

ASSESSING VULNERABILITY FROM
**COAL
DEPENDENCE**
AND NEED FOR A
JUST TRANSITION



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Creating Innovative Solutions for a Sustainable Future

Assessing Vulnerability from Coal Dependence
and Need for a Just Transition in India

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1. INTRODUCTION

Since the earliest times when coal was mined, it has played a central role in the regional and local economies. It induced growth around its milieu, be it revenue receipt of the state, urbanization, governance institutions, infrastructural development, amongst others. Hence coal has not just contributed in economic growth, but many of the development objectives could not have been achieved without the contribution of (coal-based) fossil fuels. Industrialization has primarily driven the manufacturing sector and created jobs and value added along the supply chains of material goods.

While improving the quality of life and giving an impetus to economic development, there has been an unprecedented negative cost on environment and health due to the workings of the coal sector. Following the adoption of the Paris Agreement by 196 Parties at COP 21, India, among other countries, submitted its commitment to reduce emission intensity of the

gross domestic product (GDP) by 33% to 35% by 2030 below 2005 levels. It has also pledged to increase the share of non-fossil fuels- based electricity to 40% by 2030 with international support on technology transfer and financing. This includes an ambitious target of achieving 175 GW of renewable energy (out of which 100 GW will be from solar) by 2022. India has also agreed to increase its forest cover which will absorb 2.5 to 3 billion tonne of carbon dioxide (CO₂) by 2030. It has adopted several other measures that include adoption of clean and renewable energy in the form of solar and wind energy generation, energy efficiency in industries through PAT schemes, achieving lower emission intensity in the automobile and transport sectors, and introduction of Energy Conservation Building Code amongst others. At the UN Climate Action Summit in 2019, India declared that it aims to achieve 450 GW of renewable energy capacity by 2030, thereby strengthening its position and even planning to go beyond that was committed under the NDCs.

¹ This study has been funded by Children's Investment Fund Foundation (CIFF)

2. UNDERSTANDING JUST TRANSITION

While a transition towards sustainable forms of energy is very much warranted, there is, however, a growing concern related to labour displacement in the existing coal value chains. In other words, there will be substantial long-term impact which will have massive multiplier effect vis-à-vis social trade off when addressing climate change mitigation as energy transition may have unemployment implications in coal or other fossil fuel sectors.

This calls for a mechanism that will help in identifying the possible conflicts and a path that leads to an acceptable outcome for all the key stakeholders. Although countries like Germany and Poland have carved out national policies focusing on just transition (Galgóczy, 2020), the phenomenon is an emerging concept within the global south with its understanding still in the formative stage. Countries are in the process of designing their respective strategies of adopting a Just Transition framework in moving away from coal. The Solidarity and Just Transition Silesia Declaration - COP24 of 2018 states that Just Transition of the workforce and the creation of decent work and quality jobs are crucial to

ensuring an effective and inclusive transition to low greenhouse gas emission and climate resilient development, and to enhance the public support for achieving the long-term goals of the Paris Agreement. Recent trends of electricity generation from renewables, particularly from solar projects, reveal that the cost of electricity from coal is losing its cost advantage, and the supply of affordable 24×7 electricity from solar and wind with battery storage is becoming a reality. Under such a situation, coal consumption in India is projected to peak between 2030 and 2035, and will possibly start falling thereafter (IEA 2020) . Absence of a Just Transition strategy may put many people involved in the coal sector in the country at risk of losing their livelihood and possibly affecting many of the sustainable development goals. There are, however, compelling experiences worldwide to show that Just Transition strategy can be a win–win situation for the environment and the economy if well planned and managed. A Just Transition in India will help in a faster balance between quickly providing modern services to those most burdened and transitioning towards a lower-carbon economy.

¹ Details available at <https://data.consilium.europa.eu/doc/document/ST-14545-2018-REV-1/en/pdf>

² Details available at https://niti.gov.in/sites/default/files/2020-01/IEA-India%202020-In-depth-EnergyPolicy_0.pdf

3. INDIA'S COAL ECONOMY

India currently produces around 730 million tonne of coal³ and the bulk of the production is undertaken by Coal India Limited, the national coal producer. However, numerous other public⁴ and private sector enterprises are also involved in coal mining operations⁵. Although the mining sector may not have a significant share in the national income, coal mining contribution to the mining sector income is substantial. The mining sector makes around 2% of the Indian economy and the coal sector approximately accounts for about 0.7% of the Indian economy (Spencer et. al 2018).

Undoubtedly there exists a strong interdependence between mineral extraction and local livelihood activities. Coal mining also generates large-scale employment opportunities (Mishra 2009). Much of this employment is

contained in coal-producing states, including Jharkhand, Odisha, Chhattisgarh, West Bengal, Madhya Pradesh, Telangana, and Tamil Nadu.

Coal mining often gives stimulus to local economy (both in the coal sector directly and in the other sectors indirectly) through creation of jobs and this positive impact has been documented in several studies. The presence of mine in the territory also contributed to local development, by inducing improvement in local infrastructure, such as road network and water supply, and allowed the local population to have better access to health and education services. Educational opportunities offered by the mining company and employee skill development were the further potential positive outcomes.

