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Mining caused land acquisition and livelihood displacement: A case of opencast coal mining project at Talcher Coalfield, Odisha

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ABSTRACT

Mineral extraction and coal mining industries are probably the most inevitable prospect for world economy. However, it acquires not simply a sizable tract of land and pollutes soils, vegetations, water bodies, air, etc. but in addition disrupts the whole ecosystem and its perennial resources of sustainable livelihood. Thus, the land acquisition issues have been much controversial in India. Now it seems to become a decisive constraint to India's infrastructure development and a significant reason for unnecessary delays and cost overruns in such projects nevertheless the environmentalists and social activists across globe openly question its adverse impacts. The coal mining industry at Talcher coalfield of Odisha is one such case which besides lifting Odisha's GDP growth has affected land-based livelihood since beginning. In this context, the resettlement and rehabilitation of families displaced by coal mines at Talcher coalfield under our study are now more than two and a half decades old. A large number of second and third generation land oustees have been surviving in a changed agro-climatic condition at present. Since these people are not able to restore their earlier agro-based mode and relation of production, and hardly use their traditional skills and social capital at resettlement sites, they have been marginalised in rapidly ongoing mining industry and urban based-livelihoods. Consequently, their earlier means of livelihood like physical assets, human capabilities, and economic activities have been jeopardised, disrupted and spoiled after displacement. The entire process from involuntary land acquisition to resettlement they have undergone potential shocks, risks and hazards. This article, based on a survey of households displaced by opencast coal mines, analyses how the land oustees have been forced to move toward livelihood displacement confronting their dispossession of earlier human, financial, natural, physical and social capitals in resettlement colonies and clusters.

Key Words : Coal mining, Land acquisition, Displacement, Capital dispossession, Livelihood displacement, Occupational diversification

INTRODUCTION

Mineral extraction and mining industries are the most invisible hands in building world's economy today. To a large extent the coal mining industries and coal-fired thermal plants have been the major sources of electricity generation, fuel consumption, revenue generation and GDP growth for

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the developing countries like India. Most of the world's wealthiest nations have greatly benefited from mining industries in general and so are the developing countries like India and mineral rich states like Odisha in particular (Garada, 2012a and 2013b, MMSD https://www.iied.org/mmsd-final-report). Odisha except last several years over the past decades was one of the poor states in India. Now it came out from its abysmal poverty and proved to be a better performing state in term of Gross Domestic Product (GDP) growth. It could possible largely due to flourishing mining industries like coal, bauxite, iron, etc. (Garada, 2012b and 2013a). Further to trigger better techno-economic viability the opencast method of mining is fast replacing the underground method in Odisha and worldwide. Its nature and dynamics are also so lucrative that it may be set up in just about any Greenfield or Brownfield and in just about any full world (where human being live) or empty world (where he does not) (Garada, 2009 and 2012a; Ashley and Carney, 1999). However, the mining led economic development has resulted a blessing as well as a curse for the developing countries in general. Its long lasting impact on local people, environment and economy goes without correction (Owen, Muriuki and Kemp, 2018; Garada, 2012a and 2012b; Ashley and Carney, 1999). Nevertheless a country like India which has huge coal reserve cannot dispute over land acquisition for coal extraction and consequent GDP growth at present. In the name of public purpose the mining caused land acquisition takes place without seriously taking into consideration of livelihood dispossession of the folks, peasants and farmers from whom the lands are acquired. In the country like India, without land acquisition the prospect of coal mining industry is difficult as the international organization like IMF identifies it constraint to India's infrastructure needs (IMF, 2011; Yadav and Bhar, 2016) and causes unnecessary delays and cost overruns in most infrastructures project (Jacob *et al.,* 2017) at present. Nevertheless it removes the most critical resource- land from which rural people generate their sustainable livelihood**.** Thus, the land acquisition and livelihood displacement are observed to be the two sides of the same process in the mining area. Talcher coal mining area under Mahanadi Coalfield Ltd. (MCL) is no exception to this fact. It is also fact that the whole world is currently fixing all developmental drives with Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs). But how to strike a balance between Mining-Induced Displacement and Resettlement (MIDR) and MDGs or SDGs is just a critical question. However, this article largely focuses on the human tragedy of mining caused livelihood displacement in a coal mining area.

Involuntary land acquisition and livelihood risks: Overview:

Involuntary land acquisition causes physical displacement (affected persons' involuntary movement to another location after losing their own lands, homes and assets) as well as economic displacement (loss of or no access to assets, income sources and sustainable means of livelihood) inclusively. As a result, the concerned mining projects is supposed to take care of the affected and displaced people with adequate compensation (replacement cost of the lost assets), rehabilitation (income restoration, income substitution, transfer assistance, skill training and project benefits including employment avenues) and resettlement (resettlement in resettlement sites with physical infrastructures supporting livelihood restoration and social integration) (Owen *et al.*, 2018, Garada, 2012a, 2012b and 2012c; Cernea, 2000). In the entire process from involuntary land acquisition to resettlement the land oustees undergo a host of potential shocks, stresses, risks, hazards and uncertainty.

