



Assessing the Impact of Coal Mining on Diversified Sources of Rural Livelihoods: A Case Study in the Ib Valley Coalfield Area of Western Odisha, India

Nabanita Das and Niharranjan Mishra

Department of Humanities and Social Sciences, National Institute of Technology, Rourkela, Odisha, INDIA

Available online at: www.isca.in

Received 24th April 2015, revised 26th May 2015, accepted 10th June 2015

Abstract

Extraction of coal and minerals has become an indispensable activity for industrial and societal development. But since its invasion it has been considered as a societal and environmental unfriendly substance as it creates unbearable damages on each and every component of the environment as well as society. Generally, most of the coal bearing areas exist in forest cum-agricultural zones which usually are socially and economically underdeveloped. Up to some extent, the coal mining industries prove their brilliance by providing employment opportunity and some infrastructural betterment. Certainly with the prologue establishment of these coal mining projects not only the economic development grows up, but on the other hand, some serious issues like land acquisition, mass scale displacement, loss of livelihood opportunities, air water and noise pollution, loss of biodiversity etc. crop up. Again the rural regions which have their peculiar source of diversified livelihood are becoming resource less. As a result the diversified sources of livelihood were clutched by mining activities. Reflecting on above background and taking the primary information and personal experiences into account the present paper has made an attempt to focus on the impact of coal mining on the diversified sources of livelihood in the Ib valley coalfield area. The paper concludes that though mining is providing improved income earning opportunity still it has apprehended the diversified sources of livelihood which endures a basic ingredient for rural livelihood generation.

Keywords: Diversified livelihoods, coal mining, employment opportunity, rural mass, Ib valley.

Introduction

Coal has a substantial influence on the global economy. Asia, being the principal marketplace of coal is consuming 67 per cent of global coal. Many countries across the globe are reliant on coal as they are not blessed with adequate energy resources to shelter their energy needs. Countries like Japan, Chinese Taipei and Korea, ingress substantial measures of steam coal which is meant for electricity generation and coking coal which needed for steel production. Even the alumina refineries, paper manufactures, chemical and pharmaceutical industries etc. are the regular consumers of coal. The evaluation on the growing demand of energy resources shows that in between 2000 and 2010, coal encountered nearby half of global energy demand. Though there occurred hurried exhaustion in the case of renewable energy technologies, predominantly in the perspective of climate change, coal stand as the prominent unit of sustenance to fulfill the global demand of energy¹.

Immediately after independence the mining sector of India, is proliferating an incredible growth mutually in the spheres of cost and magnitude. India yields eighty seven mineral deposits, of them, four types of minerals emanated under fuel category, ten are under metallic substances, forty seven sprung as non-metallic affluences, three are atomic and twenty three minor minerals (together with building and other materials).

Paradoxically, India holds the tag of world's prime manufacture in mica mining, ranks 3rd in the production of coal, lignite and barytes, 4th in iron ore, 6th in bauxite and manganese ore, 10th in aluminium and 11th in crude steel in the world². Among the non-metallic mineral reserves, coal is the most important and abundant fossil fuel in India. It accounts for 55 per cent of the country's energy need. It is not only beneficial to generate electricity but also convenient to extract iron and additional metals from the ores. Besides this, it also has voluminous usages worldwide. Ever since 2000, the consumption of coal excelled the other fuels across the globe. This degree is confined mostly with the five largest coal using countries, i.e. China, USA, India, Russia and Japan. And they are consuming 76 per cent of total global coal use³.

Basically coal can be obtained through excavation. And the process of excavation can be done either by underground or opencast, depending on the geology of the coal deposit. Surface mining or opencast mining excavates larger fraction, i.e. 90 percent of coal than that of underground mining. Usually coal mining takes place in rural areas where the developmental activities like mining industries provides employment, if not the majority of residents in the region. According to the recent estimation, coal industries are employing 7 million people worldwide and 90 per cent of them belong to the developing countries. Coal mining, not only provides direct employment,

but also generates employment opportunities from other associated units of it. Even the establishment of large scale coal mines is responsible for the substantial base of local revenues and gives incentives for the improvement of local infrastructure⁴.

