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Coal Transition Jharkhand

A WORKING PAPER

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1 Phasing-down Coal In India

Coal has been backbone of the Indian economy for more than a century. In major coal mining states including Jharkhand, Chhattisgarh, Odisha, West Bengal, and Madhya Pradesh, coal is a way of life, with deep-rooted linkages within the social, political, and economic systems. Early in November, India announced a concrete target year to achieve net zero by 2070 at the COP26 summit in Glasgow. This means that India has 49 years to lay out its transition strategy and phase-down coal in a 'just' manner. But what does 'phasing-down' and 'just transition' mean for a developing country like India, where millions of lives and livelihoods are directly or indirectly dependent on coal. There is no one-shoe fits all policy when it comes to transitioning away from coal, which makes the transition process extremely messy and complicated for India. India has a high incidence of informal economy, i.e., majority of workers are off-roll or contract labourers. These workers are excluded from company estimates, which makes them highly vulnerable to being left out of planned transition strategies. Further, there are no official datasets in India that capture the socio-economic indicators of the labour employed in coal and coal-allied sectors. Non-alignment of national, state, regional, and sector roadmaps act as another bottleneck in implementing strategies. Lastly, conversations around climate finance are in the nascent stage, and there is no financial system for planning early closures in place yet for India.

> **"India has 49 years to lay out its transition strategy and phase-down coal in a 'just' manner."**

While the global north or developed countries have the wealth and capacity to phase out fossil fuels, India still being a developing country must deal with its development agendas and poverty eradication. Hence, it is important to emphasize the two phrases 'phase down' and 'national circumstances' in context to India to understand the challenges it is likely to face while transitioning to a clean energy pathway. While the goal is to 'phase out' coal, that is, a complete stop on using the resource, the approach must be focused on 'phasing down', which is to decrease the proportion of coal in the overall energy mix. The text drafted by India at the Glasgow summit highlights the need to keep people at the center of this transition by, 'accelerating efforts to phase down unabated coal power and phase out inefficient fossil fuel subsidies, while providing support to poorest and the most vulnerable, in

line with national circumstances, and recognizing the need for support towards a just transition.'[1] A just transition approach will ascertain that we leave no one behind.

In November 2021, National Foundation for India released a report 'Socio-economic impacts of coal transitions in India', which quantified direct and indirect jobs associated with coal mining and coal-allied sectors including power, iron and steel, and bricks, at the national level. The study made an attempt to create a socio-economic profile consisting of age, general and technical education levels, vocational trainings, job contracts, and wages. The aim of this exercise was to assess the extent of re-skilling and training which would be required while transitioning jobs. However, the lack of data availability on socio-economic indicators acted as a limitation of the study to capture labour dynamics at state and regional level. This discussion paper attempts to deep dive into the coal economy of Jharkhand state and present the challenges which are hampering planning a just transition at the regional level.

“The study made an attempt to create a socio-economic profile consisting of age, general and technical education levels, vocational trainings, job contracts, and wages.”

1 https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1806584

2 Coal economy in Jharkhand

Jharkhand is one of the leading coal mining states in India. Situated in the eastern part of the country, this state has at least 15 districts out of total 24 districts which are likely to be impacted in some form or the other due to the impending coal transitions. Out of these 15 vulnerable districts, 12 districts are involved with coal mining.

Jharkhand is significant to the coal mining sector in India, as it produces 130 Million Tonnes (MT) of coal annually. India's almost entire production of coking coal is concentrated in the state of Jharkhand. Further, the state headquarters three of the eight subsidiaries of Coal India Limited (CIL), namely, Central Coalfields Limited (CCL), Bharat Coking Coal Limited (BCCL), and Central Mine Planning & Design Institute (CMPDI). Some mines in the state are also operated by the Eastern Coalfields Limited (ECL). The table below shows that Jharkhand produced 18-19% of the total coal produced in India between 2016 and 2018.

Table No 1: Production of Coal, 2016-17 to 2018-19 (in '000 tonnes)

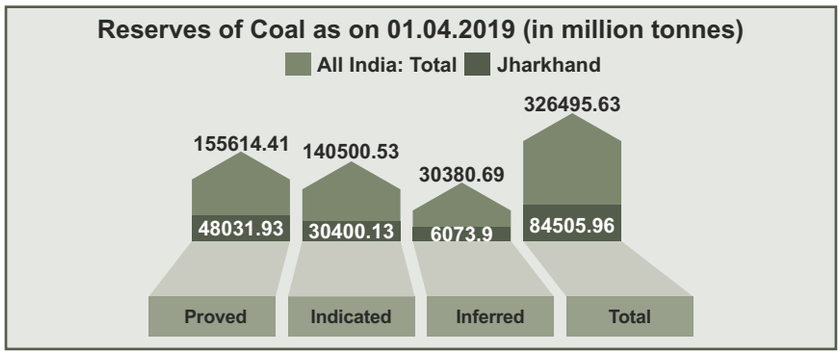
State	2016-17	2017-18	2018-19 (P)
India	657868	675400	728718
Jharkhand	126435	123297	134666

Source: Indian Minerals Yearbook 2019, Government of India, Ministry of Mines, Indian Bureau of Mines

> **"Jharkhand is significant to the coal mining sector in India, as it produces 130 Million Tonnes (MT) of coal annually."**

Furthermore, Jharkhand accounts for 26% of the coal reserves in the country.

