AT THE CROSSROADS:

Marginalised Communities & the Just Transition Dilemma

भारतीय प्रतिष्ठान
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National Foundation For India,

India Habitat Centre, Core 4A Upper Ground Floor,

Lodhi Road New Delhi 110 003, India

Tel: 91-11-24641864, 24641865

24648490, 24648491

Mail: info@nfi.org.in

Researchers and Authors

Pooja Gupta and Mohammed. A Faraz

Editor

Anuradha Raman

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Marginalized Communities and the Just Transition Dilemma

2024

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Executive Summary

Billed as one of the biggest socio-economic upheavals of the 21st century with far-reaching impact on India and its economy, the transition from coal presents challenges for the extremely vulnerable population that depend on it for its livelihood. To achieve economic sustainability for future generations, global experience in coal transition, suggests, that a just transition, as a model for change, aiming at 'maximizing the social and economic opportunities of climate action while minimizing and carefully managing the challenges'– is the way forward.

At the Crossroads: Marginalised Communities and the Just Transition Dilemma is a sequel to the- "Socio-economic impacts of coal transitions in India" published by the National Foundation for India (NFI) in 2021 when COVID had the world in its grip. This report delves deep and engages at the community and workers level breaking down the caste system and, the hierarchy underpinning it, to assess and map the socio-economic status of coal and non-coal workers in the high coal bearing districts and blocks. The report looks at the choices they are forced to make by virtue of their social standing which is often determined by caste. The document also discusses the governance and policy issue surrounding coal transition and the need for comprehensive statistics and stakeholder engagement in decision-making processes.

the 21st century with far-reaching impact on India and its economy, the transition from coal presents challenges for the extremely vulnerable population that depend on it for its livelihood.

For the large swathes of population living in coal and coal allied districts from Chhattisgarh, Jharkhand and Odisha, the future looks uncertain as the economy is weaned off coal. The objective of the report is not only to present a potential framework for safeguarding these communities and marginalised population whose livelihoods are at stake, it also offers plausible options to make local environment and governance aligned towards achieving the goal of a just transition.

So, what are the challenges towards achieving a just transition? A substantial chunk of population surveyed identified themselves as less-educated or with no education all and does not hold any cultivable land for initiating alternative source of livelihood, making the task of up-skilling them very challenging.

For the study, two districts were selected from three states each - Chhattisgarh, Jharkhand and Odisha and in each district, 18-20 villages and towns were selected. Research and surveying 1209 HHs showed how skewed the representation of classes is, with 15.5% were from the General category, with over 41.5% belonging to Other Backward Classes (OBC), 23% to Scheduled Tribes (ST), and 17% to Scheduled Castes (SC), while only 3.1% others, shedding light on classes likely to be impacted by the transition.

In all, 20 Focussed Group Discussions, (FGDs), were conducted with representatives from communities residing in coal mining regions and coal-dependent industrial areas; issues such as women's safety, predominance of lung and allied diseases, and lack of access to education were raised by at least 75% of the participants. Respiratory diseases were reported as a major issue in all the FGDs. Prolonged exposure to airborne pollutants from coal mines contributed to respiratory ailments such as chronic bronchitis and asthma. Further, approximately 65% of the respondents reported having skin issues, such as dermatitis, eczema, and fungal infections among the mining force.

Caste-based inequalities concerning access to resources and opportunities are key issues in the transition to clean energy. In coal-bearing areas where the work is dominated by marginalised communities, opportunities for education and livelihood are less. The report looks at the challenges faced by women in coal mining regions, issues related to rehabilitation and compensation for individuals affected by coal-mining activities, and the ground realities of affected communities.

Analysis of survey responses indicates a clear correlation between caste and educational attainment, wherein HHs with only primary education or no education are more prominent among marginalised castes such as SCs/ STs/ OBCs. In coal-producing districts such as Dhanbad and Koriya, nearly 57.5% and 52% of the marginalised communities had no formal education or had only primary education. The figures once again highlighted the inter-relationship and inter-sectionality of caste, with occupation, income, and education.

Additionally, the report highlights the difference in incomes between coal-centered districts and districts with diversified industries. Dhanbad and Koriya reported lower incomes compared to districts with more diversified industrial activities. The lower incomes can be attributed to several factors ranging from dependence on coal industry to limited economic opportunities in these regions. On the other hand, districts like Angul have a more diverse economic landscape to include manufacturing, power generation and agriculture.

The phasing down of coal can have both direct and indirect effects on household livelihoods. Loss of employment is a direct fallout from the transition that India seeks to achieve, impacting household livelihoods, specially for those who rely solely on coal-related employment; depriving at least 13 million people of a source of income impacting the local economy, as businesses that rely on the coal industry will also suffer. As coal-related jobs decline, individuals may need to transition to alternative occupations requiring retraining and acquiring new skills which may take considerable time and resources. The indirect effects are the economic downturn and disruption of communities which are underpinned by a strong sense of identity and social cohesion.

Lastly, phasing down coal will affect the power sector in India, which is heavily reliant on coal-fired power plants. As coal-fired power plants are phased out, there will be a decrease in the demand for coal, leading to a decline in the coal industry.

Some of the major recommendations to mitigate the deleterious impact of the transition, offered by the report, include improving infrastructure and connectivity in coal mining areas to facilitate economic development and access to markets. Enhance social infrastructure in coal mining areas like ramping up quality healthcare facilities and educational institutions. Encourage investment in alternative industries to offer livelihood opportunities. Improve access to finance and credit facilities for individuals and businesses in coal mining areas. Foster partnerships between the public and private sectors involving collaboration between government agencies, stakeholders and local communities to identify investment opportunities and create employment opportunities.

The report underscores the importance of community-specific policies, coordination between government bodies, and robust institutional mechanisms, and offers a roadmap for policymakers to mitigate the adverse impacts of the coal transition by emphasizing on alternative livelihood sources, ecological restoration, and inclusive policies to safeguard the interests of vulnerable communities caught amidst the change.

The report seeks to remind once again that a comprehensive assessment of coal transition impact within Indian regions demands a rigorous evaluation of socio-economic dynamics, livelihood challenges, and potential policy frameworks. Coal mines have shut down in the past and the process is not certainly new but closures without an alternative to the livelihoods of vulnerable people who will bear the brunt of the transition is problematic. The study offers a way out by examining the challenges and the systemic response that need to be put in place.

Summary Of Principal Findings

Lived Realities: Socio-economic conditions of the communities

- 20 FGDs were conducted with representatives from communities residing in coal mining regions and coal-dependent industrial areas; issues such as women's safety, predominance of lung and allied diseases, and lack of access to education were raised by at least 75% of the FGD participants.
- Respiratory diseases were reported as a major issue in all the FGDs. Prolonged exposure to airborne pollutants from coal mines contributed to respiratory ailments such as chronic bronchitis and asthma. Further, approximately 65% of the respondents reported having skin issues, such as dermatitis, eczema, and fungal infections among the mining force.
- On average, a household spends between INR 300-1000 on monthly medical-related bills. The average annual hospitalization expenses in Dhanbad (Rs. 28,461 per household) are the highest, with FGD participants revealing a higher incidence of lung and skin diseases.
- About 75% of FGD participants claimed that women's safety was an issue in coal mining areas or areas where industries are present. These regions are predominantly male-dominated, with a scarcity of women employed in mining-related roles.
- Caste-based inequalities with regard to access to resources and opportunities are key issues in the transition to clean energy. In coal-bearing areas where the work is dominated by marginalised communities, opportunities for education and livelihood are less.
- Analysis of survey responses indicates a clear correlation between caste and educational attainment, wherein HHs with only primary education or no education are more prominent among marginalised castes such as SCs/ STs/ OBCs. In coal-producing districts such as Dhanbad and Koriya, nearly 57%

75% of FGD participants claimed that women's safety was an issue in coal mining areas or areas where industries are present.

and 47% of the marginalised communities had no formal education or had only primary education.

- The inclination and need to get engaged in informal and coal sector jobs increases with lower educational attainments. In the coal-dependent district of Ramgarh, an overwhelming 77% of the marginalised communities reported having only primary or no education. Responses from Ramgarh FGD participants indicate that this could be due to the poor availability of transport facilities in the district.
- Written contracts play an important role in the regularity of incomes and sustainability of work. Formal occupations with tenure and wages defined tend to be jobs with written contracts whereas the occupations and jobs with no defined wage and tenure are generally not written and not contractual. In terms of written contracts for jobs and formal legal agreements, none of the respondents from Koriya reported formal written contracts.
- In Ramgarh 92% of respondents reported no formal contracts, followed by Dhanbad 88%, Jajpur 85% Raigarh 73%, and Angul 35%.
- When community access to basic public services and rights are hindered by socio-cultural and economic factors then it requires holistic efforts from multiple departments and agencies at the state, district, and block levels.
- The livelihood ecosystem in coal-dependent districts like Dhanbad and Koriya is weak due to several factors. Firstly, the mining-driven poor ecology harms the environment, making it difficult for agriculture and other industries to thrive. Secondly, there is a lack of training and skilling opportunities, which limits the options for alternative livelihoods. Lastly, the size of agricultural land is insufficient, further restricting the potential for agricultural activities.

Wages, Welfare and Government Support

- Income is an important metric which helps in understanding the overall socio-economic status of people, especially in the context of coal mining and coal transition.
- It was found that Angul reported the highest level of income of all the remaining 5 districts whereas Ramgarh reported the lowest incomes/wages. In addition to that, Ramgarh, Dhanbad and Koriya reported a higher frequency of daily and weekly wages whereas Angul reported a higher number of monthly incomes. NFI analysed the average monthly, weekly and daily incomes, as originally reported by the survey respondents in all districts.
- Incomes in coal-centred districts, such as Koriya and Dhanbad, are lesser compared to districts with more diversified industries, such as Angul. For instance, the average monthly income in Dhanbad is approximately INR 7,530 for thirty days of work. In contrast, the average monthly income in Angul, which has other mining industries along with coal mining was reported to be INR 28,670.
- On average, HHs surveyed across districts reported a low rate of regularity in receiving wages. For instance, only 21% of the surveyed respondents in Raigarh reported receiving wages regularly. Alarmingly, none of the respondents in Koriya reported receiving a regular salary. In contrast, respondents in Angul 59% on average reported receiving regular wages.
- The economic background of the districts and mainly access to education are the primary two pivotal factor that hinges on the incomes of workers and their ability to cope with the coal transition.
- The livelihood ecosystem in districts solely focused on coal production, such as Dhanbad, is weak due to the mining-driven ecology, lack of training and inadequate availability of agricultural land. In terms of land holding too, marginalised communities in affected areas possess either no land or small land holdings (less than 25 dismal). For instance, in Dhanbad, the average land holding was reportedly 0.33-0.37 acres. Compared to 0.23-0.53 acres in Angul. Land ownership offers a source of alternative income and livelihood through agriculture.
- On average, the majority of the HHs surveyed did not have access to basic welfare and economic schemes. For example, over 92 % of the surveyed HHs in Koriya were aware of the government schemes yet 95% reportedly did not avail of many of the major schemes, such as MGNREGA, skill training, or pension schemes. Even when respondents reported a high rate of awareness of such schemes, the rate at which the schemes were availed was much lower. For instance, in Dhanbad, 95% of the respondents reported awareness of the PM Awas Yojana, a

scheme for affordable housing. However, 89% of the respondents have not availed of the scheme.

- The livelihood ecosystem is dependent on many internal and external factors- both must be factored in the policy calculus for a just transition.

Communities at the Crossroads

- The majority of the surveyed Households (HHs) are from marginalised and socio-economically backward communities. Out of the 1209 HHs surveyed, 502 (41.5%) fall under the Other Backward Classes (OBC) category, 286 HHs (23%) belong to Scheduled Tribes (ST) and 196 HHs (17%) belong to Scheduled Castes (SC). Only 187 HHs (15.5%) were found to be from the General category.
- On the work front, 38% of the sampled 1209 HHs work in the coal sector and 62% work in non-coal sectors. - leading to the reasonable conclusion that the government's initiative to transition away from the coal industry will most severely impact backward communities mainly in the coal sector
- Out of the total sample population, 464 HHs are engaged in the coal sector and 745 work in the non-coal sector. People from marginalized communities in coal-dependent districts, such as Koriya, Dhanbad, and Ramgarh have higher engagement ratios in coal-sector occupations 39%, 42.14%, and 18.7% respectively. Whereas HHs from the general category engaged in coal from Koriya, Dhanbad, and Ramgarh 3% and 7% none from Ramgarh.
- The districts of Angul and Jajpur have different caste and occupation equations. The impact of the presence of coal allied industry in Angul is visible in its occupational structure -- 5.5%, 6.6% and 27.8% of SC, ST, and OBC respectively are working in the coal sector, which is a clear shift from what we observed in other districts.
- Project-affected people, tribal communities, particularly vulnerable tribal groups (PVTG) rural populations, indigenous communities, and other weaker segments of the population are at heightened risk despite several 'legal' frameworks for their safeguards. Acts like the Panchayat (Extension to Scheduled Areas) Act, 1996 (PESA)16 and Forest Rights Act, 2006 (FRA) recognized forest rights of scheduled tribes and other traditional forest dwellers' land rights and land possession
- For example, resident communities (such as those near Block-2 mine in Dhanbad), though initially recognized as right holders for compensatory job schemes, have hardly received employment. Rehabilitation and compensation remain persisting issues for such communities among other issues.

Policies and Institutions

- Administrative negligence and poor public services governance are major challenges for a just transition, but they are continuing trends in coal-dependent regions.
- Prevalent theories of energy transition mostly debate sustainability transitions and do not sufficiently address them. Given the complex inter-mingled web of governance, laws and bodies for different components of energy, land, coal mining, and communities there's a need for coordination and cooperation at the centre, state and local levels.
- A top-down approach to environment and climate change management and multiplicity of institutions, powers, and planning can be detrimental to just transition. One example of such overlap can be seen in the case of rehabilitation and resettlement (R&R) policies in the coal mining sector. In coal mines, the implementation of such policies is undertaken by the mining company, while monitoring is under the chairmanship of the district collector.
- Alternative livelihoods and job opportunities have to be created for coal-dependent communities. However, poor planning and disaggregated vision of the roadmap for coal transition by government authorities is evident.

Policy Recommendations

- Livelihoods in coal regions are dependent on multiple factors, such as education, access to basic public services, ability and scope to shift to alternative sources of livelihood, economic opportunities, healthy ecology and scope of agriculture, skill and caste dynamics, and attainments among other factors.

- Given the wide differences in socio-economic and demographic characteristics of every district, policy decisions have to be hyper local removing the possibility of one shoe fits all approach. Policy decisions must keep in mind that each of these factors must be addressed promptly. To address multiple needs and redress multifaceted challenges faced by communities' recommendations have been designed on the principles of a sustainable livelihood framework.
- The sustainable livelihood framework aims to improve human capital, environmental capital, economic capital, and physical capital to foster community leadership and protect vulnerable communities. It focuses on enhancing skills, improving access to social welfare benefits, and addressing local ecological issues.

Under the human capital some of our key recommendations are-

- Organize a worker's census in districts vulnerable to coal transition
- Improve planning and coordination between the Labour Department and the Skill Training Authority
- Simplify eligibility criteria for training and skilling (secondary schooling is an eligibility criterion for some training programs at the district level)
- Establish training and skilling centers in areas where mines are closed.
- Improve planning and coordination between the Ministry of tribal affairs, State Labour and Skill Development authority at the state level.
- Priority for stressed regions (identified through government workers' census) for launching new schemes and programs of social welfare must be in coordination with a state department of Labour, social welfare and Ministry of tribal affairs.
- Increase penalty for employing unregistered and workers without ID card
- Increase institutional awareness at panchayat and block-level administration about coal transition and their rights

Under the regulatory capital, some of our major recommendations are-

- Conduct regular audits and ensure workers' registration and ensure healthy working conditions
- Coordination between district level Labour, the Department of Industries, municipalities, and the Department of Health for assuring workers safety, rights protection, health cover and enforcement of pro-workers laws.
- Issue workers ID cards for informal coal workers
- Allow MGNREGA to function in CBA lands (currently MGNREGA does not function in a 5 KM radius of coal mines)
- Third Party audit of closed mines to ensure adherence and transparency in mine closure operations
- Grant special status (must involve job guarantee for people from the region, including guaranteed social benefit, training, and social protection) to vulnerable coal mining or coal-dependent towns/villages in the state legislature. This can be done after a state government executes a survey of workers and regions (this depends on how and where coal mines are closed and then authorities can develop a plan for mapping vulnerability and thus can grant special status)
- Amendment of DMF rules for allowing direct financial benefit transfer for "vulnerable communities" identified through the survey (survey mentioned in the above point)

Under the economic capital, some of our major recommendations are-

- Ensure effective implementation of minimum wages- research indicates that wages and salaries offered even for trained workers are lesser than the state minimum wages-which leads to migration of workers in search of better work)
- This can be implemented through coordination and integration between the Department of Industries, Department of Labour, Department of Skilling and Training and Department of Economic and Financial Affairs at the state level.

- Roll out a clear-cut policy on circular economy to foster-(a lot of reports these days speak about the circular economy but without many details of quality and standardisation of recycled products is a major hurdle without these there will be no recognition and "market" for such products and hence the such efforts are bound to tank)
- Reuse and refurbishing of material, Standardization, quality control, development of the market for such products, issue guidelines for recycling and funding for recycling units, promote and strengthen the circular economy.
- After identification of vulnerable communities and regions, launch programs on the lines of Dalit Bandhu,
- Coordination and planning between the Department of Agriculture, horticulture, labour, Animal Husbandry, and Environment for developing programs for animal husbandry, livestock development, aquaculture
- Offering credit in vulnerable areas at low interest rates, set up technical centres in vulnerable areas for the promotion of public participation and awareness for programs launched under this head
- this requires co-ordinated action and planning between departments (as mentioned above)

Under the environmental capital, some of our major recommendations are-

- Set clear targets for coal reducing coal usage -which will help in identifying areas where mines will be closed and thus planning for just transition would be easier
- Coordination between the environment, agriculture, and the Department of Industry for conducting environmental assessment of vulnerable ecologies/regions
- Establish relief and rehabilitation funds for block-level activities to assist communities in the event of mine closure.
- Launch ecological restoration programs in vulnerable areas –this would improve carrying capacity and biodiversity,
- Using abandoned mines for water conservation, or using land for other purposes (after complete backfilling of closed mines)
- Integrate livelihood and skill training programs under the SAPCC

Under social capital, some of our major recommendations are-

- Establishment of a tripartite agency between workers, mining companies and local administration for dialogue and problem-solving.
- Village development plans must give priority to vulnerable community workers
- Under the leadership of the Tehsildar and DC establish a coal transition committee involving all stakeholders for easy streamlining of operations
- Improve access to basic services and ensure 100% delivery of basic services-electricity, sanitation, drinking water, health care and education in vulnerable regions where mines are closed or on the verge of closing.

Introduction

The transition from coal promises to be one of the biggest socio-economic rejig of the 21st century calling for a well-planned and multifaceted approach to make it just for the vulnerable communities dependent on it. Global experience in coal transition so far suggests, that a Just Transition, as a model for change has been the template for workers and communities to protect the environment, natural resources, and support adaptation during times of economic change[1]. A Just Transition involves 'maximizing the social and economic opportunities of climate action while minimizing and carefully managing challenges'[2] –through effective social dialogue among all affected groups premised on a respect for fundamental labour principles and rights[3]. Phasing down will have a significant impact on livelihoods in India[4], particularly, for those who are directly or indirectly dependent on the coal industry for their income.

The current report is a sequel to the - "Socio-economic impacts of coal transitions in India" report published by NFI back in 2021. It presents the ground realities of large swathes of population living in coal and coal allied districts from Chhattisgarh, Jharkhand and Odisha and offers a potential framework for safeguarding communities and marginalised population in the wake of coal transition and to make local environment and governance more aligned to making coal transition a just transition for human and environmental capital in these states and beyond.

The 21st century calling for a well-planned and multifaceted approach to make it just for the vulnerable communities dependent on it.

The phasing down of coal will lead to job losses for coal miners and workers in the coal industry[5] which, in turn, will have a ripple effect on the local economy, as these workers will no longer have a source of income making it difficult for them to support themselves or their families[6]; leading to a decline in the local economy, businesses that rely on the coal industry will also suffer. Secondly, the power sector in India[7], which is largely reliant on coal-fired power plants will take a hit as coal-fired power plants are phased out, there will be a decrease in the demand for coal, leading to a decline in the coal industry[8]. This will lead to a decline in the income of coal miners and workers in the power sector[9]. Lastly, phasing down coal will positively impact the environment[10]. benefiting the health of local communities[11]. However, this will be at the cost of a decline in the income of local communities that rely on the coal industry for their livelihoods[12]. In conclusion, phasing down coal will impact livelihoods in India, particularly, those who are directly or indirectly dependent on the coal industry for their income.

This report offers suggestions to help supervisory and regulatory authorities build their responses to monitor, manage, and reduce risks originating from an inevitable transition and to encourage consistent methods across sectors and regulatory authorities, based on reviews and surveys of existing situations and practices. It explores the plausible policy interventions by governments at the Centre and at the state without which a transition would be impossible.

The government, both at the centre and the state, must take steps to mitigate the impact of phasing down coal on livelihoods, and commit to providing retraining and job placement programs[13] for those who lose their jobs in the coal industry and investing in alternative energy sources to ensure a smooth transition for the power sector. One of the central aspects of the energy transition is long-term energy security and capitalization of potential pathways for addressing the energy demand in the coming decades.

Overview

The report explains two distinct sets of districts with regard to economic and industrial background- Coal Producing and Coal Allied districts. The Coal Producing Districts are those where coal mining is the central economic activity; whereas the Coal Allied Districts are those where coal-dependent industries and other industrial units are central pillars of the economy (district).

One of the pivotal factors for economic sustainability or livelihood sustainability is the socio-economic backdrop against which the changes take place. because districts with "only" coal mining as a major activity will bear the brunt of the transition. In Coal Allied Districts even if coal mining fades in coming years, the impact will be felt gradually.

The Coal Producing Districts are those where coal mining is the central economic activity; whereas the Coal Allied Districts are those where coal-dependent industries and other industrial units are central pillars of the economy

The informal workforce is the first in line to face the impacts of transitioning away from coal and our research has revealed that front line or the coal workers (informal) are at the highest risk. The report presents a caste perspective and the role of caste to explain the intricacies involved in the coal transition for efficient planning and execution towards a just transition. On the one hand, in the area of study, the discussions revealed that formal worker tends to have better education and long-term fixed or contractual job contracts with better incomes. The vulnerable are those with no legally binding work contracts, or time-period of work, and with lesser education and poor skills.

The report explores the inter-relationship and inter-sectionality of caste, with occupation, income, and education. Apart from these occupations, when alternative livelihoods are explored as a substitute system when primary occupations are gone due to the transition from coal, agriculture is the primary and the most significant. But in mining areas the environmental damage is huge, intense, and widespread; agriculture is poor with erratic rains and weak soil fertility; the prospects of agriculture as the most plausible option are bleak for the entire region making employment opportunities challenging.

For the study, two districts were selected from three states each - **Chhattisgarh, Jharkhand, and Odisha** and in each district 18-20 villages and towns were selected. The socio-economic, and industrial background apart from the presence of coal mining activity was the principal method for choosing the districts.

Economic and Industrial Background of Each Selected Districts

Coal Allied Districts	
Ramgarh	The coal mining area of Ramgarh district in Jharkhand, India, has been a hub of industrial activity for several decades attracting a wide range of industries, including power plants, steel plants, cement factories, and brick kilns, which have had a significant impact on the local environment and communities.
Raigarh	The district economy of Raigarh is driven mainly by coal mining and allied industries, agriculture, and business activities forming a web of intermingled streams all equally interconnected - the inter-relationships between streams of money flow are vital to maintain the vibrancy of the economy at the local level.
Jajpur	Jajpur has a strong industrial and resource-rich-mining industry background, so the immediate fallout of the coal transition on local livelihood will not be as harsh as compared to coal-producing districts. Industrial diversity and the absence of coal mines are the two most significant features of the Jajpur economy. However, indirect jobs in the district will be gradually impacted in the wake of the formal decommissioning of thermal and steel iron ore industrial units

Coal Producing Districts	
Koriya	Koriya is a district with a majority of underground coal mines; many of them have closed over the last decade. In terms of overall economic background, agriculture is the major avenue of livelihood along with forest resources, casual work, and other related occupations.
Dhanbad	Coal mines directly provide livelihoods to a major chunk of the population from subsistence level to lower-middle level income from coal through direct engagement. Coal mining, steel, cement, thermal power plants, and coke manufacturing plants are the major pillar of industrial activity in Dhanbad.
Angul	The presence of huge reserves of essential minerals and metals such as coal iron ore, and bauxite boosted the socio-economic profile of the district. Mining, power, and metallurgy are among the district's key industries. With initiatives like the solar energy park and Aluminium Park that the government is putting forth, Angul has significant potential for growth, especially in the areas of renewable energy and downstream industries.

Research and survey of 1209 HHs across six districts have revealed a stark disparity in community representation, with over 41.5% of the population surveyed belonging to Other Backward Classes (OBC), 23% to Scheduled Tribes (ST), and 17% to Scheduled Castes (SC). Interestingly, only 15.5% were from the General category, shedding light on the disproportionate impact of the transition on marginalised groups. Work dynamics revealed that 38% of HHs were engaged in the coal sector.

The lived realities of people present a distressing picture, with reports of prevalent respiratory ailments and skin issues due to prolonged exposure to coal-related pollutants[14]. Furthermore, concerns about women's safety, limited educational opportunities, caste-based inequalities, and inadequate access to basic services surfaced during the discussions as critical issues in coal-dependent regions[15].

Economic disparities were evident across districts, with varying income levels and irregular wage receipt patterns. Dhanbad and Koriya, solely reliant on coal production, reported lower incomes compared to more diversified industrial districts like Angul. During the survey and field visits, access to basic welfare schemes was notably lacking, exacerbating the vulnerability of these communities. Policy and institutional challenges loomed large, characterized by administrative negligence, poor service delivery, and fragmented governance structures. Without a clear plan in place, workers in declining industries may face sudden job losses without adequate support or alternative employment opportunities; exacerbating tensions within the affected communities.

The report presents a sustainable livelihood framework advocating for a localized, district-level approach to address the nuanced socio-economic dynamics.

By emphasizing community-specific policies, coordination between government bodies, and robust institutional mechanisms, this report outlines a roadmap for policymakers to mitigate the adverse impacts of the coal transition, especially amongst the most vulnerable. The study, conducted by the National Foundation for India (NFI), delves into the intricate socio-economic fabric of communities residing in coal mining and coal-dependent industrial areas, aiming to illuminate the multifaceted repercussions of transitioning away from coal in these regions.