Sometimes, coal extraction is leading some sort of land use conflicts with the native inhabitants. Local residents used to oppose the establishment of mining industries as they fear that it will hinder their usual pattern of livelihood. Usually mining takes place in the mineral rich regions where people are mostly dependent on nature and natural resources to sustain their livelihoods. But the modern commercial activities like coal mining industries are hampering their traditional way of life. Even they are forcibly vacating their homestead lands. The assurance of reclamation and reuse of land, proper rehabilitation, etc. remains in the pen and paper only. The welfare measures serving directly to the governing fragments and others remain as victims without adequate manifestations of these so called development activities.

The growth of mining industries has contributed to economic development in many of the world's economy including India. However, the mining industries are proving to be better investors by providing employment, both directly and indirectly, undertaking local infrastructural development and through foreign exchange earnings. At the same time mining also threatened the dominion of the indigenous communities. So it is debatable that, what happened with the indigenous communities or they the beneficiaries or victims? By carrying out endless mining activities no doubt the country is becoming resource rich but at the same time it has ignored the traditional sources of livelihood which is decaying in the influence of mining activities. Even it barely employs any anxiety towards environment which is degrading progressively, at the same time; it also ignored the social and economic life of the indigenous communities. More specifically, mining has a direct negative impact on the diversified livelihoods of the primitive dwellers of the land. In this context the present paper made an analysis to determine the impact of coal mining on the diversified sources of livelihood at the Ib valley coalfield region of Odisha, India.

Methodology

Study Area, Data Collection and Methodology: The study contemplates on the Ib valley coalfield of Odisha. Ib valley coalfield is coming under the jurisdiction of Mahanadi Coalfields Limited (MCL) which is a subsidiary of Coal India Limited (CIL). MCL has two coalfields, i.e. Talcher coalfield and Ib valley coalfield. The first one is positioned at Talcher-Anugul belt and the second one is at Ib valley coalfield region. And Ib valley coalfield is spreading over Jharsuguda and Sundargarh districts of Odisha. Further, Ib valley coalfield is functioning in five parts, i.e. Orient area, Lakhanpur area, Basundhara area and Garjanbahal area. The first three are in operation in the Jharsuguda district and the last two are in

Sundargarh district⁵. In compare to Sundargarh district the coalfields of Jharsuguda district are old and with the rising production of coal it is leading more consequences (positive/negative) in the context of development. Owing to this reason the coalfields of Jharsuguda district were selected. Again the opencast mines are more harmful than the underground mines, for this cause the mining affected villages near opencast mines were selected for the present study.

On the basis of severity, six mining affected villages were carefully chosen around three opencast mines. As the opencast mines are in operation since 1984, a recall method was approached to acquire the information on pre and post mining situation. In order to justify the changes that have been taken place in the mining villages are because of mining or some other external forces are responsible, the research was carried out by selecting two control villages in the same agro-climatic zone, where people have lived since ages and are following their own traditional way of life. Finally, 300 households were selected from the mining villages and 100 households were selected from the control villages with the help of a systematic random sampling. Regarding demographic details the table (table-1) is describing the detailed demographic profile of the sample villages.

The study is primarily based on intensive fieldwork, which was carried out during May to September 2012. The study is basically a qualitative micro level study aiming to understand the impact of coal mining with the help of a structured interview schedule. In order to fulfil the objective of current research, data were collected both from primary and secondary sources. Apart from the quantitative techniques, for primary data collection some qualitative sociological and anthropological tools such as observation (both participant/non-participant), case study, key informant interview and some techniques of Participatory Rural Appraisal (PRA) like focused group discussion session was followed. For the purpose of gathering qualitative data, household survey was conducted. Even some audio-video accessories were also approached for the collection of qualitative information. The secondary data was collected from the record books of the concerned Anganwadi centers.