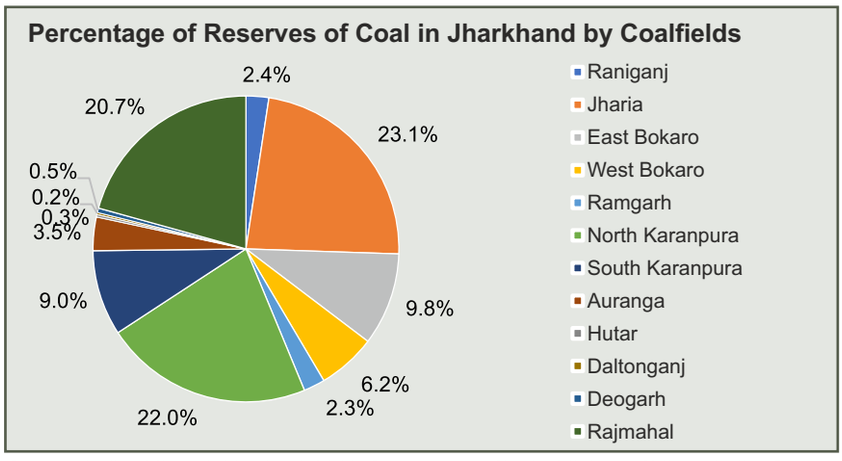
Chart No 1: Reserves of Coal as on 01.04.2019 (in million tonnes)



Source: Indian Minerals Yearbook 2019, Government of India, Ministry of Mines, Indian Bureau of Mines

As per the Indian Bureau of Mines, Jharkhand has 12 coalfields. Among them, Jharia, North Karanpura, and Rajmahal, comprises of 23.1%, 22%, and 20.7% of the coal reserves, respectively. The Indian Minerals Yearbook (2019) states that, there are total 120 coal mines in Jharkhand out of 455 coal mines in India (26% of mines in India). As per the available district specific data, of the 114 mines in Jharkhand, 27 are Underground (UG) mines, 77 are Open Cast (OC) mines, and 10 are mixed mines.

Chart No 2: Percentage of Reserves of Coal in Jharkhand by Coalfields



Source: Indian Minerals Yearbook 2019, Government of India, Ministry of Mines, Indian Bureau of Mines

Table No 2: District-wise number of mines and coal production

District	Number of Mines	Underground	Opencast	Mixed	Coal Production 2019-2020
Dhanbad	51	17	24	10	31.245
Chatra	4	----	4	----	29.65
Godda	2	----	2	----	17.37
Hazaribagh	10	1	9	----	16.04
Bokaro	14	3	11	----	15.097
Ramgarh	19	5	14	----	10.683
Latehar	3	----	3	----	6.608
Ranchi	4	1	3	----	4.52
Deoghar	1	----	1	----	2.05
Palamu	2	----	2	----	0.808
Giridih	2	----	2	----	0.13
Pakur	2	----	2	----	0.1
Total	**114**	**27**	**77**	**10**	**134.301**

Source: Source: Pai, S & Zerriffi, H. 2021. A novel dataset for analysing sub-national socioeconomic developments in the Indian coal industry, IOPSciNotes, https://doi.org/10.1088/2633-1357/abdbbb

> **"After mechanization in the coal mines, the workforce requirement in OCM is much less as compared to UG mines."**

A study conducted by the Centre for Strategic and International Studies (CSIS) and Climate Investment Fund (CIF) stated that Jharkhand will likely be worst affected by energy transitions. Over the years, Jharkhand has witnessed the shifting of coal production to bigger mines in Odisha, Chhattisgarh, Madhya Pradesh, and Maharashtra. According to Department of Mines and Geology (2020), 50% of the coal mines in Jharkhand are currently closed, including both Underground and Open Cast mines[2]. These regions were already facing economic and environmental degradation due to large-scale coal extraction over the last century. Unplanned closures and abandoning of mines will further aggravate the negative impacts. Hence, without thinking about the ways of diversification of economy, restructuring of industries, and environmental remediation, we cannot move forward with mine closures and coal phase-down.

Coal India acquires substantial amount of land in Jharkhand. This consists of two types of land. First, that which already has had coal mining for decades, and second, that which has been acquired for decades but where no mining has taken place. There are number of villages in the state which are struggling for better livelihood opportunities, and environmental remediation and rehabilitation. Ground reports suggest that jobs, better rehabilitation, education, and health facilities are the four prime demands of the families and people affected due to land acquisition[3]. In most villages, the displaced and impacted have formed organizations to voice their demands and negotiate with the coal producing companies. Vishpat Sangharsh Morcha is one such organization. It is imperative to ensure that the communities who are already facing the brunt of climate change, do not end up suffering more due to continuing unsustainable mining methods and lack of proper planning regarding mine closures, rehabilitation, and remediation.

> **“Jharkhand is the second poorest state in India with 42.16% of population who are multidimensionally poor.”**

Jharkhand is the second poorest state in India with 42.16% of population who are multidimensionally poor, encompassing the various deprivations experienced by poor people in their daily lives – such as poor health, lack of education, inadequate living standards, disempowerment, poor quality of work, the threat of violence, and living in areas that are environmentally hazardous, among others. At the national level 25.01% population is multidimensional poor. Furthermore, the coal mining regions in Jharkhand are the most underdeveloped and have faced adverse economic, social, and environmental impacts over the years. The figure below shows the percentage of population who are multidimensionally poor in each

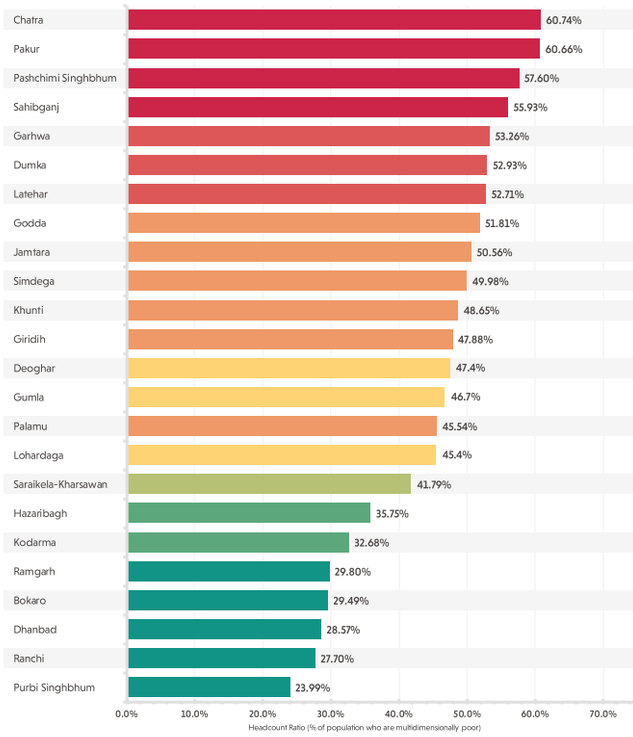
2 https://iforest.global/2021/07/just-transition-in-coal-a-perspective-from-jharkhand/

