

Pollution and it's Control in Mining Areas

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ABSTRACT

Despite government's repeated assertions for the sustainable mining extraction and development of rural and tribal communities living near the vicinity of mining areas, these have not been converted into implementable solutions. The natural resources from rural and tribal areas are being exploited to meet the ever-increasing requirements and aspirations of the affluent groups. With the above background, this article, taking both experimental and control villages into account, tried to explore the impact of coal mining on local environment. Although dealing with local environment, it has mostly focused on sociological impact of mining in air, water, and noise pollution. The data collected show that the suspended particulate matter concentration is alarmingly high in few sampling locations, whereas respirable suspended particulate matter concentration which once used to be within acceptable limits is now gradually approaching its standard acceptable value of $300 \mu\text{g}/\text{m}^3$. Along with uncovered coal transportation, lack of water spraying system and movement of heavy vehicles have brought an addition to air pollution to the locality. The extraction of mining has influenced the water table. The data collected from State Pollution Control Board, Bhubaneswar, show that suspended sediments and chemical oxygen demand in most of the mining areas and biological oxygen demand in few cases have crossed the specific standard. Along with this, household survey was conducted by covering 6 villages and 600 households. The study was undertaken by following experimental design where 450 households were taken from experimental, ie, mining villages, and 150 households have been selected from nonmining areas. Of the 450 households, around 96.44% villagers responded that Mahanadi Coalfields Limited is not taking any mitigation measures to apprehend the pollution caused by mining operations.

Keywords : Pollution, biodiversity, livelihoods

INTRODUCTION

Since independence, improvement in the health status of the population by raising the access to and utilization of health, family welfare, and nutrition services has remained one of the major thrust for social development in India. But the development projects which have been initiated to reckon the country in the threshold of economic development have always proven to be injurious. At the same time, the drive to accomplish quick economic development both developed and developing countries are utterly harnessing the natural resources. Of the development activities, mining plays an important role in improving the economic aspects of a country.² As the obvious reason of mining, diverse range of challenges is occurring. Despite voluminous growth, both in the fields of medical science and health, since some decades, environmental factors remain a major cause of disease and death globally. Even the continuous release of several pollutant particles is causing climate change in a wider

aspect. Ecological imbalance is also adding one more feather in the aspect of environmental pollution. Hence, it can be stated that the economic cannot be fortified in its truest sense, whereas the broader impact of mining is on environment.

Background

Indian mineral sector is playing a vital role not only to generate employment opportunities and improved livelihoods but also to provide sufficient space for environmental degradation. Moreover, the central impact of mining is long term and devastating as it shades negative impacts on local air and water quality, depletion of natural resources, decrease in rainfall, loss of cultivable land, etc. As per the official confirmation of Ministry of Mines, the country is bestowed with 87 minerals. Of them, the prime contributors are mica, coal, lignite, iron ore, bauxite, manganese, aluminum, and crude steel.² Among these mineral reserves, coal has occupied a vital place by fulfilling around 55% of India's energy requirements.

To meet the energy need of the country, the excavation of coal is becoming commercialized, and at the same time, various coal-extracting industries have been established. Through the customary practice of mining coal, the country is earning good revenues, but at the same time, it has resulted in serious health and environmental issues within its gamut.

Extractive industries, mainly the coal mining, generate negative impacts in the local ecological conditions, which adversely affect the local economy and threaten the sustainability of local livelihood systems. Postmining phase of the Ib Valley has broadened the realm of cost-effective industry, but the study based on raw materialistic approach also suggests that impacts of coal mining must be conceptualized through the perspective of resource curse/blessing; in addition, it is important to note that the scale and dimension of mining are always in question. Exploitation of natural resource endowment shows the negative social and ecological outcomes. Study of Ramsay, Rossi, and Williams shows the several negative impact of resource extraction in global scenario. Study of Hota and Behra also suggested that there is need to reinvest some part of resource rents in regeneration of natural capital of the region, but the results of their study also show that rural households in the mining area experience both positive and negative outcomes from the coal mining activities. The study by Deonandan and Dougherty of mining impacts in Latin America raised a range of questions about the practices of mining companies on the ground, and the impacts of mining on host communities in terms of livelihood and capabilities are very critical. They mention that century of mining operations is the reason for the disappearance of the forest, river, and lake. Nielsen and Oskarsson shed light on crucial political and social dynamics that unfold today as India seeks to accelerate industrial growth. They show that how state stimulated the rural land for the mining and ignored the assets of natural capital. Their study shows that the destruction of the natural resource base, more generally, is one of the regions for resistance.