Involuntary land acquisition apart from inducing the risks of landlessness, de-capitalisation, and pauperisation (Cernea, 2000; Downing, 2002) have triggered social hazards to the displacees

including mining affected ethnic minorities and farming groups (Nayak, 2000) with a cluster of socio- psychological vulnerabilities. A host of studies on coal mining projects conducted by Garada, 2009; Dhagamwar *et al.,* 2003; Pandey, 1998; Dhagamwar, 1997, Areeparampil, 1989 and others also reflect the similar findings. They argue that most of the displaced families became landless or have substantially reduced their land holding size after displacement. However, more often the displacement studies do not take into account of other potential livelihood impacts that are not directly related to land ownership, such as for instance the loss of wage employment, share-cropping opportunities and access to leaseholds including the risks of unemployment and underemployment (Downing, 2002). The land oustees also experience loss of access to common property resources (CPRs) like common grazing lands, burial grounds (Cernea, 2000; Kibreab, 2000) and public services like school education after displacement (Mathur, 1998; Mahapatra, 1999). At the resettlement sites when the displaced people start sharing host population's livelihood resources they invites cultural clashes, social tension, etc. with latter (Cernea, 2000). It is not easy to find out the impact of coal pollution on agricultural land in the beginning but it is visible and makes it degradable and irreparable in the long run (Dhagamwar *et al.,* 2003). In fact, the coal mining operation directly and indirectly impacts everybody and everything including human, animal, birds, society and environment in the locality (Fernandes and Paranjpye, 1997).

Consequently, the affected people's means of livelihood (means of living: the capabilities, assets and activities) get disrupted and spoiled in long run after displacement. The livelihood assets that includes a pentagon of capitals i.e. human capital (capabilities in terms of labour, skills, knowledge, education, etc.), natural capital (lands, river systems, forest resources, etc.), financial capital (credits, savings, insurance, etc.), physical capital (roads, housing structures, drainage, etc.) and social capital (kinship networks, peer group networks, associations, membership organisation, etc.) are disrupted and dismantled by the mining industry (Owen *et al.*, 2018; Cernea,1997). The livelihood assets also get exposed to consequent shocks (conflict, illness, diseases etc.), sudden trends (changes in demography, economy, government, environment, technology, etc.) and seasonality (cyclic changes in commodity, labour and agricultural markets) in due course of time (Ibid; Garada, 2012a and 2013b).

In this context, mining not just causes human displacement but in addition livelihood displacement. It is also true that the mining displaced people not merely experience livelihood displacement but remain resilient to such potential threats (Owen *et al.*, 2018; Garada, 2013a and 2012c; Downing, 2002).

Study area and sampling:

Talcher coalfield popularly known as coal town is situated at Talcher in Angul district of Odisha, 120 km away from Bhubaneswar. Talcher coalfield has highest geological coal reserve of 51.163 BT on 01.04. 2017 in the country (http://www.mahanadicoal.in). Talcher coalfield comes under Mahanadi coalfield limited (MCL); a coal subsidiary of Coal India limited (CIL) in India. It has eight opencast and three underground coal mines in its five coal bearing areas namely Bharatpur, Jagannath, Hingula, Lingaraj and Talcher coal areas. The Jagannath opencast coal mine (OCM) in Jagannath area and Bharatpur opencast coal mine (OCM) in Bharatpur area are taken for our study located 12 km away and 18 km away from Talcher railway station, respectively. These two projects selected for the study are situated not simply in the same locality, but also have caused similar land acquisition impacts (http://www.mahanadicoal.in).

Under these two projects eight revenue villages were affected from which the land oustees

were resettled in colonies, clusters and MCL quarters through different resettlement and rehabilitation processes. Under Jagannath OCM, the displaced villagers from Balanda have shifted to self-settled cluster at Pabitrapur village, permanent colony at Handidhua and temporary central colony, and displaced villagers from Purunia, Chandpur and Nakhetrapur have shifted to temporary central colony and MCL quarter. Under Bharatpur OCM, the displaced villagers from Anantabereni have shifted to Kuiojungle colony, displaced households from Baideswar village have shifted to Kuiojungle colony and self-settled cluster at Rodhasara and from Lachhamanpur village many displaced/affected households have shifted to the MCL quarter living few households in the village. The total number of household affected by these two projects was 911 (562 by Jagannath OCM and 349 by Bharatpur OCM) as per the MCL Archives, 2007). Out of the total 911 affected villages four villages namely Balanda, Chandpur, Purunia and Nakhetrapur affected by Jagannath OCP and three villages namely Baideswar, Lachhamanpur and Anantabereni affected by Bharatpur OCP were taken in our study. Out of 911 total households our study has covered 137 households by taking 15 per cent sample households through a random sampling method. The households covered in the survey are available in the resettlement colonies, self-settled clusters and one affected village.

METHODOLOGY

Objectives and Methods:

To find out the magnitude of involuntary land acquisition, to assess pre and post-displacement occupational status of sample households, to explore livelihood dynamics in terms of its human, financial, natural, physical and social capital in and around resettlement sites and to find out the overall impact of coal mining operation on land and land-based livelihood are the broad objectives taken in the study. The primary data has been collected by intensive field study through interview schedule and focus group discussion. International agencies and organizations, internets, government documents, papers, books, journals, etc. are the other important sources for our secondary data.