According to recent employment figures, Indian coal mines employed around 355,000 workers, out of an estimated workforce of nearly 450 million (Climate Transparency, 2019). It is estimated that 1.2 million people are dependent on the coal sector (Lahiri-Dutt 2016). This, however, does not include employment related to coal logistics, which include both road and railway transportation. Bulk of the coal in India is

³Details available at <https://pib.gov.in/Pressreleaseshseems.aspx?PRID=1685058>

⁴The Mineral Laws (Amendment) Bill, 2020 lifted the restriction for the end use of coal for companies whose allocation of coal mines was cancelled by the Supreme Court judgement in 2014. The 2020 amendment bill removes this restriction on the use of coal mined by such companies.

⁵ Companies will be allowed to carry on coal mining operation for own consumption, sale or for any other purposes, as may be specified by the central government. Details available at [https://prsindia.org/billtrack/the-mineral-laws-amendment-bill-2020#:~:text=The%20Mineral%20Laws%20\(Amendment\)%20Bill%2C%202020%20was%20introduced%20in,promulgated%20on%20January%2010%2C%202020.](https://prsindia.org/billtrack/the-mineral-laws-amendment-bill-2020#:~:text=The%20Mineral%20Laws%20(Amendment)%20Bill%2C%202020%20was%20introduced%20in,promulgated%20on%20January%2010%2C%202020.)

transported over long distance through railways. Road transport is mostly used to transport coal over short distance, particularly from mining pits to rail loading points (Lahiri-Dutt 2016).

The Indian Railways currently collects one-fifth of its revenue through freight charges from coal transportation. An additional 0.5 million jobs are created in transportation of coal in mining areas. Thus, it would be difficult to apportion headcount among the railway employees to coal transportation business. Further, there are substantial secondary employment opportunities both in the formal and in the informal sectors. Such employments are largely found in

townships that have come up over the years around coal mining locations.

Apart from formal mining, informal mining is also an important source of income, in particular for poor people living in and around mining areas. While no official data exists on the scale of these informal mining activities, one study estimates that the amount of raw coal transported by coal *cyclewallahs* in the eastern coal-rich states of Jharkhand and West Bengal grew from 2.5 million tonne in the early 2000s to 3.7 million tonne in 2012 (Lahiri-Dutt 2016)⁶. Table 1 lists out the contribution in the form of royalty, cess, GST by Coal India Limited.

Table1: CIL payment of royalty, cess, GST, and other levies (in crores)

Vale in INR Crore	MP	Chhattisgarh	WB ⁷	Jharkhand	Maharashtra	UP	Odisha	Assam	Total
Royalty	1,930.86	2,238.37	17.8	2,754.16	1,187.16	406.4	2,115.6	31.59	10,682.0
<i>District Mineral Fund</i>	587.38	635.91	5.32	835.68	356.41	131.4	561.75	9.48	3123.36
<i>National Mineral Exploration Trust</i>	41.08	42.42	0.35	60.24	23.74	8.8	37.05	0.63	214.31
CGST	249.95	256.6	26.94	384.18	147.72	53.74	232.71	12.76	1,364.60
SGST	249.95	256.6	23.08	390.26	147.72	53.74	232.71	9.84	1,363.90
IGST	0.51	0.79	161.66	0.94	0.66	0.92	0.99	1.08	167.55
GST Compensation Cess	4,201.98	5,258.75	1,175.9	4,493.26	1,956.43	737.1	5,320.1	22.44	23,166.0
Cess on coal	-	-	1,856.8	-	-	-	-	2.58	1,859.45
Others	650.52	246.29	-	113.94	-	53.4	-	-	1,064.15
Total	7,912.23	8,935.73	3,267.85	9,032.66	3,819.84	1,445.50	8,500.91	90.40	43,005.32

Note The table provides a detailed state-wise breakup of the contribution received from CIL under various categories.

Source: CIL (2019-2020)

⁶Details available at <https://medium.com/just-transitions/informal-coal-mining-a-key-just-transition-challenge-in-india-6bdefff951b4>

⁷Royalty rates are different for West Bengal and other mining states

Coal mining is also a source of revenue for a number of states in India. The combined transfers, as reported by Coal India Limited, for the year 2019-20 to major coal mining states, including Madhya Pradesh, Chhattisgarh, West Bengal, Jharkhand, Maharashtra, Uttar Pradesh, Odisha, and Assam, was INR 430 billion. Share of royalty contribution was 25% while GST compensation cess (earlier clean energy cess) was estimated to contribute 54% of the total contribution. Jharkhand, Chhattisgarh, and Odisha had received more than 60% of the total royalties and almost 70% of the total GST compensation cess.

Based on the assessment data reported under Appendix I, ‘Revenue Receipts of States and Union Territories with Legislature’ in the *State Finances: A Study of Budgets of 2020-21*, published by the Reserve Bank of India⁸, the share of royalty receipts as a percentage of total non-tax revenue of these states is quite substantial. For example, the share of royalty to state’s total non-tax revenue for Madhya Pradesh (MP), Chhattisgarh, and Jharkhand ranges between 18% and 20%. This indicates high reliance on royalties as a source of revenue for selected coal-bearing states. This is presented in Table 2.