3 https://samridhjharkhand.com/top-news/another-round-of-employment-crisis-begins-in-the-coal-sector-such-provisions-will-increase-further-problems-in-jharkhand

district. It is important to consider poverty index at the district level, since it plays a major role in assessing the vulnerability of each district.

Jharkhand: Headcount Ratio

Percentage of population who are multidimensionally poor in each district



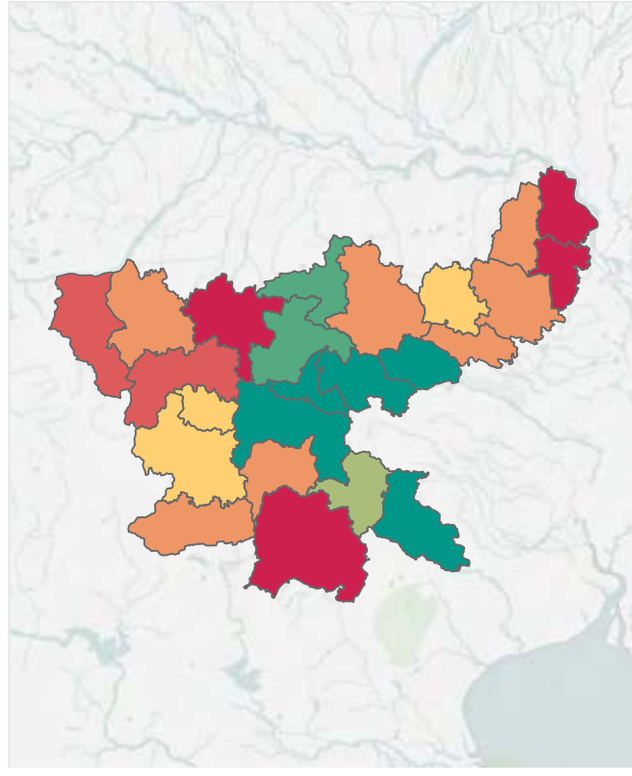
Multidimensional Poverty Index

0.110 to 0.138 | 0.139 to 0.168 | 0.169 to 0.197 | 0.198 to 0.226 | 0.227 to 0.255 | 0.256 to 0.285 | 0.286 to 0.315

The size of the bar represents the percentage of population who are multidimensionally poor in each district of Jharkhand. The colour of the bar represents the MPI score of the district. The colour moves from green, through yellow, to red as the MPI score increases. Green represents areas with the lowest MPI scores while red represents areas with the highest MPI scores. The legend provides the range of MPI scores represented by a colour.

Jharkhand

Multidimensional Poverty Index Score (District-wise)



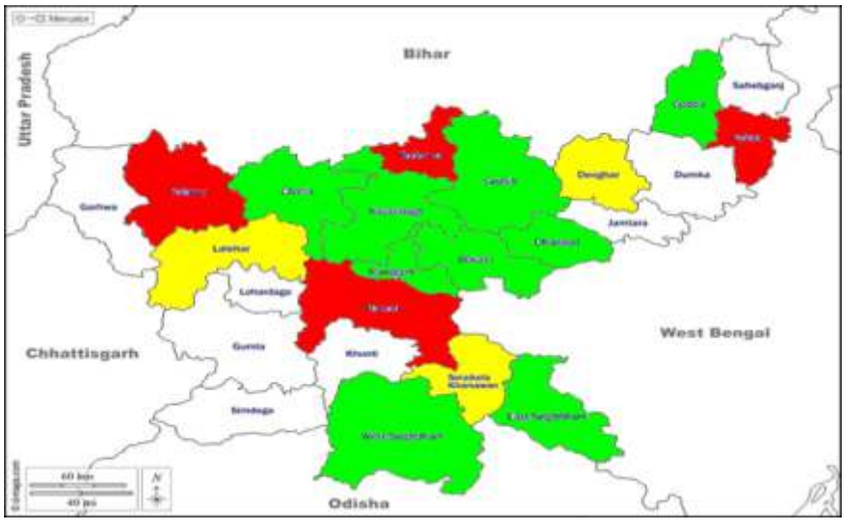
0.110 to 0.138 | 0.139 to 0.168 | 0.169 to 0.197 | 0.198 to 0.226 | 0.227 to 0.255 | 0.256 to 0.285 | 0.286 to 0.315

Districts of Jharkhand are as per the 2011 Census of India. The colour represents the MPI score of a district. The colour moves from green, through yellow, to red as the MPI score increases. Green represents areas with the lowest MPI scores while red represents areas with the highest MPI scores. The legend provides the range of MPI scores represented by a colour.

3 District-level Vulnerability Assessment

> "The most vulnerable districts would be ones that first experience mine closures and shut downs across other coal-related industries."