Table1: Social and Demographic Profile

Caste	Total	Sex	Pre-Displacement Period	Post-Displacement Period
SC	53(38.69)	Male	733(51.25)	620(51.02)
OBC	80(58.39)	Female	697(48.75)	595(48.98)
General	4(2.92)	Total	1430	1215
		Literacy	76.70	87.30
		Sex Ratio	950.88	959.67
		Av. Household	10.43	8.86

NB: Figures in Parenthesis denote percentage.
Source: Household Survey 2014-15.

All of the sample households belong to Hindus, of which 58.39 per cent are other backward castes (OBCs) belonging to *Chasa, Dhoba, Gauda, Guria*, etc. 38.69 per cent are schedule castes mostly belonging to Pana and Khajuria communities and only 2.92 per cent is General category (mostly Brahmin as village priest and Karana as writer caste). During pre-displacement period the sample households had 1430 population out of which 51.25 per cent was male and 48.75 per cent was female. During post-displacement period the sample households have 1215 population out of which 51.02 per cent is male and 48.98 per cent is female (Table1). The literacy percentage, sex ratio, and household average have been changed to 87.30, 959.67 and 8.86, respectively at present from 76.70, 950.88 and 10.43 respectively during pre-displacement period. Our study reveals

that the present generations compromise their higher education in order to get early income engagement and employment in and around the private and public sectors project operating in the Talcher locality.

Impact of land acquisition on land-based livelihood:

Land acquisition and loss of access to natural capital:

About 14266.2 hectares of land was acquired by coal mining projects through Land Acquisition Act (LAA) 1894 and Coal Bearing Act (CBAA) 1957 in Talcher coalfield. Out of this total land acquired both opencast mines (Jagannath OCM and Bharatpur OCM) taken in our study acquired 2268.5 hactares (15.90%). Jagannath OCM acquired 1389.7 hactare (9.74%) from four sample villages and Bharatpur OCM acquired 878.82 hactare (6.11%) from three sample villages taken in our study. MCL acquired more lands (69.32%) by Coal Bearing Act (CBAA) than by Land Acquisition Act (LAA) (30.68%). However, comparison to Land Acquisition Act (LAA) 1894 the Coal Bearing Act (CBAA) 1957 was more repressive to the people but less complicated to the project authority.

Our focus group discussion also reveals that the mining authority acquired lands using these two acts without enough justification and land oustees' prior-informed consent. In fact, the mining caused land acquisition has dispossessed the people not merely from their tenancy holding but from their freely available natural capitals like forests, water bodies, etc. in the Talcher coalfield locality.

Our study reveals that more than half of the sample households (from 50% to 70%) except to water bodies, has no access to forest lands, government lands, forests, minerals, etc. whereas only 10 to 25 per cent of them expressed that they could access. It is clear in the Table 2 that from 15 to 40 per cent of sample households remained indifferent to our question. Mostly the households who are staying in the resettlement colony and clusters seem to have access to natural capitals because they have shifted to forest area after displacement. And mostly the employed households who are staying in the MCL quarters have remained indifferent to the question of access or no access on natural resources because they hardly require natural capitals like land and forest for their livelihood at present.

Table 2 : Post-Displacement Perception on Access to Natural Capital

Natural Capital	Access	%	No Access	%	Indifferent	%
Forest Lands	23	17	69	50	45	33
Govt. Lands	27	20	69	50	55	40
Water bodies	96	70	34	25	7	5
Forests	34	25	82	60	21	15
Grazing grounds	15	11	69	50	53	39
Minerals	14	10	99	70	27	20

Source: Household Survey 2014-15

Most of the displaced villagers used to get into to a variety of government lands such as for instance forest land, pasture land, temple land, rock land, grazing land, etc. before displacement. Now the forest department also restrict them from accessing local forest resources. Consequently, the land oustees lost their access to or have restricted access to the natural capitals obtainable in the locality. Many argue that in the absence of resource conservation and protection measure the natural capital formation and resource density have now been damaged or decreased and to a large extent whatever available has been polluted at present.

In this context, Talcher-Angul area as one of the industrial hub of the country with many ongoing industries such as coal mines, power plants, iron plant, steel plant, aluminium smelting plants, sponge and iron plant, Ferro alloys plants etc., has been heavily polluted. Now the polluted natural resources have become closer and less productive to the displaced people than before displacement. The industrial and domestic use of the coal and pollution by other secondary industries has massively contributed to the ecological footprint in the locality. Though compared to their earlier period the land oustees remain less access to remote land, forests, rivers and springs, but alongside mining pollution they have created bigger ecological footprint in the locality at present. Acknowledging this truth the Talcher-Angul coal belt was declared one of the most 24 critically polluted industrial clusters of the country (State Pollution Control Board, 2010).