Table 2: Contribution of royalty to state’s total non-tax revenue (2019-2020) (in crores)

INR Crore	MP	Chhattisgarh	WB	Jharkhand	Maharashtra	UP	Odisha	Assam
Royalty	1,931	2,238	18	2,754	1,187	406	2,116	32
State’s own non- tax revenue	1,0591	9,150	4018	11,770	16,850	3,1375	14,500	10,208
Share	18%	24%	0%	23%	7%	1%	15%	0%

Source: RBI (2021); CIL (2019-2020)

India’s reliance on coal, particularly for electricity generation, for decades has created many economic opportunities and development in various coal mining locations of the country.

In the coal sector, rarely have closures been supported by successful social mitigation strategies. In fact, governments have typically struggled to support the people who lost their jobs and their families, and the distressed communities. In addition, layoffs have had substantial and long-lasting effects on

employment, earnings, and income prospects. Therefore, this transition has a substantial role that has to deal with mitigating the impact on people and communities.

Withdrawal in coal mining activities and the use of coal for electricity generation will have socio-economic impacts, thus, risking the livelihoods of many involved across coal value chains. The possible impacts are highlighted in Table 3 along with the perceived extent of impacts.

⁸ Details available at <https://www.rbi.org.in/Scripts/AnnualPublications.aspx?head=State%20Finances%20:%20A%20Study%20of%20Budgets>

Table 3: Assessing potential impacts of transition to non-coal economy

Potential impacts	Extent of impact
Loss in livelihoods	Moderate to high
Revenue collection in the state's total non-tax revenue receipts	Low to Moderate
Impact on local social infrastructure development activities (e.g. development and maintenance of physical infrastructure such as road, health and educational facilities)	Moderate
Possible loss in revenue collection for Indian Railways	Low to moderate
Impact on permanent employees of coal-mining companies	Nil - Minimum

Source: TERI compilation

There is a need to minimize these vulnerabilities and ensure that the transition is just for those who will be potentially affected

directly or indirectly including workers, local communities, enterprises, the local governments.

4. VULNERABILITIES ARISING FROM THE PHASING OUT OF COAL MINING

4.1 Loss in livelihoods

Studies have shown that the phasing out of coal will create long-term unemployment spells among many of the workers and those who will be able to find jobs in alternate professions might have to suffer earnings reductions by up to 30% over at least 15 to 20 years. Therefore, India's dependence on coal mining for providing livelihood opportunities is very large and a transition away from coal would possess many challenges. The opportunities that are created after the introduction of coal mining in the local economy will become an important source of livelihood for the local community.

Studies have shown that before the entry of coal mining, the local communities were mostly engaged in the agricultural sector and dependent on farm activities, but because of urbanization due to coal mining, there have been demand for goods and services, and consequently better employment opportunities. Employment in the agriculture sector is mostly uncertain and the wages are also less compared to engagement in mining, making the shift from mining to non-mining activities

difficult. The phasing out of coal mining in this context would mean disruption of non-farm employment opportunities and permanent income. CIL, which is the biggest coal producing public company, in 2018, identified 65 loss-making mines for closure. The company stated that approximately 40,000 workers, roughly 13% of the total (309,455) employed in these mines, will be redeployed (Bose2018).

In India, the average daily employment in coal mining facilities has been decreasing rapidly over the past two decades. The critical reason behind this reduction has been the rapid increase in mechanization. Mechanization has been gaining importance since the coal production methods are labour intensive and vulnerable to accidents. Thus, to make coal output more economically feasible and safer, the sector had started using machinery at large scale (Janardhanan and Tamura 2020). However, the notion of reskilling coal miners who have lost their jobs due to mine closure and mechanization has not been successful in the sector. Numbers indicate that only 400,000 people are reskilled annually through various skilled programmes conducted by the

government across its facilities. Notably, coal sector employees who are skilled under such initiatives remain a small percentage of this total count (Janardhanan and Tamura 2020).

Other than direct dependency of mining on livelihood opportunities, the negative externalities from coal mining such as environmental and natural resource degradation and depletion are significant, which often offset the economic benefits (Hota and Behera 2015). As mining activities change the local ecological environment that supports local livelihood, the phasing out of coal mining may also take away the traditional livelihood opportunities (Mukhopadhyay and Ghosh 2013). In addition to agriculture, livestock is another important source for the people before coal mining activities came to their regions. The loss of grazing lands due to mining operation discourages most of the households to keep livestock. Even environmental pollution, which has become a major threat to the life of livestock, often discourages the villagers to keep livestock with them (Mishra 2015). Other than livestock, fishing is also a common local employment opportunity which is used to persist before mining but due to rising pollution levels in water, the fishing communities are compelled to search for alternative opportunities and going back to these practices might be difficult because of the physical loss of ecosystem. Therefore, while phasing out coal mining activities may help retrieve their physical assets including land but the loss of traditional income sources is difficult to improve due to the loss of ecosystem, especially the forest-based land and water sources.

The vulnerabilities due to the loss of employment opportunities will be different for

men and women, especially for tribal women, given that the mining activities have seemingly dissipated their natural habitats owing to forest clearance and land acquisition activities. Prior to mining, women were not able to exclusively enter the workforce, as they were restricted to only forestry activities and household maintenance. But this scenario changed with the establishment of mining industry and now often livelihood diversification for women communities can be seen. However, the phasing out of coal mining would mean both a direct loss of income and an opportunity forgone due to the loss of forest resources because of mining. The local women and specially the tribal women will be unable to resume their traditional employment opportunities, thus making them more vulnerable.