Results and Discussion

Mining and Livelihoods: Review of Literature: One of the most prominent fundamentals of revolution in the context of livelihood in a mining set up has shown a dramatic transformation since its inception. In the rapidity and extent of mineral exploration and exploitation, livelihood is deteriorating hurriedly. There is a universal fact that mining brings with it the potential negative impacts on livelihood, social life and the environment. In the positive aspect of it, mining generates foreign exchange earnings and tax revenues. Coal mining is not only dealing with negative impacts, it also has some positive impacts in its share. In a way mining helps to raise the financial and physical capital, but the negative impressions such as air,

water and soil pollution, degradation of health, displacement, loss of agriculture, etc. are the unbearable damages which cannot be left out in the context of benefit only. Furthermore, if we will move towards the benefits of mining solitarily, then what will be our future as it is a short time activity only⁶? Generally, the affected communities were mostly dependent on common property resources, but displacement due to mining diminished that source of livelihood. And the capital engendering from the mining projects is going directly to the dominant sections of the economy⁷. In some countries like Ghana the 'culture' of mining is very prevalent. The Ghanians are instrumental towards immigration from diamond mining to artisanal gold mining with a desire to 'get rich quick'. The financial benefit in the gold mining sector is fairly appealing than that of diamond mining⁸.

Though agriculture is considered as the basic source of livelihood, other than agriculture the rural communities were mostly engaged on the collection of minor forest products (MFP) for the endurance of their livelihood. The Kondh tribes of the KBK belt of Odisha, nurture varieties of millet, pulses, gram, pigeon pea, castor oil, honey, edible oil, mushrooms etc. They also have a strong economic relationship with the forest which empowers them to collect multiplicity of MFPs. The Kondhs used to collect the MFPs for their own consumption and sometimes they generate revenues from the surpluses. But the mining claim in this region is going to destroy the economic sufficiency as well as the natural environment of these dwellers⁹. The prediction regarding negative impacts of mining can never be prove wrong as it has a peculiar negative impact on the soil, water and air. The pollution of both physical and natural environment is continuously degrading the soil fertility rate which has a dramatic negative influence on agriculture¹⁰. The establishment of gold mine operations in the Geita District of Tanzania has produced severe socio-environmental waves. In the adjacent mining region most of the inhabitants were dependent on agriculture (47.3 percent) and on mining the frequency is (33.8 percent). Gold mining here is procuring a harmful socio-cultural influence on the livelihoods as it is abandoning the agro-pastoral systems of the local people. In one way it facilitating the local people by providing market facility but on the other side it has been identified with the issue of crop theft¹¹.

The LPG model of development is frequently deprives the indigenous communities across the world. For the indigenous communities, land serves as the source of livelihoods and a source of security. They have spiritual and cultural connections with their traditional land. But the acquisition of land for the purpose of development projects like mining grabs indigenous communities as immediate victims. Impoverishment arising from such forfeiture, can only is substituted by providing sufficient compensation with alternative sources of resource generation. In India, the states like Odisha, Chhattisgarh and Jharkhand exhilarated the mineral based industries into its annexes. But the benefits of these industries are going directly

to the privileged sections of society and the downtrodden sections are disbursing the cost of its intrusion only¹². The neo-liberal economic and political reforms in Peru are instrumental to place the country in the global market through foreign direct investment. As a consequence, mineral extraction activities started on the name of several economic stuffs. Ever since its operation, the perpendicular production tactics of households have been considerably exaggerated. Previously the households draw their primary source of livelihood from the natural resources and also involved in diversified agricultural, livestock and small market activities. But the revolution transpired when Newmont Mining Corporation's Yanacocha (MYSA) started its operation. Though it has been reported that some communities acknowledged their magnificent access to economic and human resources, still all the households lose their access to natural and social resources¹³.

Mining and Diversified Rural Livelihoods at Ib Valley: A detailed assessment regarding the impact of coal mining on diversified rural livelihoods is an important aspect while unfolding the changes that transpired ever since the enactment of mining at Ib valley coalfield. In the present study the fragility perspective is mining and the diversified impact of mining is considered as an exogenous factor for the livelihoods of rural masses. At the same time mining activities are considered as positive propagates in the direction of income generating engine. Though the rural region of Ib valley is entirely designed with coal, therefore, it is boosting the mining giants to generate more and more income earning sources. Diversified livelihood is a rational response of the households when they fail to generate income from the primary source of livelihood. But in most of the time while the vulnerable situation occurs, the rural households used to engage themselves in multiple off-farm economic activities, i.e. day labour, charcoal making, transfer of funds etc.¹⁴. Ellis defined Rural Livelihoods Diversification as the process by which households construct a diverse portfolio of activities and social support capabilities for survival and in order to improve their standard of living¹⁵. Livelihood divergence encounters the conventional insights regarding poverty reduction of the rural poor. Logically, the rural households follow varied farm activities by performing several household level activities such as crops as well as livestock. But the true fact is that in most of the time lots of poor small scale farmers are unable to produce secure livelihoods from crop and livestock production. So the prevailing situation forces them to recreate alternative sources of livelihood¹⁶.