Changing landholding pattern and farmers' livelihood:

As per the pre and post-displacement comparison of landholding pattern of displaced households (Table 3) the number of landless households has been drastically increased to as much as 81.75 per cent at present from 5.84 per cent before displacement. Similarly, the number of large farmer (above 10 acres), medium farmer (from 5 acres to 10 acres) small farmer (from 2.5 acre to 5 acres) and marginal farmer (less than 2.5 acres) has been drastically decreased to 0, 4.38, 7.30 and 6.57 per cents, respectively in post-displacement period from 16.06, 36.50, 30.66 and 10.95 per cents, respectively in pre-displacement period. Thus, it not simply a change in landholders 'status as large farmer becomes medium farmer, medium farmer becomes small farmer and small farmer becomes marginal farmer but a large scale change as it has maximised the number of landless category at present.

Table 3 : Landholding Pattern of Pre and Post-Displaced Farmers/Households

Landholding Category	Pre-displacement	%	Post-displacement	%
>. 10 acres	22	16.06	0	0
>5 acre to 10 acres	50	36.5	6	4.38
>2.5 acre to 5 acres	42	30.66	10	7.30
< 2.5 acres	15	10.95	9	6.57
Landless	8	5.84	112	81.75
Total	137	100	137	100

Source: Household Survey 2014-15

Although many displaced large and medium farmers who have slide down to the category of small and marginal farmers but purchased lands in and around their self-settled cluster at Pabitrapur village but they feel it difficult to cultivate the unreclamated lands and barren forest lands without irrigation facility in polluted environment. Majority of the displaced medium farmers those who are not employed have become economically more insecure and vulnerable at present. Almost all small and marginal farmers do not consider themselves as farmers because they find farming is uneconomic and unviable for living at present time.

Agricultural landlessness and livelihood insecurity:

We have assessed above the livelihood disruption of displaced oustees in term of land acquisition, tenancy landholding and land holding patterns. A huge quantity and quality of lands acquired to mining operation have brought adverse impact to the oustees after displacement. Our study also reveals that still land and agriculture remain status symbol and livelihood security for the land

oustees. They argued that the government had opened up flood gate of land dispossession in Talcher coalfield areas from 1960s to 1990s. For instance, the tenancy land holding of post-displaced households has been reduced to 95.45 acres from 988.18 acres before displacement. About 90 per cent of total landholding status of the displaced households has been reduced after displacement (Table 4). As compared to the earlier tenancy lands present quality of lands available to the displaced is inferior and infertile as well as gets exposed to mining pollution. The local categories of tenancy lands such as Sarad-I Sarad-II and Sarad-III and Taila have been no more hierarchical as all of them are equally damaged and polluted by mining operation. However, Sarad land as a well levelled loamy soil is more suitable for different crops than Taila lands. Comparison to Sarad-I (better irrigated), Sarad-II (hardly irrigated) and Sarad-III (cannot be irrigated) Taila lands (inferior forest lands) are hardly cultivable (Garada, 2009).

Table 4 : Land Holding Profile of Pre and Post-Displaced Households (in Acres)

Land type	Pre-Displaced	%	Post-Displaced	%	Reduction	%
Sarad-I	487.68	49.35	20.45	21.42	467.23	95.81
Sarad-II	55.5	5.62	10	10.48	45.5	81.98
Sarad-III	85	8.60	0	0.00	85	100.00
Taila	360	36.43	65	68.10	295	81.94
Total	988.18	100.00	95.45	100.00	892.73	90.34

Note: (i) Sarad-low and medium land for different crops, (ii) Taila-Inferior high land
Source: Household Survey 2014-15

As per our study the present status of holding of Sarad and Taila lands has been almost reduced to 90.34 percent (95.45 acres from 988.18 acres during pre-displacement period). The respective holding of Sarad-I, Sarad-II and Sarad-III and Taila lands has been reduced to 95.81 per cent, 81.98 per cent, 100 per cent and 81.94 per cent, respectively after displacement. Thus, the average land holding size of sample households after displacement has been remarkable reduced to 0.70 acres from 7.21 acres before displacement. The displaced people argue that Sarad land was largely contributing to their food production, food consumption and food security in pre-displacement period. They used to grow annually almost three crops in Sarad-I land which was quite satisfactory for their reasonable living. A variety of cereals like maize, wheat, paddy, millets, etc., pulses like green gram, black gram, arhar, horse gram, etc., oilseeds like mustard, til, groundnuts, etc. and vegetables grown in Sarada lands was catering to consumption needs in the pre-displaced villages. Besides raising different crops in the agricultural lands the villagers were raising grass and fodder (for the livestock), developing horticulture and kitchen garden, fishing, dairy farming and the like. Now the land oustees in the affected village, MCL colonies and self-settled clusters hardly make multiple uses of their lands.

Occupational diversification and livelihood insecurity:

For our analysis main occupations of sample households has been grouped into farming, hereditary occupation, unskilled work, semi-skilled work, skilled work, and others work. In a comparative analysis, it is clear that there have been remarkable changes in livelihood patterns during post-displacement period.