Over the last few years, it has become increasingly evident that sustainable economies must encapsulate not only the environmental parameters of sustainable development but that of social welfare parameters as well. India still fares poorly on many welfare parameters that reflect the human development status of a nation. With respect to income inequality, the nation's richest 1% hold more than four-times the wealth held by 953 million people who make up for the bottom 70% of the country's population (the total wealth of all Indian billionaires is more than the full-year budget) (The Economic Times 2020a). This level of inequality has a trickle-down effect on people's ability to access other welfare services. For example, in healthcare out of pocket expenses account for about 62.6% of the total health expenditure which is one of the highest in the world (Sriram and Khan 2020) Lack of health insurance coverage and inadequate coverage are important reasons for high out-of-pocket health expenditures. There are many Public Health

Insurance Programs offered by the Government that cover the cost of hospitalization for the people below poverty line (BPL). Lack of health insurance coverage which stems from people's inability to pay for the premium is one of the reasons why such a grade of discrepancy exists. Further, it also imbalances the gap between men and women in society and makes them more vulnerable.

The Sustainable Development Goals (SDGs) laid out by the United Nations have laid key emphasis on social upliftment factors by advocating gender equality (Goal 5), quality education (Goal 4), no poverty (Goal 1), and good health and well-being (Goal 3). The coal industry currently employs close to 1.2 million people both within the formal and informal sector (Jayajit Dash, 2019). In a situation where coal mines are phased out, the impact will not just be felt by the formal sector, but will also impact the large number of people employed in the informal sector as well. In many areas where coal operations take place (both formal and informal), the nature of interdependency that exists between the coal economy and the population that resides in the area is extremely high. In Jharia and Karanpura in Jharkhand, 'illegal mining' is a way of life for over 500,000 people who reside there (Lahiri-Dutt 2003). Thus, in order to make sure that India stays on the vigilant pathway of achieving its sustainable development, it needs to strategically create a viable and functioning economic environment that can manage the loss of an industry as large as coal.

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4.2 Dependence of the state on coal revenue

Royalty is a major source of revenue for many states including Chhattisgarh, Telangana, Madhya Pradesh, Odisha, West Bengal. As per latest available statistics, royalty paid from coal mining in India has increased from INR 99.73 billion in 2014/15 to INR 147.46 billion in 2018/19 with a CAGR of 8.14% (as indicated in Table 1). Coal mines in Jharkhand contribute approximately one-fourth of the overall coal royalty in India as paid by Coal India Limited. Royalty received from coal mines in Chhattisgarh, Madhya Pradesh, Odisha, and Telangana are around 15% each in total coal royalty collected in the country. States such as Maharashtra and Uttar Pradesh accounted for almost 8% and 3% of the total coal royalty in India, respectively. Jharkhand receipt of coal royalty was approximately three times the royalty received from oil and gas for 2016 and 2017. From 2014/15 to 2018/19, coal royalty increased by a CAGR of 11.3% in Jharkhand, 12.3% in Telangana, and 7.4% in Odisha, respectively (as indicated in Table 1).

Coal royalty contributed to approximately 0.17% to GSDP of the coal-producing states. But, in terms of revenue receipts of the coal-producing states, coal royalty provided 4.2% of tax revenue receipt while 14% of non-tax own revenue receipt (as indicated in Table

2). In the case of Jharkhand, coal royalty contributed 1.24% of GSDP (from 2014/15 to 2017/18) which even increased to 1.46% in 2017/18. The contribution of coal royalty to state exchequer is 17.4% of tax revenue and 43% of non-tax own revenue receipts (from 2014/15 to 2017/18). The corresponding figures for Chhattisgarh are 0.8%, 12%, and 34%, respectively. For states such as Telangana, Madhya Pradesh and Odisha, 22%, 20% and 19% (as indicated in Table 2) of non-tax revenue receipt are contributed by coal royalty, respectively.

This indicates that coal royalty plays an important role in state exchequer for the coal-rich states. Other than huge employment generation, this financial dependence on coal makes the issue more challenging. ISEC (2003) has also acknowledged the significant economic and fiscal importance of coal royalty in state exchequer.

Further, the positive externality effect that is created by the coal revenue cannot be underestimated either. Coal companies are supposed to contribute 26% of their profits into the District Mineral Fund (DMF), a benefit-sharing mechanism that is designed to use the finances generated by it for social upliftment and livelihood empowerment (Ghose 2018).

In the absence or dip in coal revenues, the initiatives that are supported and managed by the DMF fund will find it hard to operate without it. The fiscal importance of coal in the revenues of central governments operation is considerably high as well. Noronha *et al.* (2009) in their research reported that revenue distribution between centre and coal-rich states is very much linked to the profits that companies make. In the case of coal development, the distribution across a select group of profit-making coal companies suggests a 50% share of revenues between the centre and the states.

Coal and mineral states in India suffer from a phenomenon called 'The Dutch Disease'. The concept is an economic phenomenon where the rapid development of one sector of the economy precipitates a decline in other sectors. This is visible in India, as the country's mineral rich states are considerably economically weak. Further, the per capita income in India's coal-rich states is also considerably lower than the national average (Table 4). Hence, in order to facilitate a coal phase out, significant structural reforms will have to be put into place that look to nurture an employment within the existing industrial structure, whilst paving the way for new segments to come through.