Methodology and Rationale

India is a diverse country with significant regional disparities in income, employment opportunities, and access to resources. The absence of an updated census and other accurate sources of information exacerbates these disparities and inequalities due to missing pieces of information. The absence of updated data exacerbates disparities in resource allocation and service provision across India's diverse regions. For coal mining and allied districts, which face unique socioeconomic and environmental challenges, accurate and current data is essential to address their specific needs.

It was noted that each district differs from the others in terms of geography, demographic indicators, occupational structure, etc. while evaluating the districts' vulnerability in the previous report published by the National Foundation for India (NFI) in 2021[16]. This study, grounded in the context of just transition, aims to provide a comprehensive assessment of these districts to inform effective policy and resource allocation, ensuring a just and equitable transition towards sustainable development.

The extent of coal dependency within the district was examined. The proportion of HHs relying on coal for livelihood or as a form or source of energy (heating, cooking, or electricity generation) formed the basis of the survey. Gathering data on the prevalence of coal-dependent jobs and the reason behind their continued dependence is key to designing targeted interventions and policies to facilitate the transition away from coal at the local level.

The absence of an updated census and other accurate sources of information exacerbates these disparities and inequalities due to missing pieces of information.

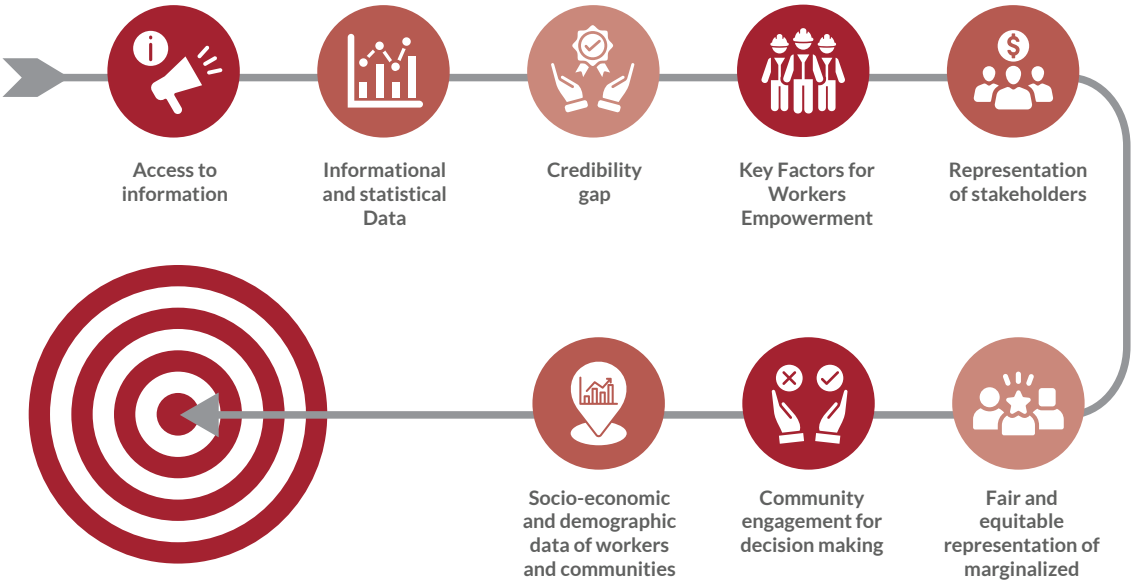
Figure 1- Area of Study

Targeted data collection efforts, stakeholder involvement, and interdisciplinary cooperation between researchers, policymakers, and local communities are all necessary to fill in these need gaps. By addressing these gaps, a district-level household survey was used to offer insightful information about the coal transition process, guiding the creation and application of efficient policies and strategies.

The purpose of the three working papers published by NFI in 2022 was to explore and present the state and district-level coal mining scenario and the state of coal-economy-livelihood interconnections present the grass-root level complexities.

Lack of data and accessibility to existing government schemes are some critical gaps that hinder effective policy planning and support mechanisms. Bridging these gaps through targeted data collection efforts, stakeholder engagement, and building understanding between researchers, policymakers, and local communities will enable and promote a just and sustainable transition for affected individuals and communities. District-level surveys helped to uncover these disparities, highlighting areas where the impacts of a just transition might be most severe.

Figure 2- Steps of Fair and equitable representation for policy-making



Selection of Districts

Districts were selected based on the economic background-presence of coal mining and coal allied industry.

- Coal Producing Districts are mainly those where only coal mines are present.
- Coal Allied Districts with the presence of heavy industries along with coal mines were selected to understand the difference in socio-economic and livelihood conditions in both categories.

In each state, one district with coal mining and one district with coal-allied industry were selected to understand the job linkages and degree of dependence on coal mining as a central source of the economic life of the communities.

Table 1- Identified Coal and Non-Coal Districts

State	District	Coal Producing	Coal industry intensive/Coal allied
Chhattisgarh	Koriya		
	Raigarh		
Jharkhand	Dhanbad		
	Ramgarh		
Odisha	Angul		
	Jajpur		

The National Foundation for India focused on mining areas (covering operating as well as non-operating mines) of prominent coal-bearing districts that were identified with the help of state mineral maps, and geological survey of India reports. While it was found that districts like Ramgarh, Jajpur, Raigarh, Bilaspur, Giridih, Sambalpur, Hazaribagh Singhbhum, and others are the ones that have a high dependency on coal. These districts also have more than one amenity/industry associated with coal; hence these districts were taken into consideration. For understanding and assessing the economic background of each district-industrial profiles prepared by the Micro, Small, and Medium Enterprises studied along with desk research including coal directory 2020-2021 and 2021-22 and other reports.

Analytical Approach

By employing comprehensive analytical approaches, this study aims to provide a detailed and nuanced understanding of the livelihood impacts during the coal transition in India. This will inform the design of fair and equitable transition policies that support affected communities, promote sustainable development, and ensure that no one is left behind in the shift towards a cleaner energy future.

Data collection

Discussion with economists, and field experts-led to the identification of villages lying in the core zone within the proximity of 0-10 Kms of coal mines; coal allied industrial assets were taken into consideration. 20 villages were selected within 5Km, 10km and 20km buffer zone. Additionally, 20 Focus Group Discussions (FDG) were held across districts along with more than 25 semi-structured interviews and 5 expert interviews along with 5 in-depth conversational interviews were held. The survey process was managed and overlooked by experts from NFI and survey agency.

Process

- The population of interest are the HHs residing in coal-bearing areas in three chosen states. These areas are selected based on their proximity to active coal mines or coal dependent assets/industrial units/plants.
- Strata included HHs in close proximity to mines and HHs located farther away from coal mining activities.
- The study targeted a sample size of 1209 HHs by a two-stage sampling process-towns and village stratified and random sampling for HHs in each village/towns. But prior to that a pilot survey was executed in Dhanbad district covering 60 HH's
- HHs were clustered within certain areas.
- Villages/towns serve as primary sampling units (PSU). The HHs in the selected villages/towns were listed prior to the survey. 18 HHs were selected by sampling in each village (72 villages), giving a sample of 1209 HHs , Annexure 1.

The following parameters/aspects/data points were considered for data collection to understand the occupational and socio-economic profile of the communities.

- Household demographics
- Income sources – Household level
- Consumption expenditure- 1) food 2) household 3) health 4) education 5) energy and transport/commutation 6) rent, loan and miscellaneous categories
- Socioeconomic Factors
- Occupation and livelihood factors
- Land holding and cultivation.
- Access to social welfare schemes

Limitations and Challenges

Survey participants reported income or earnings based on the frequency of occurrence i.e., daily, weekly, and monthly however expenditures were reported for the entire month. The expenditures part of the questionnaire was designed in principle in line with the survey questionnaire of the National Sample Survey Office's socio-economic survey (68th round) consumer expenditure household survey questionnaire. The line items for expenditure were modified to suit the local economic and cultural conditions.

Data Verification

Data verification for the household survey was an essential step to ensure the accuracy and reliability of the collected data. It involved checking and validating the information through field visits, pilot surveys and secondary sources for the data obtained from respondents to minimize errors, inconsistencies, and inaccuracies. The following secondary sources were used to identify discrepancies or contradictions PLFS data, Informal economy data, District Census, Ministry of Agriculture, Private Consumer Expenditure 2012, and NSSO survey to name a few. Logical rules or consistency checks were also applied in the process. Based on the study's purpose, the data was used for a two-step evaluation.

Quantitative Evaluation

The first part of this two-prong analytical approach is a large-scale quantitative analysis by utilizing a set of standard measurements, leading to a quantitative assessment of the livelihood impact of a transition away from coal at the district level thereby providing baseline estimates for policymakers and local governments.

Qualitative Evaluation

However, there were limitations, the quantitative assessment strategy is frequently based on standardized measurements and indicators, which might not fully account for the distinctive cultural and social contexts of various communities. Quantitative analysis might also miss the variety of effects on various groups, including the most vulnerable ones. Qualitative analysis, on the other hand, can supplement information sought through quantitative analysis by providing a closer, in-depth study at the district level, highlighting the ways in which the districts differ from one another, i.e. in their geographic and demographic indicators or their occupational structures.

Methods of Qualitative Analysis

The use of qualitative data such as focus group discussions and personal interviews along with discussions with state and local government representatives as well as civil society groups enabled us to capture the specific needs of affected communities in addition to the broader patterns identified through quantitative analysis. By selecting a district-level rather than a state-level analysis, the sheer diversity of the stakeholders presented a more viable approach to facilitate the formulation of a just transition framework.

Daily and Monthly Basis Income Data Challenges:

Many of the respondents were reluctant to share income data, making it difficult to reconcile the difference between household data or individual data.

To remove the joint household incomes, the participants were requested to report the income and expenditures of their HHs

Incomes and expenditures of families who have kitchens were considered for the survey, as one family. Hence the analysis was done based on per day income reported in the wage analysis section. The definition of a household is in line with the definition followed by the NSSO survey, by the government of India.

Socio-economic and more specifically, the household consumer expenditure survey are often marred by limitations pertaining to open participation in the survey process by the participant, homogeneity in expenditure patterns, under-reporting of incomes and expenditures (in some cases) lack of accurate information regarding annual expenses among the survey participants, irregularity of wages and income, inconsistent work occupation of people.

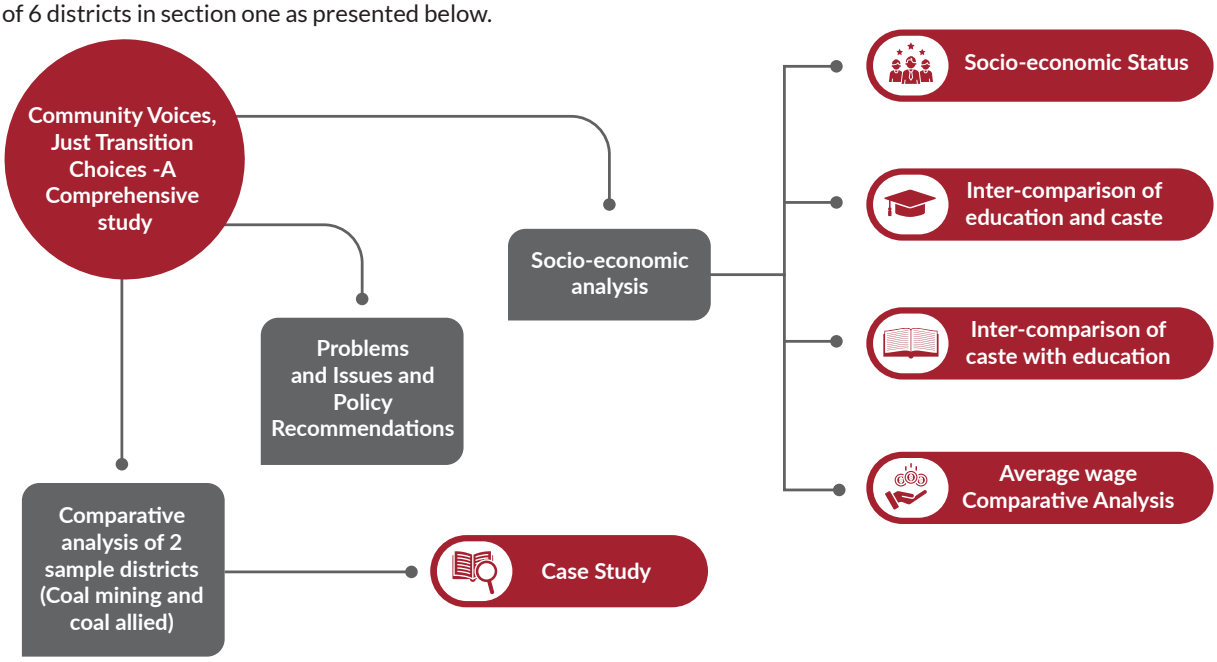
Report Format

The reports are subdivided in three major sections-socio-economic and income analysis of 6 districts based on non-monthly incomes and wages as reported and second major section is based on full comparative study of 2 districts-Angul and Ramgarh.

Further in the first section the report is divided into 4 major sections, 1) socio-economic status 2) inter-comparison of education with castes, 3) Inter-comparison of caste with occupation 4) Average wage and income analysis.

Figure 3- Report Layout

Section one presents socio-economic analysis and, caste hierarchies and wage analysis and the second section presents the comparative analysis of 2 districts from the study. The major differences between case studies and the representation of 6 districts in section one as presented below.



Calculation in section 1	Calculation in section 2 (case study districts)
Wages and income reported on -- daily, weekly, and monthly basis	Daily and weekly wages are calculated on 30 days, or 4 weeks basis respectively.
Average wages (daily, weekly, and monthly) are average under each category of income.	A cross-sectional analysis of incomes with geography, education, and land holding (agricultural) is presented.

The last section of the report presents the policy recommendations that not only aims to improve income earning capacity but also the overall socio-economic and environmental conditions of the regions is necessary.

Why the Sustainable Livelihood Framework[17]

The DFID's Sustainable Livelihood Framework is being applied for this analysis due to its comprehensive and holistic approach to understanding and addressing livelihood impacts during the coal transition in India. It considers multiple dimensions of livelihoods, including human, social, physical, financial, and natural capital, allowing for a comprehensive understanding of the factors affecting livelihoods in coal mining districts. Alternative livelihood once coal mining is phased down, especially for informal coal workers, is a big challenge in the absence of training, skilling development, investment in education, and ecological conditions.

Table 2- **The DFID's Sustainable Livelihood Framework is being applied for this analysis**

Approach	Reason
Holistic Analysis	The Sustainable Livelihood Framework (SLF) considers multiple dimensions of livelihoods, including human, social, physical, financial, and natural capital, allowing for a comprehensive understanding of the factors affecting livelihoods in coal mining districts.
Focus on Vulnerability	The SLF highlights vulnerability contexts such as shocks, trends, and seasonality, crucial for understanding the impacts of coal transition on different communities and individuals.
Stakeholder-Centered Approach	By focusing on people's strengths and resources, the SLF promotes a bottom-up approach, ensuring the inclusion of voices and needs of all stakeholders, especially marginalised groups, in the analysis and policy recommendations.
Integration with Policy and Institutions	The SLF emphasizes the role of policies, institutions, and processes in shaping livelihood outcomes, aligning with the study's goal to inform equitable and effective policy-making.
Sustainable Development Focus	The framework supports sustainable livelihood strategies that promote economic diversification, environmental rehabilitation, and resilience, essential for a just transition from coal.

Human Capital

A substantial chunk of the population surveyed identified themselves as less-educated (below grade 5) or with not educated all and does not hold any cultivable land for initiating alternative source of livelihood. Livelihood dependence mainly aims to show how communities are "solely" dependent on coal mining as their central economic activity. We have identified 3 main variables that can help in assessing how vulnerable is the scenario for alternative livelihoods.

- Skill training, upskilling, and training opportunities.
- Poor educational background
- Poor agriculture and poor ecology.

Economic Capital

The economic capital mainly consists of physical infrastructure, buildings, units, plants and housing and any other infrastructure that can physically transfer its benefits to the communities.

For the purpose of analysis and research we have focused on all most all aspects of economic capital such as

- Infrastructure and connectivity
- Social infrastructure
- Investment and livelihood generation

Regulatory Capital

The concept of regulatory capital (although not in the sustainable livelihood framework) is a slightly modified version of economic capital. Regulatory capital aims to expand the economics of regulation in regions especially in context of coal mining. Research indicates that poor enforcement of rules and laws has given birth too many of the complex and issues and challenges which are pressing for the communities. In many cases it was found that there is a lack of effective implementation of legislated laws and rules, huge numbers of people are suffering and facing hardships in social and economic life as well. We have identified major issues such as

- Poor enforcement
- Lack of oversight and administrative negligence
- Poor planning and planning with gaps
- Non-compliance or non-implementation of certain laws, rules, and regulations in these regions

Social Capital- In the context of the sustainable livelihoods framework it is taken to mean the social resources upon which people draw in pursuit of their livelihood objectives.

These are developed through:

- "Networks and connectedness, either vertical (patron/client) or horizontal (between individuals with shared interests) that increase people's trust and ability to work together and expand their access to wider institutions, such as political or civic bodies.
- Membership of more formalised groups
- Relationships of trust, reciprocity and exchanges that facilitate co-operation, reduce transaction costs and may provide the basis for informal safety nets amongst the poor"[18].

During our research, we found the absence of a platform for the voices of the marginalised communities to be echoed. Additionally, we identified that there's an absolute absence of representation of communities by the government and the coal mining companies.

Environmental Capital

"The sustainable livelihoods framework, the relationship between natural capital and the Vulnerability Context is particularly close. Many of the shocks that devastate the livelihoods of the poor are themselves natural processes that destroy natural capital (e.g. fires that destroy forests, floods and earthquakes that destroy agricultural land) and seasonality is largely due to changes in the value or productivity of natural capital over the year."[19]

In the context of the coal transition proper enforcement of mine closure laws, (one of the key aspects of regulatory capital) is very important and restoration of damaged ecology and revitalizing agriculture is key for supporting the idea of alternative livelihoods because if the environment and ecologies are damaged, survival of the population would be difficult. In this context, environmental capital or natural capital was identified as having immense significance in the journey towards just transition.

In this context, environmental capital or natural capital was identified as having immense significance in the journey towards just transition

Lived Realities: Socio-economic conditions of the communities

In regions around coal mines or allied industries, the socio-economic landscape varies. The presence of coal mining and related industries shape social dynamics within communities, influencing factors such as class structure, political beliefs, and community cohesion. Disputes over land use, environmental regulations, and economic development also contribute to social tensions. These regions comprise majorly of marginalised communities, like Scheduled Tribes (STs), Scheduled Castes (SCs), Other Backward Castes (OBCs) and a significant majority of the workforce belongs to these marginalised communities. Communities in these regions are heavily reliant on coal mining or related industries for employment. These industries provide jobs for a significant portion of the local workforce.

The occupation of individuals in these areas is often determined by their caste, reflecting historical patterns that persist today.

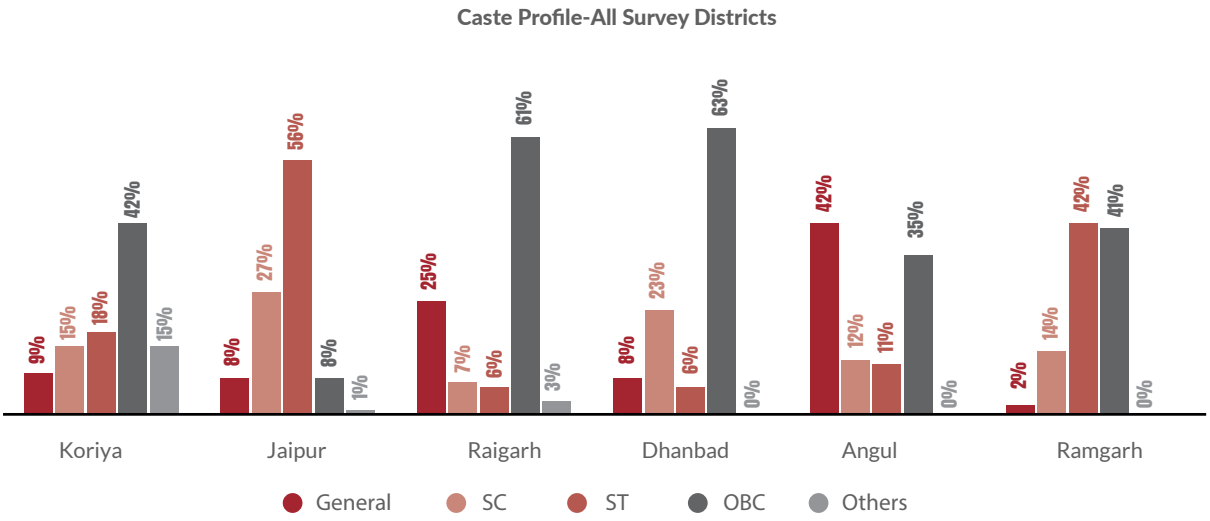
Apart from historical biases, higher caste groups have better access to quality education compared to minorities. This educational advantage enables them to acquire the skills and qualifications needed for managerial positions in coal mining and related industries. Whereas people from Scheduled Tribes (STs) and Scheduled Castes (SCs) for instance, frequently work in the mines performing dangerous manual labouror works which are minor and informal. They can be seen loading and unloading coal or cleaning the coal.

Caste-Based Hierarchies

Focused Group Discussions (FGDs) revealed how caste-based prejudices impact hiring procedures in these regions. Fifteen out of 20 FGDs recorded that communities belonging to minorities had more informal and low paying jobs. The data suggests a troubling pattern of economic disparity, revealing how these communities often grapple with limited access to formal job markets, subsequently leading them towards occupations that offer meagre wages and lack employment benefits. In the coal mining regions, the caste system is a factor in pay Inequality, jobs, type of jobs, contracts, and working conditions. People from lower castes, particularly Scheduled Tribes (STs) and Scheduled Castes (SCs), are

paid less than those from higher castes. For example, in occupations such as workers in coal dump yard, coal sidings, coal loading, coal transport, coal washeries and other informal coal work, it was discovered that a substantial people were from marginalised communities. This wage disparity exacerbates economic inequality and limits the upward mobility of people from low-status castes.

Figure 4- Caste Profile across 6 surveyed districts

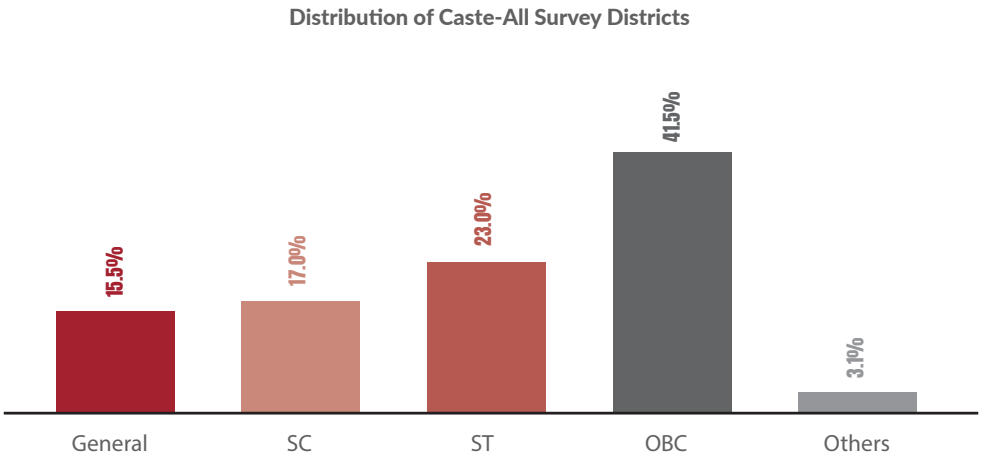


Work, access to education and caste are interwoven to some extent in some regions of the study especially in coal mining district Koriya and Dhanbad and some parts of coal allied district of Raigarh as well. In rural area of Raigarh, people from marginalised caste were found to be working in stressful condition under some contractors. Their chances of achieving upward social and economic mobility are hampered by a lack of access to high-quality education and resources.

Communities and Caste

The biggest impact of the coal transition in terms of livelihood and alternate livelihoods in all the survey districts will be on the marginalised and backward communities; 81.5% of the total surveyed sample are from marginalised and socio-economically poor backgrounds. As per the survey, 17% are SC, 23% are ST and 41.5% are OBC.

Figure 5- Caste Break-up across the surveyed population



In Koriya, 42% of the survey population belonged to OBC, 61% in Raigarh, 63% in Dhanbad, 41% Ramgarh 35% in Angul and just 8% in Jajpur. Furthermore, industry-intensive districts such as Angul and Raigarh are the only two survey districts where the proportion of the population belonging to the general category is higher- 42% in Angul and 25% in

Raigarh, whereas high-coal dependent districts such as Koriya, Dhanbad and Ramgarh have 9%, 8% and 2% surveyed population belonged to general category. The coal industry, particularly in certain areas, has been linked to specific caste groups that hold influence and power.

"WE MUST EMPOWER AND UPLIFT MINORITY AND VULNERABLE COMMUNITIES DURING THE COAL PHASE-DOWN, PROVIDING THEM WITH ACCESS TO CLEAN ENERGY ALTERNATIVES, JOB TRAINING, AND ECONOMIC OPPORTUNITIES TO ENSURE THEY BENEFIT FROM THE TRANSITION".

Manoj Kumar Bhuiyan from Nathkhurki is an **informal worker loading and unloading coal trucks.** He lives within 100 meters of the offloading point and the muck dump site. The offloading point is for Block 4 of BCCL mines. He is a (Schedule Cast and a 7th **generation worker** from his family. Manoj earns INR 870 per truck loading/unloading coal and supports a family of five. In peak season, he loads and unloads coal from 3-4 trucks that come down to 2 in lean season.

He does not own any land and lives on a day-to-day basis. He mentioned that even though there are many informal and contractual jobs available around the coal mines, permanent jobs are only for displaced families. Manoj's family lost their agricultural land due to the muck dump and the pollution in the area. Scarcity of water makes agriculture unsustainable.

His caste does not allow him to get any other kind of regular job. On days when he has no work in the coal loading/ unloading work, he does **manual scavenging**, which he does not like. In order to survive he takes up any job that he gets.

Coal does not bring any life upgradation for him, but at least he has a source of income.

"हम इसको गंदा नहीं मानते दीदी, गंदा तो वो है जो करना पड़ता है, जब कोयला नहीं होता"

Focus Group Discussions

Twenty (FGDs) were conducted with representatives from communities residing in coal mining regions and coal-dependent industrial areas to understand the ground situations.