NFI's report on the 'Socio-economic impacts of coal transitions in India' identified 15 districts of Jharkhand which would be most vulnerable to a coal transition. The most vulnerable districts would be ones that first experience mine closures and shut downs across other coal-related industries. The study also highlighted that districts such as Dhanbad or Korba, which are mono-industry coal towns, will be the least vulnerable districts due to their higher production and consumption of coal. The highly vulnerable districts would be the ones which have lower coal production, less than two coal-dependent industries, and industries anticipating consolidation in the near future due to technological and structural changes. From the point of view of economic regeneration and rehabilitation, these districts can act as experimental districts for implementing just transition strategies.



Red: High vulnerability; Yellow: Medium vulnerability; Green: Low vulnerability Source:

The following districts are classified as highly vulnerable as per the study:

1. **Pakur:** In 2019, forested area accounted for 15.85% of the total geographical area in the district. As per the 2011 census, the district has a population of 9,00,422, with almost equal proportion of men and women. The economy of the district primarily consists of agriculture and industrial sectors. Being one of the most backward districts of the country, it receives funds from the Backward Regions Grant Fund

Programme (BRGF). As per the NFI report, Pakur is producing coal less than 1 MT, and hence, there are 923 people directly involved in coal mining.

2. **Palamu:** As per census 2011, this district has a population of 19,39,869. The major economic activity taking place in the district is manufacturing of Caustic. The industrial sector contributes significantly to the revenues of the district. Like Pakur, Palamu receives the BRGF funds because of its economically and socially backward status. The coal production in Palamu is less than 1 MT and it employs 156 people.

3. **Ranchi:** With a forest cover of 22.85% of the total geographical area, this district has a population of 29,14,253, as per census 2011. The economy of the district is mainly based on both the agriculture and industrial sectors. Ranchi is one of the most backward districts too and receives the Backward Regions Grant Fund. Ranchi has a coal production between 1-10 MT. The number of people employed in coal mining are 4,377 in the district. The five iron and steel plants situated in Ranchi district employs 1,238 people.

4. **Koderma:** This district has a forest area of 40.29% of the total geographical area. According to census 2011, the district has a population of 7,16,259. The economy is dependent on agriculture and industrial sectors. The majority of land is used for agriculture. Koderma does not produce coal; however, it has steel, sponge iron, and power plants that consume coal. There are five iron and steel plants in Koderma, which employ 2,233 people, and a power plant (Koderma TPP) which employs 1,760 people.

The analysis done in Phase-1 of the study gave us conservative estimates of the number of people directly and indirectly employed in coal and coal-allied sectors. These numbers are good enough to present baseline estimates; however, planning a just transition will require us to look at various other parameters. Before discussing the parameters required for a just transition planning, it is important to map the existing policies at the national and state level, and identify the challenges in the regulatory frameworks.

“These numbers are good enough to present baseline estimates; however, planning a just transition will require us to look at various other parameters.”

4 Challenges in the Regulatory Frameworks

A just transition framework is the need of the hour, not only to tackle climate change issues, but also development issues. Major question which needs to be addressed here is, 'how do we redevelop coal communities and rejuvenate coal bearing areas, so that they can phase-down and end coal use?' The subject of coal is heavily regulated in India. Coal is a central subject, whereas land is a state subject. Hence, the overall coal administration landscape has a plethora of policy and regulations, laws, and rules. Present regulatory frameworks have made an attempt to ascertain social and economic justice for the communities; however, their effective implementation on ground still have a long way to go. Despite challenges, existing and new policies must be made more effective and inclusive.

> **"Present regulatory frameworks have made an attempt to ascertain social and economic justice for the communities; however, their effective implementation on ground still have a long way to go."**

Privatization of coal mining

In May 2020, it was announced that the coal mining would be privatized through "open-access auctioning" of coal blocks. Nine coal blocks in Jharkhand were included in the first round of auctions, out of which four were auctioned off in the first round[4]. However, this process did not incorporate any approval of the state government or the communities, whose land would eventually be used.

Forest Rights Act and The Right to Fair Compensation, and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013, governs the terms under which land can be acquired. The auctions and the move to privatize coal mining was opposed by the Jharkhand government by filing a petition in the Supreme Court in June, 2020. It showed that the amendments did make the approval processes easier and seamless, but social and environmental impacts on the state's tribal population and forest land is neglected.

Under-utilization of District Mineral Foundation (DMF) fund

The District Mineral Foundation (DMF) fund is a levy on coal production which is collected by the district governments. As per the rules, district governments should collect a DMF of 30% of the royalty paid to the state government for the mines operational before January 2015, and 10% for the ones operational after that. In Jharkhand, almost

4 https://caravanmagazine.in/environment/devastating-cost-india-coal-recovery

8% of the state government's revenue comes from coal mining taxes and royalties. In 2021, the local district governments in Jharkhand collected nearly Rs. 6,855.81 crore under the DMF. 73% of this is through coal and lignite mining. As per Department of Mines, Government of India, Rs. 5,169 crore have been sanctioned through various projects, and projects worth Rs. 3,000 crore have been completed as on March 2021. This implies that the utilization rate of the DMF funds is less than 50%.

At present, DMF is seldom used for skill development and trainings. The majority of the fund is allocated towards physical infrastructure, which are usually mega-infrastructure projects. The money collected under DMF remains under-utilized. In order to optimally utilize funds, it is important to extend the power to use the funds to the regional level, including panchayats. As per a report by Centre for Science and Environment (CSE), DMF administration in the Jharkhand state is top-down; with no involvement or representation of the mining affected people in decision making, despite the Jharkhand DMF Rules mandating bottom-up planning[5].