Table 4: Comparison of average national annual per capita income with average annual per capita income of top five coal states

Average National Annual Per Capita Income (FY19) (INR)	Average Annual Per Capita Income of Top 5 Coal States (By Capacity) (FY19)	
	State	Average Annual Per Capita Income (INR)
126,406	Jharkhand	76,019
	Odisha	95,164
	Madhya Pradesh	90,998
	West Bengal	109,491
	Chhattisgarh	96,887

Sources: RBI (2019); Statista (2019)

4.3 Infrastructure and social vulnerabilities

In addition to the provision of local revenue, local employment, business opportunities, establishment of coal mines also provides incentives for the improvement of local infrastructure. Mining activities bring basic infrastructure facilities such as schools, hospitals, and construction of improved transportation and communication facilities to remote villages that allow local communities to expand and diversify their livelihood options (Mishra 2009). In fact Coal India and its subsidiaries spent INR 19.78 billion on CSR initiatives between FY 17 and FY 20 (The Economic Times 2020a). The corporation has established vital infrastructural facilities for local social empowerment, such as construction of a home for underprivileged/orphaned boys in Ranchi, Jharkhand, construction of hostel for accommodating girls belonging to BPL and backward communities for their skill development in Purulia, West Bengal, and the construction of satellite eye hospital in Alwar, Rajasthan (Vision 2018).

Though in the pre-mining phase, basic infrastructural facilities did exist in the regions, but substantial infrastructural development was usually seen in the post- mining phase. Moreover, this was just not limited to renewed infrastructure capabilities; coal companies also contributed towards social empowerment in the form of grants. Coal India Limited (CIL) provided educational scholarships to BPL students in Kolkata, supported financially in the development of a school in Burdwan, West Bengal, helped in the procurement of critical medical machines in South 24 Parganas, West Bengal, and trained and prepared sportspersons for Olympics and Paralympics in different games across the country (Vision 2018).

Thus, the phasing out of coal mines from the pre-established regions would not only mean the loss of existing infrastructure capabilities and the social capital associated with it, but also the collective disenfranchisement of programmes and initiatives that rely heavily on the influence and financial capital that coal companies are associated with. With the organization already spending more than the

statutory requirement of 2% on CSR activities and prioritizing close to 70% of its budget on developing basic healthcare, water supply and education infrastructure in remote areas of the country (Vision 2018), a sudden loss in revenue can derail several social projects and directly impact thousands of people that rely on its initiatives.

In the absence of sustained management of various CSR initiatives established by coal companies, the intervention of state government here becomes critical. As a means to enable efficient resource allocation for communities in and around the mining areas and further enhancing their livelihood and access to resources, the Government of India established the DMF fund in March 2015, under the Mines and Minerals (Development and Regulation) Amendment Act 2015 (Banerjee 2020). Conceptualized as a benefit-sharing mechanism, the legislation for DMF states that coal corporations need to contribute 26% of their overall profits to the fund (Ghose 2018). However, DMF has been laden with severe administrative and governance issues, which have halted its progress.

Lack of planning, inefficient strategic implementation and often misplaced fund sanctions are one of the biggest drawbacks of DMF in most districts. For example, Dhanbad, the biggest mining-affected area, Jharia has been kept out of the scope of district's DMF sanctions. The area is infamous for deplorable living conditions of its inhabitants with no livelihood opportunities but to pick coal. DMF

funds are also being diverted for urban projects, which have nothing to do with the priorities of mining-affected areas and communities. For example, in Odisha's Jharsuguda district funds have been diverted for electricity supply to an airport; in Korba, Chhattisgarh, the DMF fund has been used for work under AMRUT, construction of multi-level parking lots in the town, convention centres, bus stops, etc. (CSE 2018).

A possible alternative to DMF are the grants to local bodies of the country which are offered by the Finance Commission. Being at the centre of India's fiscal federalism, the finance commission is the core body that is responsible for evaluating the state of finances of the Union and State Governments, recommending the sharing of taxes between them, laying down the principles determining the distribution of these taxes among States. Created in 2017 against the backdrop of the abolition of the Planning Commission, the 15th Finance commission has increased the grants to local bodies from 3.54% of the divisible pool in 2019-20 to 4.32% of the divisible pool in 2020-21 (PRS 2021) (refer table 5). The commission has taken a pragmatic view of supplementing the resources to panchayats and municipalities through untied grants as its proposal provides financial stability to the local bodies through assured transfers of planning and delivering basic services smoothly and effectively. The local state government can look to compensate the organizations and provide them financial assistance from the 'Grants for Local Bodies' budgetary allocation.

Table 7: Share of states in the centre’s taxes of the top five coal states in India by capacity

State	14th Finance Commission		15th Finance Commission		Devolution for FY 2020–2021 (In Rs crore)
	Share out of 42%	Share in divisible pool	Share out of 41%	Share in divisible pool	
Jharkhand	1.32	3.14	1.36	3.31	28,332
Odisha	1.95	4.64	1.9	4.63	39,586
Chhattisgarh	1.29	3.07	1.4	3.42	29,230
West Bengal	3.08	7.33	3.08	7.52	64,301
Madhya Pradesh	3.17	7.55	3.23	7.89	67,439

Note The share of states in the centre’s taxes decreased from 42% during 2015–20 period to 41% for 2020–21. The 1% decrease is to provide for the newly formed union territories of Jammu and Kashmir and Ladakh from the resources of the central government.

