Bulletin of Environment, Pharmacology and Life Sciences Bull. Env. Pharmacol. Life Sci., Special Issue [1]2022 : 1060-1064 ©2021 Academy for Environment and Life Sciences, India Online ISSN 2277-1808 Journal's URL:http://www.bepls.com CODEN: BEPLAD ORIGINAL ARTICLE



# Impact on Social Environment due to Lignite Mining and Thermal Power Plant at Village Barsingsar, District Bikaner, Rajasthan

Vijay Kumar Matoria<sup>\*,1</sup>, Deva Ram Meghwal<sup>1</sup>, R.K. Saran<sup>2</sup>, Shishir Sharma<sup>3</sup> <sup>1</sup>Department of Geology, Govt. Dungar College, Bikaner <sup>2</sup>Department of Environmental Science, Maharaja Ganga Singh University, Bikaner <sup>3</sup>Principal, Govt. M.S. Girls College, Bikaner Corresponding author <u>- vijaykumarmatoria@gmail.com</u>

#### ABSTRACT

Whenever there is any talk on mineral extraction, it becomes necessary to discuss its impact on the environment also. But when it is the case of any energy minerals like Lignite, it cannot be stopped only on the basis of any adverse environmental impacts. It also becomes necessary to discuss its social and economic impacts. The lignite mine and thermal power plant located in Barsingsar village of Bikaner is not only an important pillar necessary for the progress of our country but also provides employment opportunities to the local youth. The life of the people living near any mining project is very much affected by the project, so under this campaign, people's attitude towards lignite mining has been investigated. During this study, the surrounding areas of the Lignite Mines and Thermal Plant were observed and data was collected while conducting the socio-economic survey. A pre-defined questionnaire was used to collect data from representative adult males and females. The survey concluded that a large section of the population acknowledges the positive impact of the lignite project in their daily lives. The results of the study may be particularly useful for policymakers to formulate a socially acceptable plan.

Keywords: -Socio-economic impact, Lignite, mining, Thermal power plant, Bikaner

Received 12.02.2022

Revised 27.03.2022

Accepted 18.04.2022

#### INTRODUCTION

If we want the development of our country then our focus should be on the development of our energy resources. Among energy resources, coal and electricity produced by coal-based thermal power plants occupy an important place. India ranks second in coal production in the world [1]. The coal mining industry is a major energy generation industry that has accelerated India's development [2,3]. The lowest category among the various grades of coal is lignite, which is considered highly injurious to health [4]. Although harmful, lignite is an important energy source because it can be easily mined at a low cost by the surface mining process[5]. Presently lignite is being mined in two villages named Gurha and Barsingsar in the Bikaner district of Rajasthan [6]. This research paper is confined to the study of the area around Lignite mines and pit head thermal power plant operated by a company named "NLC India Limited ". According to GSI [7], the total reserve of mines is about 77.83 million tonnes. The lignite (Palana Formation of the Palaeocene age) seams with thickness from 0.10 to 41.50 m is reported below an overburden of 45.75–125.20 m [8]. The production capacity of Barsingsar Lignite mines is 2.1 MT per annum. According to Velan, M., & Prasad, M. N. V. [9] about 12.21 million tonnes of Lignite were mined out from mines up to March 2007 and this mining is continuous and increasing day by day. The government of India sanctioned a thermal power plant with a capacity of 250 MW (2×125MW) in October 2004. These units were commissioned in December 2011 and in January 2012. [9].

The population of the areas near any mining projects has always to scarify their land or houses. The quality of the local environment, water resources (surface and groundwater) available to the nearby villagers are deteriorated due to these projects. But along with these negative impacts on the environment, there are also some positive impacts on the socio-economic status of surrounding people. Such positive effects of increased employment and economic development are also noticed among residents around lignite mines in western Macedonia, Greece [10].

# **STUDY AREA**

The lignite mine under study is located in the Bikaner district of Rajasthan. The mining lease is approximately 27 km southwest from Bikaner city on NH 89 near village Barsingsar and falls in Survey of India Topo sheet No. 45E/1 (Figures 1 and 2). The lignite succession of Bikaner which is about 70 km long and about 30 km wide has been reported to be of early Paleogene (Paleocene–Eocene) age in association with the Palana and Kolayat sub-basins [11].



Figure 1: Location of Barsingsar lignite mine and Thermal Power plant.



Figure 2: Google location map showing Lease boundary of Barsingsar Lignite mine, Thermal Power Plant Site (TPS) and eleven villages (A1 to A11) under study.

#### Matoria *et al*

### MATERIAL AND METHODS

Our study is concentrated over eleven villages around "Barsingsar Lignite Mines and Thermal Power Plant" (project). These villages are Saroopdesar, Bhojoosar, Lalamdesar, Basi, Barsingsar, Deshnok Rural, Palana, Sujasar, BholasarBudhan, Bholasar Chouhanan, Jangloo (Figure 2). The baseline information was collected from primary and secondary sources. Secondary data refers to census records and data from various government departments. Primary data refers to field observations and data collected with the help of socio-economic surveys in the villages under the study area. The sampling of the survey is randomly stratified and proportionate. A socio-economic survey helped to understand peoples' awareness and opinion about the project, as well as their apprehensions and expectations from the project.