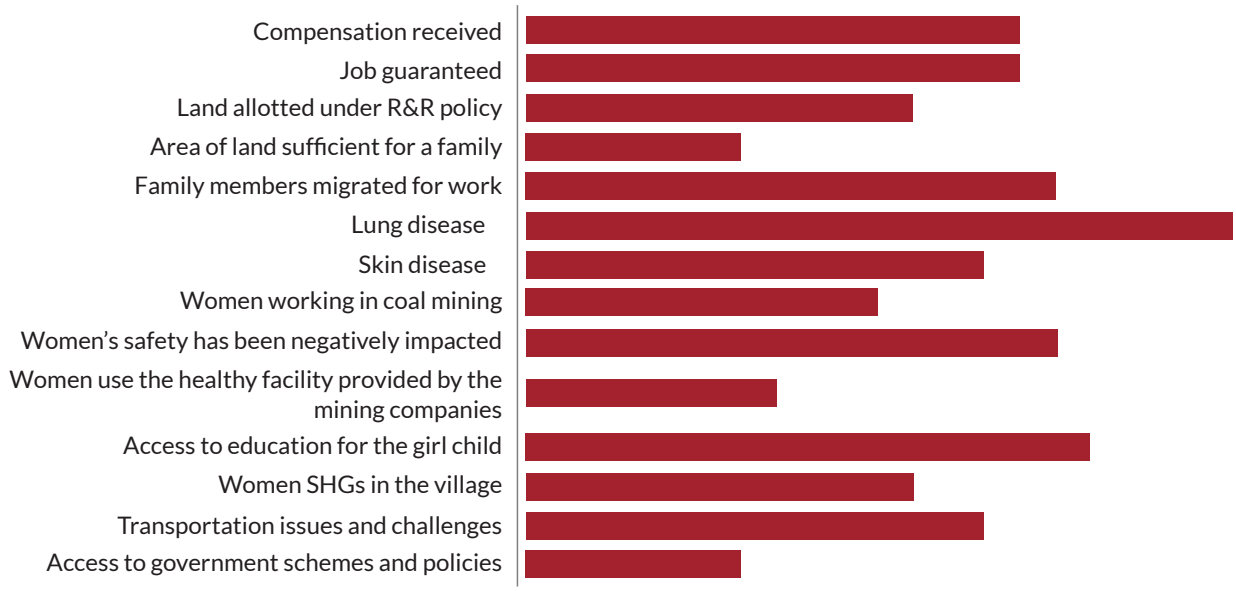
These FGDs were held at different villages across the districts (refer methodology section) – Sansailo, Manpur, Rakash, Kalamachhuin, Khongapaani, Chainpur, Manendragarh, Matigarh, Phulwaritand, Kuju, Milupara, Patlgaon, Baghmara, Nathkhuki, Bada Pandaydih, Sidpoki, Tandabadi Basti, Lututand, Muralidih, Duburi, Talabeda, and Bhardaura.

The FGDs involved local people, community members, local leaders, and people working in relevant fields. The objective of the study was to understand the situations that marginalised communities have experienced due to coal mining and examine the potential impacts of the coal transition on their lives and livelihoods. The discussion centered around:

- Health and Medical Care Facilities
- Rehabilitation and Compensation
- Safety and Security of Women
- Commutation and Transportation
- Access to Public Services

The table below presents detailed category-wise community response that was recorded during the FDG's. The format of discussion was mainly open and based on circumstances and living conditions of villages.

Figure 6- Groups Responded 'Yes' to the questions asked (out of 20 FGDs)



A total of 20 FGDs were conducted with an average participation rate of 50 people per group. The discussions were initiated in 3 stages - **1)** basic life and living conditions **2)** work and social issues **3)** larger issues or issues that are affecting the entire communities. In villages where focused group discussions were conducted about 50% of them were displaced communities and project-affected people. These are the first lines of people who suffered from voluntary or involuntary displacement and were promised jobs.

The response was recorded in different categories mainly on larger issues such as compensation of land acquisition, health issues, and women's conditions including commutation and accessibility. The above table presents the summation of responses in each category of FGD. In compensation of land acquisition, 14 groups comprising of an average 50 people responded yes, meaning they have received the compensation. For job guarantee, out of 20 groups, 14 groups consisting

of 50 people on an average responded positively for this segment which indicates that the majority of the substantial number of people have been guaranteed a job. Furthermore, in case of the transportation and commutation segment, 13 groups responded positively indicating they face huge challenges in commutation and transportation because there is no regular and systematic rural transport network in those regions. In about 75% of the discussions, what emerged was the issue of women's safety in coal mining areas.

These regions are predominantly male- dominated, with a scarcity of women employed in mining-related roles. This gender imbalance, coupled with the remote and often isolated nature of mining communities, has created an environment where women face several challenges and safety risks. Instances of verbal abuse, sexual harassment, and assault have also been reported, creating a hostile environment for women in these areas. Fear of retaliation or stigma often discourages victims from speaking out or seeking justice; lack of economic empowerment and financial independence can further exacerbate their safety risks, as they may have limited options or resources to escape or report abusive situations.

Health and Medical Facilities

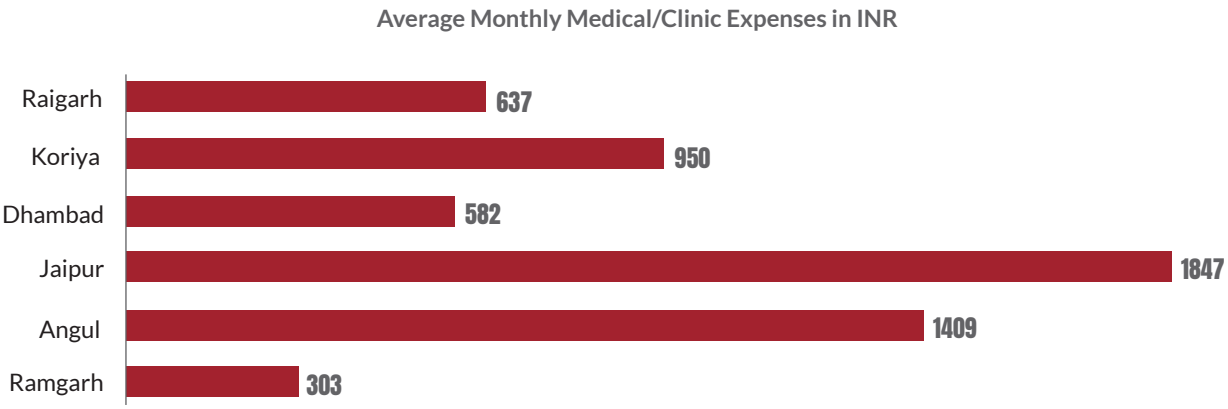
Discussions revolved around the availability and adequacy of health and medical care facilities in these areas. Participants shared their experiences regarding access to healthcare services, the prevalence of health issues attributed to coal mining activities such as respiratory ailments and water contamination, and the challenges faced in obtaining medical assistance[20].

One of the primary health concerns that came out was the prevalence of respiratory diseases (in all the FGDs), particularly those affecting the lungs. Coal mining releases various pollutants into the air, including coal dust, silica, and other particulate matter. Prolonged exposure to these airborne pollutants can lead to respiratory conditions such as coal workers' pneumoconiosis (CWP), also known as black lung disease.

In addition to CWP, other respiratory ailments like chronic bronchitis and asthma[21] are also prevalent in these areas[22]. Dermatitis, eczema, and fungal infections are commonly reported among the mining workforce and the local population[23]. About 65% of the responses received during the FGDs mentioned skin-related issues, making it a predominant issue. Out of the total group discussions that took place, in about 80% of the areas it was said that health and education infrastructure was developed over a period helping especially, the girl child.

The FGD discussions and HH's survey revealed that average hospitalization expenses are not consistent across the districts and are not significantly higher than the monthly medical/clinical expenses. On average a household spends between INR 300-1000 on monthly medical-related bills. The average hospitalization expenses in Dhanbad are the highest followed by Jajpur.

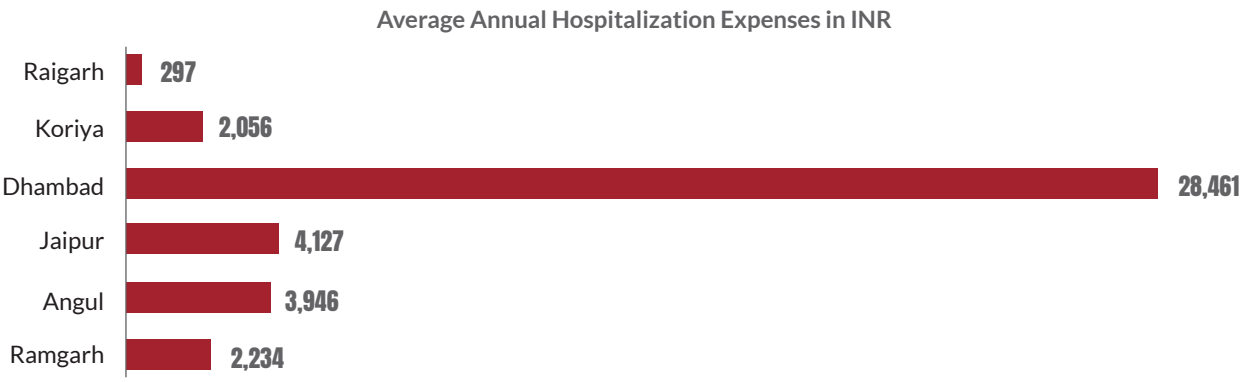
Figure 7- Average Monthly Medical Expenses



The population leaving closer to the mines are identified as most vulnerable group and especially those living in the danger zone of the coal mines. Dhanbad, Ramgarh have larger population size living in such zones and FGD's have revealed

higher incidence of lung and breathing related including skin diseases. During the discussion in Matigarh, Phulwaritand, Chainpur, and Kuju (Jharkhand) particularly, it was seen that women were working in the mining areas, engaging in social development and empowerment.

Figure 8- Average Monthly hospitalization expense



Rehabilitation and compensation

Participants discussed issues related to rehabilitation and compensation for individuals affected by coal mining activities, including displacement, loss of land or livelihood, and health impacts. The discussions explored the effectiveness of existing rehabilitation measures and the adequacy of compensation schemes in addressing the needs of affected communities.

During the group discussion in *Bada Pandedih*, a rehabilitated village of Jharkhand[24], majority of the population from the first generation had permanent jobs in the coal industry and were paid very well. This helped them to have a better socio-economic profile. They had access to education, health, and basic infrastructure which was not present earlier. Coal mining operations often necessitate the development of infrastructure such as roads, railways, schools, hospitals, and electricity networks.

Post nationalization of coal mines in the 70's BCCL launched a land survey and around the year 1980-82, notification was issued by authorities for people living in the nearby villages and hamlets for eviction because of the upcoming mining project by the BCCL. This project gradually started around 1984-85 affecting hundreds of HHs living in the vicinity of the project, however, to compensate the loss of land and livelihoods, BCCL allocated open land of 45 acre for 80-145 HHs by the end of the decade. During those days, almost 75% of affected people (one from a household) were offered employment with the company and around 20-30% of the people were left out with just a promise of employment. Swifter action in terms of rehabilitation and compensatory employment was on the cards of the management of the company as the process of mining was in the initial stages whereas in the later company changed its policies and schemes which gravely impacted tens and hundreds of HHs .

Technological development, mechanization of mining heavily dented the prospects of livelihoods, for the people living in the vicinity of the mines and apart from this, earlier shift in company policy has severed the socio-economic conditions of the people. Earlier compensatory employment in lieu of land (irrespective of size) was allotted to PAP (Project Impacted People). During the early 90's a cap of 2 acre per household was introduced to claim compensatory job or land for livelihood----this move crushed all opportunities and sources of livelihoods for the PAP and still their people are leading life in harsh conditions near the coal mines.

During the early years of rehabilitation, no full-fledged functioning public services were operational in the area and people were just allowed to reside on the open land- however, over the years, people have progressed economically and have built their homes themselves. Another most striking fact is the non-issuance of certificate of displacement meaning which, the population is legally not entitled to live there and can be evicted by force anytime despite living there from last 30 years.

However, in the later years of rehabilitation, roads and water facilities were provided along with electricity by BCCL. But there no second investment on public services from BCCL till date and locality come under the gram Sabha jurisdiction where most of public services are facilitated by the community themselves through the means of voluntary charity by HHs . However, in the later years of rehabilitation, roads and water facilities were provided along with electricity by BCCL.

Another instance of mismanagement and poor implementation of rehabilitation and resettlement rules was found in rural Raigarh where there was an established resettlement colony and people had shifted from their original place, but with no accessibility to electricity, or water, it was learnt through interviews with local leaders that after some time, the resettled communities moved back ? due to lack of basic facilities.

Sambhu Mahato from Bada Pandedih had a household income of 55000 per month and works in Area 1 of BBCL coal mine for the last 35 years. He belongs to the OBC category and says that the type of infrastructure facilities he has now was not available to him before the company resettled them.

But when confronted with the question of phasing out of coal, he appears concerned, as it threatens his livelihood and the future of his children, who are also working in coal mines but on contract. Even though he has 7 acres of agricultural land, he has a family of 18 to feed. He and his son earn their leaving from coal and are completely dependent on it. He and his family have built a house on the land given by the mining industry under the compensation act, and with the compensation they received. He points out that to acknowledge the issues of families like his, it is crucial, for the government, mining companies, and other stakeholders to diversify the local economy. It is also crucial for the relevant stakeholders to invest in alternative industries, focus on infrastructure maintenance and expansion, and ensure continued access to quality healthcare services to sustain the progress made thus far.

For some people in the village like *Milupara*, in Raigarh, even though mining has provided employment to a significant number of community members, people are not getting paid timely. Some families acknowledged that because of their work in thermal power plants they have stable income sources, and it has improved their lifestyle as compared to their previous generations.

Safety and security of women

Concerns about the safety and security of women in coal mining regions were highlighted in discussions in the context of challenges faced by women. , Gender-based violence, lack of adequate support systems, and the impact of coal mining activities on their overall well-being and security were some of the specific concerns shared by women.

These regions are predominantly male-dominated, with scarcity of women employed in mining-related roles. It was found that in many places the social structures in villages not only hindered the work participation of women but also affects their wages. However, community-led initiatives have created a positive impact on local women. For instance, in Jharkhand[25], grassroots organizations have established skill development programs tailored specifically for women, enabling them to gain economic independence. Similarly, in Odisha, community-driven projects have provided access to education and healthcare services, empowering women to lead healthier and more fulfilling lives. These initiatives demonstrate the significant role that local communities can play in uplifting and supporting women's advancement. They can participate in consultations, meetings, and discussions with decision-makers to ensure that the needs and perspectives of the community are considered. These women's SHGs play an important role in empowering local women and the adolescent girl child.

Commutation and Transportation

Commutation and transportation infrastructure emerged as significant topics of discussion, with participants sharing insights into the accessibility and reliability of transportation services in these areas. Challenges such as poor road conditions, limited public transportation options, and the impact of coal transportation on local traffic and safety were explored.

During FDGs in villages like Milupara, Sidpoki, and Murlidah, commutation challenges emerged as the prominent problem. Out of the 20 FGD's in 13 GGD's people raised the problem of lack of regular and frequent transport especially during the monsoon season where roads get frequently damaged due to passage of heavy coal loading dumper trucks. Many people also reported that they have taken loans (mostly from friends and family members) to purchase vehicles for commuting those who don't have access to funds, depend on bicycles, which, again cannot be used for long distances and hampers the opportunity for accessing facilities and services.

COAL PHASE-DOWN SHOULD INCLUDE COMPREHENSIVE PLANS TO PROVIDE ALTERNATIVE EMPLOYMENT OPPORTUNITIES AND ECONOMIC SUPPORT FOR MINORITIES AND VULNERABLE GROUPS, ENSURING THEY ARE NOT DISPROPORTIONATELY AFFECTED BY THE TRANSITION.

On the other hand, in villages like Balkhuda, and Ramgarh, the development of roads and connectivity in the post-mining era has benefited the communities. According to a mining manager at one unit of Balkudra Mines, a few years ago when coal mining was dominant in this locality, the communities were solely dependent on it for livelihood. However, only 10% of the population would be earning their livelihood out of coal mining. Now due to better connectivity through roads, and an increase in services by the government, better and easily accessible alternatives are available. This has led people to shift from coal mining to other alternative livelihood options.

Access to public services

Discussions centred on the availability and accessibility of public services such as education, water, sanitation, and electricity in these areas. Participants discussed the adequacy of existing infrastructure, the quality of services provided, and the challenges faced by communities in accessing essential public services.

Access to public services is poor in rural Raigarh villages like Milupara, Patalgaon, Baraud, Chhal, and Tamnar. During interviews local people reported that they face acute water shortage and there's hardly any proper and regular water supply in some parts of these towns. Additionally in rural Dhanbad towns like Bada Pandedih, Matigarh, Muralidih, and Tandabadi substantial size of the population was dependent on water tanks provided by coal mining companies for daily water needs. These trucks are operated by companies and are supposed to operate 3-4 days a week, but in most cases, they function 1-2 times in week, leading to severe water shortages in the region, which compels people to depend on open sources of water which in most cases remains contaminated. During the FGDs as well, it was found that many people raised the issue of water, and transport or commutation as major challenges.

During the interviews with local leaders, it was found that many families have abandoned the education of their daughters due to lack of proper transportation and communication.

Work and Living Conditions

The head of the Bhurkunda village Mr. Vijay Munda, informed that the village has a population of 7500 with 703 HHs , and is divided into 8 *tolas* (neighbourhoods). 70% of the population comprises of the STs. It is noteworthy that only 150-200 people residing in the village are working either at the Jindal Steel plant or nearby coal mines. This shows a pattern of significant decline in coal jobs both direct and indirect. 5% of the population of village comprises of migrant workers from other states. A large proportion of the population is dependent on seasonal employment and work as daily wage

workers on various construction reality of life in the coal bearing regions like Dhanbad. Involvement of a significant proportion of the population in mining coal illegally and selling into the markets constitutes as a major source of income for these people. Those who do not possess a stable livelihood, depend largely on this illegal coal economy for their income.

Wages, Welfare, and Government Support-Income and Wages Analysis

Minorities as studies have shown, lack equal access to education though it is a Constitutional Right. Lower levels of educational attainment, fewer resources to schools in areas where minorities live, and segregation of minority children from mainstream schools are some of pointers[26]. Marginalization of communities at first, limits the universe of opportunities available to these people; the relationship between education and livelihood is the holy grail for livelihoods after skills. Research suggests that rural HHs spend the most on primary education for their children[27]. However, ground realities indicate that lower educational attainment leads more individuals — especially those from marginalised backgrounds — to pursue employment in the coal sector. We see some categorical similarities for coal dependent districts and coal allied industrial districts.

In the year 2002, by 86th constitutional amendment inserted Article 21-A in the Constitution of India free and compulsory education of all children in the age group of six to fourteen years became a Fundamental Right. [28]. Educational attainment and livelihoods for tribal and rural people especially the coal communities can soften the blow from an inevitable transition. However, despite government's repeated assertions for the sustainable mining extraction and development of rural and tribal communities living near the vicinity of mining areas, implementable solutions have been hard to come by[29].

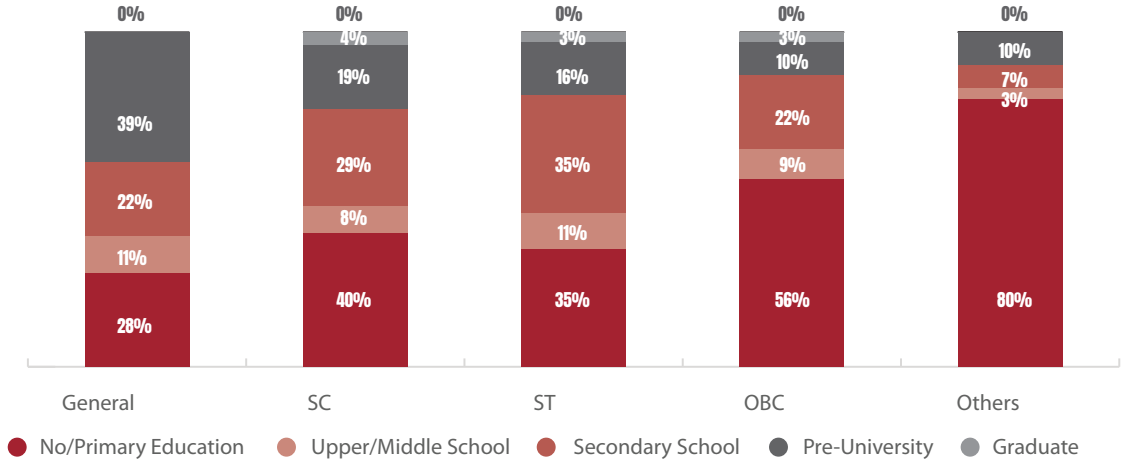
Perspective of the Study

The study's selection of three coal-producing and three coal-dependent districts for a just transition analysis is strategic for capturing the full spectrum of impacts and opportunities associated with the coal sector's transformation. According to the International Labour Organization (ILO)[30], understanding both production and dependence is crucial for designing inclusive policies that address employment, social, and economic implications. The Government of India's Ministry of Coal[31] highlights the need for a comprehensive approach that includes both types of districts to ensure a balanced and equitable transition, mitigating adverse effects on livelihoods and regional economies. Additionally, the World Bank emphasizes that diverse district selection helps in tailoring transition strategies that are context-specific, addressing unique local challenges and leveraging opportunities. This dual focus aligns with India's commitment to sustainable development and its goals under the Paris Agreement[32], ensuring no community is left behind in the shift towards cleaner energy sources. Furthermore, it allows for a comparative analysis of varied socio-economic dynamics, enhancing the robustness of policy recommendations[33].

Coal Producing Districts-

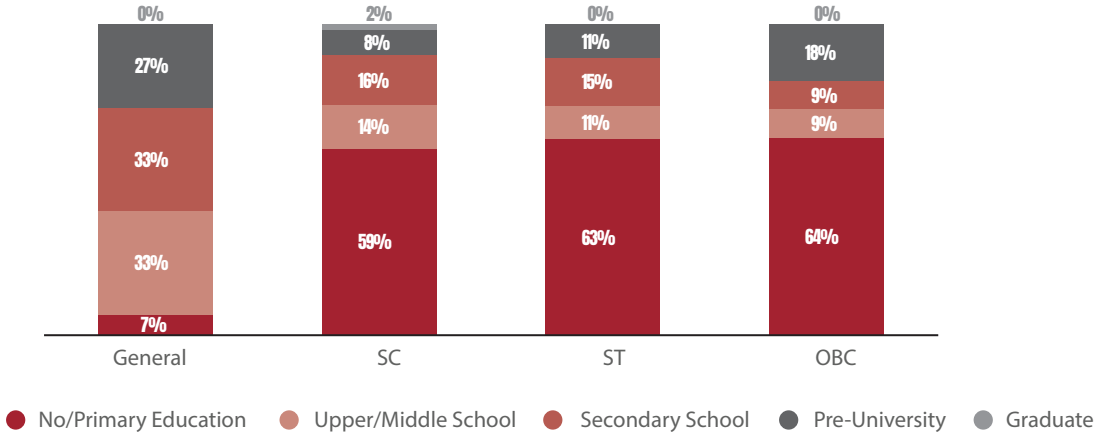
As in case of **Koriya** (40% OBC, 35% SC, 56% ST, 80% others) blighted by higher illiteracy or only primary education. A general pattern of lower levels of educational attainment is more prevalent among the marginalised groups al across the selected study areas.

Figure 9- Educational Attainment in Koriya



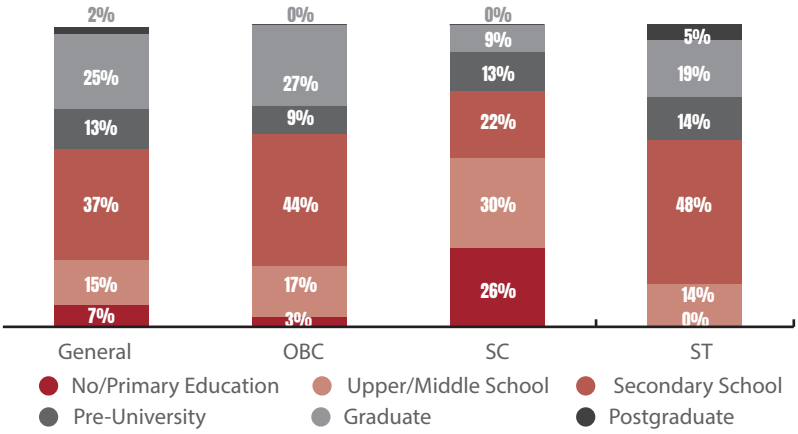
In **Dhanbad**, socially and economically backward sections of the community correspond with lesser educational attainments. For example, 35.53% of OBC, 18.27% for SC and 3.55% of ST have no/primary education. Inter-comparison of caste and education in coal districts has revealed that the equivalence of HH with no/primary education with the marginalised communities is higher.

Figure 10- Educational Attainment in Dhanbad



Angul also has a few similar characteristics compared to coal districts ---- SC and ST category of HH's reported lesser educational attainments. Only 9% OBC had completed pre-university level of education whereas 13% of HH belonging to the general category have completed pre-university level education. In Angul, OBC category of HH's fares much better for higher education compared to other sections of the communities in term of educational completion. Among all the categories SC recorded the highest (26%) no/primary education in the district.

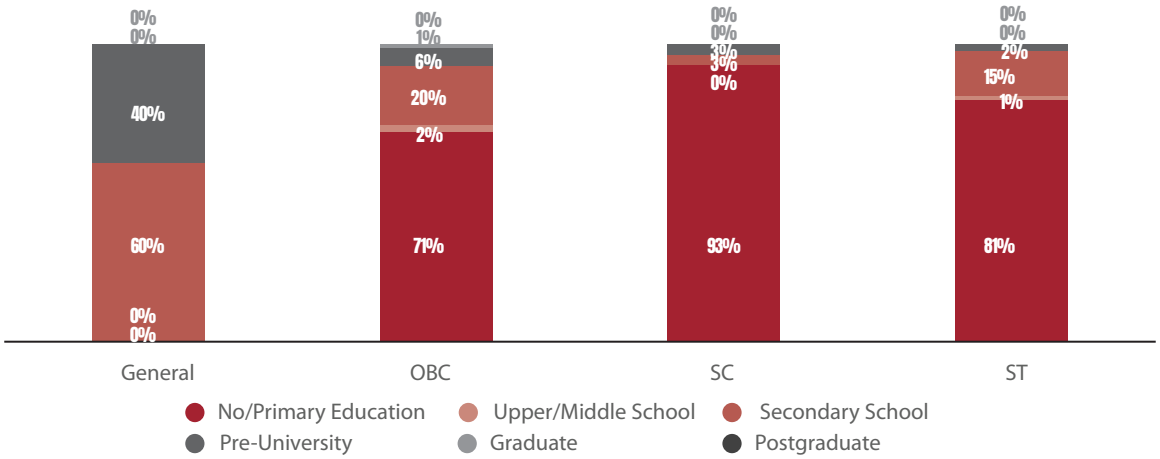
Figure 11- Educational Attainment in Angul



Coal Allied Districts

In **Ramgar**h respondents from the general caste category had no recorded primary school education, and the highest proportion of respondents had either a pre-university (40%) level education. In focused group discussions in Ramgarh, it came to light that lack of accessibility to public transport is also responsible for lower educational rates.

