and coordination mechanisms, and the incorporation of feedback and accountability mechanisms.

The agency or institution undertaking the SIA study should work in coordination and consultation with all concerned stakeholders, including the mining company (the Just Transition Cell/Sustainability Division), local government, the worker's unions, members of the local community, members/representatives of institutions of local governance institutions (such as PRI members)/local bodies and institutions, and any such concerned members.

b. Determining the ZOI to plan interventions

The ZOI in mine closure refers to the area surrounding a mine site that may be affected by the closure activities due to the economic dependence of these areas on the mine.

To determine the social impacts of closure, the ZOI can be categorised as follows:

- Primary Impact Area, which includes villages/wards from where permanent/ departmental, contractual, and informal workers are presumed to come to work at the mine and thus the areas are highly dependent on the mine. Besides there is also significant induced dependence.

This is the area where workers live, and it can be assumed that the local community and the induced economy have been impacted by the closure of Bandel TPS.

- Secondary Impact Area , including villages/wards where it is assumed that people are not directly dependent on the mine for an income, but there is indirect and induced dependence.

The ZOI, including the primary and secondary impact areas, should be delineated in a geospatial map. Further, a detailed list of villages and wards falling within each should be developed.

c. Identify directly affected workers and communities

The affected workers and affected communities should be identified by the concerned mining company and the SIA team in consultation with the workers' union/workers' representatives, and PRI/ward members in the ZOI.

The 'directly affected workers' shall include permanent, contractual, and informal workers, who will/may face an immediate job and/or income loss which will have consequences for them and their families.

The 'directly affected communities' shall include individuals/families residing within the zone of influence who are not directly dependent on the concerned mine for an income but have an indirect or induced dependence.

d. Undertaking a SIA study

The SIA study shall identify and assess the nature, extent, and intensity of the positive and negative social impacts associated with the closure. The study should be based on a participatory appraisal (PA) process and should be conducted in consultation with community members at the village level or ward level in the ZOI through a process of social dialogue.

The SIA study shall include the following steps:

- i. Undertaking primary surveys in the primary and secondary impact areas- FGDs and informed interviews.
- ii. Collate and analyse a range of quantitative data (economic, social, environmental, etc.) to develop baseline information and to inform the development of the just transition plan.
- iii. Determine the impacts of the closure considering impacts on:
 - a) Economic aspects: livelihood and income; and,
 - b) Social aspects: social and cultural cohesion
- iv. The assessment parameters for livelihood and income should include (but not be limited to) the following-
 - a) Level and type of employment
 - b) Intra-household employment patterns
 - c) Income levels
 - d) Food security
 - e) Standard of living
 - f) Access and control over productive resources
 - g) Economic dependency or vulnerability
 - h) Disruption of the local economy
 - i) Impoverishment risks
 - j) Access to livelihood alternatives of the local community
- v. Assessment parameters for social and cultural cohesion should include (but not be limited to) the following-
 - a) Demographic changes and migration
 - b) Crime and illicit activities
 - c) Violence against women
 - d) Any other social ills.
- vi. Develop a SIA report based on the findings of the primary survey and analysis of the baseline data.

e. Develop a just transition plan

The just transition plan should address the prospective economic and social impacts identified in the SIA study and identify and outline prospective economic activities that should be undertaken in the reclaimed mining land/area to minimise the impacts.