The major source of livelihood in the Ib valley coalfield is mining. As the expansion of mining wings had already been taken away the productive agricultural lands, the local residents are entirely relying on the mining activities to sustain their livelihood. Though agriculture was in practise much before the initiation of mining, it has lost its significance in the ostensible mining era. Although mining is a profitable economic activity still it lacks the guarantee of utter occupational portfolios. But the rural residents are so adapted with the vulnerable situation

that they are instrumental to carry out varied livelihood assortments. So, the present research, analyses the diversified livelihood strategies being practised by the rural mass of the Ib valley coalfield. It also tries to give a snapshot calendar regarding the pre-mining phase as well as it will draw a perpetual comparison between the mining affected and control villages. In this regard the table-2 pronounces the diversified sources of livelihood at Ib valley.

However, it is inevitable to mention that the income earning sources are the basic pyramid to construct sustainable livelihoods. But when a single source of livelihood fails to encounter the prerequisite of households, the emergency of diversified sources of livelihood derives. Table-2 clearly depicts the varied income earning sources of the respondents of both mining-affected and control villages. During the post mining phase in all the mining affected villages, the majority of the respondents (51 per cent) was uttered their liability regarding their primary source of income from the mining sectors. Logically, this category of respondents actually provided employment against their loss of land for mining. But the situation was entirely different all through the pre-mining phase when a majority of households were in the practise of agriculture. While comparing with the control villages, now also the preponderance of agriculture is holding its significance among the mainstream respondents. On the other hand, once the agricultural season is over they are in a habit of occupying themselves in some kind of non-farm activities.

Engagement in dairy and other allied activities (17 per cent) and practise of agricultural labourers (15 per cent) are the additional specialised doings in control villages. Though these activities were assigned the villagers of mining affected villages much before the mining era, they lost their significance by the enactment of mining giant. So an alteration in the cradle of enduring a livelihood is observed in the case of mining affected villages. Around 26.7 percent respondents were reportedly engaged as unskilled non-farm wage labourers who were hypothetically regarded as agricultural labourers in pre-mining phase. Though most of the cultivable lands were already taken by MCL and the rest are filled with coal dusts and ashes, it creates an uncertain environment for agriculture. As a result, the mining affected mass is stirring towards non-farm sectors. While the rural populace of control villages is all set to grind as casual labour, the deficiency of occupational prospects in the neighborhood ambiances has narrowed down their action towards farm sectors.

Contrariwise, the employment in government and private sectors is increasing both in the mining-affected and control villages. In compared to mining-affected villages (i.e. 7.7 per cent in Govt. and 2.7 per cent in Pvt.) a minimal difference was found in the realm of control groups (i.e. 6 per cent in Govt. and 2 per cent in Pvt.). Likewise, the income from fixed assets of trade/business is more in the control villages rather than the mining affected villages. So it is worth to mention here that no

doubt mining is bringing extraordinary modifications in and around the affected villages, still in some aspects a minor chunk of control groups are also trying to be more contented.

As it is clear from the above said discussions, during the vulnerability occurrence, the rural masses turn out to be instrumental in the adoption of diversified livelihood portfolios. But when they grow into unsuccessful to cope with the situation by practising varied primary occupational sources, they used to embrace several secondary means of support. In the present research a vast majority, i.e. 62 percent of mining-affected households have indulge themselves in *beedi* making followed by 12 percent in agriculture, 7.7 percent in collection of payments from house and other assets, 7 percent as shopkeepers, 4.3 percent as vendors, 3 percent as LIC agents, 2.7 per cent as unskilled non-farm wage labourers and 1.3 percent are in different types of self-employed activities like tailoring, running betel shops, cycle repairing shops and working in the nearby small budget hotels respectively.