Figure 12- **Educational Attainment in Ramgarh**



The marginalised communities (SC and ST), have higher percentages of the population with no/primary education- SC (15%), ST (18%) communities. As far as **Raigarh** is concerned in the OBC category of HHs only 23% from the survey do not have any/primary education followed by 22% of the general category with no/primary education. Furthermore, proportion of HH with pre-university diploma or certificate is higher for all categories of population with highest among the others category (80%). Over 42% of HH falling under the OBC category have completed pre-university level of education for Raigarh. SC and ST communities face higher levels of educational disadvantage, with a larger proportion of HHs having no or only primary education compared to OBC and general categories.

The "others" category and a significant proportion of OBC HHs in Raigarh demonstrate relatively higher levels of attainment in pre-university education, indicating some success in educational advancement within these groups. In Raigarh, there are similarities in educational attainment levels between OBC and general category HHs , suggesting comparable access to education or socio-economic conditions.

Figure 13- **Educational Attainment in Raigarh**

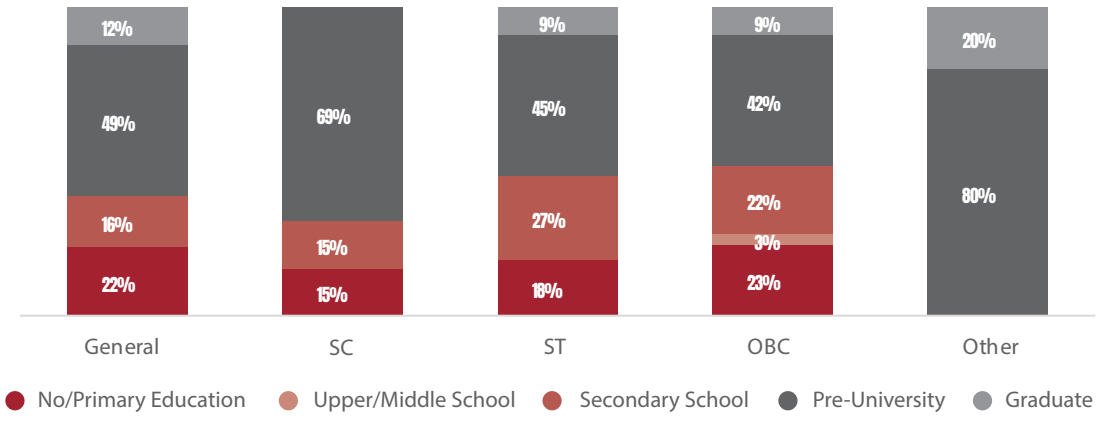
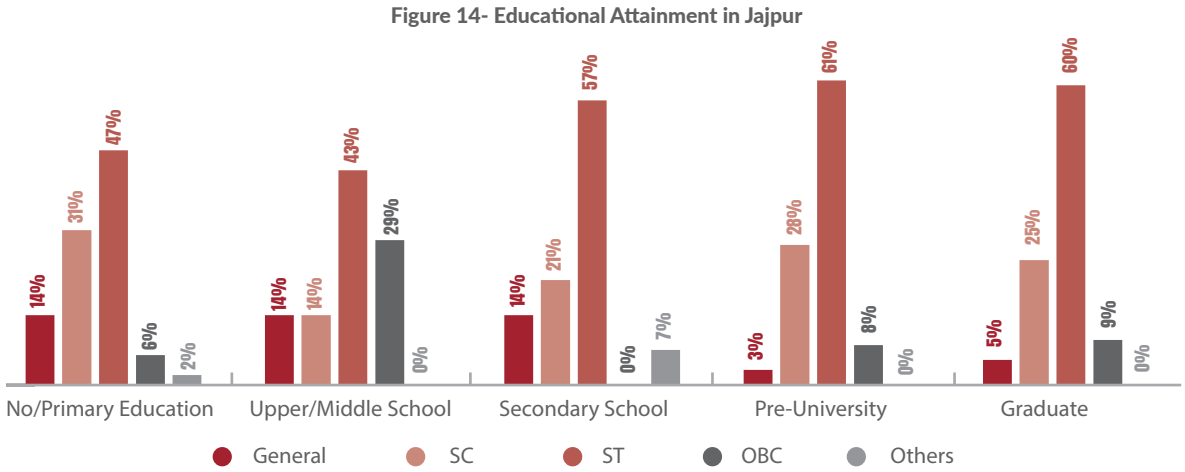


Figure 14- Educational Attainment in Jajpur



In Jajpur, ST (47%) has recorded highest percentage of no or primary education, followed by SC (31%). OBC had highest percentage (29%) of Upper or middle school amongst all other categories. SC have a lower percentage (31%) of individuals with no or primary education compared to ST. Similar to the ST community, SC individuals also face challenges in accessing quality education. Discrimination, economic disparities, and social marginalization might be some of the factors contributing to this statistic. Efforts to promote inclusive education and provide support to SC students could help address this gap. It's still noteworthy that a significant portion of the SC population falls into this category. Among all other categories, OBCs have the highest percentage (29%) of individuals with upper or middle school education. This suggests that a relatively higher proportion of the OBC population in Jajpur has attained education beyond the primary level compared to ST and SC populations.

Inter-comparison of Occupation with Caste

Coal Producing Districts

In addition to analyzing the impact of caste on educational outcomes across six districts, our investigation delved into the occupational distribution along caste lines within each district. This dual perspective sheds light on socio-economic dynamics. Consistently across coal and non-coal districts, disparities in educational attainment were evident among different caste groups, particularly among Scheduled Tribes (ST) and Scheduled Castes (SC). These communities exhibited higher percentages of individuals with limited education, reflecting systemic barriers to access and quality. Conversely, Other Backward Classes (OBC) in certain districts displayed comparatively better educational attainment, indicating varying levels of access and opportunities among caste groups. This similarity in educational disparities across coal and non-coal districts underscores the entrenched nature of socio-economic challenges affecting marginalised communities regardless of regional economic specialization. Such insights highlight the need for comprehensive policies addressing both educational and occupational inequalities to foster inclusive development across diverse districts.

Consistently across coal and non-coal districts, disparities in educational attainment were evident among different caste groups, particularly among Scheduled Tribes (ST) and Scheduled Castes (SC).

In coal-dependent districts Koriya, for example, there is a high prevalence of SC, ST, OBC, and other marginalised communities in both coal and non-coal areas when compared to the General population; individuals from general castes only represented 3% coal and 5% from non-coal sector. Significant engagement of marginalised communities in coal sector occupations-ST-5%, SC-8%, OBC-22%, and others-4% totaling to 39% of the total surveyed population was seen. Similarly, in Dhanbad, marginalised communities engaged in coal sector jobs are much higher, as compared to the general category population. For instance, the percentages of SC-13.20%, ST-2.54%, and OBC-26.40%, totaling 42.14% are much higher compared to 7.11% of the general caste engaged in coal activities.

Figure 15- **Occupational Profile- Koriya**

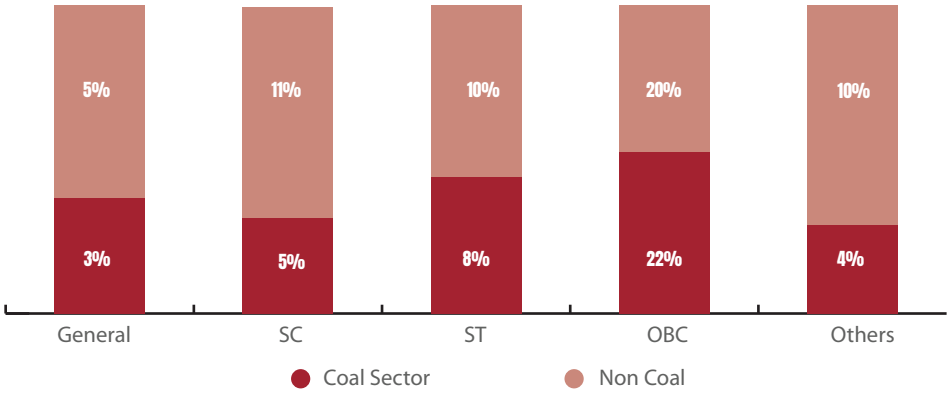
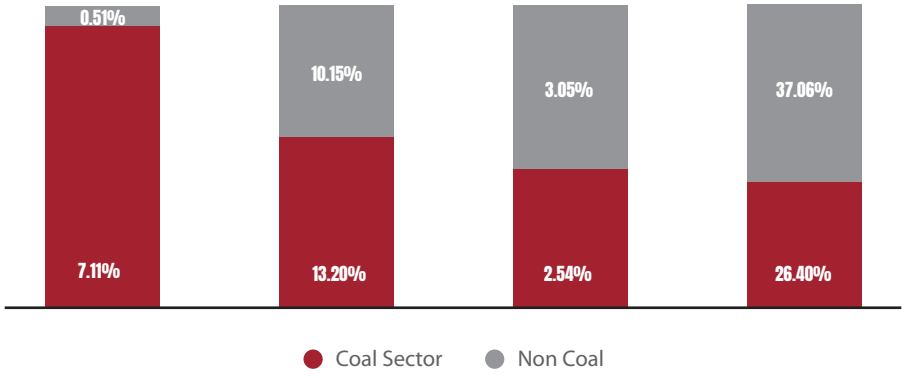


Figure 16- **Occupational Profile- Dhanbad**



Coal Allied Districts

In Ramgarh, all the 2.44% of the surveyed population from General Caste individuals, were involved in non-coal related work. The vast majority of those surveyed came from SC, ST, and OBC backgrounds, with the latter two categories forming the largest group. As such, — Koriya, Dhanbad, and Ramgarh — represent a repeated trend in which marginalised groups are involved in both the coal sector and in occupations surrounding and supporting the larger coal economy.

In Raigarh most individuals surveyed come from OBC backgrounds; 27.64% of OBC worked in the coal sector, while 33.17% of OBC worked in non-coal areas.

Figure 17- **Occupational Profile- Raigarh**

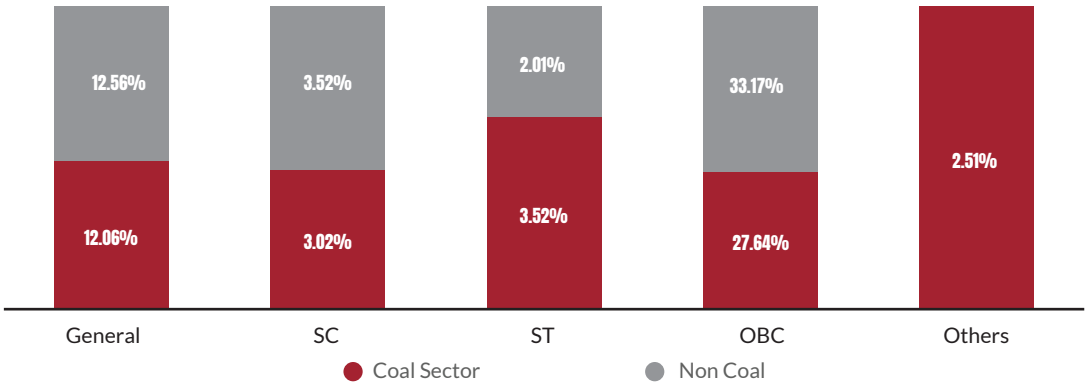
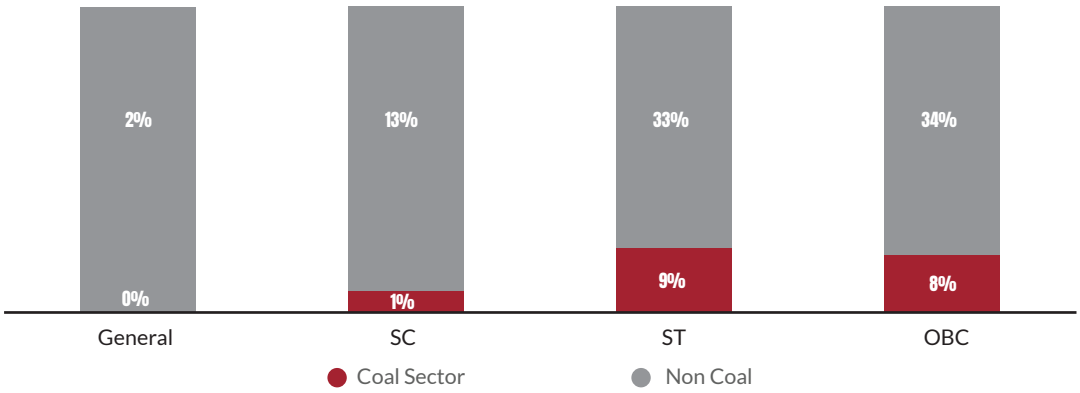


Figure 18- **Occupational Profile- Ramgarh**



These findings underscore a recurring trend wherein marginalised groups, including SC, ST, and OBC communities, are integral to the functioning of the coal sector and its associated industries across various districts. This points to the intertwined nature of socio-economic structures, where marginalised groups often find themselves disproportionately represented in both the primary industry and its peripheral support sectors. Such insights necessitate nuanced policy interventions that address not only the challenges within the coal sector but also the broader socio-economic disparities faced by marginalised communities across different regions.

In Jajpur, we see higher representation in coal and non-coal areas from both SC and ST groups; 22% of those surveyed in Jajpur came from SC backgrounds and worked in non-coal areas, and 32% of those surveyed came from ST backgrounds and worked in non-coal areas interestingly, that trend is repeated in Raigarh as well, despite it not being considered a coal district. In Jajpur on the other hand, we see that the coal sector is clearly a very small portion of all represented occupations, and that most respondents — across all caste backgrounds — do not work in the coal sector. Moreover, we see that the OBC community tends to comprise a smaller percentage of the population in comparison to SC and ST groups.

Angul is the district that differs the most from the others. Here, the majority of the survey respondents are from general caste backgrounds, and the area's coal employment greatly exceeds its non-coal employment. Additionally, we see that 29% of respondents who work in the coal sector are from a general caste background. Out of all survey participants belonging to the general caste category, 14% are employed in non-coal areas. OBC respondents make up the second-largest group polled in the area; 28% of respondents in this category work in the coal industry, whereas 8% do non-coal related jobs.

Compared to other districts, Angul and Jajpur — A higher percentage of the population are graduates and post-graduates. Angul also happens to be the district with the highest average wage (see below for further analysis). Angul's high average income comes in the form of monthly salaries rather than daily wages although the majority of individuals are involved in coal-based occupations.

Figure 19- Occupational Profile- Angul

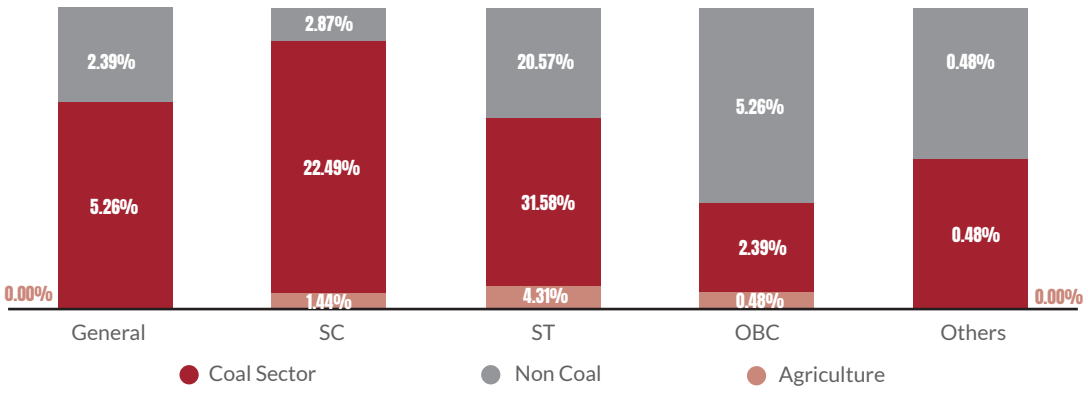
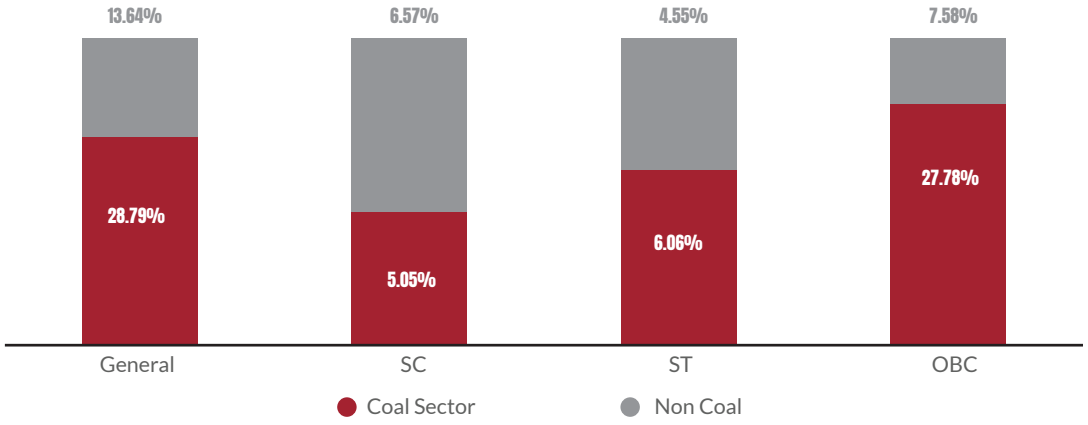


Figure 20- Occupational Profile- Jajpur



Average Wage Analysis

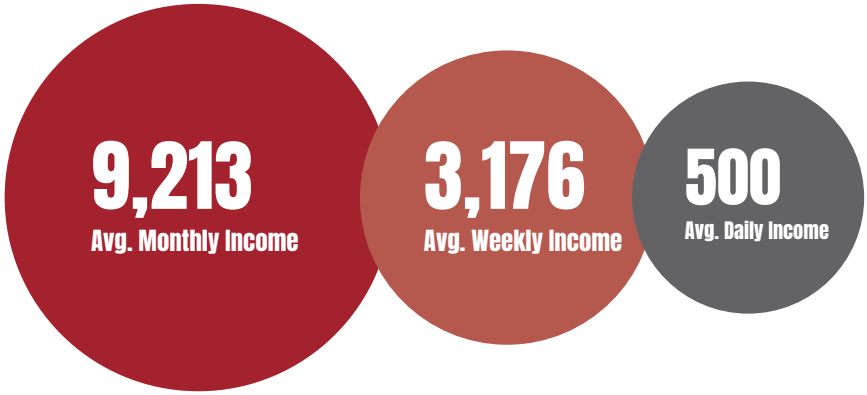
We conducted an analysis of average monthly, weekly, and daily incomes in all six districts. In some districts (i.e. Jajpur, Angul, Raigarh), respondents reported incomes almost entirely on a monthly basis. In other districts (i.e. Dhanbad, Ramgarh), incomes were predominantly reported in the form of daily wages. The graphs below depict the average monthly, weekly, and daily wage per district alongside the number of respondents that reported income in those forms.

Coal Producing Districts

Koriya

Secondary research, FGD consultations, survey, and field visits indicates that there is very little presence of industrial units or establishments in the district. Economic migration and marginal living with very limited livelihood options are the main socio-economic characteristics of the district. The district of Koriya is viewed as the most vulnerable to coal transition due to the presence of a high number of underground mines.

Figure 21- **Average Monthly Income - Koriya**



The two most significant technical parameters of the closure of mines are 1) if production falls below one MT 2 and) if increasing depths of the underground mines mining becomes cumbersome. Major mines in Koriya such as Haldibari NCPH R6 New, Katkone 1&2, West JKD, and Bartunga Hill, currently have production of less than one MT per annum. Out of the total 52 mines, 28 mines in the state are underground (UG) mines. It must be noted that UG is the first in line for closure on technical grounds such as increasing temperatures due to the depth of the mines, health issues of workers, and falling production. Hence, in terms of vulnerability, Koriya district PRESENTS A BIGGER CHALLENGE risk in the future. The level of vulnerability in Koriya can be further assessed by HH living and earning near the coalmines, for example, average incomes.

In Koriya, the majority of respondents (176/201) reported earning weekly wages, with an average of Rs. 3,176. Interestingly, in addition to being the only district in which the majority of respondents reported earning on a weekly basis, none of the respondents in Koriya reported earning a regular salary. However, among all the districts, Koriya had the highest rate of respondents who reported awareness of

job training schemes; 85.07% of respondents were aware of such training opportunities, while only 2.49% had actually received them. The disparity between job training awareness and availability is evidenced in all six districts but is perhaps most staggering in Koriya. The chart above shows the average income on monthly, weekly and daily basis where, for Koriya, Rs 500 is the daily average wage and Rs 3,176 is the average weekly wage and Rs 9,213 is the average monthly income mostly for salaried HH's as per the survey. The biggest challenge for people with primary school education is that it immediately disqualifies them for skill training and up-skilling under central and state-level schemes.

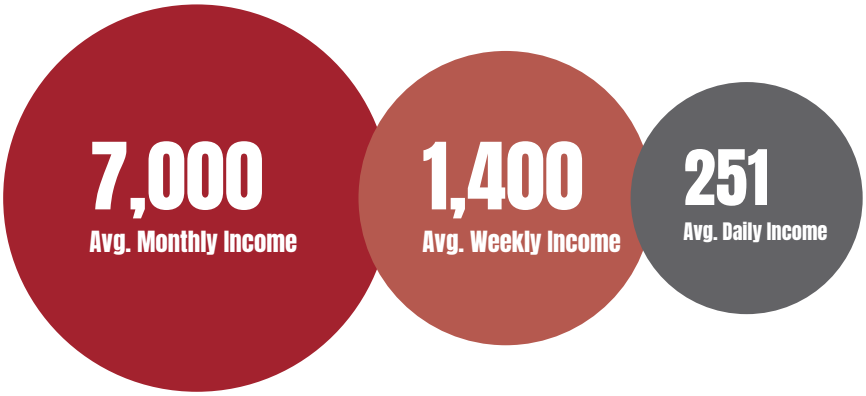
One of the important features of the workforce in Koriya is informality and casual work where livelihoods mostly come from agriculture, mining, mining-related business activities, and other daily wage-related work.

Coal transition for Koriya will lead to massive changes in the socio-economic conditions of the majority of people given the fact that coal mining forms a core part of the local economy and the limited scope of opportunities for earning a livelihood due to poor industry and agriculture given the poor industrial profile of the district as a whole where 81% of agriculture is dependent on rains with only 6.1% being irrigated. , options for livelihood are scarce for a majority of the population.

Dhanbad

Dhanbad is one of the few districts where coal mining has been active for more than a century, in comparison with other districts of our study such as Raigarh or Angul, which have relatively shorter mining histories. Mining has a strong bearing on the current and future generations in terms of health, livelihoods, access to basic rights, compensation for land acquired, education, and skills along with other key socio-economic indicators applicable to mining areas.

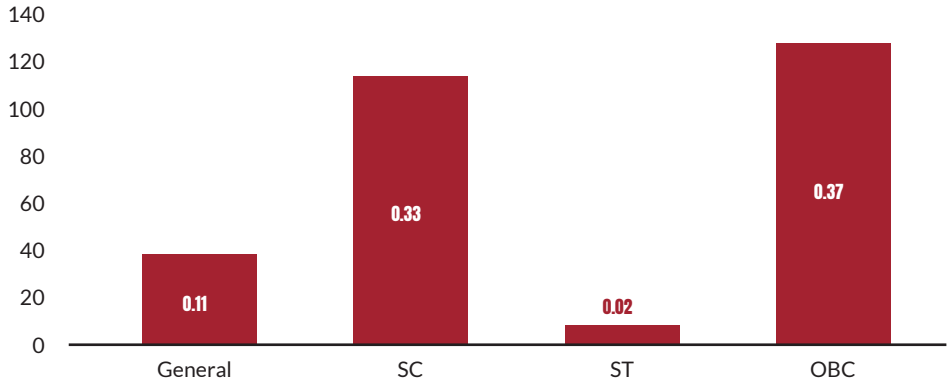
Figure 22- Average Monthly Income - Dhanbad



The chart below shows the average income on a monthly, weekly, and daily basis where, for Dhanbad, Rs 251 is the daily average wage, Rs 1,400 is the average weekly wage and Rs 7,500 is the average monthly income mostly for salaried HH's as per the survey. The chart below shows, that 125 HH from the OBC community has an average holding of 0.37 acres. Similarly, 15 HH belonging to the general category hold an average land of 0.11 acres. Like in other districts, very few respondents (3.05%) availed of these opportunities. Furthermore, the land holding in Dhanbad is also smaller on an average. 0.11-0.37 acres of land is the most common size of land holding in the district and nearly 125 HH from OBC community reported to have largest share in holding pattern out of 200 HH surveyed.

The socio-economic variables at play in Dhanbad district are different from other districts of our study in the sense that coal in Dhanbad is at the centre of livelihoods. Coal mines directly provide livelihoods to a major chunk of the population from subsistence level to lower-middle level income from coal through direct engagement. The level of direct engagement with coal and some alternative sources of (occasional) livelihoods is high in the form of coal picking or coal scavenging, coal for fuel, and according to various studies, the number of people dependent on illegal coal picking is more than half a million[34]. In Dhanbad alone, at least 2,000[35] registered enterprises and hundreds of unregistered units will be affected . Labelled, as the coal capital of India, coal and allied industries are dotted across the district providing livelihoods to lakhs of people posing a direct challenge to a just transition for the communities and environment.

Figure 23- **Caste-wise Land Holding & Land Size , Dhanbad**



Coal allied occupations have a strong bearing on socio-economy because the entire mining mechanism from excavation to dispatch (mines and dump yards) including transport, mechanical works, businesses, and commercial units derives income through the movement of coal and coal-related activities. In terms of indirect engagement with coal, the strong presence of nearly 1400 industrial units and nearly 214 TPPs surrounding the district---the level of job creation, and financial flows are the key lifelines for many people and a vital economic base for the district economy as a whole.

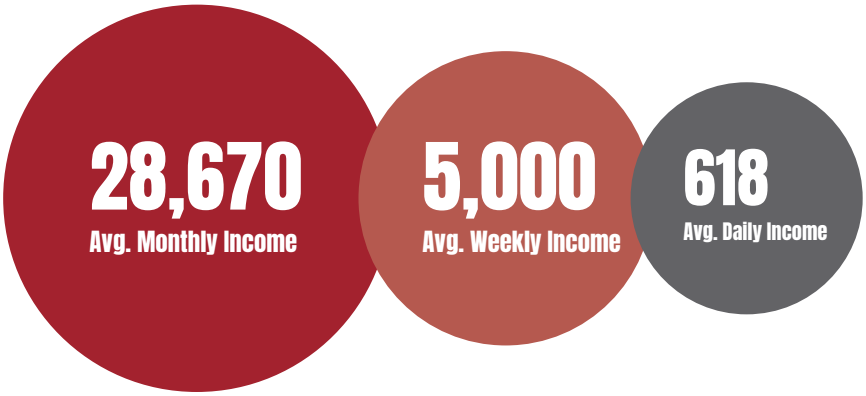
Angul

In Angul, many survey respondents (191/198) reported monthly salaries, with an average salary of approximately Rs. 28,670. Unlike Jajpur, most respondents in Angul (71.21%) actually reported having a regular salary.