Changing farm based occupation and livelihood insecurity:

In the case of farm based occupations the number of main earners was reduced to 3(0.88%)

in post- displacement period from 242 (51.49%) in pre-displacement period (Table 5). Out of total main earners of sample households in pre-displacement period the farm-based occupational holders were 51.49 per cent (cultivators 32.98 %, agriculture labourers 17.87% and share croppers 0.64 5 %). Now it has been reduced to 0.88 per cent, zero and 0.88 per cent respectively in post-displacement

Table 5 : Occupational Profile of Surveyed Households in Pre and Post-Displaced Period

Occupation	Pre-displacement period			Post-displacement period		
	Male	Female	Total	Male	Female	Total
1. Farming						
Cultivation	149	6	155	3	0	3
	(31.7)	(1.28)	(32.98)	(0.88)	(0)	(0.88)
Agr. Labouring	62	22	84	0	0	0
	(13.19)	(4.68)	(17.87)	(0)	(0)	(0)
Share Cropping	3	0	3	0	0	0
	(0.64)	(0)	(0.64)	(0)	(0)	(0)
Total	214	28	242	3	0	3
	(45.53)	(5.96)	(51.49)	(0.88)	(0)	(0.88)
2. Hereditary						
Caste based	62	0	62	6	0	6
	(13.19)	(0)	(13.19)	(1.77)	(0)	(1.77)
3. Unskilled						
Non-Agr. Labouring	24	0	24	8	13	21
	(5.11)	(0)	(5.11)	(2.36)	(3.83)	(6.19)
4.Semi-Skilled						
Business	8	0	8	17	0	17
	(1.7)	(0)	(1.7)	(5.01)	(0)	(5.01)
Transport Work	9	0	9	24	4	28
	(1.91)	(0)	(1.91)	(7.08)	(1.18)	(8.26)
Contract Work	68	0	68	117	3	120
	(14.47)	(0)	(14.47)	(34.51)	(0.88)	(35.4)
Masson/ Carpenter work	9	0	9	2	0	2
	(1.91)	(0)	(1.91)	(0.59)	(0)	(0.59)
Total	94	0	94	160	7	167
	(19.99)	(0)	(19.99)	(47.19)	(2.06)	(49.26)
5. Skilled						
Government Service	6	0	6	2	0	2
	(1.28)	(0)	(1.28)	(0.59)	(0)	(0.59)
Private Service	0	0	0	5	0	5
	(0)	(0)	(0)	(1.47)	(0)	(1.47)
Public Sector/	40	2	42	92	10	102
Pvt. Corporate Service	(8.51)	(0.43)	(8.94)	(27.14)	(2.95)	(30.09)
Total	46	2	48	99	10	109
	(9.79)	(0.43)	(10.22)	(29.2)	(2.95)	(32.15)
6. Others	0	0	0	30	3	33
	(0)	(0)	(0)	(8.85)	(0.88)	(9.73)
All Total	440	30	470	306	33	339
	(93.62)	(6.38)	(100)	(90.27)	(9.73)	(100)

Note-Main occupation – Involvement of more than 180 man days almost regularly
NB: Figures in Parenthesis denote percentage.
Source: Household Survey 2014-15

time. Now female involvement in the farming has been reduced to zero. As stated earlier, the massive land acquisition, land pollution, loss or no access to the other natural capitals like government land, forest land, non-availability of agricultural and reclamated lands, etc. have reduced the numbers of farming households and consequently increased their livelihood insecurity after displacement (Table 5).

Changing hereditary occupation and livelihood insecurity:

In case of hereditary occupation (caste based non- professional skilled) the number of caste-based earners has been reduced to 1.77 per cents in post-displacement period from 13.19 per cents in pre -displacement period (Table 5). Each and every caste used to have a unique occupation before displacement. The caste based occupation was prevailing among the caste groups in a principle of division of labour and mutual obligation. The occupational castes like priest, potter, washerman, barber, fisherman, blacksmith, goldsmith and carpenters were servicing to each other on Jajmani basis. Somehow they continued their hereditary occupations till their physical displacement by the mining project but now they cannot. For instance, traditionally *Dhoba* (washer man) who used to receive food grains/crops annually from other higher caste households by washing clothes find it difficult to do so. The displaced washer man has either do not like to continue the caste based occupations or those who like hardly find it economic due to unavailability of water sources like ponds and nalla (canal) for washing and unavailability of their clients in resettlement sites.

Similarly, the *Keuto* (fishermen) neither finds it easy to carry on fishing in coal polluted environment nor can compete with fish sellers in the local market. The *Kumbhara* (potter) cannot make their living by selling earthen pots and wares because they hardly finds quality earth for preparing it, and rarely finds any clients in the colonies and clusters as people turn toward steel made utensils. The *Guria* (sweet maker) cannot continue their caste-based occupations because now villagers go to town to purchase sweets at the time of festivals and functions. They also do find it difficult to compete with sweet shop owners at present.

The scheduled caste, *Panas* the weavers, drummers and brooms/rope makers and *Khozuria* the local wine makers from mahua and date-palm no more continuing their caste-based occupations because they find it non-economic or they do not like it on prestige ground. The *Bhandari* (Barbar) those who used to cut hair, shave beards and trim nail of other higher castes cannot finds it as occupation for their younger generation. The *Goudas* who used to tame cows and bullocks also finds it difficult to keep cows due to lack of space and grazing grounds in their resettlement sites. Now Barbar cannot arrange clients as many people go to saloon and *Goudas* find it difficult in selling milk as people purchase it from the local market. *Kamara* (blacksmith) who used to make their living in making and selling agricultural implements cannot carry it due to lack of demand on these implements in the colonies and clusters. Thus, many among the caste groups either have been forced to give up their caste-based occupations or started pursuing new or other non-agricultural type of occupation in resettlement sites.