Table No 3: DMF Fund status for Jharkhand (up to May 2021)

Total no. of districts in the state	No. of states where DMF has been set up	Total amount collected under DMF w.r.t coal and lignite (in crore)	Total amount collected under DMF (in crore)	Amount collected from coal mining as a proportion of total amount collected
24	**24**	**5007.23**	**6855.81**	**73%**

Source: https://www.mines.gov.in/writereaddata/Content/DMF%20Fund%20Status%20May%202021.pdf

Lack of dialogue with the communities

We need to ensure that the climate change adaptation and mitigation does not take place to the detriment of poverty alleviation and economic justice. Right now, the discussion on just transition in India is limited within think tanks and union ministries. Engagement and starting a dialogue among the communities is imperative to the process of just transition. Based on the field visits conducted by NFI, evidences suggest that people including labour unions are not aware about transitions or do not know what does a transition mean. It is important to introduce that vocabulary, as it will help the communities plug

> **"In 2021, the local district governments in Jharkhand collected nearly Rs. 6,855.81 crore under the DMF."**

5 https://www.cseindia.org/district-mineral-foundation-dmf-in-jharkhand-is-failing-to-fulfil-its-objectives-cse-8888

themselves into ongoing dialogues and discussions around energy transitions. It will further induce a community level acceptability to interventions and changes in the energy systems, which will play a major role in making the transitions just and inclusive.

Non-compliance of environmental norms

Over the years, communities and workers have experienced both temporary and permanent mine closures in Jharkhand. This leads to unemployment and displacement among communities dependent on these mines for their livelihood. Contract or outsourced workers are the ones highly vulnerable to such closures, since they suffer from unemployment. On the other hand, permanent employees receive salaries irrespective of the operational status of mines. Evidences from the field visits conducted by NFI suggested that recent non-operational status of the mines run by CCL is due to non-compliance of the environmental norms, resulting in non-issuance of the Environmental Clearance (EC) certificate. As informed by CIL, for CCL, the following actions have been taken by Jharkhand State Pollution Control Board (JSPCB) and state department of mines[6]:

1. CTO (Consent to operate) of 4 projects revoked by JSPCB on 20.01.2020.

2. Credible action against project officials of Karo Open Cast Coal Mine, Selected Dhori Open Cast Coal Mine & Tarmi Open Cast Coal Mine has been taken by JSPCB.

> **"Over the years, communities and workers have experienced both temporary and permanent mine closures in Jharkhand."**

Number of adaptation strategies could be formulated to prepare the communities against such sudden mine closures. These closures might be temporary in nature and affect the communities in the short run, but the strategies to cope against the consequences can act as a prototype for formulating long-term transition strategies.

Lack of economic diversification

Due to presence of massive mineral resources, particularly coal, there are districts and towns in Jharkhand which do not have any other industry apart from the coal mining sector. This not only restricts alternate livelihood options for people and communities residing in these towns, but also disincentivizes the government to move away from their only source of revenue, which is taxes and royalties from coal mining.

6 http://loksabhaph.nic.in/Questions/QResult15.aspx?qref=11523&lsno=17

Dhanbad for instance, has experienced a significant decrease in coal jobs over the years. Coal India has stopped the hiring of any new labourers working in excavation processes. This has led to a significant decrease in the number of coal jobs under Coal India. Meanwhile, the people working in the mid- and senior-level positions are retiring at a fast pace. This implies that, currently, permanent jobs under Coal India are at its lowest. The new generation, or the youth, is moving away towards sectors other than coal mining. The ones who wish to work in the coal sector, are procuring technical degrees. People no longer want to work as labourers in the coal mines and other related activities. On the other hand, there are no new industries coming up in the regions, which has resulted in lack of jobs for the upcoming youth. Hence, the solution to bridge this gap between the decrease in coal jobs and lack of alternatives in other industries is to focus on economic regeneration and diversification. Jharkhand has immense potential for setting up new industries. With new policies and strategies being introduced for industrial decarbonisation at the domestic and global level, Jharkhand can be an excellent example of simultaneously industrialising while adopting decarbonisation pathways.

Rehabilitation and remediation challenges

In the 2021 monsoon session of the Parliament, The Coal Bearing Areas (Acquisition and Development) Amendment Bill, 2021[7], was introduced with three new amendments. These amendments would make the land acquisition and allotment of coal fields to mining companies or the State easier. However, these amendments will affect the local populations. The proposed amendment opens up and eases mine leasing for private actors, and does not seem to place the burden of community compensation on them[8]. In coal bearing areas, the Rehabilitation and Resettlement policy, 2012, states that the rehabilitation will be governed by Coal India, a government-owned mining corporation. Under the policy, decisions of relief and rehabilitation were to be made in consultation with the Gram Sabhas. The second amendment suggests that the land once acquired by the government will not only be used for coal mining operations, but also, for "allied or ancillary activities". This is a marked step away from Coal Bearing Areas current form which allows acquired land to be used only for mining purposes. Presently, under the conditions listed during the land acquisition processes, the government and private company would usually both assure that at the end of the mine's lease, the land will be returned back to the people in the same condition as it was when acquired. However, this does not always happen.

> **"These amendments would make the land acquisition and allotment of coal fields to mining companies or the State easier."**

7 https://coal.gov.in/sites/default/files/2022-04/22-04-2022-acts.pdf

8 https://thebastion.co.in/politics-and/one-act-three-proposed-amendments-and-an-overhaul-of-indias-coal-extraction/

> **"Jharkhand has significant area of land under coal mining, however, due to lack of plans related to land repurposing and diversification, the land remains barren."**

There have been evidences of Rehabilitation and Resettlement (R&R) by Coal India and its subsidiaries. Bharat Coking Coal Ltd. made efforts to restore biodiversity in degraded coalfields of Jharkhand. It established a 3-tier ecological restoration system consisting of trees in the upper tier, shrubs in the middle tier, and grass in the lower tier. This was done in an attempt to bring back the ecosystem which existed in the pre-mining period. However, this practice did not help in improving the socio-economic indicators, and only helped in providing a green cover[9].