In comparison with average income of coal districts, such as Koriya, where average daily wage is Rs 500, in Angul it is Rs 618. Furthermore, Angul, has higher wages compared to Koriya (INR 5,000 and Rs 3172 respectively).

Land ownership in Angul also exhibits a relatively equitable distribution across different community groups. Out of 84 HHs , the average landholding size is 0.63 acres. Among Scheduled Castes (SC), 25 HHs average 0.44 acres, while 21 Scheduled Tribe (ST) HHs average 0.70 acres. The Other Backward Classes (OBC) group, with 68 HHs , has an average landholding size of 0.53 acres. This contrasts with districts like Ramgarh, where marginalised communities hold significantly less land. In Jajpur and Angul, however, the distribution of land is more balanced, suggesting a less pronounced inequality among different caste groups. This equitable distribution and higher wage levels contribute to Angul's relatively better economic status.

Figure 24- **Average Monthly Income - Angul**

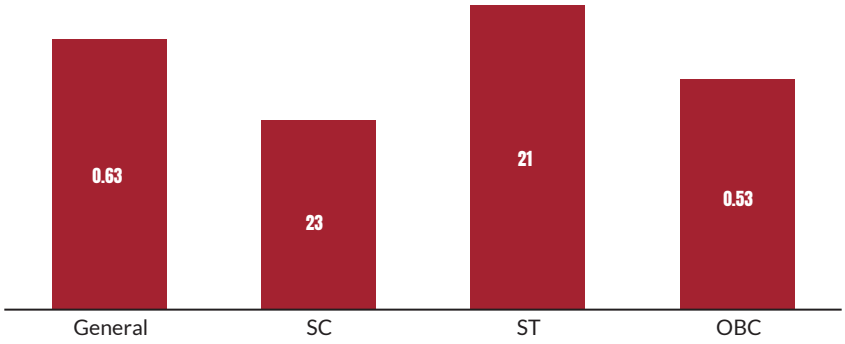


The presence of huge reserves of essential minerals and metals such as coal, iron ore, and bauxite boosted the socio-economic profile of the district. This led to the development of a strong industrial base which serves as the primary avenue for livelihoods-household survey revealed that 49% are coal allied workers occupation which is mainly a resultant factor of industrial activity and other related economic activity.

Angul reported total coal production of 96.7 million tonnes (MMT) for 2020-21, and production is expected to reach 38.8 million tonnes over the next 10 years with the operationalization of all proposed coalmines. The total number of workers in coal mines and coal-dependent industries is expected to double in the next decade.

The Odisha Economic Survey[36], a report by the state government of Odisha indicates that the coal industry directly employs 21,670 workers. These could be coal miners, coal-fired power plants, coal refineries, and other coal-dependent industries such as steel and aluminum[37]. The interconnectedness of incomes and expenditure and its multiplier effect in essence is the broader concept of derived economy as in the case of Angul, given the rich resource base and pursuant economic activity. These occupations mainly run on mining, industry, and allied activities and any major shift in its base, will in effect hurt incomes and expenditures. Mining generates different categories of employment including unskilled or semi-skilled labor[38]. Therefore, the cumulative multiplier effect of cumulative monthly incomes and expenditures primarily generated from industrial and mining activity is huge and supports the large size of the local economy. The primary economic flows stemming from these activities nurture downward economic activity in terms of generating livelihoods, incomes, and expenditures.

Figure 25- Caste-wise Land Holding & Land Size, Angul

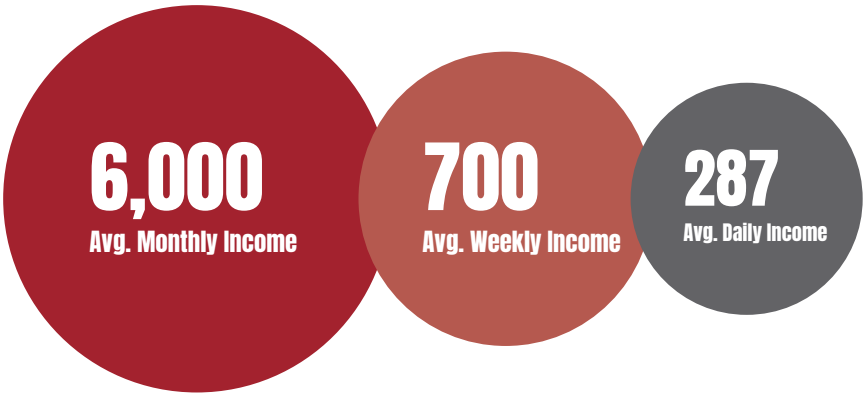


Coal Allied Districts

Ramgarh.

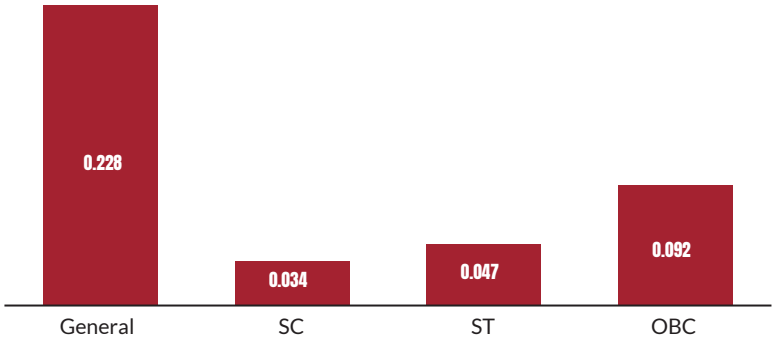
In Ramgarh, most respondents (199/203) reported earning daily wages, with an average daily wage of Rs. 287. Interestingly, in Ramgarh, we see the highest rate of respondents with a regular salary, with 85.85% reporting a regular wage. However, Ramgarh is the district with the lowest rate of training awareness; only 1.56% of all respondents were aware of training opportunities. Among the two daily-wage districts, Ramgarh had higher average wages in comparison to Dhanbad (Rs. 287 vs. 251). The salary regularity (85.85% vs. 38.58%) corresponded with an increase in average wages among the monthly districts. The difference, however, is not quite substantial; the two districts did not report the highest average daily wages among all the 6 districts surveyed. In terms of alternate livelihood and agriculture, the survey revealed that in Ramgarh, the average land holding size ranges between 0.22 to 0.090 acres. However, the marginalised communities belonging to SC, ST, and OBC have the largest number of land holdings.

Figure 26- Average Monthly Income - Ramgarh



A large section of the population in the Ramgarh district works in agriculture and other related industries. According to a study conducted by Gupta and Singh (2020), around 76% of HHs in the area rely on agriculture for their livelihood. Ramgarh is one of the districts where coal mining is centuries old and, in many blocks, mines are closed. People around abandoned mines are struggling to find sustainable livelihood sources, and thus have started micro and small-scale units to generate income. These industries/units include brickmaking, food processing, and handicrafts[39]. The data from 2020 (Gupta and Singh) found that around 29% of HHs in the area engage in livestock-rearing activities. The livestock reared in the region include cows, buffaloes, goats, and sheep[40] . A study by Saha and Chakraborty (2019) highlights the importance of forest-based livelihoods for the tribal communities[41] in Jharkhand state. The district has a good presence of forest economy, and many people are dependent on it for their livelihoods. These include a collection of non-timber forest products such as fruits, nuts, and medicinal plants, and the sale of timber and firewood. The collapse of the coal mining industry has forced many to look for other sources of income and has led to increased migration. The state of Jharkhand has experienced significant out-migration because its unemployment rate is higher than the national average, according to a report by the Centre for Monitoring Indian Economy (2020).

Figure 27- **Caste-wise Land Holding & Land Size , Ramgarh**

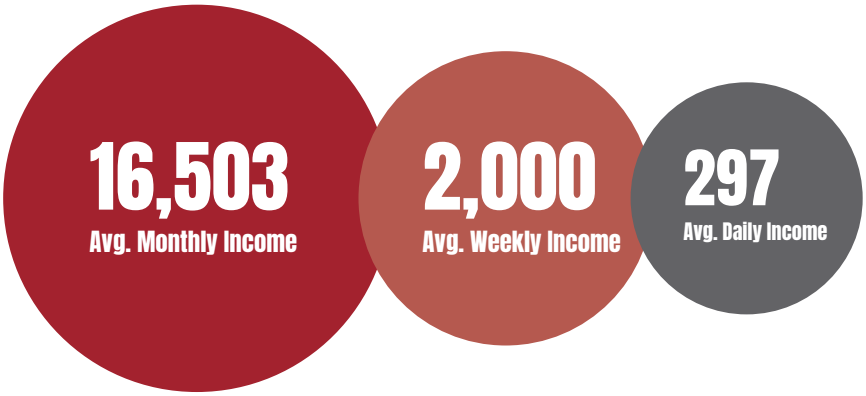


Raigarh

In Raigarh, the majority of survey respondents (150/199) reported monthly salaries, with an average salary of approximately Rs. 16,503. 27.14% of respondents reported having a regular salary, while 48.24% reported being aware of job training schemes. The level of vulnerability in Raigarh can be further assessed by HH living and earning near the coalmines, for example, the average wages.

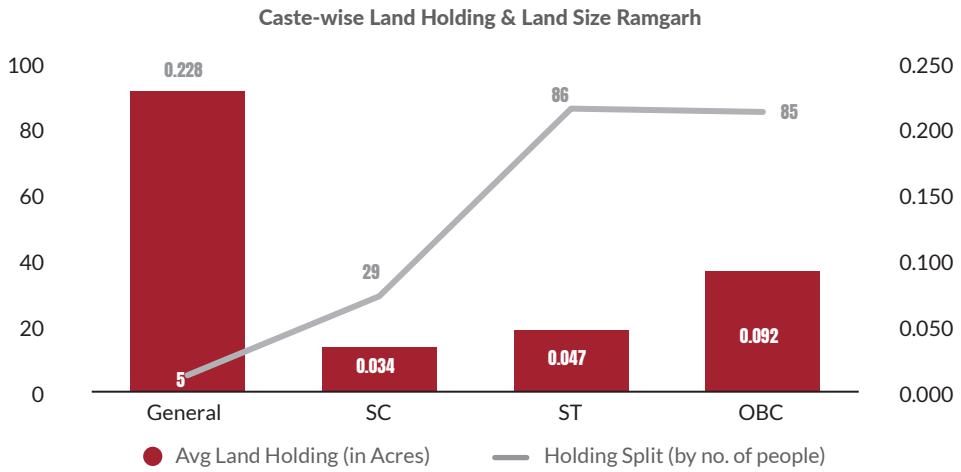
The coal economy of Raigarh is fragmented between informality, high dependence on coal-dependent jobs, and a relatively poor educational structure. The strong industrial profile with more than 450 industrial units, but poor agriculture and low educational attainments give some for protecting the vast workforce of the direct.

Figure 28- **Average Monthly Income Raigarh**



The chart on the below depicts the caste-wise lands holding pattern of Raigarh survey blocks and towns. The average size of the land holding within each sub-caste category is relatively equal and the marginalised communities have a larger size of average agricultural lands. Unlike Ramgarh, where, the majority of the marginalised communities have smaller size of agricultural land compared to the general category of HH surveyed. Agriculture and work occupations have emerged as the 2 vital sources of livelihood for people. In this light, it must be noted that policy interventions must aim to limit the adverse impact of the coal transition in the coming years encapsulating four pivotal factors- socioeconomic, demographic, ecological, and human capital. For example, the restoration of damaged ecologies in coal towns post-mining must impart its benefits on agriculture in terms of increasing livelihood opportunities or and consequently industry-oriented training and skilling programs in line with industry demand.

Figure 29- Caste-wise Land Holding & Land Size, Raigarh

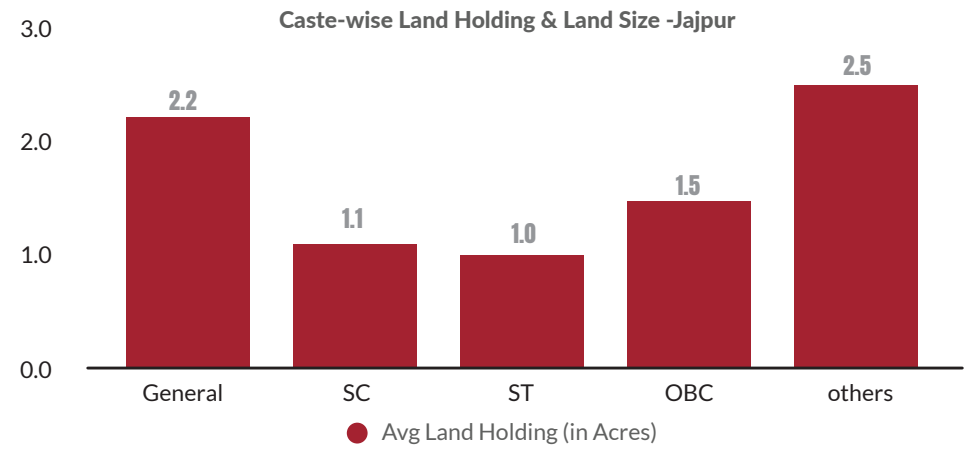


Jajpur

In Jajpur, most survey respondents (192/209) reported monthly salaries, with an average salary of approximately Rs. 10,882. The district has fertile land. Besides agricultural activities, mining (non-coal) activities constitute the mainstay of livelihood of the people of the district. The district has several urban areas, including the town of Jajpur, which is the district headquarters. Other important towns in the district include Dharmasala, Korei, and Vyasanaga which are home to several small and large-scale industries and contribute significantly to the economy of the district.

With a solid bedrock of natural resources such as chromium, iron ore, and quartz, fertile soil, and a strong hydrological background, the district's economic prospects are strong with a wide range of diverse livelihoods options such as industry, manufacturing, agriculture, and mining-related occupations. The chart on the left-hand side shows caste-wise land holding and land size for all HHs. The general category of workers holds an average land of 2.2 acres, SC 1.1 acre, ST 1 acre, OBC 1.5 acres, and HH belonging to other category hold an average land of 2.5 acres.

Figure 30- Caste-wise Land Holding & Land Size, Jajpur



Access to Basic Services

Our survey in 6 districts revealed that majority of the HHs have no access to basic welfare and economic schemes. Koriya reported least access to any of the major policies and schemes of the government. During the survey to assess the vulnerability of the communities in the coal towns vis a vis, five key schemes, namely, pension scheme, skill training, toilets construction MGNREGA and any housing scheme, over 90% of the respondents, in the 6 districts, though aware, reported to have no access to any such schemes.

the coal towns vis a vis, five key schemes, namely, pension scheme, skill training, toilets construction MGNREGA and any housing scheme, over 90% of the respondents, in the 6 districts, though aware, reported to have no access to any such schemes.

To understand and measure the vulnerability of senior aged tribal population in the survey area, pension scheme was an indicator. Similarly, HHs were asked about access to training and skill development programs to assess the livelihoods of most of the informal workers in the wake of the coal transition. The above chart shows the state of accessibility of major public schemes and programs in coal-dependent districts. After Koriya, HHs in Ramgarh and Dhanbad have reported the least access to major schemes. The chart below focuses on coal-allied districts which have shown a little higher education and wage rates in comparison with coal districts. In terms of accessibility HH from Angul district reported the lowest access followed by Raigarh and Jajpur. Alternative livelihood, skill, and training including MGNREGA, are some of the pivotal issues attached to communities.

Except for toilet construction under the Swaccha Bharat scheme, all HH reported the least accessibility for all other schemes which is a grave concern in the light of the upcoming coal transition.

Districts	PM Awaas Yojna		MGNREGA		Swaccha Bharat		Skill Training		Pension	
	Not Availed	Aware	Not Availed	Aware	Not Availed	Aware	Not Availed	Aware	Not Availed	Aware
Koriya	98%	92%	97%	87%	62%	95%	98%	82%	96%	78%
Dhanbad	89%	95%	80%	98%	60%	78%	97%	48%	54%	74%
Angul	83%	98%	99%	57%	71%	90%	99%	13%	99%	57%
Jajpur	85%	38%	100%	50%	22%	81%	100%	39%	83%	22%
Raigarh	82%	78%	84%	59%	67%	74%	83%	42%	82%	44%
Ramgarh	81%	72%	81%	24%	85%	18%	100%	12%	95%	60%

The chart illustrates the level of public awareness and accessibility to key government schemes in three coal-dependent districts: Koriya, Ramgarh, and Dhanbad. The five schemes examined are PM Awaas Yojana, MGNREGA, Toilets in Swachha Bharat Program, Skill Training, and any Pension schemes.

General Observations

- **High Awareness, Low Access:** There is a significant gap between awareness and actual access to the schemes. Most HHs are aware of the schemes but still do not avail themselves of the benefits.

- **Scheme-Specific Disparities:** The Toilets in Swachha Bharat Program has relatively better accessibility compared to other schemes, indicating some success in sanitation efforts. However, other critical schemes like MGNREGA and Skill Training exhibit very high non-availment rates.

low educational backgrounds, poor housing conditions, and high yearly medical expenses can be viewed as more vulnerable to coal transition

Implications

- **Vulnerability of Populations:** The high non-availment rates across all districts, especially for pension schemes, highlight the vulnerability of senior-aged and tribal populations who lack social security. Similarly, the lack of access to skill training programs undermines the livelihood prospects of informal workers.
- **Ineffective Implementation:** The data suggests that while awareness campaigns may be effective, there are significant barriers in scheme implementation and accessibility, possibly due to bureaucratic hurdles, lack of infrastructure, or misinformation.

Government of India References

- **National Social Assistance Programme (NSAP):** Managed by the Ministry of Rural Development, this program aims to provide social assistance but is evidently not reaching the target populations effectively.
- **MGNREGA:** Designed to provide 100 days of wage employment, but the survey shows low actual utilization.
- **Skill India Mission:** Aims to train millions by 2022, yet the survey indicates that vulnerable communities are not benefiting as intended.
- **Swachh Bharat Mission:** Shows better implementation in toilet construction, highlighting a relative success compared to other schemes.

The survey data, combined with the chart, reveals a critical disconnect between awareness and accessibility of government welfare schemes in coal-dependent districts. This gap indicates the need for enhanced implementation strategies to ensure these schemes effectively reach and benefit the intended populations, particularly in light of the upcoming coal transition which demands robust support for alternative livelihoods and social security measures.

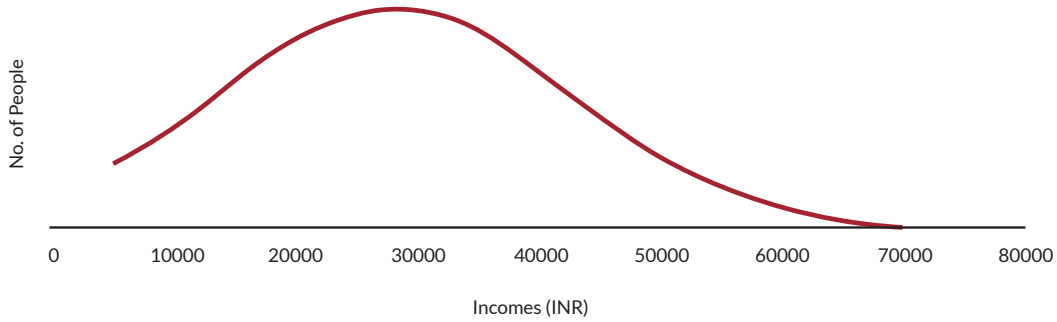
Outliers!!

Angul - The Highest Coal Producer

- Nearly 67% of HHs are engaged in coal sector jobs.
- 23% being graduates, while 12% completed a diploma/pre-university level education.
- Angul has the highest monthly total and monthly average incomes for both coal and non- coal sectors.
- Nearly 70% HH have uncultivated lands.
- 7% of the total HH have primary or no education.
- 35% reported having no written contract for jobs.

Income distribution for Angul shows a common pattern where larger size of smaller incomes is clustered between the narrow ranges with peak of around INR 30,000 thousand per month.

Figure 31- **Income (INR) Distribution Curve: Angul**



The income levels range from 0 to 70,000, with the majority of the population earning between 10,000 and 40,000.

The highest number of people falls within the income range of 30,000 to 35,000. This indicates that the median income level is around this range, suggesting a central tendency where most people earn this amount. The Left Side of the Curve indicates that there is a steep rise in the number of people as income increases from 0 to 30,000, indicating a lower proportion of people with very low incomes. While, the Right Side of the Curve shows a gradual decline in the number of people as income increases beyond 35,000, indicating fewer people with high incomes. The tail on the right side extends towards 70,000, showing a smaller but significant number of high-income earners, albeit a steep drop after 40,000.

Figure 32- Box and Wiskers for Coal and Non Coal Income

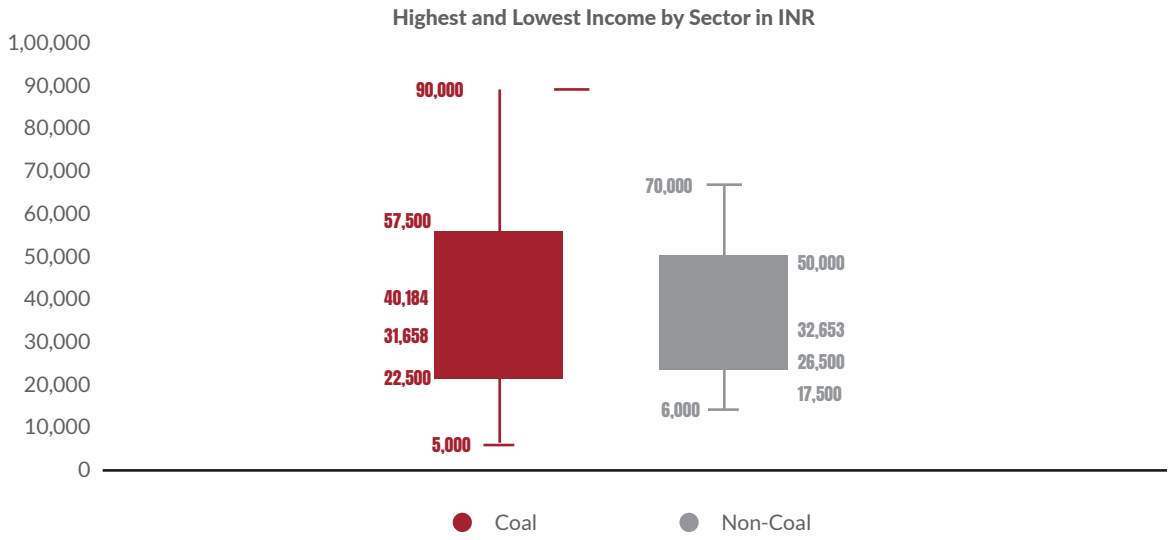


Figure 33- Job Types in Angul

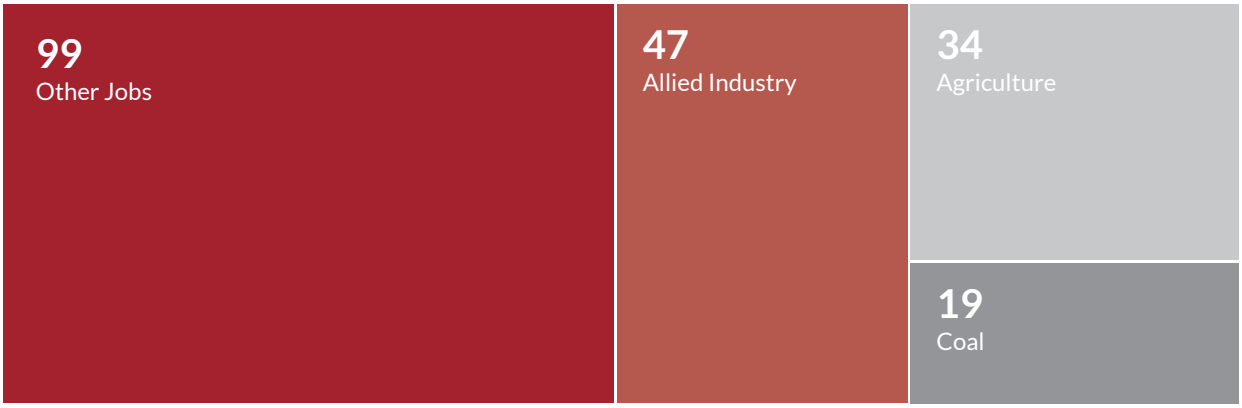
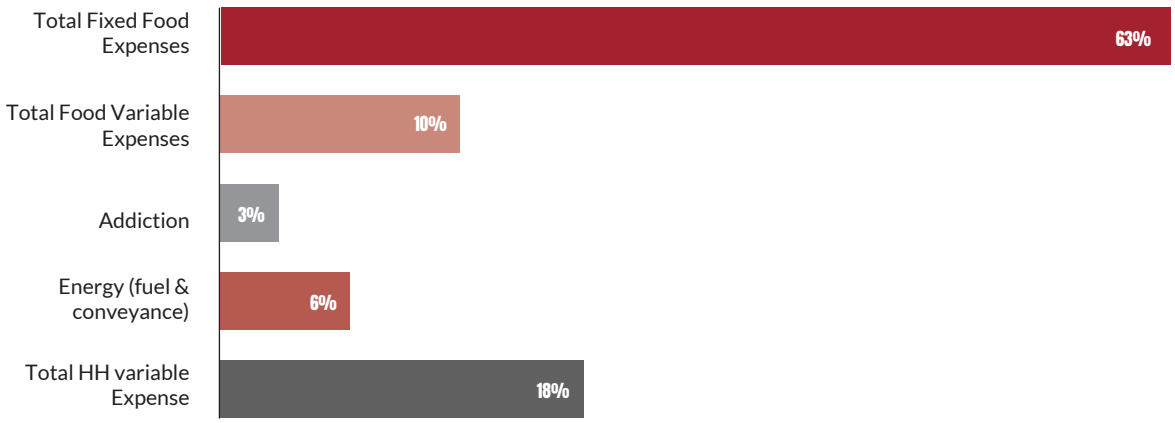


Figure 34- Expenditure by Category : Monthly



Furthermore, if total incomes are divided into coal and non-coal, it also shows stark differences between highest and lowest incomes recorded for coal and non-coal sectors occupations. For coal sector incomes, highest income recorded is INR 90,000 whereas for non-coal occupations, highest income is 70,000 per month. A line in the box represents the median or the mid-point of the data and lowest HH income recorded were INR 5,000 and 6,000 for coal and non-coal sector incomes respectively.

Incomes and Expenditure by Occupations - Given the agro-industrial background of the district- heavy coal mining and ensuing industries, the proportion of income from coal sector emerged higher (31,088 INR) from the survey, followed by 26,457 INR in the non-coal sector.