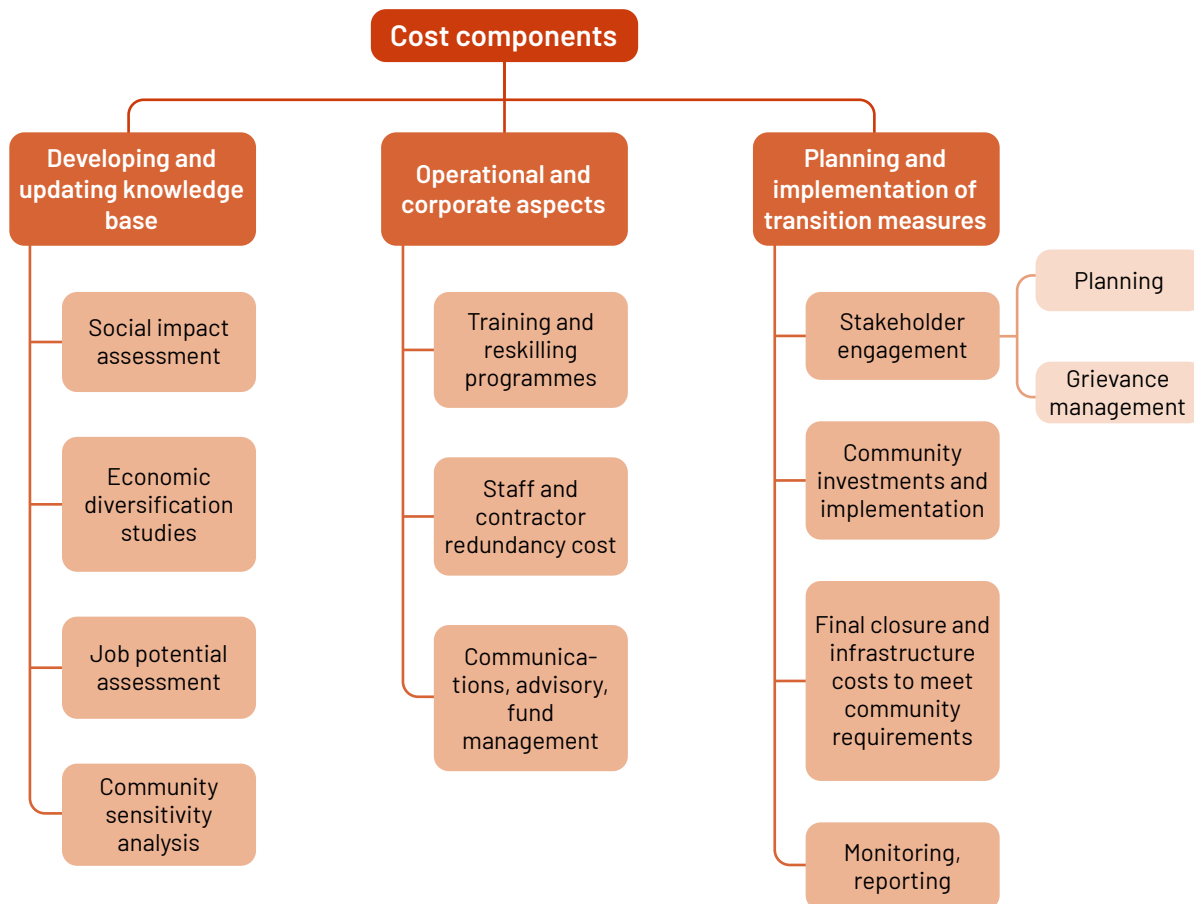
The plan should include the following components elaborating on each of them in a context-specific manner:

- i. Mapping of resources, including physical and financial resources, that can support the plan and facilitate its implementation.
- ii. Measures that may be adopted by the industry in consultation with the government to avoid impacts.
- iii. Measures that may be adopted by the industry in consultation with the government to minimise and mitigate impacts.
- iv. Institutional structure for implementation of the plan.
- v. Mechanisms of monitoring and evaluation of the success of the plan implementation.

f. Determining the transition costs

Determining the costs of a just transition will be crucial for mobilising the required financial resources to implement the just transition plan. The cost components include elements that focus on generating post-closure economic and social returns in local communities. These include costs for developing and updating the knowledge base including undertaking impact studies and various other assessments from time to time, costs associated with operational and corporate aspects, and costs of planning and implementation of transition measures.

Figure 3.2: Just transition cost components for mine closure planning



3.3.4 Accountability mechanisms

The holder of the mining lease will be responsible for the implementation of the final mine closure plan including the just transition plan. An annual progress report should be prepared by the mining companies on the implementation of the plan.

To ensure public accountability, the company should on the company website publish the following:

- a. The SIA report.
- b. The final mine closure plan, including the just transition plan.
- c. The yearly monitoring reports.
- d. Details of local economic activities created and employment generation.

The plan and the annual progress report should be submitted to the Ministry of Coal at the central level, and concerned state government department(s) for review.

The plan and the progress report shall be open to public scrutiny and may be audited by the Comptroller Auditor General (CAG) as considered necessary.

In conclusion, it is important to recognise that mine closure is not simply an end-of-life process for mining operations. Instead, it marks the beginning of a new phase that requires careful planning and management to address the environmental and socio-economic impacts once the mining operation ceases. Long-term stewardship is essential to ensure that the communities and ecosystems affected by mine closures can transition smoothly and sustainably. By prioritising socio-economic continuity alongside environmental rehabilitation, the negative effects of mine closure can be minimised and a prosperous future for the concerned regions can be ensured.

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Notes

Handwriting practice lines consisting of 28 horizontal dotted lines.