Changing unskilled work and livelihood insecurity:

For our analysis as stated earlier beside farm and caste based occupations the number of main earners of sample households has been grouped into unskilled workers, semi-skilled worker, skilled workers, and others workers. As per the Table 5 the number of unskilled workers mostly non-agricultural labourers has been increased to 6.19 per cent in post-displacement period from 5.11 per cent in pre-displacement period. The disguised non-agricultural and manual labourers as unskilled

workers were engaged seasonally before displacement. Unfortunately, their numbers have not been reduced because many of them are not rehabilitated adequately and many small and marginal farmers have become unskilled workers after displacement. Interestingly comparison to male unskilled workers the number of female unskilled workers has been increased from zero in pre-displacement to 3.83 per cent in post-displacement time. Earlier women were largely part-time engaged in agricultural and non-agricultural activities. As a matter of prestige many of them hardly used to engage themselves in the non-agricultural labour work. Our study reveals that while many male unskilled main workers have been diverted toward semi-skilled and skilled occupations and many of them remain unemployed and under-employed, the female workers (3.83%) are forced to engage themselves in unskilled works in these days. Thus, the sustainable livelihood security for these category people has been far from the reality at present.

Changing semi-skilled work and livelihood insecurity:

Similarly as many sample households now became landless people they had to pursue business, transport work and contract work with their little skills (49.26% of total main workers now). The unemployed and under employed landless oustees with little qualification and experiences have been engaged in the self-employed business (5.01%), mining industry induced transport work (8.26%) and mining based contract works (35.40%) (Table 5). Thus, except mason/ carpenter (Table 5) the number of semi-skilled workers has been increased to 48.67 per cent in post-displacement period from 18.08 per cent in pre-displacement period. However, semi-skilled engagement and employment are temporary and unsustainable at present. The number of mason and carpenter has been reduced to 0.59 in post-displacement period from 1.91 per cents in pre -displacement period. Our focus group discussion reveals that initially more number of mason and carpenter were engaged while construction work was started for the mining project but gradually their engagement was declined due to non-availability of work and entry of migrated masons and carpenters in their locality. Now though many of them get engaged in the semi-skilled works but rarely and occasionally that has added to their spectrum of livelihood insecurity now.

Changing skilled work and unsustainable livelihood:

The number of post-displaced skilled workers (professional) has been increased to 32.15 per cent at present from 10.22 per cent in pre-displacement period (Table 5). Before displacement government service and Public Sector/Pvt. Corporate Service provided employment to 1.28 per cent and 8.94 per cent of our sample households respectively. After displacement many of them got employment in private service (1.47%) and public sector/ pvt. corporate services (30.09%) operating in and around mining projects (Table 5). However, they argue that the displaced households were employed in the mining projects in lieu of their land acquisition and that too it is till the date of superannuation. The present maid servants and pension holders (9.73%) are some of the other categories who were not found in the pre-displacement period. Unfortunately very less number of female skilled workers was increased (2.95%) after displacement. The entire main occupational profile reflects a gender disparity as it was only 6.38 per cent and 9.73 per cent during pre and post displacement period respectively. The post-displacement situation could not reduce the livelihood insecurity related to feminisation of poverty based on the extent of women's involvement in the main occupation.

Trajectory of occupation based livelihood insecurity:

Our study and focus group discussion reveals that the above changing trajectory of occupation in post-displacement period was caused due to many factors of which backward and unproductive use of human capital, mismanagement of financial capital and unavailability of physical and social capitals are largely responsible.

Extent of human capital used in households and livelihood:

The project has largely displaced the traditional livelihood activities with modern alternatives in the Talcher locality. As per the post-displacees' responses (6) from 50 to 100 per cent of their capabilities based on traditional labour, knowledge and skill no longer compatible to modern labour, knowledge and skill after displacement. The landless labourers' seasonal engagement in village level agriculture and animal husbandry and their hereditary occupation largely based on traditional labour, knowledge and skill get out dated now. About 70 to 95 per cent of the displaced households say that they cannot have productive use of their traditional labour, knowledge and skill. And the rest 10 per cent of them also feel traditional labour, knowledge and skill are now less valuable and viable in and around Talcher coalfield.

Other part-time farmers, sharecroppers, tenants and even small landowners who used to depend upon other's farm and non-farm works and other dependant adult members mostly women used to act as labourers for their subsistence while adult active member mostly head of the household remained busy with their traditional occupations. However, the traditional labour engagement known as semi-free labourer and dwarf-holding labourer used to lack full time employment in the villages before. Many of them used to remain under-employment all the year except harvesting time. Whether these semi-free labourers, dwarf-holding labourers and under-employed landless labourers have been absorbed in and around the coal mining project is critical question.