Additionally, a good proportion of respondents (17%) were from an agricultural background, which will perhaps cushion them from the impact of the coal transition immediately. The major livelihood threat looms large on coal sector jobs. The average monthly incomes and expenditure patterns reflects the composition of the district economy, where a major chunk of the income comes from non-coal sector (mainly induced or coal allied) work occupations- which accounts for 67%. Whereas the share of the coal sector in income and expenditures is 33%. In terms of values, Angul is the one district with the highest level of monthly income as well as literacy among all 6 districts.

Figure 35- Monthly Incomes and Expenditures

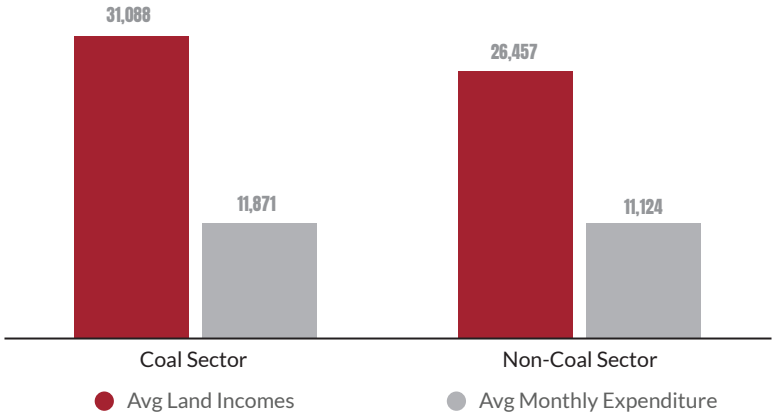
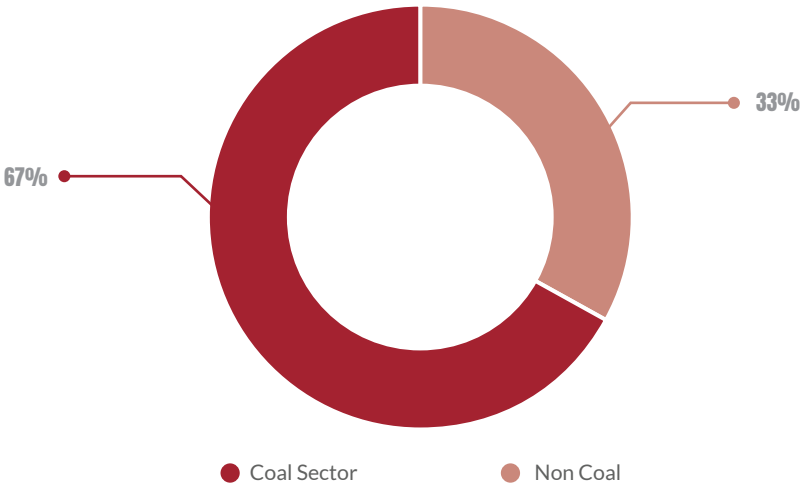


Figure 36- Workers Occupation Profile



Proximity from the Coal Assets and Key Characteristics of Workers

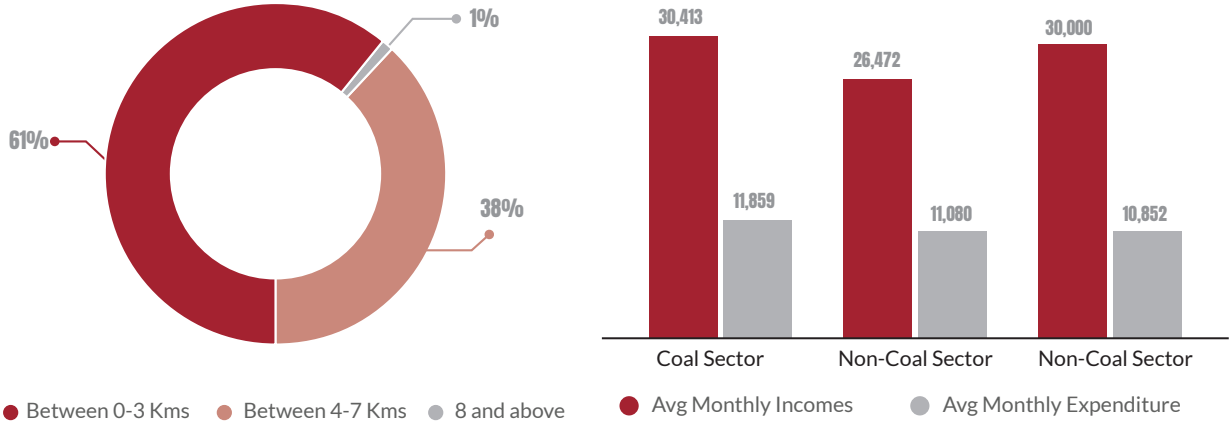
In Angul, as the share of coal jobs is higher, the policy attention must sharply address the emerging issues surrounding the coal-dependent economy.

The pie chart on the left-hand below and the bar graph on the right-hand below, indicate that the population near, 0-3 KM of coal mines, has a higher income, INR 30413 per month, as compared to the population residing within the range of,

4-7KM, with an average monthly income of INR 26472. Interestingly, people residing beyond 8 KM also earn an average monthly income of INR 30000, indicative of the diversity in livelihood opportunities.

And in terms of expenditures, the average reported between 0-3, 4-7kms and beyond 8 is between INR 11,000-12,000. One of the key features of Angul is higher incomes compared to all the other six districts coal mining-driven industrial template of the district is primarily the key reason of the higher than usual incomes comparatively.

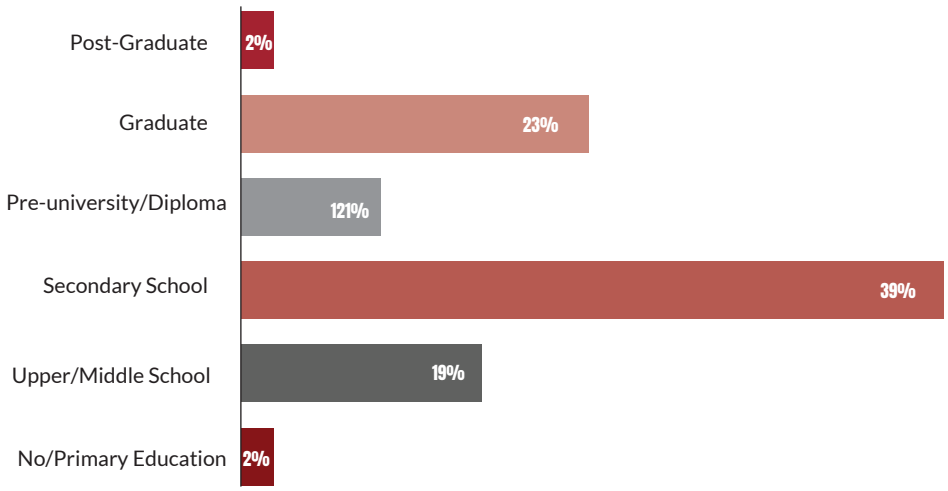
Figure 37- Proximity to Coal Mine/Coal Assets and Income (INR)



The high literacy rate and significant levels of secondary and higher education among Angul's workforce present a robust foundation for transitioning away from coal-dependent industries. Strategic policy measures, focusing on targeted training, upskilling, and comprehensive support for non-coal workers, will be essential to leverage this educational base and ensure a smooth and inclusive economic transition.

With 12% having pre-university/diploma education, 23% being graduates, and 39% having completed secondary education while 18% had upper and middle school while a small proportion 7% were no education or primary education only. Higher education completion indicates the possibility of shifting workers into different occupations with the help of training and upskilling and can be beneficial in the wake of the coal transition; however, in the case of Angul non-coal workers need more policy attention.

Figure 38- Education Profile of theh Workforce



The fact that 23% of the workforce are graduates and 12% have pre-university or diploma education indicates a good potential for upskilling. These individuals are more likely to adapt to new technologies and job requirements, making it feasible to transition them into different occupations with appropriate training.

In the case of the informality, 64% of the respondents did not receive technical education in the last year and additionally, 35% were working without any written contracts. This implies that those without contracts are more vulnerable and are prone to layoffs (dismissals) compared to workers with contracts. The lack of continuous technical education means that a significant portion of the workforce may not be up to date with the latest skills and technologies, making them less competitive in the job market and more vulnerable to economic shifts.

Moving ahead, the data shows, that most of the HHs are from coal allied and other alternative jobs, the level of education is good in those cases and the total monthly income and expenditure reflect the same.

Based on the survey data showcasing the income and expenditure relation, education-pre-university /diploma certificates where 39-37% followed by 24-25% from graduates and 14-16% from the people who have completed secondary school. Furthermore, from the agricultural perspective, the presence of a heavy coal mining background and industrial set-up, the agriculture of the survey regions truly reflects it.

The survey revealed that 72% of the population were holding non-cultivated lands, and 28% were holding cultivable lands. 36% of the 28 percent reported to have cultivated the lands. Moreover, out of these 28% only 40% has land up to 1 acre. Angul's population residing within a specific radius of 8-12 has a smaller size of cultivated lands and a higher ratio of uncultivated lands.

Implications

This implies HHs without regular wages, non-contractual jobs (informality in employment), non-cultivable lands, low educational backgrounds, poor housing conditions, and high yearly medical expenses can be viewed as more vulnerable to coal transition. In this light, it must be noted that policy interventions must aim to limit the adverse impact of the coal transition in the coming years by encapsulating 4-5 pivotal factors- human capital, demographic, ecological, and governance factors

Figure 39- **Land Breakup**

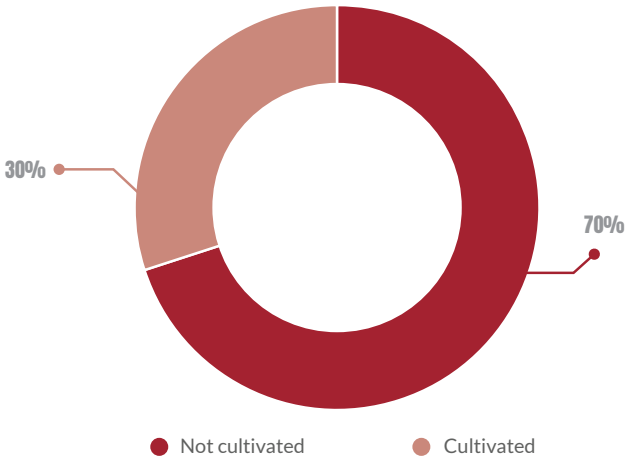
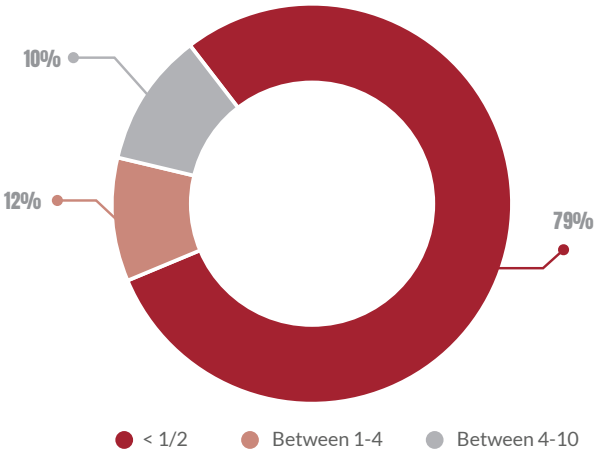
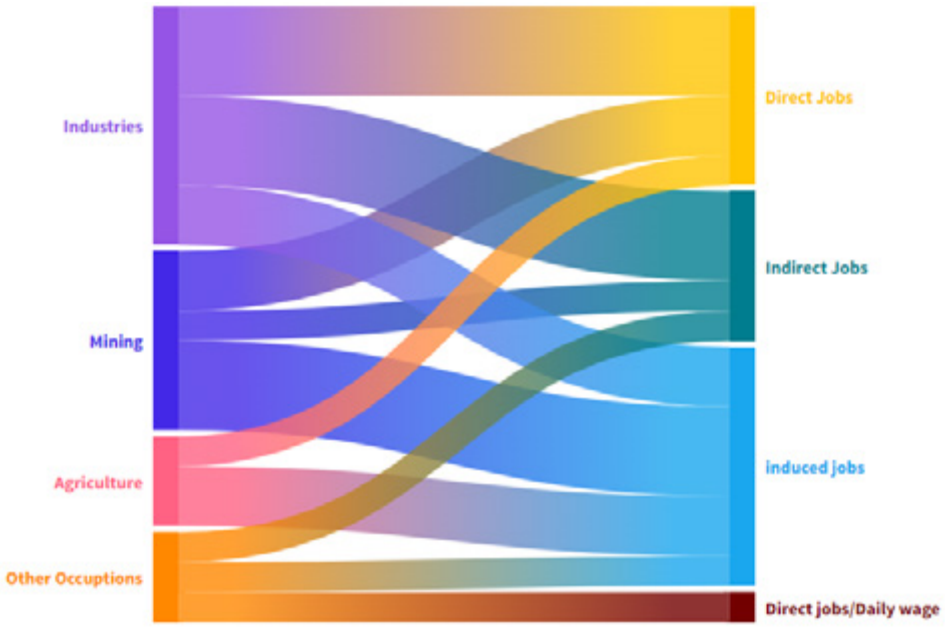


Figure 40- **Land Breakup For Cultivated Land (In Acres)**



The Sankey chart below attempts to portray the inter-relationship and interdependence of sectors and livelihoods in the district. Industries play a dominant role in creating livelihoods apart from mining and, it must be noted that these occupations and livelihoods are interconnected, and if apart part breaks down it will cause a chain reaction in the entire district livelihood profile. This chart is based on occupations reported by the HHs under the survey and district macro-economic data interpretations and understanding, analysis.

Figure 41- The chart shows the interconnectedness of different sectors and how workers transition into various job types: Angul



Key points:

- Industries: Major contributor to both Direct and Indirect Jobs, indicating a significant role in creating primary and supportive roles.
- Mining: Has a balanced distribution across job types, reflecting its foundational role in creating diverse employment opportunities.
- Agriculture and Other Occupations: More oriented towards Induced Jobs and Direct Jobs/Daily Wage, highlighting the prevalence of informal and supportive roles in these sectors.

SWOT Analysis

The SWOT analysis gives an extensive understanding of the **S**trength, **W**eaknesses, **O**pportunities, and **T**hreats of the district when the transition is being planned. If the policy framework is structured based on the SWOT, there is a high chance of the vulnerablecommunities to be least impacted and have better opportunities.

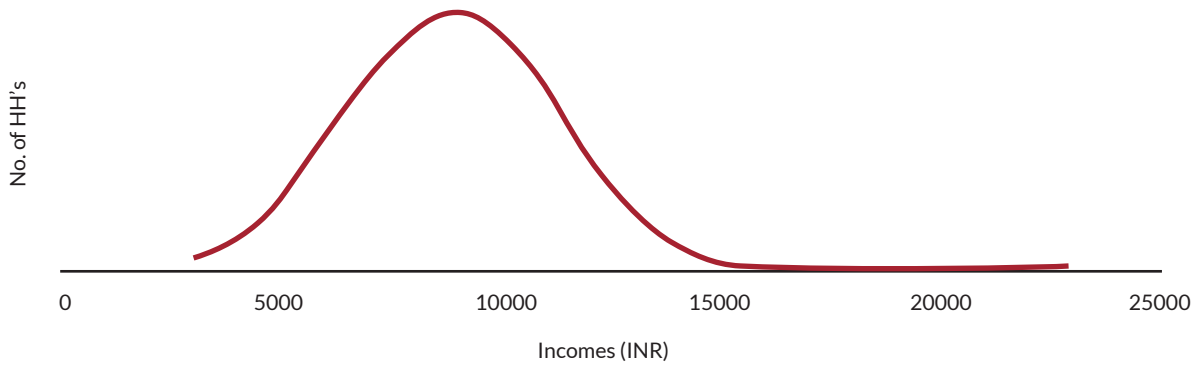
Strengths	Weakness
Strong industry and industrial clusters Housing, banking, sanitation, and education factors are good. Illiteracy level lowest of all six districts Moderate level of the informal economy Strong revenues for the district administration Circular economy started.	Coal mining and allied activities are a central part of the Angul economy. Mining and environmentally affected people have a poor voice. Poor infrastructure in the rural/interiors of the district. Wide-spread pollution and an adverse huge impact on agriculture, groundwater, and income earning capacity.
Opportunities	**Threats**
Existing non-coal industrial Potential for economic diversification DMF funds can be user and multifaceted purposes	Drastic loss for environmental capital Poor social capital Huge costs of transition

Ramgarh - District Representing Coal Phase Out

- 205 HHs were surveyed.
- 77% of the population have No /Primary Education
- Only 5% completed pre-university or more
- Only 14% of the HH have cultivated land.
- 92% of the workforce is engaged in the informal sector with no written job contracts.
- Only 14% of the HH had a regular source of income, which is the salaried section.
- Almost all the HHs had a reliable source of energy as fuel and 99% had an LPG connection.
- It was also seen that a vast majority of the coal-dependent population in and around the survey sites were illiterate.
- 11% had a higher or technical degree.

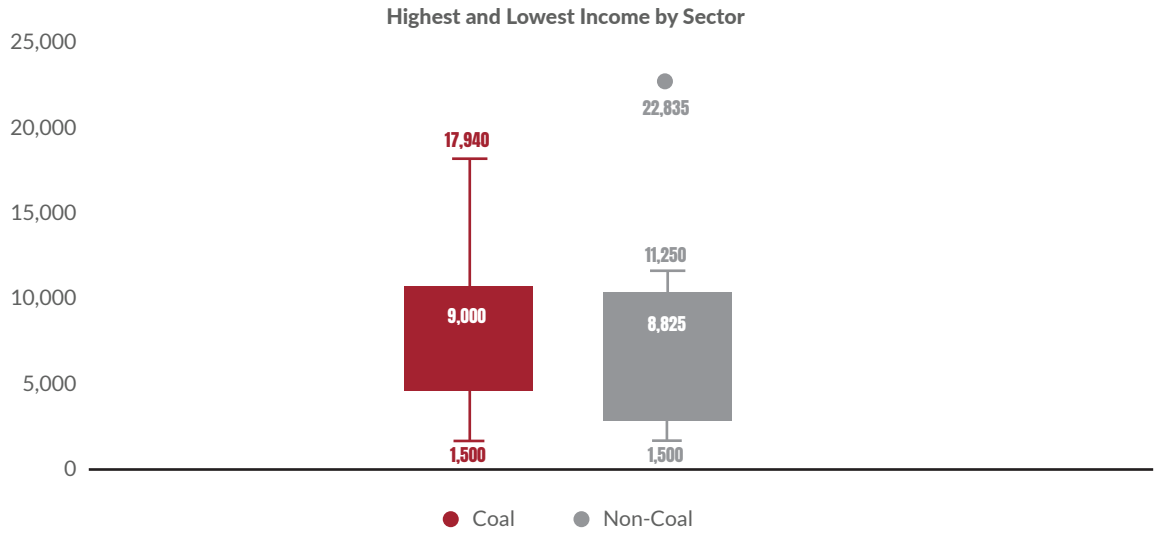
The distribution of income spread across 205 HH indicates a larger concentration of HHs with lesser income showcasing left skewed. While on the right-hand side there are lesser number of HHs earning higher income. Furthermore, if total incomes are divided into coal and non-coal, it also shows stark differences between highest and lowest incomes recorded for coal and non-coal sectors occupations.

Figure 42- Income Distribution Curve: Ramgarh



For coal sector incomes, highest income recorded is 17,940 whereas for non-coal occupations, highest income is 22,835 per month. A line in the box represents Median or the mid-point of the data and lowest HH income recorded were INR 1,500 per month for coal and non-coal sectors. The outlier more than two times of the highest monthly income recorded at INR 11,250 for the non-coal sector incomes. The smaller box for the coal incomes indicates lesser proportions of HH occurrences in this category, whereas, on the contrary, the slightly larger box for non-coal incomes depicts moderately higher proportion of HH under this category.

Figure 43- **Box and Whiskers Chart for coal and non-coal income**



The distribution of income among 205 HHs exhibits significant disparity, with a large concentration of lower-income HHs and fewer high-income earners, especially pronounced in the non-coal sector. The coal sector shows a more uniform but generally lower income distribution. Understanding these patterns is crucial for formulating policies aimed at reducing economic inequality and supporting the financial well-being of HHs across different sectors.

Incomes by Occupation

One of the critical aspects of this study is assessing the fraction of population by type of occupation and their income. The chart on the left-hand side shows 82% of the respondents reported to have been engaged in non-coal sector (agriculture, coal allied jobs, daily wage work, small businesses, and other related work types) and 18% are engaged in coal sector for livelihoods direct work in coal mines, coal transportation, coal washeries and colliery related work, working at sidings, or any skilled or trade related job in mining companies.

For analysis, total monthly HH expenditure is segmented into five major categories-total fixed food expenses, total food variable expenses, addiction, energy and total HH variable. Major chunk of expenditure goes into food; 44% for Ramgarh district. Second major expenditure segment is total HH variable expense which stands at 38%. The pattern of expenditure remains more or less the same for the HH in other districts as well, where primary expenditure is incurred on total fixed food expenses irrespective of the total value of this component. In Ramgarh, a majority of abandoned coal mines have led to loss of incomes and the migration of the workforce to alternative livelihoods.

Figure 44- **Box and Whiskers Chart for Coal and Non-Coal Income**

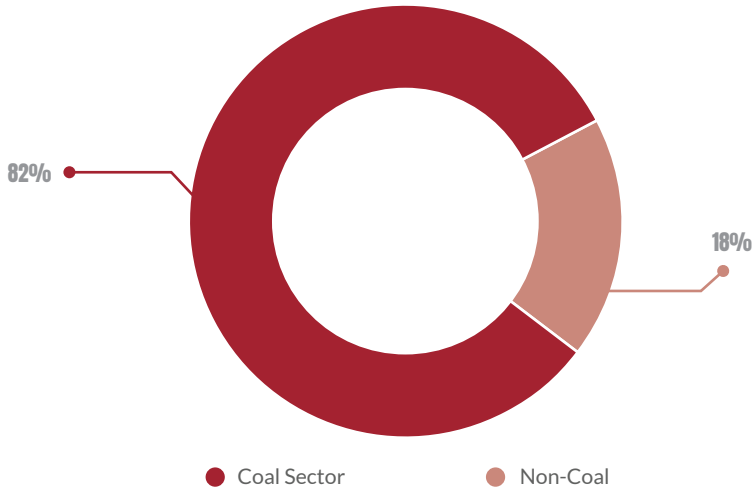
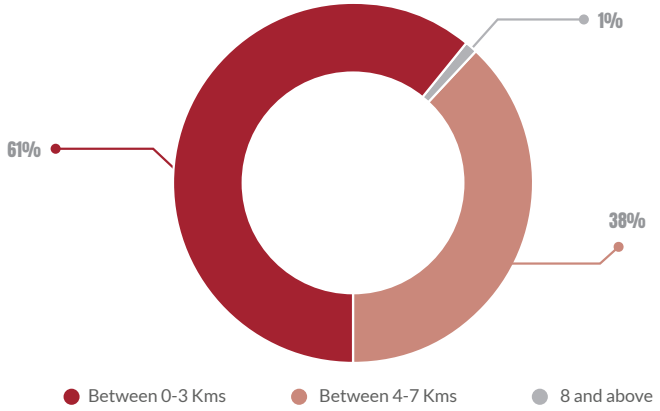


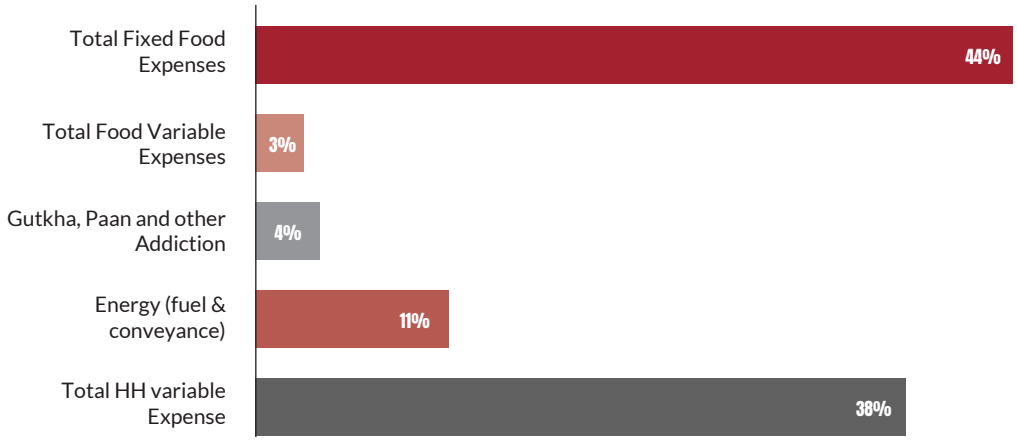
Figure 45- **Worker and Occupation Profile**



Proximity from the Coal Assets and Key Characteristics of Workers

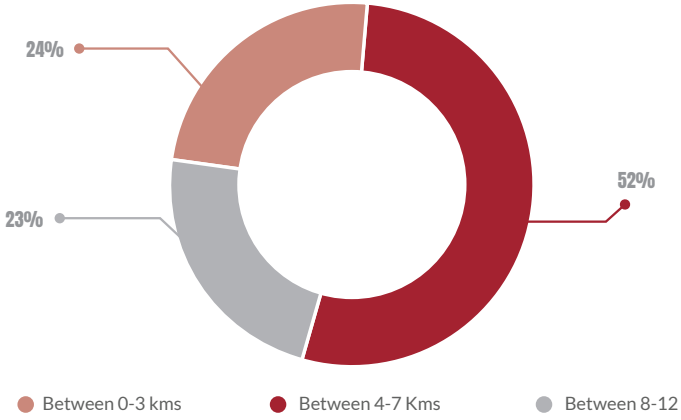
The chart below shows average incomes of HHs based on their distance from the coal assets or coal mines.

Figure 46- **Job Type: Ramgarh**



On an average between INR 8,000-9,000 is the average monthly income; the expenditure averages between INR 6,000-7100 monthly. 52% of the HH surveyed were residing between 4-7 Kms. The Minimum wage in the state for unskilled workers is INR 7,1450.60, while INR 7,485.40 for semi-skilled, INR 9,867.26 for skilled workers, and INR 11,398.14 for highly skilled workers. But 15% of the surveyed population earns less than the minimum wages declared by the government. The level of income poverty in the district is alarmingly high and is dependent on multiple factors- level of education, geography, state of agriculture, climate change, access to education, avenues for alternate livelihoods and other.