Sources: Reports of 14th and 15th Finance Commission; PRS Legislative (PRS, 2021)

4.4 Social capital of land

In addition to the provision of local revenue, local employment, business opportunities, establishment of coal mines also provide incentives for the improvement of local infrastructure. Mining activities bring basic infrastructure facilities such as schools, hospitals, and construction of improved transportation and communication facilities to remote villages that allow local communities to expand and diversify their livelihood options (Mishra 2009). Though in the pre-mining phase, basic infrastructural facilities do exist in the regions but substantial infrastructural development is usually seen in the post-mining phase. Studies with primary research have evidences that mining activities in rural areas have led to establishment of well-connected roads, availability of bore-wells, and provision of improved health infrastructure through community health centres (Das 2015). The phasing out of coal mines from the pre-

established regions would mean loss of both existing infrastructure and the provision of any future developments.

The literature of social impact assessment suggests that a sense of belonging, culture, community cohesion, identity, self-determination, and attachment to places are essential building blocks that make up an individual’s social capital. Social values are intrinsically associated with the quality of people’s everyday activities and the places in which they occur, as well as the significance people attach to these activities and locations (Graham *et al.* 2013). Community support is a resource that can develop independent of economic wealth. It is arguably possible for the poor to be rich in social capital through formal and informal arrangements for mutual aid and the mobilization of collective labours (Greenbaum 2008). If people and communities alike lose control of these values, they slip and risk their sanity on the altars of rage and

violence to try and establish control over a situation they cannot understand anymore. The violence that ensued in 2006 in Singur, West Bengal when 1000 acre of farmland were set to become the new manufacturing ground for TATA motors is a testimony of people's resistance when they are detached from their land.

Displacement from land also has a disproportionate impact on women. A breakdown of this social construct has a severe sociocultural impact on them as women are less mobile than men and prefer to move as part of a pre-existing community (Parasuraman 1993). For women in rural tribes, kin relationships still constitute the prime avenues of access to scarce resources such as information, economic assistance, and other social support (Dyson and Moore 1983). A large degree of support for them comes from established networks that assist them on various aspects such as childcare, diseases, resource sharing, economic assistance, and other forms of social support. Resettlement takes women far away not only from access to critical resources, but also significantly impact their welfare and access to opportunities (Parasuraman 1993). In rural Rajasthan and Gujarat, it has been noticed that water access has influenced schooling opportunities for girls (Yadav and Lal 2018). Kookana *et al.* (2016) in their research reported that in Rajasthan, the frequency of female students missing schools for five or more days per month was on average two to ten times greater than that for males. We see that when it comes to women, there exists a sizeable opportunity cost which not only has an impact on the sociocultural dynamics of a community but also on the financial landscape. Given that women also do not have access to similar resources, globally it has been estimated

that if rural women had the same access to agricultural resources as men, yields could increase by 20-30% and the total number of hungry people around the world could reduce by 12-17% (Jost *et al.* 2015).

Mining closure induced displacement forces people to relinquish control over their resources and shifts them to a new kind of economy with which they are least familiar with. This creates a system of economic inequality. (Kumar and Binod, 2014).

4.5 Illegal mining

Illegal mining has been prevalent within the global discourse for a long time, resulting from a range of pressures such as economic disparity, urban unemployment in the cities, and poverty in agricultural areas (Lahiri-Dutt 2007). India bears a strong foothold for illegal coal mining; Jharkhand which is home to India's largest coal reserve accounts for close to 300,000 individuals employed within the illegal coal mining industry of which 100,000 are children.

The construction industry in large parts dictates the inflow of employment in mining areas; the demand for coal opens up employment opportunities in the informal sector, further, drawing individuals who are impoverished, uneducated, and have few livelihood options available to them (Hass 2021). The other primary reason behind the rampant spread of illegal mining within the eastern (easter) block of India has been the expansion of large mines. Open cut mines, that leave their large footprints on the ecology, have narrowed down the scope of alternate occupation within the tracts ranging from Hazaribagh to Ranchi (Lahiri-Dutt and Williams 2005).

On the other hand, there are deep structural legislative gaps within the policy structure which has allowed for illegal mines to flourish. The Minerals Conservation and Development Rules (MCDR 1988) divides all minerals into 'major' and 'minor' categories. The Indian Bureau of Mines, however, puts them into two categories of A and B, which are determined on the basis of labour employed and the kind of mechanical systems used (Lahiri-Dutt 2007). While there is a definitive definition of 'major' minerals within the law, there is significant ambiguity regarding the definition of B class of mines. The point of contention in this definition is scale: 'small production', 'small capital investment', 'labour intensiveness', 'shallow nature of deposits' and 'low technology development'. Thus, while some of the coal operations happening on privately owned lands can come under this category, some labour intensive underground collieries of the Eastern Coal Fields could also qualify as 'small mines' (Lahiri-Dutt 2007). This level of ambiguity is not only dangerous from an economic perspective but from a safety and

legitimacy point of view as well. Illegal mines do not function on the ethics of implementing safety codes in their mines, thus jeopardizing the lives of the miners it employs. Meghalaya has been a hot-bed for these disasters recently; in 2018, 15 miners lost their lives in a mining tragedy while in another accident in January 2021, 6 miners were tragically killed (Hasant 2021). Gradual phasing out will put the livelihoods of lakhs of people, involved in informal mining activities, at risks.