Table 6 : Use of Human Capital

Human capital	Incompatible Use With Modern Skills	%	Non-Productive Use	%
Unskilled	127	93	123	90
Semi-skilled	69	50	125	91
Professional Skilled	137	100	96	70
Non-professional skilled	134	98	130	95

Source: Household Survey 2014-15

Our study reveals that non-farm engagement including with mining is though available round the year to some extend but come like employment wave and not sustainable. Now based on the skills most of the farmers, peasants, small landowners, landless labourers, part-time farmers, sharecroppers, tenants, hereditary occupational holders, etc. are grouped into skilled labourers, unskilled labourers and semi-skilled labourers in and around the coal mining projects.

In fact, the uneducated, non-trained and people (who lack specialized skills and education and work in the mines and industries) as daily wage workers remain unskilled labourers while the construction workers, occasional cooks, temporary security guards/watchmen, gardeners, mason, carpenter, etc. act as semi-skilled labourers with some specialized abilities, education and trainings. Skilled labourers like carpenters and mason remain non-professional while the project employees with technically qualification and skills required for the mining employments become the professional.

The all unskilled and semiskilled labourers earn daily wage while the project employees earn

salary enjoying most of the project benefits as any other white-collar workers in India. Today's employment market needs more skilled and semi-skilled labourer comparison to unskilled labourers. However, turning all of the semi-skilled and unskilled labourers into skilled labourers with necessary education, training and experience is not possible. The many unskilled labourers thus feel outdated and unproductive and therefore feel more difficult to find jobs in the mining projects. As a result, the skilled migrated labourers in the locality have grabbed the employment opportunities created by the mining operation in the Talcher locality.

Extent of financial capital used in households and livelihood:

The financial capital or cash as a fluid capital plays vital role in stabilising the economic status of the post-displaced households. However, there are polarise views on the management of and spending on their cash income and compensation. Many of the sample households expressed that they found difficult in handling their cash compensation without any effective management practices after displacement. For instance their spending has been different such as saving (40%), investment (15%), lending (5%), borrowing (77%), purchasing assets (100%) and buying insurances (30%) and housing structure (100%) have been at present (Table 7). Our study reveals that many employed land oustees have saving as bank deposit, purchased houses and bought equity, mutual funds and regularly make payment on life insurances. On the other hand, the non-professional skilled and semi-skilled workers hardly have any saving but invested their cash compensation on small business like grocery shop, pan shop, Xerox shop, rice mills, hotels, etc.

Table 7 : Use and Management of Financial Capital

Financial Capital	Management	%
Saving	59	40
Investing	21	15
Lending	7	5
Borrowing	105	77
Purchasing assets	137	100
Housing structure	137	100
Insurances	41	30
Marriage/ Health/ Pilgrimage/Social Function	75	55

Source: Household Survey 2014-15

Almost 100 per cent of the displaced households have invested some amount of their cash compensation on building their houses at present. Purchasing ornaments still remain a status symbol nevertheless the extent of private mortgaging of ornaments; private money borrowing and money lending has also been equally increased at present. A large number of the land oustees (55%) likewise have spent their cash compensation lavishly on marriage, health, pilgrimage and social functions and festivals. For instance, a few affected families (Chasa caste) from Baideswar displaced village could not construct their houses on MCL allotted plots at Kuiojungle colony because they spent compensation money on repayment of old debts and of marriage of their sons and daughters. Our focus group discussion reveals that many unemployed - non professional skilled and semiskilled oustees have increased their debts burden because it is readily available in the private formal and informal markets.

Table 8 : Status of Physical Capital at Resettlement Sites/ MCL quarters

Physical Capital	Adequate	%	Accessible to MCL provided Infrastructure	%
Colony	25	18	95	69
Clusters	38	28	19	14
MCL Quarters	41	30	23	17

Source: Household Survey 2014-15

Status of physical capital availability and livelihood security:

The physical infrastructure *i.e.* schools, housing, roads, health centre; community centre and related other common amenities can promote the formation of other capitals. However, about only 18 per cent, 28 per cent and 30 per cent of households residing in colonies, clusters and MCL quarters, respectively express their satisfaction with available physical infrastructure (Table 8). This means about 24 per cent of households don not find available physical infrastructure as adequate. Our study reveals that the MCL project though provided some basic infrastructure *i.e.* homestead plots, roads, wells, schools, etc. in colonies and clusters but not yet provided clean drinking tap water, cremation grounds, postal and public transport services, primary medical centre, etc. For example, in the absence of cremation ground the resettled ousstees at Kuiojungle colony take their deceased persons' dead bodies to a place more than from 10 to 15 km away from the colony. The size of allotted homestead plot of 5 and 8 decimals in Handidhua and Kuiojungle colony respectively was not adequate enough. The central colony utilized by the projects as temporary settlement has become permanent colony because the project did not make resettlement sites for them. The problems of road and transport were acute in Pabitrapur cluster till 2005 and Rodhasara self settled clusters till 2008. However, the maintenance of roads seems to be neglected and the available tube wells, open wells, and ponds more often remain dysfunction and dry during summer season in the clusters and colonies. The water sources are not safe from the coal-based pollution. Similarly though present clusters have electricity connection but suffers from the irregular electricity supply, frequent power cuts and voltage fluctuation.