Starting from its excavation to loading and unloading, coal produces dusts and radiation which have a direct negative impact on the ecology, biodiversity, and health of the surrounding communities. During drilling, blasting, sizing, and transportation, the release of total suspended particulate (TSP) matter and inhalable particulate matter (PM₁₀) is the reason of air pollution in and around the mining zone. To check the air quality of the coal mining regions in India, a study was being undertaken by Ministry of Environment & Forests (MoEF), Government of India. According to the report prepared by MoEF, the critically polluted areas of India due to coal mining are Korba, Anugul, Talcher, Hazaribagh-Chatra, Singrauli, Chandrapur, Raigarh, and Jharsuguda. The Central Pollution Control Board

(CPCB) has developed a Comprehensive Environmental Pollution Index (CEPI). Central Pollution Control Board has done a nationwide environmental assessment of industrial clusters based on CEPI, and 43 such industrial clusters having CEPI greater than 70, on a scale of 0 to 100, have been identified as critically polluted. In Odisha, 3 clusters—Angul-Talcher, Jharsuguda, and Ib Valley—came under the category of critically polluted. Among these 3 regions, Angul-Talcher secured the highest position acquiring 82.09 CEPI score (SPCB, 2016). Even recently, CPCB has claimed Angul-Talcher region as critically polluted area in Odisha. In the Angul-Talcher region, pollution is caused primarily due to Bhushan Energy, Nalco Smelter, Bhushan Steel along with the Mahanadi Coalfields Limited's (MCL) Bharatpur and Bhubaneswari mines (The Pioneer; June 17, 2017). The central reason behind the pollution of air is the release of suspended particulate matter (SPM).²¹

In India, the central producer of coal is Coal India Limited (CIL) which operates in 8 different stations. They are excavating coal through both opencast and underground techniques. However, the opencast mines are the major producer of fugitive dust to the air which ultimately pollutes the air environment.²² Sometimes, the assessment of air quality shows that the air quality of both the residential and industrial areas is surpassing the National Ambient Air Quality Standards (NAAQS) protocol. Study done by Chauha²³ in the Ib Valley coalfield region of MCL shows that the 24-hour average of TSP and PM₁₀ is much more than the prescribed limit of NAAQS. Even the study done by Central Institute of Mining and Fuel Research, Dhanbad, during 2012 to 2013 concluded that the emission of total particulate matter at the mines of MCL is because of the release of contaminating dust.²⁴

The long-term and continuous mining of coal deteriorates the natural environment as it sheds negative influences on the nearby water bodies and soil.¹⁰ However, the regular disposal of millions of wastewater into the nearby water bodies is the main cause of pollution of water. More specifically, the release of chemical particles with the wastewater is the reason behind alteration of water regimes. Above all the chemical particles, contamination of water through acid mine drainage is the reason behind the alteration of pH balance. Even the low pH balance is the reason behind the hazardous condition of aquatic life.²⁷ Furthermore, the metallic materials which comprise iron (Fe), copper (Cu), manganese (Mn), and nickel (Ni) are hindering the domestic use of water.

Pollution of both surface water and groundwater is becoming rampant due to coal mining activity. During the initial period, the release of obnoxious substances such as ash, oil, phosphorus, ammonia, urea, and acids are contaminating the surface water quality of the mining regions. Studies have found that the groundwater quality is also getting contaminated due to the release of manganese (Mn), cadmium (Cd), and lead (Pb). The concentration of these metallic particles was found beyond the maximum permissible limits. Similarly, the presence of these metallic substances in water resulting in various health hazards such as rheumatism, speech and hearing disability, euphoria, impotency, high blood pressure, high cholesterol, diabetes, kidney stones, and cancer. Sometimes, overexploitation of water from the nearby water bodies is becoming the major cause of water scarcity.