Another aspect which has not been explored is repurposing of land. Repurposing refers to the beneficial reuse of a closed mining or other industrial operation, whether through value-added changes or reuse of the land. A report by iForest based on the Korba district of Chhattisgarh states that, currently, over 24,364 hectares (Ha) of land is under coal mining (including closed mines) and coal-based thermal power plants (TPPs) in the district. The post-closure plan for four Open Cast mines - Gevra, Dipka, Kusmunda, and Manikpur, shows that nearly 8,859 Ha of land will be available for various investments and development of industries, including solar parks. Likewise, Jharkhand has significant area of land under coal mining, however, due to lack of plans related to land repurposing and diversification, the land remains barren. Hence, it is imperative to include land repurposing as part of R&R policies.

9 https://bcclweb.in/environment/Eco-restoration%20vs%20Plantation.pdf

5 The Road Ahead

India by announcing its net zero target has gained much appreciation at the global level. However, it still has a long way to go to achieve it. The transition strategy has to be well planned in advance and needs to start today. Coal transitions in India will necessitate economic, social, and political interventions to minimize negative impacts of an energy and industrial transition on the coal dependent states, districts, workers, and local communities.

Objective

National Foundation for India aims to address the aforementioned issues by adopting an approach that accounts for its development agenda, its diversity and its democratic values and an approach that keeps the agenda of alleviating poverty and eradicating inequity at its heart as a core value.

NFI will undertake the next phase (Phase-2) of the coal study in the state of Jharkhand. Phase-1 of the research study estimated direct and indirect jobs in coal and coal-allied sectors at a national level. The study was acknowledged as one of its kind for defining a coal transition worker and looking at energy transitions from a community's perspective. Going forward, the objective of Phase- is to estimate the induced jobs and engage with the coal communities to facilitate knowledge sharing. Induced jobs refer to those employed to provide goods and services to meet consumption demands of additional directly and indirectly employed workers[10]. For example, a local street vendor or a tea seller. Hence, major activities which we aim to conduct at state and district level are as follows.

- Work with state and local government of Jharkhand to map resources on coal and non-coal revenues, DMF, CSR, and local taxes, income levels, existing demographic and socio-economic indicators.
- Create a data repository of energy and climate action plans in the state.
- Facilitate knowledge sharing between state and central ministries - labour, coal, agriculture, energy, environment and climate change.

“India by announcing its net zero target has gained much appreciation at the global level.”

10 Issues in estimating the employment generated by energy sector activities, Sustainable Energy Department, World Bank, 2011

- Conduct a household level survey (quantitative) in 2 districts of Jharkhand which will likely be impacted by a coal transition.
- Conduct qualitative surveys through focus group discussions with stakeholders like labour unions and coal sector officials, and personal in-depth interviews with state and local government representatives, and civil society groups.

> **"India can learn from other countries' approaches, but it will have to chart its own path on coal transitions."**

The conversation for India to transition away from coal is just beginning. Planning for a phase down must begin now given the economic, political, social, and financial challenges ahead of the country. India can learn from other countries' approaches, but it will have to chart its own path on coal transitions. The report by NFI gave conservative estimates of the number of people directly and indirectly employed in coal and coal-allied sectors. These numbers are good to present baseline estimates; however, planning a just transition will require us to look at various other parameters, as elaborated below.

6 Need for a Qualitative and Quantitative study at the District Level

While assessing the vulnerability of the districts, it was observed that each district is different from one another, in terms of geography, demographic indicators, occupational structure, etc. Hence, an in-depth study at the district level is imperative to formulate a regional level just transition framework. Some of the aspects which needs to be studied are income levels, social and economic infrastructure, dependence on coal for livelihood and income, alternative livelihood options, etc. The framework below highlights the four major pillars of just transition planning at the district level.

Four pillars of Just Transition planning

01 Social Infrastructure

- Health status
- General education level
- Technical education level
- Vocational trainings and skill development

02 Economic Infrastrucrure

- Income of employed labour
- Income of households
- Dependency of income on coal
- Primary and subsidiary livelihood
- Economic diversification including industrial restructuring

03 Political Infrastructure

- Securing and mobilising financial resources
- Sync between union and state governments on developing policies
- Allocation and utilisation of DMF
- De-risking land used for coal mining
- R&R initiatives for abandoned mines

04 Stakeholder Engagement

- Effective communication strategy
- Community engagement
- Stakeholder mapping
- Capacity building and educational awareness of the communities and labour unions w.r.t. coal transitions and climate change

The issue with existing mine closures is the lack of planning behind it. Unplanned mine closures can lead to displacement of the communities and affect local economies. A quantitative survey focused on capturing the status of district economy, can be a step forward towards providing baseline estimates. District specific assessment will facilitate the formulation of just transition framework. Furthermore, a qualitative

"The issue with existing mine closures is the lack of planning behind it."

> **“Strong public policy support and programs can ensure a just and equitable transition.”**

survey in the form of focus group discussions with stakeholder groups like labour unions, coal sector officials, and personal in-depth interviews with state and local government representatives, civil society groups, etc. should be conducted.

Economic and social justice can be achieved only if there is full engagement of workers, unions, and communities in the negotiations with business and government. Strong public policy support and programs can ensure a just and equitable transition. A just transition strategy would ensure that the affected communities are made participants in this process, rather than being victims of change.

