

ESTIMATING HEALTH DAMAGE OF THE PEOPLE DUE TO OPEN CAST COAL MINING UNDER MARGHERITA SUBDIVISION, TINSUKIA DISTRICT ASSAM

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ABSTRACT

Among various abundant fuels in India, coal is one of the most important sources of energy for the industrial sector. In the North Eastern Region, Coal India Limited, have its mining activities mainly in Coalfields of Assam, at present four mines are in operation. These are Tirap, Tikak, Ledo and Tipong. Out of these Tirap, Tikak and Ledo OCP are Open Cast projects while Tipong is Under Ground mine. This paper mainly highlights various environmental problems created because of the hazardous pollutants emitted from these coal industries. However this paper focusses on the negative impact of coal industry on the health of the people of the area. It also focusses on the economic valuation of the health damage due to coal mining.

KEYWORDS: - Coal Mining, Pollutants, Health Damage, and Economic Valuation.

INTRODUCTION

One of the most important sources of energy for the industrial sector in the country is coal, which is the most abundant fuel in India. Today the operation of coal mining spreads over several states like Orissa, Madhya Pradesh, Chhattisgarh, Maharashtra, Uttar Pradesh and few states in the North-East. In the North Eastern Region, Coal India Limited, have its mining activities mainly in Coalfields of Assam, at present four mines are in operation. These are Tirap, Tikak, Ledo and Tipong. Out of these Tirap, Tikak and Ledo OCP are Open Cast projects while Tipong is Under Ground mine. In the North Eastern Coalfields there are 5 major outsourcing patches in the Opencast mines, these are Tirap(East), Tirap(West), Tikak(East), Tikak(OCM) and Ledo(OCP). NEC's entire Coal Production of Opencast mine is outsourced. Ledo Opencast project was started in the financial year 2008-09. Every year around 1.1 million tones coal is produced from the three opencast mines and one underground mine. But the major contribution of coal production for the financial year 2013-14 has come from the Opencast Mines where the production was 6.63 million tones.

Over several decades' environmental problems have being drawing the attention of research workers, policy makers and civil rights activists all over the world (Brandon &

Kirsten, 1995). Despite its multiple uses and its potential to earn revenue, coalmines have a large number of negative impacts in the form of externalities- Water, air, soil and noise pollution, health degradation and loss in agricultural productivity.

The positive and negative aspects of coal mining have to be taken into account so that we can assess the net benefits from coal mining. In the absence of such assessments the present benefits could be at the cost of other resources/communities or future generations (Mishra, 2007).

However there are several dimensions of mining in the form of negative externalities that has not received due attention, one of the important dimension is the pollution arising from these mining and its impact on health.

Manual opencast mining was started at Tikak during 1930 and the process was mechanized during 1981 to replace the old manual method (NEC, CIL 1990).

Local people including the businessman are benefitted by the Opencast Mining of Tikak. Employment opportunities are also created in this mining. Along with this success problems are also created in several ways.

The mining operation at Tikak continued till 05.04.1990 when it was stopped as per directive of Ministry of coal. Tikak Opencast Project (OCP) was reviewed by various committees formed by Central Government and State Government to assess the environmental damages caused due to opencast mining in the area. The expert committee constitute by the Ministry of Environment vide No.J-11015/19/88-1A dated 22.09.98 completed on the spot evaluation and submitted the report to the Ministry of Environment and forest (CIL, NEC, MARGHERITA).

Opencast Mining System entirely alters the mining patches into a desert of a mixture of broken rock and rocky soil called spoils which have a bad impact on agriculture. Moreover during the time of coal operation various air polluting gases like carbon-dioxide, carbon monoxide, sulphur dioxide etc. are emitted which creates different health diseases of surrounding inhabitants.

SECTION II- OBJECTIVE

- The main objective of the study is to compute the economic valuation of health due to coal mining pollution in North Eastern Coalfields.

SECTION III- STUDY AREA AND METHODOLOGY

The study site is located in the hills of Patkai in Tinsukia District of Assam which is about 150 km South-East direction from Dibrugarh University. The area lies 27.20⁰ N latitude and 95.41⁰ E to 95.51⁰ E longitude. It occupies a foot-hill area of the Eastern Himalaya above 150m and 300 sea levels.

Tikak Opencast Mine is located at 8 km North-East direction from Margherita. In the northern side of the mine goes the National Highway No.-38. The southern side is covered by Patkai Range. In the eastern side flows Ledo Pani River and the Namdang River covers the western side.

The immediate village that is affected by the Tikak Opencast mine is Malu Gaon with more than 150 families and farmers and members of Sonali Pather Parichalana Samity with 108 numbers of families. Number of projects has been implemented to recover the situation but these have been proved to be poor due to lack of adequate ecological scientific knowledge. One controlled site, Ketetong village is also studied for comparison.

The study relied heavily on empirical evidence, situational analysis and probabilistic prediction. As such, extensive field surveys, in depth interviews and interactions with the people of the sample villages and various doctors from different health centres and private practitioners under this subdivision constituted the core of the methodology. The study required a two pronged approach to collection of information:

- Conducting a field survey
- Collection of data from secondary sources

Here the Cost of Illness (COI) has been calculated.