Noise pollution is quite evident while discussing about coal mining and pollution. As mining activity is taking place throughout the day, the noise coming out at the time of blasting, drilling, and transportation is polluting the entire environment. Mostly because of opencast mines, the noise comes out at the time of blasting and overburden (OB) removal. Even the workers are working in the polluted environment where they have continuous exposure to

noise, humidity, unhealthy ventilation, smell of chemical explosion, etc. and are becoming the adverse sections because of mining.³³

However, all these issues can be tackled by formulating and implicating the appropriate policies for the project-affected communities. Time and again, some policies have been formulated, but the improper distribution of resettlement and rehabilitation (R & R) measures underpinned varied distress among the affected communities. In receipt of the above-mentioned consequences of mining, this article is being devoted to observe major environmental issues that are being encountered by the project-affected people of Talcher coalfield. Here, we have tried to explore the impact of mining on local environment. While exploring the impact, we have looked it from sociological perspectives.

OBJECTIVES

This article is an attempt to discuss the following environmental aspects of coal mining at Talcher coalfield region:

- The reasons behind environmental degradation.
- The impact of coal mining on local environment including air and water.

MATERIALS AND METHODS

This study was conducted in MCL region of Odisha, India. Mahanadi Coalfield Limited, a subsidiary of CIL, is divided into 3 parts as per its functioning areas, such as Talcher, Ib Valley, and Vasundhara. However, this study is confined to the opencast mining areas of MCL, Talcher (Map 1).



Map 1. Talcher coalfield. Adapted from <http://mahanadicoal.nic.in>.

Talcher coalfield, bounded by latitudes 23°53'N and 21°12'N and longitudes 84°20'E and 85°23'E, covers an area of about 1800 km². It has 8 opencast and 3 underground coal mines in its 5 coal areas, namely, Jagannath area, Bharatpur area, Lingaraj area, Hingula area, and Talcher area.

In this study, the targeted population consists of those who bear the negative costs of mining. In the first stage, a list of all those villages which are near the mines was undertaken. Given the choice of a target population, the next step was to put together a list of the target

population, known as the sample frame population, from which, ultimately, the sample was drawn. Second, a list of 6 villages was undertaken according to stratified random sampling procedure. The strata were decided on the basis of the distance from the mine. The significance of selection of the villages in this particular way is to capture the variations in the impact of livelihood due to mining activities.

The closer a village is to the mines, the more is the probability that is affected by the mining. Since mines have started operation 20 years ago, it is difficult to go for a before and after analysis. Instead, with and without comparison will be conducted. For the purpose of with and without comparison, 2 more villages are selected that are not affected by mining, but belong to the same district, as control villages. In the last stage, from each sample village households were selected on the basis of circular random sampling methods for final study (Table 1).

Table 1. Sample villages.

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SAMPLES	NO. OF VILLAGES	DISTANCE FROM VICINITY	NO. OF SAMPLES HOUSEHOLDS	TOTAL SAMPLE
Affected by mining (experimental group)	2	3	75@2	150
	2	6	75@2	150
	2	9	75@2	150
Nonmining affected (control group)	2		75@2	150
Total				600

Adapted from Field study.

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To fulfil the objectives of the study, data were collected from both primary and secondary sources. For primary data collection apart from quantitative techniques, this study used qualitative anthropological tools. As part of qualitative data collection, the techniques such as observation (both participants and nonparticipants), case study, key informant interview, formal and informal interviews, and some of the participatory rural appraisal techniques such as focused group discussions, resource maps, and seasonal analysis were used. For gathering quantitative data, household survey was conducted using the pretested schedules. The secondary data were collected from official records, policy documents, published reports of similar projects, journals, and literature from social science discipline.