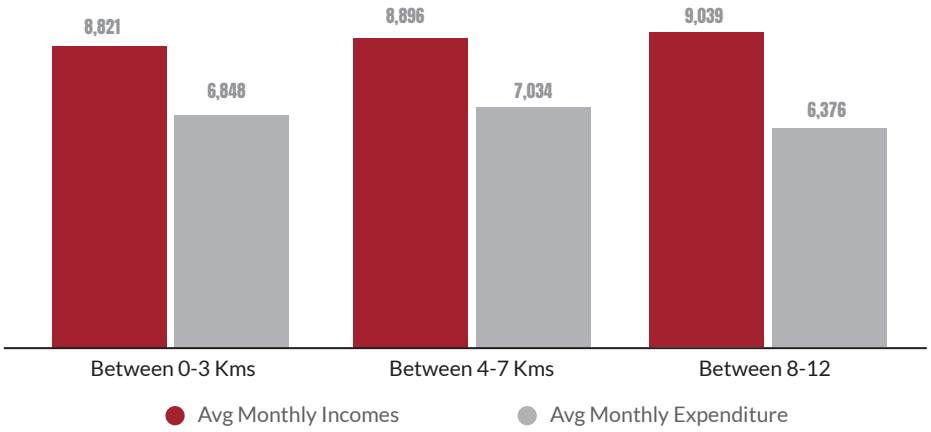
Figure 47- **Total Monthly Expenditure (In INR)**



Education and Key Characteristics of Workers

A vast majority of survey respondents were in the 'no or primary' education category as they were within 5-8 KM of the mines and coal allied/dependent industries. The district has a low educational rate, only 10% of the respondents were above the senior secondary level of education. In addition, lack of economic opportunities for the educated category, poverty, unemployment, and malnutrition leads to rural-urban migration to the cities and other districts or states. In the focused group discussion, it was seen that the district faces a significant problem with the availability of clean drinking water.

Figure 48- **Distance-wise split of Responses: Ramgarh**



Agriculture and Key Characteristics

Out of the 205 HH, only 14% hold cultivated land, and 86% are reported to have uncultivated lands. 72% of the surveyed population has less than 0.25 acres. This suggests that most of the local farmers have small land holdings, which can make it challenging for them to sustain a living.

Figure 49- **Distance-wise split of income/expenses: Ramgarh**

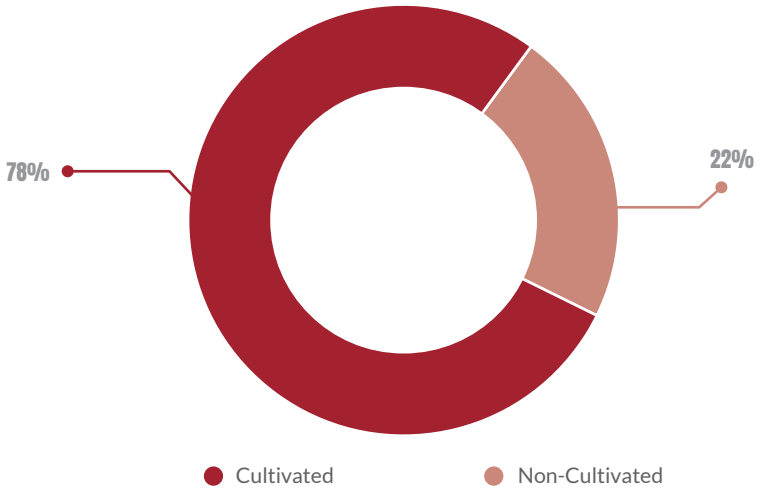
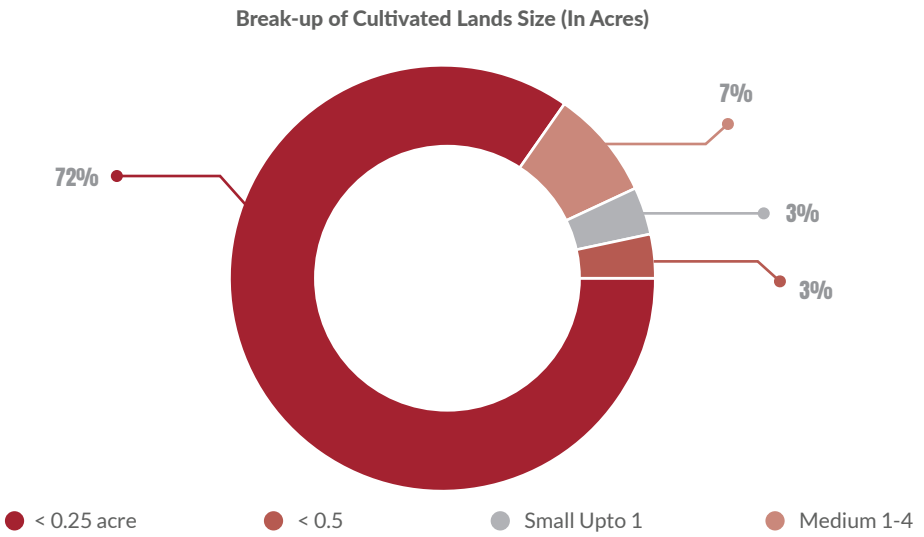


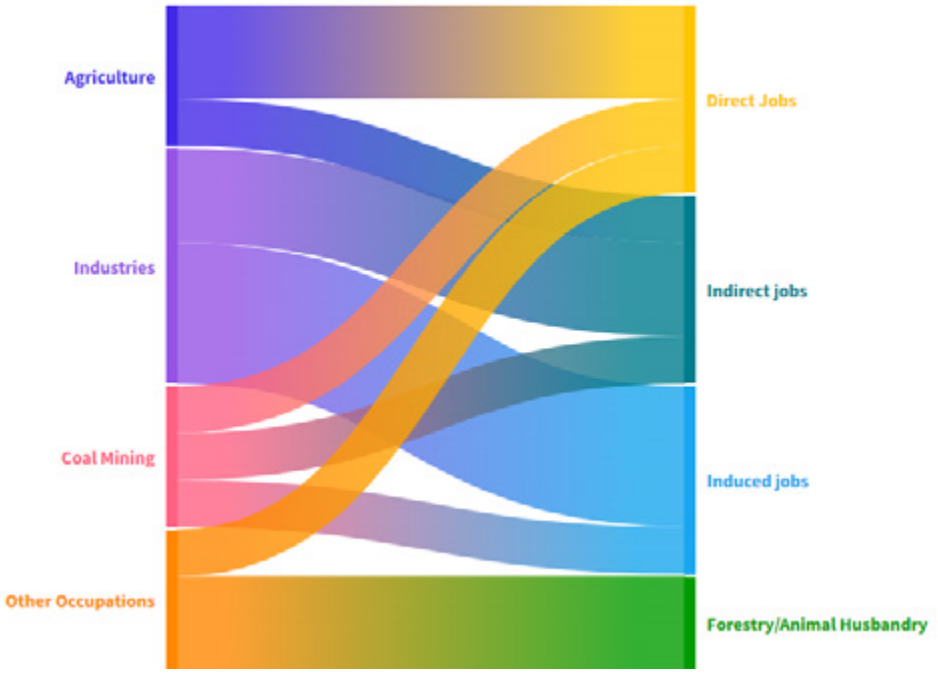
Figure 50- **Land Breakup For Cultivated Land**



This also indicates that small-scale farming and landless laborers are the norm in the district. Only 7 % of HHs has medium land holding that is between 1-4 acres. Despite this hardship, the people of Ramgarh district have managed to generate livelihoods through a variety of means, including agriculture, animal husbandry, and non-farm enterprises such as small-scale manufacturing and services.

Agriculture is the primary source of income for the rural population, with crops such as paddy, maize, wheat, and pulses growing in the area. The below Sankey chart attempts to portray the inter-relationship and inter-dependence of occupations and livelihoods from Ramgarh District based on occupations reported by the HHs survey and district macro-economic data interpretations. The overall understanding of the district economy in terms of 3-4 major sources of livelihoods is attempted to be explained here. The district has an agricultural base and farmers are increasingly turning to cultivation of paddy, wheat, maize, and other crops to sustain themselves. Apart from agriculture, the closure of coal mines has also led to a rise in self-employment opportunities with many people have started small shops, tea stalls, and other businesses to sustain themselves. Animal husbandry, handicrafts, and fisheries are some of the other areas where people have migrated.

Figure 51- **The chart shows the interconnectedness of different sectors and how workers transition into various job types: Ramgarh**



Understanding these flows is crucial for devising policies to manage workforce transitions, particularly in the context of economic changes:

- Upskilling Initiatives: Focus on sectors like agriculture and other occupations to move workers into more stable and secure job types.
- Support for Induced Jobs and Forestry/Animal Husbandry: Recognizing the importance of these job types in the local economy and ensuring policies to sustain and grow these roles.
- Formalizing Employment: Encouraging formal contracts, especially in sectors where informal employment is high, to improve job security and worker rights.

SWOT Analysis

The purpose of the SWOT analysis gives an extensive understanding of the Strengths, Weaknesses, Opportunities, and Threats to the district when a transition is being planned. If the policy framework is structured based on the SWOT analysis, there is a high chance that the vulnerable communities be cushioned against the detrimental impact of the transition.

Strengths	Weakness
Ramgarh has already moved away from coal Alternate livelihoods like fishing in abandoned mines can be seen. Low proportion coal-dependent economy	Water scarcity Poor irrigation Vast land degradation due to extensive mining and industrial activity Climate change- drought is hitting hard in some blocks (like Mandu)
Opportunities	**Threats**
Can serve as case study for unplanned coal transition. Pilot project for generating livelihoods can be lunched	Large unskilled population Sustained migration Poor governance especially in rural interior areas of the district

A detailed examination- Comprehensive Analysis

The following section is divided into three sub-sections — vulnerability, comprehensive wage analysis, and conclusion. P**eople's livelihoods** and the wider availability of assets which are fundamentally affected by critical trends as well as by shocks and seasonality – over which they have limited or no control[42]. Ground-level statistics will help in sharpening policies and programmes. The need for comprehensive statistics for effective policy execution and just transition cannot be overstated enough.

Coal Producing Districts

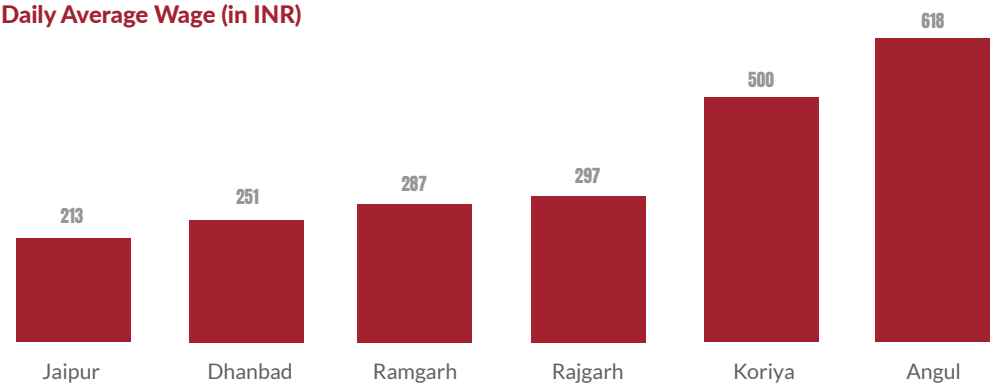
- **Koriya-** In Koriya, our research indicates that people have limited access to public schemes or employment works that are allotted in a radius of 5 Km of the CBAA act); Hilly agro-climate, poor agriculture, and low land holding rates, Combined with poor educational background have further limited livelihood options.
- **Dhanbad-** in Dhanbad, ecological damage, poor rains and scarce underground water has left many people with barren lands. Hence, in the absence of education, the illiteracy rate is 58 % here. Around 97 % of HH reported a lack of access to training and skill upgrading - people face harsh challenges.
- **Angul -** In Angul, literacy rates are better in comparison with other districts, and the regularity of work/job is also good at 71%. And strong industrial background is also a big economic asset for the communities in Angul. But the land holdings (60 % had none) and cultivation factors are far from desirable. Ecological damage and severely impacted groundwater make agriculture an unviable option. More than 95 % of HH surveyed had no access to training or skill upgradation.

Coal Allied Districts

- **Ramgarh –** Ramgarh has witnessed the coal transition to some extent and many of the mines in the district which are closed or abandoned. A substantial chunk of the workforce is engaged in informal occupations and migration is dominant in the younger population. Vast land degradation, water scarcity, and illiteracy are major challenges. Only 27 % of HH have cultivated lands. Close to 98% of HH had no access to training or skill upgrading.
- **Raigarh - A** mix of industry and agriculture, makes this district less dependent on coal mining. Formal and informal occupations are both present, however, informal workers face huge challenges concerning wage pay, insurance, working conditions, and work structure. The challenges here are two-fold. Ecological damage and weak irrigation systems have rendered agriculture unviable; 52 % of HH have non-cultivate lands.
- **Jajpur -** A non-coal mining district Jajpur is relatively less vulnerable from livelihood perspective under the context of coal transition. The literacy level is above 70 % and there is no coal mining in the district. Workers face numerous challenges in transitioning to alternative job opportunities. Issues such as lack of access to job cards and limited education make obtaining replacement options difficult. Many workers can only find employment as daily wage earners and do not qualify for job cards.

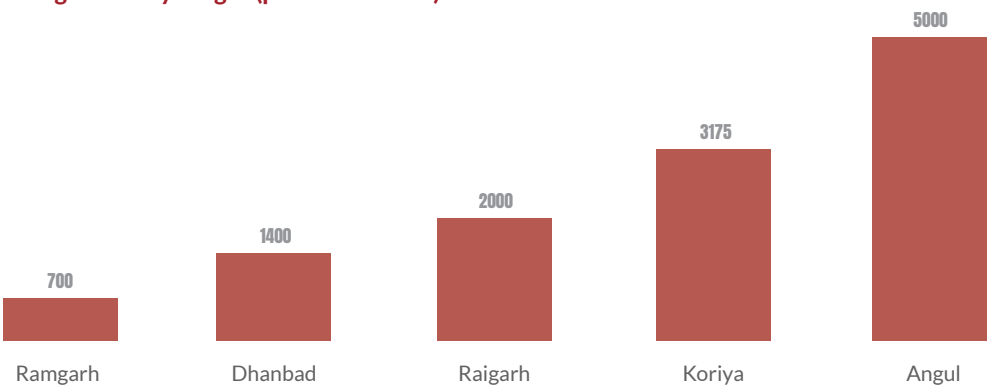
Income and Wage

Figure 52- Daily Average Wage (in INR)



The average daily wage in coal mining or coal-dependent districts such as Koriya and Dhanbad is INR 500 and 251 per day whereas in Angul has the highest of INR 618. Whereas, Coal-dependent districts like Jajpur, Raigarh, and Ramgarh have lower average incomes of INR 213, INR 297, and INR 287 respectively. Jajpur has reported the lowest daily wages followed by Dhanbad because the economy of Jajpur is majorly agrarian driven which is strong and worker's occupations for Jajpur during the survey revealed a higher share of agriculture and allied jobs occupations.

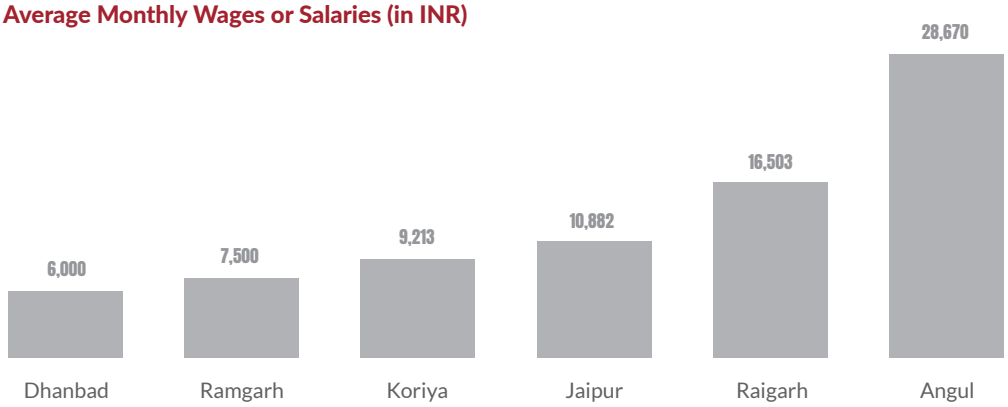
Figure 53- Average. Weekly Wages (per week in INR)



In terms of daily wages, the picture of vulnerability to coal transition gets clearer where the survey in Ramgarh has reported lowest weekly wage of INR 700, followed by Dhanbad at INR 1400. The declining role of coal in Ramgarh and Dhanbad is reflected in their low weekly wage averages, with Ramgarh reporting the lowest at INR 700 and Dhanbad following at INR 1400. This suggests that as the coal sector diminishes, there's a decrease in demand for daily wage laborers, impacting their earning potential and overall economic stability.

Ramgarh and Dhanbad exhibit distressingly low average monthly salaries — Rs. 6000 and Rs. 7500, respectively – which fall below the state's minimum wages. In addition to the financial disparities, demographic differences in each district contribute to income inequality. Districts with significant SC-ST groups show the lowest average income, while districts with the highest concentration of General groups display the highest average monthly incomes.

Figure 54- Average Monthly Wages or Salaries (in INR)



Conversely, Angul, with its strong industrial background and coal-related industries, exhibits higher weekly wage averages. This indicates that despite the transition away from coal, these districts still benefit from robust industrial activities, providing better economic opportunities and higher incomes for their residents. In contrast, Ramgarh and Dhanbad lag behind, indicating a greater struggle for residents in these districts to achieve financial stability and higher living standards.

Hence, we can say that addressing the economic vulnerability in districts like Ramgarh and Dhanbad requires focused efforts to diversify their economies, attract new industries, and provide alternative employment opportunities to mitigate the adverse effects of coal decline on local communities.

Summing Up

The communities here face grave financial crisis due to inadequate salaries raising questions about their sustenance during the transition period. Lack of sufficient land holdings exacerbates the situation. The average monthly salaries in various districts further highlight the urgency for the state to step in and provide financial support to the affected communities. In addition to the financial disparities, demographic differences in each district contribute to income inequality.

Angul and Raigarh have a higher percentage of General and OBC communities (42% General and 35% OBC in Angul; 25% General and 61% OBC in Raigarh), whereas Ramgarh and Dhanbad have a substantial SC-ST population and a nominal General population (42% ST, 14% SC, and 2% General in Ramgarh; 23% SC and 7% General in Dhanbad).This demographic difference may also contribute to the income disparity between districts. As a result, it becomes evident that the SC-ST communities will be the most affected during the coal transition, followed by OBC communities. Recognizing these disparities is crucial for implementing targeted support and assistance to ensure a just and equitable transition for all affected communities.

As we scale up, we find that Coal mining plays a significant role in India's economy, providing employment and contributing to energy production. India, being one of the largest coal producers and consumers globally, is making efforts to reduce its reliance on coal and transition towards renewable energy sources. This transition, while necessary for environmental reasons, will adversely impact HHs residing in coal mining areas. In conclusion, the report underscores the importance of considering the vulnerable and marginalised communities that will be severely impacted. Policymakers need to ensure that adequate knowledge, support and measures are in place to facilitate a fair transition required to protect livelihoods and create sustainable and alternative jobs.

Communities at the Crossroads of Transition

Communities living in coal towns and coal-dependent regions are at the crossroads of multiple challenges such as livelihoods, healthcare, weak agriculture, and increasing pollution. The calculus of inequity, unfortunately, shows that most of the coal mines and coal towns in Chhattisgarh, Odisha, and Jharkhand are located in rural and interior regions where the socio-economic disparities are stark in comparison to people living in semi-urban and urban areas.

"For people whose lives are directly or indirectly related to mining, such as contractors or labourers, the future is uncertain once mining is finished in their region. The best way forward is to invest in human capital especially because the development index in most of the mining region is quite low"[43]

FGDs in all districts revealed that Project-affected people, tribal communities, particularly vulnerable tribal groups (PVTG) rural populations, indigenous communities, and other weaker segments of the population are at heightened risk despite 'legal' frameworks enacted by Parliament for their safeguards. Acts like the Panchayat (Extension to Scheduled Areas) Act, 1996 (PESA)[44] and Forest Rights Act, 2006 (FRA) recognized forest rights of scheduled tribes and other traditional forest dwellers' land rights and land possession. The legislations have done little to ameliorate the constant tension between tribal communities and mining companies due to the lack of appropriate compensation for the land acquired under mining activities, despite their legal rights under Coal Bearing Areas Act 1957 (CBA)[45] for fair compensation.

Acts like the Panchayat (Extension to Scheduled Areas) Act, 1996 (PESA) and Forest Rights Act, 2006 (FRA) recognized forest rights of scheduled tribes and other traditional forest dwellers' land rights and land possession.

During NFI's team visit to the block-2 in Dhanbad mine we noted that locals recognize themselves as those who were the initial right holders for the compensatory job in lieu of the opening of the block-2 mine which started operations around 1985; the jobs promised around 1992-93 remain unfulfilled. Out of the total affected families (90-80), 50-40 families have got employment with the mining company, and the remaining 30-35 families are holding on to hope, living on the edges of the block-2 mine. "Farmers in Korba sacrificed their land thinking about the nation's future and development[46]. More than 2-3 decades have passed but compensation is far from sight for thousands of landowners in Dhanbad,

Korba, Raigarh, and many coal-bearing districts. Additionally, it's been found that grave violations in adhering to the provisions of the Forest Rights Act 2006 in Chhattisgarh has rendered thousands of people landless and without any opportunity for earning a basic livelihood. At a micro level also, a violation of norms is a new norm in many places for example, covering trucks with tarpaulin is one of the mandatory regulations imposed on the coal transporter but wide-scale violations and rampant neglect have created severe environmental and health issues for people residing on coal transportation routes.

Compromising on health is an unfair barter for current and future generations and on top of it, the coal transition presents enormous challenges to people who are already being affected by the existing development. Climate change creates varying degrees of impact on livelihoods and health, poses a challenge for people and communities living at the frontline of climate change.

Co-Existence-Life in the Middle

Accidental fires, some of which have been blazing for decades, have charred the ground, and left it spongy. Smoke hisses from cracks in the surface near their hut and "fatal sinkholes are common"[47]. Coal mining and mine-based industrial activities are the major sources of the economy in these regions. Consultation and interviews around Balkudra mines in Ramgarh district revealed that the mines face closures from time to time, mainly due to changes in technology and renovation. Balkudra mines were non-operational for some time before 2014 but in 2014, the mines became operational again after a change in technology and activities being outsourced to MDOs. A local mines blaster by profession, Mukesh Singh, a resident of Bhurkunda village, is one of the coal workers who are currently unemployed due to the non-operational status of Balkudra mines. He is skilled to undertake the blasting activity in a coalmine, and a third generation from his family engaged in coal mining-related livelihood.

A local researcher near the Jindal Steel and Power (JSPL) plant area in Angul shed light on the state of agriculture in the surrounding areas. The degraded lands and lack of groundwater make it difficult for the locals to sustain agriculture alone. According to department of Horticulture the productivity has decreased tremendously over the last few years and hence the farmers had to either migrate or take up daily wage jobs in and around mines. According to the 2020-21 report by the Chhattisgarh Environment Conservation Board, there are about 470 small and medium-sized industries along with 59 large industrial units in Raigarh District; the region is home to one of the largest coalfields-Mand-Raigarh-"Coal mines located in the Tamnar and Gharghoda blocks are part of the Gare Palma coal block. Gare Palma coal block is the largest among the 80 coal blocks in the Mand-Raigarh coalfields and is spread over an area of 16649 hectares"[48].

Statistically, the state generates over 20 million tonnes of fly ash but utilizes hardly 6-8 million tonnes per year[49] leading to illegal large-scale dumping of fly ash in farmlands, water sources, and areas that are in close vicinity to residential areas quite common. 12 TPPs operate in Gharghoda and Tamnar blocks and the overall fly ash generation in the Raigarh district comes to around 6,628,283 Tonnes per annum[50]. In the year 2022, the Government of Chhattisgarh directed district officials to formulate an action plan for the disposal of fly ash generated by thermal power plants as it leads to excessive pollution, land degradation, soil infertility, groundwater depletion, water toxicity (due to reckless industrial discharge) coal dust, industrial smoke---taking a toll on public health. "Nearly 52 villages in the Tamnar and Gharghoda block of Raigarh are affected by industrial pollution in the area"[51].

A community-based and inclusive approach that engages and empowers local communities in the decision-making process will be essential for a successful and sustainable energy transition and sustainable livelihoods.

Coal Communities

The study revealed the direct and indirect effects of the phase-out of coal on household livelihoods in coal mining regions. With no access to job cards, MGNREGA (in Coal Bearing Areas), or enough education to know about their rights the lack of participation of these communities in decision making lead to prejudiced planning of resource mobilization and constraints upskilling/re-skilling requirements.

Local Economy

The study further provided scientific evidence on the implications for local businesses, vendors, and the overall economic ecosystem of the coal mining and allied industrial areas. Coal mining as an economic activity apart from providing direct and indirect jobs, helps in creating induced jobs, - jobs or work occupations such as street vendors, street hawkers, tea sellers, smaller enterprises such as cycle or bike mechanics, tyre, and truck workshops, including pharmaceutical stores, and other business or occupations that are dependent in nature on larger economic activity in the region. This ecosystem stands imperilled if alternative coping mechanisms are not investigated.

Diverse income sources, alternative employment, engaging in entrepreneurial activities, or relying on social networks for support were explored.

Caste Dynamics and Coal Transition

The survey also investigated the social dynamics within coal mining communities, examining changes in social cohesion, migration patterns, and community well-being resulting from the shift away from coal. Lack of comprehensive social impact assessments of these coal-dependent communities was also a reason, why the study kept its focus on the community. The study aimed at understanding the vulnerability of coal dependent communities and how social hierarchy impacts the job profile, access to schemes and job guarantee.

To recap

Through this report, it was intended that policymakers, researchers, and stakeholders can gain insights into the multifaceted impacts of coal phase down on HHs in coal mining areas at district level which in turn cancan inform the development of targeted interventions, policies, and programs to support affected communities, facilitate smooth transitions, and ensure sustainable development in these regions without being non-inclusive of those who will be indirectly impacted.

The ground reality that emerged from the socio-economic survey (conducted over 1,209 HHs in 6 vulnerable districts in 3 states by NFI) and field visits, consultation, interviews, and interactions with local leaders, government officers, community, and working population revealed primarily their lack of social statistics. Secondly lack of adequate planning and tunnelled vision of the authorities on coal transition and its roadmap design was felt. Thirdly, poor access to basic public service have severely affected the marginalised community and compromised their rights.

Policies, Institutions and Marginalised Communities

In recent years there's been an increasing trend of governments to focus on releasing new climate laws, declaring carbon emission targets, accessioning or acceding to international climate treaties and pacts, and promoting cleaner energy with little discussion on how these objectives will be achieved?