#### **RESULTS AND DISCUSSION**

To study the socio-economic impact of the project on the people living in the vicinity, the following observations were made over data received from various government units and the above-said survey:-

**Demography:** - Eleven villages were surveyed under the study. The area of villages varies between 11.2 hectares to 6502 hectares. Deshnok Rural Village has the lowest number of 48 households and Palana has a maximum number of 1312 houses followed by Jangloo with 1162 houses. Village population varies from a minimum of 290 persons (at Deshnok Rural) to a maximum of 9331 persons (at Palana) (as per Census 2011). The literacy percentage varies from 41.8% to 65.1%. The demographic structure of villages under the study area is given in Table. 1.

**Infrastructure:-** The infrastructure resource base in villages under the study area is very poor. The approach roads in most of the villages are by kachha road. Infrastructure facilities were developed by NLC India Limited in nearby villages and play a very significant role in the socio-economic status of the area. Electricity is utilized both for domestic and irrigation purposes. Though most of the villages are electrified, the power supply is not continuous. Education facility up to the primary level is available in most of the villages. Education facility up to Senior Secondary level is available in five villages under study. Only health sub-centers exist in the name of medical facilities in most villages. The nearest Community Health Center is operating in Deshnok. Basic amenities available in villages under the study area are given in Table 3.

**Economy and Employment:-** The population of male cultivators and agriculture laborers varies from 9 to 1604 and 1 to 254 respectively. People are earning Rs 6000-17000 per month from different sources. The economy of the study area is found to be completely dependent on mining, agriculture, and related activities. Lignite mining activity has further accelerated the economic activities in the region by creating employment opportunities in (i) Primary sector, (ii) Secondary sector and (iii) Tertiary sector. Local unskilled and semi-skilled persons are employed through contractual agencies engaged in the various operational activities for the project. Such temporary employment would continue throughout the life of the project and falls under the secondary employment sector. The project has further boosted the various service facilities like the supply of agriculture produce, milk and dairy product, fruits, vegetables, etc. which fall under the tertiary employment sector. Details of the employment pattern are given in Table 2.

Table 1. Demographic details of vinages under the Study Area (Census 2011)									
S.N.	Name of village	Area in	No. of	Population				Literacy	
		hectares	Households	Total	Female	Male	SC	ST	Rate %
1	Saroopdesar	3622	495	4052	1896	2156	1139	1	45.70
2	Bhojoosar	360.13	57	493	230	263	0	0	65.10
3	Lalamdesar	4356	564	3770	1764	2006	1096	1	44.10
4	Basi	2717	331	2239	1013	1226	167	21	53.10
5	Barsingsar	6502	817	5766	2738	3028	938	6	50.70
6	Deshnok Rural	11.20	48	290	131	159	1	0	43.40
7	Palana	5191	1312	9331	4424	4907	2604	10	50.80
8	Sujasar	1924	73	538	258	280	233	0	41.80
9	BholasarBudhan	3066	360	2592	1252	1340	496	0	48.50
10	BholasarChouhanan	3028.77	62	433	216	217	151	0	45.90
11	Jangloo	7978	1162	7735	3640	4095	1585	4	44.90

 Table 1: Demographic details of villages under the Study Area (Census 2011)

S.N	Name of village	Agricultural	cultivato	Mining	Household	Marginal	Other
		Labours	rs	Labour	Industry	Workers	worker
1	Saroopdesar	252	967	243	21	611	38
2	Bhojoosar	5	33	45	0	4	88
3	Lalamdesar	92	1099	143	6	47	168
4	Basi	17	172	24	17	634	257
5	Barsingsar	101	905	223	38	555	537
6	Deshnok Rural	1	87	31	0	3	28
7	Palana	254	1604	456	38	1292	894
8	Sujasar	32	119	46	3	72	65
9	BholasarBudhan	128	214	111	12	504	143
10	BholasarChouha nan	27	9	38	11	31	33
11	Jangloo	45	713	69	9	869	711