This extent of ambiguity that largely features within the current policies and regulations is not built to deal with the complexity that exists within India's coal industry. Clearly the existing regulatory framework cannot comprehensively handle the interlinkages that exist within the subsector of the informal mining segment, part of which is both licensed and illegal and part of which is artisanal in nature.

5. CONCLUSION

In this paper we delved deep into the aspect of the linkages that surround the Indian coal economy and the possible economic, societal, and cultural repercussions that will engulf the coal mining states in the case of a coal phase out. While there exists several interdependencies within the network, the case for a phase out needs to be assessed carefully. This caution comes from the understanding we have been able to establish throughout this working paper with regard to the detrimental impact the phase out will have on the livelihood and social surplus across state, coal royalties that make up for a significant portion of no-tax revenue for a state, stoppage on social empowerment initiatives and infrastructural loss, and the unintended loss of the financial and social structure that function within the grey market of the coal mining industry. Given these parameters we can conclude that in a mixed economy like India, the framework of Just Transition takes utmost precedence as it not only looks to formalize the deeply informal sector of that of coal but also looks to achieve the critical characteristics needed to fulfill the notion of ‘Energy Democracy’.

While a transition, as big as this, comes with a layer of caution attached to it. There exists several opportunities that can be capitalized through vigilant governance planning and targeted fiscal and economic stimulus. Given the large-scale direct and indirect employment associated with industry, there is a case to be made about upscaling the skilling initiatives within the sector. Such a proposal will help bring the highly scattered miners employed within the informal market into the formal employment network. Further, since the existing coal mine areas are extremely well networked from a transportation perspective, especially railways, by establishing manufacturing capabilities in these areas will not only help in efficient land usage, but also allow the railway industry to recover their revenue stream as well. Finally, if we are able to revitalize the economic network that will be disrupted because of a phase out, we will not only succeed in structurally reforming a complex industrial network but also be able to protect the existing communities and the rural population from abandoning their networks and social capital; all of which is collectively associated with the land they reside upon.

In our second working paper, we explore these opportunities in further detail.

References

- Ayog, N. (2021) SDG India Index, NITI Ayog.
- Banerjee, S. (2020) *District Mineral Foundation funds crucial resource for ensuring income security in mining areas post COVID-19*, Brookings. Details available at <https://www.brookings.edu/blog/up-front/2020/05/06/district-mineral-foundation-funds-crucial-resource-for-ensuring-income-security-in-mining-areas-post-covid-19/>, last accessed on 28 March 2021.
- Bose, P. R. (2018) 'CIL plans to shut down 65 loss-making mines', *The Hindu Business Line*, p. 1. Details available at <https://www.thehindubusinessline.com/companies/cil-plans-to-shut-down-65-loss-making-mines/article9717877.ece>.
- CIL (2020), Annual Report, Published by Coal India Limited. Available at <https://www.coalindia.in/performance/financial/annual-report-accounts-2019-20-subsidiary-cil/>
- Climate Transparency (2019) *Brown To Green: The G20 Transition To A Low- Carbon Economy*. Available at https://www.teriin.org/sites/default/files/2018-11/BROWN%20TO%20GREEN_2018.PDF
- CSE (2018) DMF Status Report 2018. People First: District Mineral Foundation (DMF), Status Report 2018, Centre for Science and Environment, New Delhi
- Dyson, T. and Moore, M. (1983) 'On Kinship Structure, Female Autonomy, and Demographic Behavior in India', *Population Council*, 9(1), pp. 35-60.
- CSR Vision. (2018) Coal India Limited (CIL), CSR Vision. Details available at <https://www.csrvision.in/cover-story/coal-india-limited-cil/>.
- Das, N. (2015) *Socio-economic Impact of Mining on Rural Communities: A Study of the Ib Valley Coalfield in Odisha*. Doctor of Philosophy Thesis. Available at http://ethesis.nitrkl.ac.in/6913/1/Nabanita_509HS304_PhD_2015.pdf
- IEA (2020) *India 2020: Energy Policy Review*, Published by International Energy Agency. Pages 305. Available at https://niti.gov.in/sites/default/files/2020-01/IEA%202020-In-depth-EnergyPolicy_0.pdf
- Galgóczi, B. (2020) 'Just transition on the ground: Challenges and opportunities for social dialogue', *European Journal of Industrial Relations*, 26(4), pp. 367-382. doi: 10.1177/0959680120951704.
- Ghose, J. (2018) *Benefit Sharing in the Mining Sector*. New Delhi: The Energy and Resource Institute.
- Graham, S. *et al.* (2013) The social values at risk from sea-level rise, *Environmental Impact Assessment Review*, 41(1), pp.45-52.
- Greenbaum, S. (2008) Poverty and the willful destruction of social capital: Displacement and dispossession in African American communities, *Rethinking Marxism*, 20(1), pp. 42-54.
- Hass, J. (2021) *Buried in Sand: Understanding Precarity in the Context of the Political and Criminal Economy in India*. Available at https://ruor.uottawa.ca/bitstream/10393/41720/1/Buried%20in%20Sand_Final%20Version_JHASS_January_2021.pdf
- Hota, Padmanabha & Behera, Bhagirath. (2015). Coal mining in Odisha: An analysis of impacts on agricultural production and human health. *The Extractive Industries and Society*. 2. 10.1016/j.exis.2015.08.007.
- Hasant, Karishma (2021) Another year, another mining tragedy – why Meghalaya's 'rat holes' won't stop killing, *The Print*. Details available at <https://theprint.in/india/another-year-another-mining-tragedy-why-meghalayas-rat-holes-wont-stop-killing/594667/>.
- ISEC (2003), *Economic and Fiscal Impact of Royalty Rates of Coal and Lignite in India*.
- Janardhanan, N. and Tamura, K. (2020) 'The sociopolitical dynamics of coal transition in India', *International Studies* 57(2), pp. 171-185.
- Jayajit Dash (2019) 'Stressed power assets set to amplify unemployment crisis: Study', *Business Standard*, p. 1. Available at: https://www.business-standard.com/article/economy-policy/stressed-power-assets-set-to-amplify-unemployment-crisis-study-119041200275_1.html.