Similarly many of them express their dissatisfaction on the inadequate educational infrastructures in the clusters and colonies. For instance, in Handidhua colony students do not feel going to schools, because the schools do not have playground and lacks quality teaching. On the contrary a few those who have got MCL jobs on rehabilitation ground have been sending their children to English medium schools enjoying all facilities in the MCL quarters. Even, whatever the basic amenities like schools, tube well, etc. provided by the MCL authority in the colonies and clusters, are not maintained regularly by the government. Addition to these civil disabilities, the displaced families have been suffering from pollution and hostile atmosphere from host population in the new sites.

Table 9: Access and Use of Social Capital

Social capital	Pre-displacement period		Post-displacement period	
	Yes	%	Yes	%
Social network	134	98	14	10
Kinship network	137	100	15	11
Peer-group network	96	70	27	20
Membership association	7	5	41	30
Reciprocity	96	70	10	7
Trust	110	80	3	2

Source: Household Survey 2014-15

Status of use of social capital and livelihood security:

Now some senior oustees feel like refugees in their own lands. In this impoverished context, they miss their earlier mode of social capital for rebuilding present social life. They argue that if they revive their earlier practices of social networks, kinship networks, peer-group networks, membership organisation and associations, trust, reciprocity, etc. they can reduce their present stress, risks, hazards, vulnerability, conflict, isolation, and so on. However, except membership association from 2 to 20 per cents of sample households have access to and use their social capital at present whereas it was 70 to 100 percent during pre-displacement period. Now they feel more difficult to preserve and maintain their social capitals as they have been divided, discriminated to each other, differently displaced, dispersed, affected, unevenly benefited, violated, evacuated and so on. Since the land oustees have passed more than 25 years of their resettlement at colonies and clusters and have been living in a changed social and physical environment they cannot revive their lost social capital at present. Now they not simply lack proactive community organisation like caste-based organizations, youth organization, cooperative bodies, Bhajan Mandalis, Drama pendal, etc. but also lack space and festive locations of ritual and religious importance at resettlement sites.

Conclusion:

In the prospect of mining led development coal mines with a host of other industries like thermal power plant, steel plant, aluminium smelting plants, etc. had acquired tenancy and forest lands to an alarming scale in Talcher-Angul coal belt. As a result the land oustees lost their earlier access or have restricted access to their freely obtainable natural capitals like land, forest and water bodies. Our study reveal that in the absence of resource conservation the natural capital formation and resource density have now been damaged or declined and whatever available has been polluted. These polluted natural resources have become closer and less productive to the displaced people than before. Thus, land based livelihood is increasingly impossible in the mining area. The mining caused land acquisition not simply changed the status of farmers as large farmer becomes medium farmer, medium farmer becomes small farmer and small farmer becomes marginal farmer but has maximised the number of landless category. In case of status of hereditary occupation many among occupational castes like potter, washer man, barber, fisherman, blacksmith, goldsmith and carpenters have been either forced to give up their caste-based occupations or pursue new or other non-agricultural type of occupations in resettlement sites. Without village and agricultural land the livelihood security for these category people have been far from the reality at present.

Our study reveals that the above changing trajectory of occupation in post-displacement period was caused due to many factors of which unproductive use of human capital, mismanagement of financial capital and unavailability of physical and social capital are largely responsible. In case of human capital management the employment market needs more skilled and semi-skilled labourer comparison to unskilled labourers in post-displacement period. Since many unskilled labourers remain unproductive they hardly find jobs in the mining projects than before. This led to labour pooling from outside as skilled migrated people have grabbed the employment opportunities in the locality. The entire main occupational profile also reflects a gender disparity. The post-displacement situation could not reduce the livelihood insecurity related to feminisation of poverty based on the extent of women's involvement in the main occupation.

In case of management of financial capital our study reveals that while many employed land oustees have savings as bank deposit, purchased houses and bought equity, mutual funds and insurance, the non-professional skilled and semi-skilled workers hardly have any savings. They

have invested their cash compensation on small business like grocery shop, pan shop, hotels, etc. Our focus group discussion reveals that many unemployed-non professional skilled and semiskilled oustees have increased their debts burden because loan is readily available in the formal and informal markets.

In case of availability of physical capital our study reveals that the MCL project though provided some basic infrastructure *i.e.* homestead plots, roads, wells, schools, etc. in colonies and clusters but not yet provided clean drinking tap water, cremation grounds, postal and public transport services, primary medical centre, etc. In the clusters and colonies the available tube wells, open wells, and ponds more often remain dysfunction and dry during summer season. Addition to this, the displaced families have been suffering from coal based pollution, hostile atmosphere from host population, vulnerability, mutual conflict, stress, risks, and hazards in the new sites. At this juncture they desperately need their earlier social capitals like social networks, peer-group networks, mutual trust and reciprocity, etc. but they hardly revive these now as they have been divided, discriminated to each other, differently affected and impacted, unevenly benefited and so on.

Thus, the mining induced land acquisition has led to their livelihood displacement because they could not access or use their natural, human, financial, physical and social capitals after displacement. The real tragedy of land acquisition will relapse virtually to self immolation situation when coal reserve will be exhausted and coal-industries will be closed down. In the absence of cultivable lands whether the people of Talcher coalfields will eat industries, drink mines and breathe coal ashes in future is another livelihood related question. This is high time to think about a life sustaining option for rehabilitation of the mining displaced and affected people in the state.

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