# Table 2: Employment Pattern (Number of Persons) in Villages under the Study Area (as per census2011 and Survey).

Table 3: Basic Amenities / Facilities Available In Villages under the Study Area

S.N.	Name of village	Water	Elect.	School	Transportation	Commn.	Market Distance	Medical Facility
							Village	
1	Saroopdesar	GT, TW, RW, T	Yes	GUPS,GSS, PS	Bus, PV, Tractor, cart Mobil		18 KM	Sub Center
2	Bhojoosar	RW,T	Yes	GUPS	Bus, PV, Tractor, cart	Mobile	25 KM	No
3	Lalamdesar	GT, RW, TW, T	Yes	GSSS,GPS, PS	Bus, PV, Tractor, cart	Mobile	31 KM	РНС
4	Basi	RW, C, T,	Yes	GPS, PS	Bus, PV, Tractor, cart	Mobile	37 KM	Sub Center
5	Barsingsar	GT, RW,T,	Yes	GSSS, GGUPS, GUPS,PS	Bus, PV, Tractor, cart	Mobile	31 KM	РНС
6	Deshnok Rural	RW, T,	Yes	PS	PV, Tractor, cart	Mobile	21 KM	No
7	Palana	GT, RW, T,	Yes	GSSS, GGSS, GPS, PS	Train, Bus, PV, Tractor, cart	Mobile	18 KM	PHC
8	Sujasar	RW, T,	Yes	GUPS	Bus, PV, Tractor, cart	Mobile	22 KM	No
9	BholasarBudhan	GT, RW, T,	Yes	GSSS	Bus, PV, Tractor, cart	Mobile	37 KM	Sub Center
10	Bholasar Chouhanan	RW, T,	Yes	GPS, PS	Bus, PV, Tractor, cart	Mobile	36 KM	No
11	Jangloo	GT, RW, T,	Yes	GPS, GGUPS, GSSS, PS	Bus, PV, Tractor, cart	Mobile	37 KM	РНС

\*GT=Government Water Tap facility, TW=Tube well, RW= Rain water storage tank, T=Tanker, GSSS=Government Senior Secondary School, GUPS=Government Upper Primary School PS=Private school, GPS= Government Primary School, GSS= Government Secondary School, CSC= Community Health Center, PHC= Primary Health Center, PV = Personal Vehicle

### CONCLUSION

Based on the discussion held with a number of respondents from each village it is found that there is no adverse impact on people due to the project. Overall positive impacts are due to increased infrastructure facilities, education, employment, health & medical facilities. The standard of living has increased due to the above-mentioned improvements. The quality of life has improved and is satisfactory throughout the villages surveyed.

#### REFERENCES

- 1. Ambrose, W.A. (2020). EMD Coal Committee annual report, Bureau of Economic Geology, The University of Texas at Austin, Austin, Texas.
- 2. Chaulya, S.K. and Chakraborty, M. K. (1995). In Khuntia, G. S. (Ed.), Perspectives of new national mineral policy and environmental control for mining sector. Proceedings of National Seminal on Status of Mineral Exploitation in India. Institution of Engineers New Delhi, India. pp. 114-123.
- 3. Kumar, U. (1996). In Bose, A. K. (Ed.). Coal Scenario by 2001, Proceedings of International Conference on Business and Investment Opportunities in Mining industries, Oxford press and IBH, New Delhi, pp. 183-194.
- 4. Li, X., Bai, Z.-Q., Bai, J., Han, Y.-N., Li, P., Lv, D.-M., Xu, J.-L., Dai, X., Kong, L.-X., Li, W. (2015). Influences of exchangeable metallic species on solvent extraction of Xiaolongtan lignite and characterization of the separated portions. Fuel Process. Technol. 138, 42–47
- 5. Liu, P., Le, J., Zhang, D., Wang, S., Pan, T. (2017). Free radical reaction mechanism on improving tar yield and quality derived from lignite after hydrothermal treatment. Fuel 207, 244–252
- 6. Kumar, D., Ghosh, S., Tiwari, B., Verma, A.K., Mathews, R.P., Chetia, R. (2021). Palaeocene-Eocene organic sedimentary archives of Bikaner-Nagaur Basin, Rajasthan, India: An integrated revelation from biogeochemical and elemental proxies., International Journal of Coal Geology, 247 (2021) 103848
- 7. GSI (Geological Survey of India), (2019). Indian Coal and Lignite Resources. Natural Energy Resources Mission-II B, p. 41.
- 8. GSI (Geological Survey of India), 2011. Geology and Mineral Resources of Rajasthan, , Third ed.Vol. 12 Miscellaneous Publication No. 30. 120(p)
- 9. Velan, M., & Prasad, M. N. V. (2018). Neyveli Lignite Mine Waste Rehabilitation for Sustainable Development. Bio-Geotechnologies for Mine Site Rehabilitation, 347–370.
- 10. Karasmanaki, E., Ioannou, K., Katsaounis, K., Tsantopoulos, G. (2020). The attitude of the local community towards investments in lignite before transitioning to the post-lignite era: The case of Western Macedonia, Greece, Resources Policy, Volume 68,101781, ISSN 0301-4207,
- 11. Agarwal, R.K., Sharma, A., and Hussain, S. (2011). Geology and mineral resources of Rajasthan. Geol. Survey. India Misc. Publ. 30(12), 1-130.

# **CITATION OF THIS ARTICLE**

V K Matoria, D R Meghwal, R.K. Saran, S Sharma. Impact on Social Environment due to Lignite Mining and Thermal Power Plant at Village Barsingsar, District Bikaner, Rajasthan. Bull. Env.Pharmacol. Life Sci., Spl Issue [1] 2022 : 1060-1064