Jost, C. *et al.* (2015) Understanding gender dimensions of agriculture and climate change in smallholder farming communities, *Climate and Development*, 5529 (March), pp. 1-13.

Kumar, U. and Binod, C. (2014) 'Socio-Economic Issues and Dilemmas of Mining Induced Displacement : a Case of Coal', *Journal of Economic & Social Development*, 10(2), pp. 131-142. Available at: [http://www.iesd.org.in/jesd/Journal pdf/2014-X-2 Utpal Kumar Chakroborty & Binod Narayan.pdf](http://www.iesd.org.in/jesd/Journal%20pdf/2014-X-2%20Utpal%20Kumar%20Chakroborty%20&%20Binod%20Narayan.pdf).

Kookana, R. S. *et al.* (2016) Groundwater scarcity impact on inclusiveness and women empowerment : Insights from school absenteeism of female students in two watersheds in India, *International Journal of Inclusive Education*, 3116(June).

Lahiri-Dutt, K. (2003) Informal coal mining in Eastern India : Evidence from the Raniganj Coalbelt, *Natural Resources Forum*, 27, pp. 68-77.

Lahiri-Dutt, K. (2007) Illegal coal mining in Eastern India: rethinking legitimacy and limits of justice, *Economic and Political Weekly*, 42(49), pp. 57-66.

Lahiri-Dutt, K. (2016) The diverse worlds of coal in India : Energising the nation , energising livelihoods, *Energy Policy*, pp. 1-11.

Lahiri-Dutt, K. and Williams, D. J. (2005) The coal cycle: Small-scale illegal coal supply in eastern India, *Resources, Energy, and Development*, 2(2), pp. 93-105.

Mishra, Prajna. (2009). Coal Mining and rural livelihoods: case of the Ib Valley coalfield, Orissa. *Economic and Political Weekly*. 44. 10.2307/25663741.

Mukhopadhyay, L., B. Ghosh (2013), 'Mining induced Desiccation and Consequent Impact on Traditional Economic Livelihood - an Analytical Framework', in Nautiyal, Sunil, K.S. Rao, Harald Kaechele, K.V. Raju, Ruediger Schaldach (eds) *Knowledge Systems of Societies for Adaptation and Mitigation of Impacts of Climate Change*; Ch.20, SpringerLink, India

Noronha, L. *et al.* (2009) Resource federalism in India: The case of minerals, *Economic and Political Weekly*, 44(8), pp. 51-59.

Parasuraman, S (1993) *Impact of Displacement by Development Projects on Women in India*. Details available at <https://repub.eur.nl/pub/18852/wp159.pdf>.

PRS (2021) *Report Summary Report of the 15th Finance Commission for FY 2020- 21*. [AQ: Please provide place of publication]

RBI (2019) *Macroeconomic Aggregators*. Details available at https://rbidocs.rbi.org.in/rdocs/Publications/PDFs/1T_HB15092019EA2B9307F08B4B4AB305B6D25552E76E.PDF.

Spencer, Thomas *et al.* (2018), "Coal Transition in India", TERI Discussion Paper (New Delhi: The Energy and Resources Institute).

Sriram, S. and Khan, M. M. (2020) Effect of health insurance program for the poor on out-of-pocket inpatient care cost in India: Evidence from a nationally representative cross-sectional survey, *BMC Health Services Research*, 20(1), pp. 1- 21.

Statista (2019) Estimated per capita income across India in financial year 2019, by state, *Statista*. Details available at <https://www.statista.com/statistics/1027998/india-per-capita-income-by-state/>.

The Economic Times (2020a) Coal India, its subsidiaries spend Rs 1,978 crore on CSR from FY'17 to FY'20, *The Economic Times*. Details available at <https://economictimes.indiatimes.com/industry/indlgoods/svs/metals-mining/coal-india-its-subsidiaries-spend-rs-1978-crore-on-csr-from-fy17-to-fy20/articleshow/78167107.cms?from=mdr>.

The Economic Times (2020b) Wealth of India's richest 1% more than 4-times of total for 70% poorest: Oxfam, *The Economic Times*, p. 1.

Yadav, S. S. and Lal, R. (2018) Vulnerability of women to climate change in arid and semi-arid regions: The case of India and South Asia, *Journal of Arid Environments*, 149, pp. 4-1