Coal Mining and Environment

With due course of time, many environmentalists agreed that burning coal is the most polluting method for producing electricity and is causing huge environmental damage. The worst thing that occurs during this process is of course the production of greenhouse gases (mostly carbon dioxide emissions) by burning coal, but carbon emissions are not the only negative thing in this process, as it also involves varied harmful compounds that released during burning of coal. Besides burning process, environmental problems are also associated with transportation, storage and disposal, loading and unloading, blasting, etc. Because coal is predominantly mined from the surface of earth, this often causes damage to nearby ecosystems as many of the ecosystems above are degraded or sometimes even completely removed. Coal is usually transported by diesel trains over great distance, which means that it releases extra carbon dioxide and other harmful particles. And there is also coal dust that

once produced contributes to particulate matter in the air which ultimately causes air pollution.

The trace factors contained in coal (and others formed during combustion) are a large group of various pollutants with a number of health and environmental effects. As a result, it disturbs ecosystem and endangers human health as well. Some cause cancer, others impair reproduction and the normal development of children, and still others damage the nervous and immune systems. Many are also respiratory irritants that can worsen respiratory conditions such as asthma. There is an environmental concern because they are often damaging ecosystems.

Coal mining and air pollution

In the era of 21st century, this belt has become an industrial hub. Along with MCL, a good number of coal-based thermal power plants, several heavy industries, coal washeries, and a large number of subsidiary industrial units have come up in the area. All these mining and industrial activities have caused rapid degradation of environmental quality. Although, on one hand, the natural resources available are degrading very first, on the other hand, the demand for resources have risen in this locality because of rise in industries and inflow of outsiders.

Across the globe, mining activities have either direct or indirect association with air pollution.³⁴ Although the effect of mining, ie, opencast and underground, varies, the negative impact of opencast coal mining is much higher than that of underground mines. The activities such as drilling, blasting, and transportation are the central cause behind air pollution.^{21,35} Even the release of fugitive dust into the air is also responsible for air pollution.²² In this study, it is observed that in the mining-affected villages, due to the release of particulates and poisonous gases, the atmosphere has created havoc and panic among the villagers. As a result, all the opencast mines have directly or indirectly are contributing to the air pollution. Even the associated activities of opencast mines such as unloading and loading of coal, transportation of coal, poor condition of roads, and huge quantities of open air coal burning by the villagers are the causes responsible for air pollution.

In all the affected villages and the nearby areas, it was observed that airborne emissions occurs during each stage of the mine cycle, but especially during exploration, development, construction, and operational activities. Mining operations generally mobilize large amounts of material, and waste piles containing small size particles are easily dispersed by the wind. The largest sources of air pollution in mining operations are as follows: particulate matter transported by the wind as a result of excavations, blasting, and transportation of materials; wind erosion fugitive dust from tailings facilities; stockpiles; waste dumps; and haul roads. Exhaust emissions from mobile sources (cars, trucks, heavy equipment) also raise these particulate levels. In the roads, it was observed that the movement of heavy vehicles, which had tons of coal meant for transportation to other places, was seen creating air pollution. It was also noticed that during transportation, the coal-loaded vehicles were normally uncovered. Even the trains which transport coal from the source point to the designated place pose serious threats as the loads are literally uncovered. Mahanadi Coalfields Limited authorities are not at all concerned to monitor the uncovered vehicles. In a discussion, MCL officials blamed the State authorities for not monitoring these issues. They claimed that around 85% of coal is being transported through train, and only 15% coal is transported by

truck to local industries because of the Memorandum of Understanding (MoU) with State Government. They also claimed that till the MCL gate they used to monitor and are giving clearance certificate, but the truck drivers used to remove the cover once they cross the MCL gate.

However, during the field study, it was observed that almost all coal-loaded trucks were uncovered. Interestingly, when the drivers were asked whether they were directed to cover the coal loads at the time of transportation, they replied as no such directions were given at the time of loading neither they have paid any penalty for the same. Although there was an agreement that a separate coal corridor road will be built, it is not yet ready. Villagers in the study area revealed that sprinkling of water to prevent dust from flying never occurs and they have to take in the polluted air which is fatal for their health. Mahanadi Coalfields Limited has openly flouted the Pollution Control Board’s norms by allowing overloading of coal through vehicles which in turn generate large amount of dust particles due to spillage, and the authorities have not made any provision for the collection of spilled over coal materials which have become a source of pollution. This clearly violated the Environment (Protection) Act 1986.