44 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7327742/
45 https://www.sciencedirect.com/science/article/pii/S0167715218300944

Annexure

ANNEXURE-1: Mine-wise dataset

State/UT Name	District Name	Mine Name	Coal/ Lignite Production (MT) (2019-2020)	Coal Mine Owner Name	Coal/Lignite	Govt Owned/ Private	Type of Mine (OC/UG/Mixed)
Jharkhand	Godda	Rajmahal	17.37	ECL	Coal	G	OC
Jharkhand	Godda	Hurra 'c'	0	ECL	Coal	G	OC
Jharkhand	Deoghar	Chitra East	2.05	ECL	Coal	G	OC
Jharkhand	Dhanbad	Tasra (captive)	0.185	SAIL	Coal	G	OC
Jharkhand	Dhanbad	Jitpur (captive)	0.092	IISCO	Coal	G	OC
Jharkhand	Dhanbad	Chasnala (captive)	0.35	IISCO	Coal	G	OC
Jharkhand	Dhanbad	Badjna	0.07	ECL	Coal	G	UG
Jharkhand	Dhanbad	Hariajam	0.06	ECL	Coal	G	UG
Jharkhand	Dhanbad	Lakhimata	0.08	ECL	Coal	G	UG
Jharkhand	Dhanbad	Shayampur-b	0.08	ECL	Coal	G	UG
Jharkhand	Dhanbad	Kumardhubi	0.03	ECL	Coal	G	UG
Jharkhand	Dhanbad	Khoodia	0.04	ECL	Coal	G	UG
Jharkhand	Dhanbad	Rajpura	0.21	ECL	Coal	G	OC
Jharkhand	Dhanbad	Barmuri	0.43	ECL	Coal	G	OC
Jharkhand	Dhanbad	Kapasara	0.4	ECL	Coal	G	OC
Jharkhand	Dhanbad	Nirsha	0.19	ECL	Coal	G	OC
Jharkhand	Dhanbad	Chapapur -ii	0.18	ECL	Coal	G	Mixed
Jharkhand	Dhanbad	Jogidih	0.04	BCCL	Coal	G	UG
Jharkhand	Dhanbad	Kharkaree	0.02	BCCL	Coal	G	UG
Jharkhand	Dhanbad	Maheshpur	0.02	BCCL	Coal	G	UG
Jharkhand	Dhanbad	Salanpur	0.07	BCCL	Coal	G	UG
Jharkhand	Dhanbad	Muudidih	0.01	BCCL	Coal	G	UG
Jharkhand	Dhanbad	Bhagaband	0.02	BCCL	Coal	G	UG
Jharkhand	Dhanbad	P. B. Project	0.02	BCCL	Coal	G	UG
Jharkhand	Dhanbad	Kb 10/12 Pits Ug	0.003	BCCL	Coal	G	UG
Jharkhand	Dhanbad	Bastacolla	0.13	BCCL	Coal	G	UG
Jharkhand	Dhanbad	Bhowrah(north) Colliery	0.01	BCCL	Coal	G	UG
Jharkhand	Dhanbad	Moonidih Project	0.53	BCCL	Coal	G	UG
Jharkhand	Dhanbad	Muraidih	1.04	BCCL	Coal	G	OC
Jharkhand	Dhanbad	Amalgamated Bocp Mine	1.65	BCCL	Coal	G	OC
Jharkhand	Dhanbad	Amalgamted Block-iv Govindpur Colliery(abgc)	0.58	BCCL	Coal	G	OC
Jharkhand	Dhanbad	Nichitpur	0.61	BCCL	Coal	G	OC
Jharkhand	Dhanbad	Sendra Bansjora	1.17	BCCL	Coal	G	OC
Jharkhand	Dhanbad	Kankanee	0.38	BCCL	Coal	G	OC
Jharkhand	Dhanbad	Bansdeopur	0.03	BCCL	Coal	G	OC
Jharkhand	Dhanbad	E. Bassuriya	0.54	BCCL	Coal	G	OC
Jharkhand	Dhanbad	Amalgamated Dhansar. Inoustry. Colliery	0.83	BCCL	Coal	G	OC
Jharkhand	Dhanbad	Ena	1.67	BCCL	Coal	G	OC

State/UT Name	District Name	Mine Name	Coal/ Lignite Production (MT) (2019-2020)	Coal Mine Owner Name	Coal/Lignite	Govt Owned/ Private	Type of Mine (OC/UG/Mixed)
Jharkhand	Dhanbad	Kenduadih	0.13	BCCL	Coal	G	OC
Jharkhand	Dhanbad	Rocp	2.23	BCCL	Coal	G	OC
Jharkhand	Dhanbad	Amalgamateo N.T.S.T. Jeenagora Colliery	2.54	BCCL	Coal	G	OC
Jharkhand	Dhanbad	Amalgamateo Sudamdih. Patherdih Colliery	0.18	BCCL	Coal	G	OC
Jharkhand	Dhanbad	Basantimata-dahibari Colliery	0.78	BCCL	Coal	G	OC
Jharkhand	Dhanbad	Agkcc	0.16	BCCL	Coal	G	OC
Jharkhand	Dhanbad	Phularitand	2.68	BCCL	Coal	G	Mixed
Jharkhand	Dhanbad	New Akash Kinaree Colly (nakc)	1.2	BCCL	Coal	G	Mixed
Jharkhand	Dhanbad	Amalgamated Keshalpur West Mudidih Colliery (akwmc)	4.22	BCCL	Coal	G	Mixed
Jharkhand	Dhanbad	Tetulmari	0.67	BCCL	Coal	G	Mixed
Jharkhand	Dhanbad	New Godhur. Kusunda Colliery	0.95	BCCL	Coal	G	Mixed
Jharkhand	Dhanbad	Gondudih Khas Kusundu Colly	0.24	BCCL	Coal	G	Mixed
Jharkhand	Dhanbad	Gopalichuck	0.01	BCCL	Coal	G	Mixed
Jharkhand	Dhanbad	Kuya /kocp	1.922	BCCL	Coal	G	Mixed
Jharkhand	Dhanbad	Bhowra(south) Colliery	0.32	BCCL	Coal	G	Mixed
Jharkhand	Dhanbad	Jharia Division	1.243	TSL	Coal	P	OC
Jharkhand	Ramgarh	Bhurkunda Ug	0.04	CCL	Coal	G	UG
Jharkhand	Ramgarh	Bhurkunda Oc	0.68	CCL	Coal	G	OC
Jharkhand	Ramgarh	Saunda	0	CCL	Coal	G	UG
Jharkhand	Ramgarh	C. Saunda	0	CCL	Coal	G	UG
Jharkhand	Ramgarh	Sirka	0	CCL	Coal	G	OC
Jharkhand	Ramgarh	Sarubera/chainpur	0.01	CCL	Coal	G	OC
Jharkhand	Ramgarh	Ara	0	CCL	Coal	G	OC
Jharkhand	Ramgarh	Karma	0.49	CCL	Coal	G	OC
Jharkhand	Ramgarh	Pundi	0.03	CCL	Coal	G	OC
Jharkhand	Ramgarh	Kuju	0	CCL	Coal	G	OC
Jharkhand	Ramgarh	Topa	1.2	CCL	Coal	G	OC
Jharkhand	Ramgarh	Hesagara	0	CCL	Coal	G	OC
Jharkhand	Ramgarh	Kedla Ug	0.02	CCL	Coal	G	UG
Jharkhand	Ramgarh	Laiyo	0	CCL	Coal	G	UG
Jharkhand	Ramgarh	Kedla Oc	0.01	CCL	Coal	G	OC
Jharkhand	Ramgarh	Parej East	0.59	CCL	Coal	G	OC
Jharkhand	Ramgarh	Jharkhand	0.91	CCL	Coal	G	OC
Jharkhand	Ramgarh	Rajrappa	1.4	CCL	Coal	G	OC
Jharkhand	Ramgarh	West Bokaro (captive)	5.303	TSL	Coal	P	OC
Jharkhand	Hazaribagh	Urimari	0.01	CCL	Coal	G	UG
Jharkhand	Hazaribagh	Urimari	1.04	CCL	Coal	G	OC
Jharkhand	Hazaribagh	N. Urimari(birsa)	2.82	CCL	Coal	G	OC
Jharkhand	Hazaribagh	Gidi 'a'	0.11	CCL	Coal	G	OC
Jharkhand	Hazaribagh	Gidi 'c'	0.42	CCL	Coal	G	OC
Jharkhand	Hazaribagh	Religara	1.4	CCL	Coal	G	OC