SECTION IV- RESULTS AND DISCUSSIONS

SOCIO-ECONOMIC CHARACTERSTICS OF THE SAMPLE VILLAGES

S NO.	INSTITUTIONS	SONALI PATHER	CHIPPE GAON	MALU GAON	KETETONG
1	Distance from the mine (km)	2-2.5	3	5	15
2	Social composition	SC, OBC	SC,OBC	ST	ST,OBC
3	Total no. of households	68	40	150	140

4	Livelihood	Wage labour, Cultivators	Wage labour, Cultivators	Wage labours, mine workers, Cultivators	Cultivators, wage labourers
5	Primary Health Centre (km)	3	3	5	6
6	Electricity	Available	Available	Available	Available
7	Drinking Water	Available (highly polluted)	Available (highly polluted)	Available (highly polluted)	Available
8	Primary School	Available	Available	Available	Available
9	Secondary School	3km	3km	5km	5 km

SECTION IV.1- Impact on water quality

As all the three villages are situated in one strike direction, water samples have been tested in one of the villages i.e. Sonali Pathar. The results of the chemical analysis of one number of water sample tested showing concentration of pollutants and exceeding their normal ranges.

	FOR WATER SAMPLE	IS:10500,1983
pH	3.07	6.5 to 8.5
Turbidity(NTU)	79.0	10 NTU (Max)
Total hardness as CaCO ₃	1560 mg/lit	300 mg/lit(Max)
Calcium as CaCO ₃	826.0mg/lit	75 mg/lit(Max)
Magnesium as mg	650.0 mg/lit	30 mg/lit(Max)
Iron as Fe	31.20mg/lit	.30 mg/lit(Max)
Sulphate as SO ₄	269.0 mg/lit	150 mg/lit(Max)
Chloride as Cl	19.80 mg/lit	250mg/lit(Max)
Alkalinity	Beyond limit of detection	-
Acidity	410.0 mg/lit	-
Total solids	6746.0 mg/lit	500 mg/lit(Max)
Source:- Regional Research Laboratory (Jorhat, 785006 Assam)		

The tested water sample showed a pH value below the normal range, which means it, is acidic. An imbalanced Ph affects all cellular activity in the body, leading to various harmful diseases like allergic respiratory infection, bronchial asthma, skin allergy, gastric, pneumoconiosis, diarrheal diseases, tuberculosis, viral fever, amoebic colitis etc. Here, the water is hard in nature, and the consumption of this water lead to digestion problem.

SECTION IV.2- IMPACT ON HEALTH

A total of 20 households in Sonali Pathar, 20 households from Chipe gaon, 20 households from Malu Gaon were surveyed in the mining villages. Among them 41(13.6%) complained that they have suffered from various health problems during the last one year. On the other hand in the control village 20 households were surveyed. But in the control village, the health impact was minimum (.04%).

S.NO	PARTICULARS	MINING VILLAGES	CONTROL VILLAGE
1	Health affected	41(13.6%)	4 (.04%)
2	Major problems	Skin Disease, Gastro Intestinal diseases, Bronchitis, Pneumoconiosis, Asthma	Malaria, Fever

However in order to know the health impact it was surveyed among various doctors in Margherita Central Hospital, NEC, CIL, Ledo Railway Hospital, Margherita Rontix Hospital, and in Private Clinics in Margherita and Ledo.

LOCATION	MARGHERITA	LEDO
NO. OF PATIENTS ATTENDING	Chronic- 4-5 Acute- 2-3	Chronic- 2-3 Acute – 2-3
MAJOR DISEASES SEEN AMONG THE PATIENTS DUE TO OPEN CAST COAL MINING	Acute – <ul style="list-style-type: none"> • respiratory tract infections • bronchial asthma • Coal mine Pneumoconiosis Chronic cases <ul style="list-style-type: none"> • Intestinal lung disease • Diarrheal disorder • Tuberculosis 	Acute – <ul style="list-style-type: none"> • Respiratory tract infection • Asthma Chronic Diseases <ul style="list-style-type: none"> • Skin allergy • Diarrheal disorder • Tuberculosis

DIFFERENT TYPES OF DISEASES THAT OCCURS DAILY, WEEKLY AND MONTHLY	Daily and weekly – acute cases of Bronchitis and Pneumoconiosis Monthly & Yearly- acute exacerbating episodes of COPD and Intestinal Lung Disorder	Daily and weekly – acute cases of Bronchitis Monthly & Yearly- acute exacerbating episodes of COPD and Intestinal Lung Disorder
WHETHER PATIENTS ARE MALE OR FEMALE	MALES >> FEMALES	MALES >> FEMALES
RANGE OF COMPENSATION	Only Mine workers are compensated	Mine workers are compensated
COST OF ILLNESS DUE TO MINING	3000-5000 per month(CHRONIC) 800-1200 per month (ACUTE)	4000 – 5000 per month 800 -1200 per month

Estimating Health damage Using Cost of Illness (COI)

The Cost of Illness includes the sum of direct medical, direct non medical and indirect costs incurred to relieve illness. Direct medical costs include out of pocket expenditure on consultation fees, laboratory tests and medicines. Non medical direct costs include out of pocket expenditure on transportation, special foods and drinks. Indirect costs are included as the product of days work missed by the patient and a monetary value of loss of productivity, proxied by average daily wage rate (Bahl et.al 2004). To measure the total COI the respondents were asked about the total number of days they were unable to work, total number of visits to doctor, total expenditures on medicines and total expenditure on health.