It is evident (table-2) that, while a fixed income was in practise from common property resources (CPR), it has lost its relevance now. The common lands have already been converted into mining plots. So the CPR activities are not in practise at present. Even the allied activities and animal rearing have been entirely vanished with the acquisition of productive lands. At the same time a whole new category of LIC agents have been emerged. The process of in and out migration has introduced this section of active community. In the mining-affected villages, though the earning is much better along with life threatening repulsions, it is very easy for the LIC agents to run their business industry by delivering motivated counseling among the vulnerable unit. On the other side, the control group mass is still gaining a portion of income from common properties. Both the villages are surrounded by natural resources like river, forest, and mountains, etc., which are proving beneficial for the villagers. Talapatia village is located on the bank of the river Ib, so the residents of this village are reportedly involved in fishing and after accomplishing their own requirements they used to sell it in the nearby village market. Even the availability of abundant natural forests is approaching them to carry out animal rearing.

Mining is a profitable business. At the same time it provides direct/indirect livelihood to an uncountable mass. The resolution to avail an income earning source from this industry is welcoming exogenous groups of people to migrate from their own territorial milieus to the mining hubs. This migration has a direct impact on the economically deprived as well as well-off sections as the migrants prefer rented houses to stay. So the proportion of migrant workers as well as contractors in Darlipali, Kudopali and Kantatikira villages is more prevalent. As these villages are situated near Samaleswari, Lakhapur and Belpaher opencast mines where the operation needed ample of permanent and temporary workers along with specialised contractors, they are highly in demand for providing rented houses. At the end, minority residents of both mining-affected

and control villages are also involved in some other activities. control group residents is involved in selling seasonal For example the mining-affected villagers are involved in vegetables, garlands, chara(a kind of forest fruit), handmade selling local wines and stealing and retailing coal whereas the mud pots etc.

Table-1
Demographic Details

Category	Mining Villages						Control Villages	
	Kudopali	Kantatikira	Ainlapali	Darlipali	Ubuda	Khairkuni	Grindola	Talpatia
Total Population	909	429	468	617	1221	831	1407	1695
Male Population	454	214	235	308	621	432	725	807
Female Population	455	215	233	309	600	399	682	852
Total Household	191	96	82	90	220	179	305	362
Sample Household	50	50	50	50	50	50	50	50

Source: Concerned Anganwadi Centres.

Table-2
Diversified Sources of Occupation

Primary Sources	Mining Affected Villages		Control Villages
	Pre-Mining	Post-Mining	
Agriculture	174 (58)	Nil	38 (38)
Horticulture	8 (2.6)	Nil	3 (3)
Agricultural Labour	57 (19)	Nil	15 (15)
Skilled Wage Labour	8 (2.6)	21 (7)	5 (5)
Unskilled Non-farm Wage Labour	9 (3)	80 (26.7)	2 (2)
Employment (Pvt. Sector)	2 (0.6)	23 (7.7)	6 (6)
Employment (Govt. Sector)	1 (0.3)	8 (2.7)	2 (2)
Trade/Business from fixed Premises	3 (1)	12 (4)	7 (7)
Dairy and Allied	29 (9.7)	Nil	17 (17)
Mining	Nil	153 (51)	Nil
Others	9 (3)	3 (1)	5 (5)
Total	300	300	100
Secondary Sources	Mining affected villages		Control villages
	Pre-mining	Post-mining	
Agriculture	Nil	36 (12)	2 (2)
Common Property Resources	167 (55.7)	Nil	40 (40)
Unskilled Non-farm Wage Labour	Nil	8 (2.7)	12 (12)
Fishing and Allied	97 (32.4)	Nil	19 (19)
Goatery/Other animal rearing	20 (6.7)	Nil	6 (6)
Vendor	9 (3)	13 (4.3)	4 (4)
Shopkeeper	5 (1.7)	21 (7)	3 (3)
Beedi Making	Nil	186 (62)	Nil
LIC Agent	Nil	9 (3)	Nil
Rents (House/other assets)	Nil	23 (7.7)	Nil
Others	2 (0.7)	4 (1.3)	14 (14)
Total	300	300	100