State/UT Name	District Name	Mine Name	Coal/ Lignite Production (MT) (2019-2020)	Coal Mine Owner Name	Coal/Lignite	Govt Owned/ Private	Type of Mine (OC/UG/Mixed)
Jharkhand	Hazaribagh	Tapin	0.5	CCL	Coal	G	OC
Jharkhand	Hazaribagh	Tapin South	0.32	CCL	Coal	G	OC
Jharkhand	Hazaribagh	Pakri Barwadih Coal Mine Project (captive)	9.42	NTPC	Coal	G	OC
Jharkhand	Hazaribagh	Dumri Coal Mine (captive)	0	HIL	Coal	P	OC
Jharkhand	Bokaro	Bermo Coal Mine (captive)	0.047	DVC	Coal	G	OC
Jharkhand	Bokaro	Govindpur	0.06	CCL	Coal	G	UG
Jharkhand	Bokaro	Karo Spl	0	CCL	Coal	G	UG
Jharkhand	Bokaro	Dhori Khas	0.1	CCL	Coal	G	UG
Jharkhand	Bokaro	Kathara	0.13	CCL	Coal	G	OC
Jharkhand	Bokaro	Jarangdih	0.88	CCL	Coal	G	OC
Jharkhand	Bokaro	Govindpur Ph.ii	1.84	CCL	Coal	G	OC
Jharkhand	Bokaro	Bokaro	0.21	CCL	Coal	G	OC
Jharkhand	Bokaro	Karo - I	3.27	CCL	Coal	G	OC
Jharkhand	Bokaro	Kargali	0	CCL	Coal	G	OC
Jharkhand	Bokaro	Akk Ocp	4.45	CCL	Coal	G	OC
Jharkhand	Bokaro	A A D Ocm	1.43	CCL	Coal	G	OC
Jharkhand	Bokaro	Sel. Dhori	2.22	CCL	Coal	G	OC
Jharkhand	Bokaro	Tarmi	0.46	CCL	Coal	G	OC
Jharkhand	Giridih	Kabribad	0	CCL	Coal	G	OC
Jharkhand	Giridih	Giridih	0.13	CCL	Coal	G	OC
Jharkhand	Ranchi	Churi	0.48	CCL	Coal	G	UG
Jharkhand	Ranchi	Dakra	0.51	CCL	Coal	G	OC
Jharkhand	Ranchi	Kdh	0.59	CCL	Coal	G	OC
Jharkhand	Ranchi	Rohini	2.94	CCL	Coal	G	OC
Jharkhand	Chatra	Purnadih	2.02	CCL	Coal	G	OC
Jharkhand	Chatra	Piparwar	4.32	CCL	Coal	G	OC
Jharkhand	Chatra	Ashoka	10.52	CCL	Coal	G	OC
Jharkhand	Chatra	Amrapali	12.79	CCL	Coal	G	OC
Jharkhand	Latehar	Magadh	5.21	CCL	Coal	G	OC
Jharkhand	Latehar	Tetaria Khar	1.17	CCL	Coal	G	OC
Jharkhand	Latehar	Sikni Coal Project (captive)	0.228	JSMDCL	Coal	SG	OC
Jharkhand	Palamu	Kathautia Open Cast Mine (captive)	0.798	HIL	Coal	P	OC
Jharkhand	Palamu	RAJHARA	0.01	CCL	Coal	G	OC
Jharkhand	Pakur	Panchwara North (CAPTIVE)	0.1	WBPDCL	Coal	SG	OC
Jharkhand	Pakur	SIIVLONG OCP	0	ECL	Coal	G	OC

Source: Pai, S & Zerriffi, H. 2021. A novel dataset for analysing sub-national socioeconomic developments in the Indian coal industry, IOPSciNotes, https://doi.org/10.1088/2633-1357/abdbbb

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