Prevalent theories of energy transition mostly debate sustainable transitions and do not sufficiently address the process of change at the regional and local levels[52]. In the 2021 report published by NFI on coal transition "socio-economic impact of coal transitions" it was mentioned that the current governance structure is unlikely to yield results[53] -given the complex and interconnected nature of challenges such as labour, employments, land management, ecological rejuvenation or effective coal mine closures and protecting or supporting the local regional economy. This is because the responsibilities and accountabilities are vested with different agencies, and power venues—states are responsible for land and labour and the central government is accountable and responsible for coal, energy security and environment.

India's environmental laws do not bind the government to fulfil the promises of mitigation that have been made at COP26.

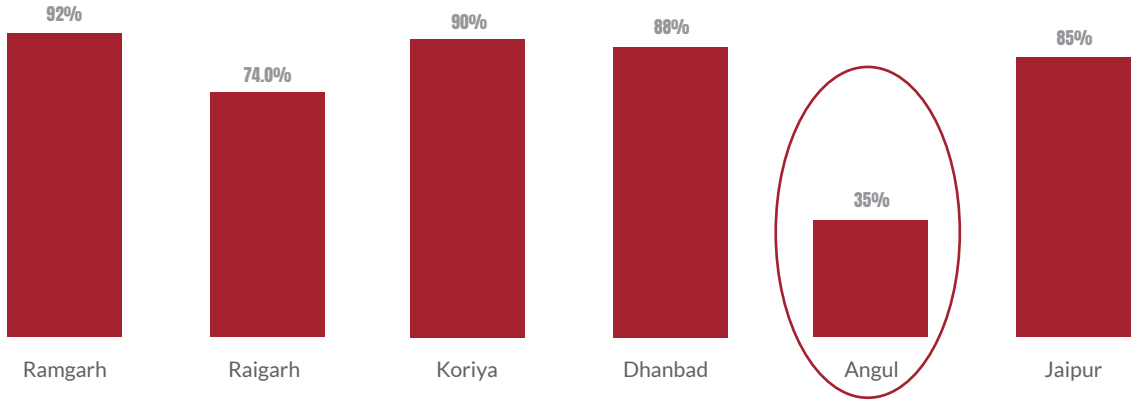
The Transition Gap

One of the pressing challenges associated with coal transition is the protection of livelihoods of the most marginalised and environmental sustainability of the region. However, lack of implementation and negligence in critical areas such as those associated with communities and environment are prima facia the essential features of coal governance India currently. India's environmental laws do not bind the government to fulfil the promises of mitigation that have been made at COP26. They also do not deal with important aspects of climate change adaptation such as extreme weather events, loss of food and water security, or welfare of climate migrants, which are all issues of high vulnerability[54] .

The labour force engaged in coal mining and allied industries mostly work under the constitution's, state laws, and have the freedom to work anywhere in the country. However, the poor socio-economic background and low education of most off-roll workers is a major barrier between them and justice. The state of off-roll or non-contractual labour working in mines, allied factories, and industrial units in all three states is penurious--- accounting for at least 70 percent of the total labour across all sectors, reaching as high as 92 percent and 80 percent in transport and bricks. Almost 7,00,000 people (in and around Dhanbad) over half of them women and children, work in inhuman conditions of bonded labor, with pervasive violence and widespread gender and caste discrimination, and currently around 0.3 deaths in coal mines per 1000 employees in India[55].

Labour, is on the concurrent list and despite the host of schemes (both at the central and state level) the state of coal workers is a matter of concern. According to the Ministry of Labour and Employment, there are about 42 million unorganized workers across the country, but it is still not clear how many are engaged in the coal sector. On the other hand, for the marginalised communities and tribal communities-which have considerable social-political and socio-economic protection under various central and state government schemes, as per the survey, on average, only 35-40 percent of population had access to them.

Figure 55- District Wise Breakup of No written Contracts



Informality, irregularity in wage earning, low skills, and poor alternate livelihoods including small sizes of agricultural land holdings are some of the basic characteristics of the marginalised and PVTGs in these areas. In sharp contrast, for the year 2022-23, the budget outlay of the Ministry of tribal affairs increased[56] by 70.69% with several schemes and policy programs launched.

Stakeholder consultation and interaction with community leaders revealed that the responsibility of rehabilitation and resettlement (R&R) for the "project-affected people "for land acquired under the Coal Bearing Areas Act 1957(CBAA), is vested with the miner, however, implementation is undertaken by the mining company and monitoring is under the chairmanship of the district collector. This reveals a three-sway complex mechanism with delays and negligence. In this respect, it must be noted that R&R policies have been promulgated at the national, state, and PSU (public sector units) level often suffers from overlapping issues and thereby hinders the process. R&R also deal with under the overarching rehabilitation and resettlement National R&R policy 2003 and 2007; several coal-rich states have their specific R&R policies[57] .

Conclusion

The findings of this study underscore the multifaceted nature of the challenges faced by coal-dependent communities, particularly those belonging to the socio-economically marginalised groups. Through a meticulous methodology encompassing household surveys, on-site visits, expert interviews, and group discussions, this study has shed light on the complexities involved in the transition process. **The impacts of such transitions reach far beyond economic spheres, with profound social, cultural, and infrastructural implications that demand attention.**

The study highlights how intricate **caste dynamics and transition cannot be ignored while framing a course of action. The differences in average wages and economic stability across districts highlight the urgent need for tailored interventions to ensure that no community is left behind during this transition.**

The study's focus on the direct and indirect impacts of coal phase-out on household livelihoods has explained the challenges faced by those directly engaged in coal-related activities. **The fluctuations in employment opportunities, income levels, and job security have far-reaching consequences that reverberate through entire communities.** Moreover, the study has highlighted the lack of access to social and economic welfare schemes, further exacerbating the vulnerabilities faced by these HHs .

In addition to economic concerns, this study has also emphasized the need for an inclusive decision-making process where the most marginalised are represented in key policy decisions—This **has resulted in resource imbalances and hindered efforts to provide adequate support and upskilling opportunities.**

The survey and focused group discussions along the line of employment showcased that each coal-dependent direct employment generates at least 5 indirect and induced jobs in coal-intensive districts, while for coal-dependent districts the number is 11. Hence, the number of people likely to be employed

in coal mining, transport, power, sponge iron, steel, and bricks sectors", is more likely to be three folds conservative estimates that peg the number at around 13 million, making it important for the policymakers to make more inclusive policies.

Districts like Dhanbad and Angul generate most of their revenue (coal and non-coal) because of the existing coal mining and other allied industries, while districts like Jajpur and Raigarh have major economic contributions because of coal-dependent industries. Ramgarh and Koriya on the other hand, showcase how alternative livelihood can be a reliable source of revenue generation when transition takes place.

Places like Angul and Dhanbad have less agricultural dependency as compared to Ramgarh and Koriya. Hence policies need to be framed keeping in mind that one single framework will not be a suitable fit for all districts. Moreover, the literacy rate varies drastically for all the districts. Angul is comparatively a young mining district as compared to Dhanbad and Ramgarh which has already shown how moving away from coal impacts the community and how policies need to be framed to avoid the past mistakes of unplanned transition.

The shift towards a circular economy will also have a significant impact on these communities. The circular economy encourages an economic model that aims to minimize waste and promote the use of renewable resources. **This shift will help to create new business opportunities and promote sustainable development in these regions. The circular economy will also help to reduce the environmental impact of these communities, which is critical for preserving natural resources and ensuring long-term sustainability.**

A Just transition calls for a collaborative effort between the government, industry, and local communities to ensure that the transition is fair and equitable for all. This approach includes providing support and training for workers to ensure that they have the skills and resources necessary to transition to new jobs.

The suggestions made in the Policy Roadmap section of the report encourage authorities to expedite the thorough identification and creation a comprehensive dataset for supervisory and regulatory objectives to aid in Identifying pertinent categories of data and metrics authorities and policymakers might need from financial institutions and provide key policy considerations towards extending routinely standardized regulatory reporting requirements.

This study offers instrumental insights for policymakers, researchers, and stakeholders alike to understand **the challenges faced by coal-dependent communities and serves as a** final reminder that the weaning away from coal is not merely an economic transformation; it is a social, cultural, and environmental shift that requires comprehensive strategies to ensure that no one is left behind.

Policy Recommendations

Human, social, environmental, economic, and physical capital are the core pillars of sustainable livelihoods. Research in six districts revealed that the role of regulatory, institutional capital is pivotal for protecting occupations that are more vulnerable to coal transition calling for separate recommendations. Policy recommendations are designed under the concept of sustainable livelihoods for all the districts. Based on the comprehensive analysis provided, several policy recommendations can be formulated to address the economic vulnerabilities and challenges faced by districts transitioning away from coal-dependent economies:

	Governance	Planning	Accessibility	Likely Impact
Human Capital	Develop a comprehensive database in coal-bearing and coal-dependent regions to identify dependent population	Systematic mapping of skills and occupational capacity of the workforce Mapping of training and institutions at panchayat/block level to increase participation.	Legal recognition to vulnerable stakeholders Issue Identification cards	Lays the foundation for formalizing the informal sector and setting accountability for companies and government departments
	Launch persuasive programs and missions (apart from MGNREGA) for improving workers' registration at panchayat/block/ district level	Expand the labor welfare board and include stakeholders (educational institutions, industries, trade unions, and youth representatives among others) at the district level.	Simplifying eligibility for training and skilling programs (eligibility criteria should not be restricted to formal education)	Increases in participation lead to better planning of resource mobilization and identification of upskilling/re-skilling requirements
		Launch consultative (stakeholders) programs and events for designing skill and training development programs (at the district level) to increase employability	Ease in accessing and participating in skilling, training, and skill development schemes apart from digitization/ online access	
	Improve coordination between the Department of Labour and skill development authority, district authorities, and agencies like HRD, DMG, Ministry of Tribal Affairs	Mapping the geographical location of vulnerable communities at the block level to restructure the economy.	Improve transport and connectivity for rural and interior areas (to increase citizen access to training, skill development, health, and other services)	Helps in strengthening administrative machinery and for effective delivery of services that will be just and fair to all
	Set up a mechanism for general public awareness (especially for informal workers) about the upcoming closure of mines	Promotion of social dialogue-tripartite communication between administration, mining companies, and impacted communities	Conduct workshop/ knowledge disseminating sessions (at panchayat and block level) involving local communities for larger inclusion and access to welfare services.	This will help in strengthening and addressing the issues of informal workers
	Identify occupations in regions where mines are closed or on the path to closure for better alternatives	Assess the market demand for specific skills and re-adjust the workforce	Launch vocational training and skilling/ upskilling programs based on mapping consultations at district as well as rural interior villages	Bridges the gap between industry needs and market demand for labor/workers and helps in the smooth transition

	Planning	Governance	Accessibility	Potential Impact
Human Capital-II	Workers and contractors must provide proper documentation for employing informal workers (in line with the ID card issued) as per the Occupational Safety Health laws/code	Increase penalty for employing unregistered workers in industrial and factory units including mines. This will provide accountability towards the vulnerable & informal workforce.	Increased ease of registration and strict audit/inspection of labor contractor's documents/ registration and licenses based on a fixed set of rules	Reduces malpractices, reduces social injustice, and brings accountability

Planning	Governance	Accessibility	Potential Impact
Connect people with center and state-level livelihoods, and rural employment schemes like the *Surya Mitra* skills program.	Districts like Raigarh, Jajpur & Anugul can be the focus for workforce transition. The proportion of diploma/ pre-university/technical education (Raigarh, 46%Angul 34%, and Jajpur 31%)	Expand the network of the training center to vulnerable districts and rural interiors to avoid biases. *(Currently, Chhattisgarh has 7, Jharkhand has only 3 and Odisha has 6 such centers)*	Aligns skills set of people in line with demands of upcoming industries such as solar energy, another renewable sector
Expand MGNREGA to vulnerable regions and the farming community. Farmer out-reach programs and schemes for effective farming	Integrate planning for knowledge dissemination at panchayat, and block levels. Localized plans at the Block Development Office level	Regular Offline programs and workshops in vulnerable block	Improved framing practices, creation of framing community, and better yield
Develop alternative livelihood opportunities	Government should work with local communities to develop alternative livelihood opportunities	Ensure that the affected individuals are trained and equipped with the necessary skills to take up these opportunities	Promoting small-scale industries, agriculture, and eco-tourism, among others

Regulatory Capital	Enforcement	Institutions	Delivery	Likely Impact
	Conduct audits (regular and strict adherence to the existing rules) in industrial units' establishments for improving labor registration.	Connect unemployed registered informal workers with state welfare schemes, especially for people from project-affected districts.	Coordination between a state-central program and proper channelization for transferring the benefit to the marginalised and vulnerable communities.	Occupational safety and accessibility to alternate jobs
	Improve enforcement of workers' registrations at all industrial units/shops and establishments	State directive/rule on employing people from affected regions (based on ID cards)		
	State labor, social welfare, and other line departments must layout plans for the effective implementation of all direct benefit schemes	Ensure 100% delivery of benefits for example under schemes such as PM *Shram Yogi Maan-dhan* scheme (unorganized worker benefit scheme)		
	Allow MGNREGA schemes to function in CBAA areas of the closed coal mines areas (apart from repurposing guidelines dated 22nd April 2022)	Strict enforcement of comprehensive mine closures Utilize closed coal mines for strengthening local ecology and water demand & generating livelihood	A third-party audit of temporary and final mine closure plans (within 5 years of the closure of mine as per the guidelines dated 22nd April 2022)	Improve access of vulnerable communities to basic service Improves livelihood options. Improves housing conditions. Improves health and sanitation
	Ensure smooth implementation of Rights to Fair Compensation and Transparency in Land Acquisition and Resettlement Act 2013, and other Resettlement and Rehabilitation policies and regulations.	Mining companies, vulnerable communities, and administration must work under a tripartite setting for fair redressal of issues and challenges	Land allotment for R&R must have access to basic services (drinking, electricity, food, and toilets) It's been noted R&R lands are allotted in the far interior without access to any basic service and many people have migrated from these R&R centers)	

	Enforcement	Institutions	Delivery	Likely Impact
Regulatory Capital	Amendment in DMF rules for allowing direct financial benefit schemes for vulnerable communities	Launch new cash transfer schemes for "identified vulnerable populations" funded under DMF funds at the district level (currently DMF under the rules doesn't run direct benefit schemes)	Publication of project reports under DMF (list of affected areas from time to time to increase public accountability of DMF)	Access to better life and livelihood Improve sustenance capacity.
	Declare/Grant special status to coal vulnerable districts (may require central intervention and constitutional amendment)	Establishment of a separate development board in the region	First preference for HHs from direct and induced occupations for government employment opportunities	Guarantees employment for vulnerable, marginalised impacted communities
	Establish a state-level committee for promoting a circular economy integrate with SAPCC aims with state industrial policy	Standardization and grading for material for recycling, reuse of products	Identification and creation of a repository for all the CE products/materials	Expansion of alternative livelihood in the region Promotes sustainable jobs
	Strengthen grievance redressal mechanism	Government should establish effective grievance redressal mechanisms to address any grievances or complaints that may arise from the affected communities.	These mechanisms should be transparent, accessible, and accountable.	Ensuring that no one is left behind during the transition
	Integrate ecological restoration in Village Development Plans under the PM Gram Adarsh Yojana	Integrated planning between state departments such as agriculture, social welfare, PWD, Forests, Revenue, DMF, and agencies of central governments		
	Special Consideration of vulnerable blocks and Panchayats under PM Grams Adarsh Yojana			

	Planning/Governance	Technical Aspects	Likely Impact
Economic Capital	Ensure effective implementation of minimum wages in the respective states. (Minimum wages revised in 2022 for Odisha, Chhattisgarh, and Jharkhand)	Co-ordination between the labor department, human resources department, skills development authority, and livelihoods program agencies	Research shows that despite receiving training many workers are not able to join work because of the very low wage rate and are forced to migrate-impacting the economic demography of the district.
	Investment promotion in affected areas and on repurposed lands offering benefits such as- -Tax benefits, -Subsidized electricity, -Concessions for state charges, lands tax, and other -Duty exemptions for export, food-agro, green energy, and recycling sectors	Global Investors Meets Programs, New State-wise industrial policies and Programs Land allocation for industrial clusters near towns where mines are closed.	This will increase revenue in the district and thus public expenditure on services and hence access to basic services Promotes investment, CAPEX in vulnerable regions-increase employment and expenditure

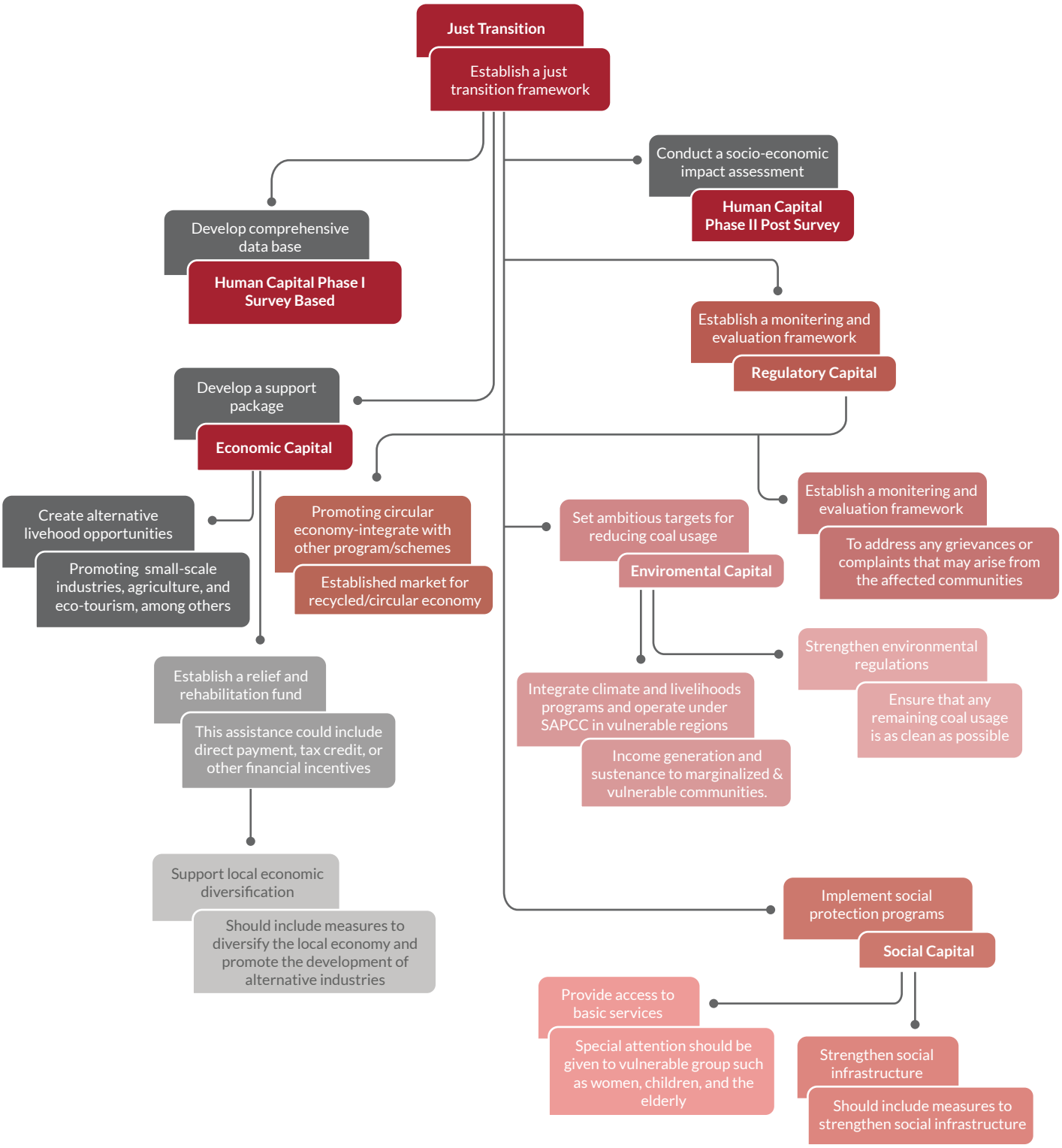
	Planning/Governance	Technical Aspects	Likely Impact
Economic Capital	Technical assistance, for establishing or expanding to recycled based manufacture units financial assistance for non-linear manufacturing/industrial units	Promote investment in the circular economy through technology, innovation, & summits/workshops for the corporate	Helps in building the foundation for a standardized circular economy-increases public awareness and industrial demand as an input.
	Increase state budgets for labour and skill development departments Currently Chhattisgarh, Jharkhand & Odisha have no/marginal expenditure on skill training and skill building	Prioritize investment and programs expansion in vulnerable areas	Builds human resource/human capital
	Districts with high illiteracy rates (including primary education) Ramgarh 75%, Dhanbad 58%, and Koriya 57% must be the prime focus for reducing illiteracy and skill-building programs	Expand the network of Agriculture, aquaculture, and horticulture training centers for climate-resilient crops, animal rearing, and integrated farming among others Ensure 100% access to basic education-operationalize Anganwadi and lunch mini-Anganwadi, especially in the interior of Koriya, Dhanbad, and Ramgarh)	Financially helps village-level communities in gaining sustenance
	Promotion of forestry, home-based forest- agro products manufacturing, at the district level	Registration, and licensing of local artisans and local traditional products	Increases access to interest-free capital for re-establishing self-employment/business along with the promotion of a sustainable market chain
	Expand the electricity network for rural interiors farms for irrigation and water supply	Expanding the reach of PM KUSUM or other similar programs in vulnerable districts (component B)	
	Launch programs for benefit of small businesses and induced workers on the lines of the Dalit Bandhu Program run by the Government of Telangana		
	Roll-out Circular Economy policy and guidelines	Implementing the existing framework and updating as necessary.	Establishes a general framework for the evolution of circular economy standardization, procurement rules, fiscal non-fiscal concessions (in any), Establishment of a market for recycled/circular economy.
	Expand livestock development and breeding programs in areas where mines are closed-focusing on underprivileged population		Provision/access to basic services such as health, education, transport, and water

	Measures	Governance	Potential Impact
Environmental Capital	Set ambitious targets for reducing coal usage.	Set ambitious targets for reducing coal usage and increasing the use of renewable energy sources	Policies and regulations to incentivize the adoption of renewable energy sources.
	Socio-economic impact mapping of vulnerable regions (due to mine closures and climate change impact)	Launch block/panchayat level ecological restoration programs under SAPCC, Environmental Impact Assessment rules	Rebuild local ecology. Improve agriculture and livelihood sources

	Measures	Governance	Potential Impact
	Conduct a comprehensive social impact assessment	Crucial to conduct a comprehensive social impact assessment of the coal phase-down on the surrounding communities and the environment	Evaluation of the potential needs and vulnerabilities of the affected communities
	Establish a relief and rehabilitation fund and implement social protection programs	Coordination between state agriculture and environmental departments Integrated planning for designing ecological restoration projects in vulnerable areas	Provides benefits/ sustenance to landless/ contract less workers. Supports local forestry and agriculture practices.
	Launch ecological restoration programs in vulnerable district/ blocks	Aquifer recharge, water harvesting techniques for improved water system in affected areas	Income generation and sustenance to marginalised & vulnerable communities.
	Promotion of micro-irrigation projects	Holistic roadmap for integrating state and centre-level programs for improved accessibility	
	Integrate climate and livelihoods programs and operate under SAPCC in vulnerable regions	Strict enforcement of compensatory afforestation under CAMPA and other independent schemes	Reduces soil erosion, carbon sequestration, promotes agriculture and income generating avenues
	Backfilling and strict enforcement of afforestation policies and programs	Use closed/abandoned mines for water purposes for local communities	Utilization of closed mines as a resource to the local vulnerable community
	The promotion of organic farming and the use of organic fertilizers The use of bio-fertilizers and bio-pesticides can also help to reduce the dependence on chemical fertilizers	Integrate at block level agriculture schemes and programs	Can help to improve soil fertility and reduce the use of chemical fertilizers. This leads to reduction in farming costs for farmers
	Foster community participation and ownership	The government should work with local communities to foster a sense of ownership and participation in the policy design and implementation processes.	Community participation and ownership are critical to the success of any policy aimed at supporting vulnerable groups due to mine closures.

Social Capital	Institutional	Consultation	Potential Impact
	Established local coal transition bodies (on the lines of Latrobe valley authority or R4A South Africa)	Trade and labor unions, administration, communities, and regional agencies including mining companies must be on the board	Plan, designed, and suggest programs and schemes for protecting the vulnerable working community
	Provide access to basic services	government should ensure that affected communities have access to basic services such as healthcare, education, and water supply	Special attention should be given to vulnerable groups such as women, children, and the elderly, who may be at a greater risk of being left behind
	Establish a multi-stakeholder committee	The committee should be responsible for overseeing the implementation of the socio-economic impact mapping initiative, including data collection, analysis, and dissemination of findings.	It will ensure effective coordination and collaboration among relevant stakeholders, including government agencies, mining companies, local communities, and civil society organizations, it is recommended to establish a multi-stakeholder committee.

Figure 56- **Pert Chart for Transition Framework**



The diagram is a strategic framework outlining the necessary steps for a "Just Transition." It focuses on five key capitals: Human, Economic, Environmental, Social, and Regulatory. By focusing on these five capitals, the framework aims to ensure that the transition is just, equitable, and sustainable, minimizing negative impacts on workers and communities while promoting economic and environmental resilience.

Annexure - 1

Districts	List of Villages Surveyed	
Raigarh	Baraud	Kosampalli
	Chhal	Lukapara
	Dongamahua	Nawapara Tenda
	Gadumaria	Saria
	Garhumariya	Saria Milupara
	Gharghoda	Tamnar
	Gugahan	Tenda Nawapara
	Kondkel	
Koriya	Charcha	Manendragarh
	Chirimiri	Sorga
	Dubchola	South Jhagrakhand
	Haldi Badi	West Jhagrakhand
	Jhagrakhand	West Khongapani
	Khongapani	Kurasia
	Khond	
Angul	Bada Jorada	Natedi
	Badibahala	Rakash
	Danara	Solada
	Gopal Prasad	Talabeda
	Jambubahala	Jorada
	Kalamachhuin	Langijoda
Jajpur	Ambagadia	Bhaguapal
	Jajpur Road	Mandapada
	Sansailo	Kalinganagar
	Duburi	Bhagiapal
	Sarangpur	Hatimunda
	Nadiabhanga	
Dhanbad	Bara Pandeydi	Matigarh
	Dandabari	Muraldih
	Lutuland	Nadhkharki
	Pahuda Basti	Pathar Gariya
	Phularantand	Sidpoki
	Phulwartand	Tandabadi
Ramgarh	Balkudra	Mandu
	Bhurkunda	Patratu
	Bongabar	Sundar Nagar
	Chainpur	Tandabadi
	Karma	Koto
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National Foundation For India

India Habitat Centre, Core 4A
Upper Ground Floor, Lodhi Road
New Delhi 110 003, India
Tel: 91-11-24641864, 24641865 24648490, 24648491
Mail: info@n.org.in

Researcher and Authors: *Pooja Gupta and Mohammed A Faraz*

@NFI_India /NFIInd @nfi_india @NFI_India @nfiind www.nfi.org.in