Source: Field Study, Note: Figures in the parenthesis are percentage

Conclusion

From the above assessment, it is clear that the diversified livelihood strategy explains the varied income generating sources, but rural livelihood of the Ib valley coalfield is going through a period of transformation. Diversified sources of sustenance is not at all a whole new approach, it was developed much before the industrialised era. But there appears a considerable modification in both the pre and post mining phase. Though post mining phase has broadened the realm of cost-effective industry and even the local residents are embracing this line of track, still the demolition of natural vegetation, community forest, healthy environment, social connectedness etc. are conveying the uneven circumstances to sustain a livelihood. A remarkable shift was marked in the context of diversified livelihood. During the pre-mining phase the realm of diversification was more as the households were more dependent on land, agriculture and allied services. But the post mining phase has seized the age-old diversity and restricted the affected households towards mining related activities only. But on the other hand, the representation of control villages in diversified sources is quite appealing as they are possessing natural environment, i.e., river, forest, agricultural fields etc. So the present research is clearly demarcated that mining has a direct positive impact on the financial aspect of the project affected communities and at the same time it has decreased the whole traditional sources of diversified livelihood in the Ib valley coalfield region.

References

1. World Coal Association. Coal Statistics, Retrieved from <http://www.worldcoal.org/resources/coal-statistics/December>, 15 (2014)
2. Ministry of Mines. India Mineral Scenario, Retrieved from <http://mines.nic.in/index.aspx?lid=73and-level=2andchk=24dfe45y5edf5e3>, December, 15 (2014)
3. Ministry of Coal. Coal Mining in India, Retrieved from <http://www.coal.nic.in/content/coal-mining-india>, December, 14 (2014)
4. World Coal Institute. Coal Fact. Retrieved from www.wci-coal.com, December, 15 (2014)
5. Mahanadi Coal Fields Limited. Coal Fields in India and Orissa, Retrieved from <http://www.mcl.-gov.in/Others/ecoalfields.php>, December, 15 (2014)
6. Mishra P.P., Coal Mining and rural livelihoods: case of the Ib Valley coalfield, Orissa, *Economic and Political Weekly*, **XLIV(44)**, 117-123 (2009)
7. Bhengara R., Coal Mining displacement, *Economic and Political Weekly*, **31(11)**, 647-649 (1996)
8. Hilson G., Once a miner, always a miner: Poverty and Livelihood diversification in Akwatia, Ghana, *Journal of Rural Studies*, **26(3)**, 296-307 (2010)
9. Palit A., Mining in India: Separating Growth from Development? Institute of South Asian Studies. National University of Singapore, (2010)
10. Guha D., A case study on the effects of coal mining in the environment particularly in relation to Soil, Water and Air causing a Socio-economic Hazard in Asansol-Raniganj Area, India, *International Research Journal of Social Science*, **3(8)**, 39-42 (2014)
11. Kitula A.G.N., The environmental and socio-economic impacts of mining on local livelihoods in Tanzania: A case study of Geita District, *Journal of Cleaner Production*, **14(3)**, 405-414 (2006)
12. Meher R., Globalization, Displacement and the Livelihood Issues of Tribal and Agriculture Dependent Poor People: The Case of Mineral-based Industries in India, *Journal of Developing Societies*, **25(4)**, 457-480 (2009)
13. Bury J., Mining mountains: neoliberalism, land tenure, livelihoods, and the new Peruvian mining industry in Cajamarca, *Environment and Planning A*, **37(2)**, 221-239 (2005)
14. Iiyama M., Livelihoods diversification patterns among households and their implications on poverty and resources use: A Case Study from a Kerio river basin community. LUCID Project, International Livestock Research Institute, (2006)
15. Ellis F., Household strategies and rural livelihood diversification, *The Journal of Development Studies*, **35(1)**, 1-38 (1998)
16. Ellis F., and Allison E., Livelihood diversification and natural resource access, *Overseas Development Group, University of East Anglia*, (2004)