S.NO	PARTICULARS	Mining Villages(3)		TOTAL	Control villages(1)		TOTAL
		LARGE FARMERS	SMALL FARMERS		LARGE FARMERS	SMALL FARMERS	
1	Affected people	8.75% (7/80*100)	13.75% (11/80*100)	22.5%	5% (1/20*100)	5% (1/20*100)	10%
2	Average no. of days sick	16.6 (30/180*100)	22.2 (40/180*100)	38.8%	5.5% (10/180*100)	5.5% (10/180*100)	11%
3	Average no. of visits to doctor	3.8 (7/180*100)	6.1 (11/180*100)	9.9%	1.1% (2/180*100)	1.1% (2/180*100)	2.2%

4	Average amount spent on medical(Rs.)	2200	3500	5700	500	750	1250
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In the above table, it can be seen that average number of people affected under mining area is 22.5%, whereas only 10% people are affected under the control village. Out of total working days 180, average number of days, the farmers under mining areas sick is 38.8% whereas in the control village average number of days the farmers remain sick out of 180 working days is 11%. The average number of visits to doctor out of 180 working days is 9.9% under the mining area, whereas in the control village is 2.2%. Average amount of money spent on medical under mining areas is Rs. 5700, whereas in the control village, amount spent is Rs. 1250.

SECTION V- PRESENT ENVIRONMENTAL STATUS OF TIKAK OCP

S. No	EC CONDITIONS	STATUS
1	For Sustainable mining production from Tikak OCP must be limited to a maximum 2 lakh tones per annum	But it has been seen that ,considering the coal demand & energy crisis production is from 2 lakh tones to 4 lakh tones
2	All slope dumpings should be restored with growing shrubs/bushes and trees.	All previous slope dumps have been restored after the slopes were graded, terraced
3	The project authorities should take adequate pollution control measures for maintaining air quality, water quality and noise level within the standards prescribed by the State Pollution Control Board.	The water flowing out from the coal dump area during monsoon is canalized through settling tanks and neutralization pits where necessary treatments are carried out by adding suitable chemicals like lime, soda ash to neutralize the acidity of effluent before disposal to the stream.
4	6 monthly environmental status report should be sent to the Ministry & Regional office. Adequate funds should be provided for implementation of the measures and funds should not be diverted for other purposes.	6 monthly status report of the colliery is being regularly submitted to Ro-MoEF, Shillong. Regular fund for

		implementation of the environmental control measures has been provided as per the action plan. Total expenditure incurred in the period between January 2014- March 2014 is 9.741 lakhs.
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SECTION VI- CONCLUSION

From the above discussion, it is clear that the extent of negative externality is more than the positive externality. In case of health impacts, various diseases can be seen in the mining area villages and their cost of illness is also too high compared to that of the control village. For this reasons pollution mitigating techniques should be adopted like implementation of green belts around the sensitive areas where the concentration of air pollutants exceeded the standard limit. Wetting of surface of overburden dump to be regularly practised and also coal receiving pits are to be located closer to the quarry to reduce the haul length of the dumper.

REFERENCES

1. Borpujari, D(2006), Thesis on "Restoration of Vegetation restoration and soil in Coal Mine spoil at Tikak Opencast Mine"
2. Bhattacharya.N, Hussain.Z and Sarkar. D,"Occupational Diseases and their determinants, A Study of Coal mine Workers in West Bengal",1-26.
3. Brooks, R.G.(1987)"The Economics Of Health"Journal of Economic Studies:14(5),63-72.
4. Epstein, P.R.,Buonocore, J.J., Eckerle, K, Hendryx,M, Doshi S.K.(2011). Full cost accounting for the life cycle of coal, 1219:73-98
5. Feng.S, Wang.D, and Zhang.X (2014), "Study on Ecological Compesation For Coal Mining Activities Based on Economic Externalities", Journal of Geoscience and Environment Protection, 151-156.
6. Mishra S.K (2009) Estimation of externality electricity generation from coal : An OH-MARKAL extension dissertation. Unpublished Doctoral Thesis, The Ohio University, Canada.
7. Mishra S.K. (2012), "Valuing Coal Mining externalities: A Study in Basundhara Coalfield , India, Volume 1, Number 1,2012.
8. Yushi, M. Hong, S anf Fuquiang,Y,(2008). The true coast of coal. Available at <http://act.greenspace.org.cn/coal/report/TCOC-Final EN.Pdf>