The data collected from field reflected in Table 2 show that around 95.33% households reveal that mining has polluted their local environment. As there is no much variance in responses, the reliability of the questionnaire shows high reliability.

Table 2. Respondents’ response on pollution.

NAME OF THE VILLAGE	YES	NO	TOTAL
Balanga Khamar	73 (97.33)	2 (2.67)	75
Langijoda	59 (78.67)	16 (21.33)	75
Hensamul	75 (100.0)	0	75
Naraharipur	75 (100.0)	0	75
Danara	72 (96)	3 (4)	75
Jambu Bahali	75 (100)	0	75
Total	429 (95.33)	21 (4.67)	450 (100)

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During summer, the temperature in Talcher remains between 42°C and 48°C which is unbearable and at the same time mine fire also adds to an extreme summer condition. The release of huge stocks of coal from Lingaraj, Bharatpur, and Ananta mines is causing mine fires regularly. Simultaneously, the failure of MCL authorities to pacify the fire has worsened the situation. The constant fire has soared up the atmospheric heat and is polluting the whole environment. Although there is no moisture in the air, it is necessary to disperse the produced coal. It should not be stored. The coal should not take to stocks, which lead to combo stone,

fire, and smoke. Coal dispatch facilities have to be developed to avoid a chance of fire. Mahanadi Coalfields Limited authorities are also well aware about the fact that the dust particles which arise out of blasting, loading, unloading, and transportation of coal are lethal, but the authorities are inactive in terms of paving the way for a permanent and strategic method for countering the menace of dust-related hazards. From the available official data of MCL, they claim that varieties of measures were taken to encounter air pollution. Such measures include using blast-less mining technology which eliminates the dust-generating operations, such as drilling, blasting, and crushing, completely while sprinkling water at the same time, but hardly there is blast-less mining technology which is eliminating dust particles nor there is any consistency in water sprinkling. Another mitigation measure as claimed by the MCL includes mist type water spraying system along the conveyor belts/bunkers in the major coal handling plants, but hardly the mist type water system was found during the field study.

To reduce the fugitive dust emission, the MCL has started using Surface Miner Machine. Earlier it used to completely depend on the method of normal mining. However, MCL Talcher is not totally depending on Surface Miner. Most of its mining activities are still depending on conventional method. Coal-transported roads are not much equipped with water spray system. Maintenance of fixed and mobile water sprinklers on roads, railway sidings, stockyards, etc, is also not done by the MCL in a regular fashion. It should be a compulsion that both the road sides should have sufficient number of water sprinklers which are not seen in Talcher coalfield. Occasionally some tanks are moving on roads to sprinkle water. The seriousness of MCL regarding the installation and strengthening of existing dust collectors and dust extractors in drill raises serious concerns.

Crushed coal from coal handling plant or directly from Surface Miner face is transported through tippers which unload the coal on the platform. Then, pay loaders load the coal in the wagon. Due to the unloading, loading, and movement of number of tippers, railway sidings become a major source of fugitive dust emission. Although water sprinkling through mobile and fixed sprinklers and good housekeeping through plying of wheel dozers are used to control the dust at railway sidings, still pollution is a major challenge here. Even the mining-affected villagers reported that MCL has openly cut around lakhs of trees and has never planted a single plant in their villages. Trees not only yielded fruits for them but also purified the atmosphere. This demonstrates that how MCL has openly disobeyed the environmental laws and is not serious in abiding to any afforestation programs for the betterment of the environment.

Table 3 reveals that around 96.44% villagers responded by saying that MCL is not taking any mitigation measures to apprehend the pollution caused by mining operations. Villagers also added that the mitigation measures which MCL claims that are implemented in the affected villages such as use of blast-less technology and use of water sprayer are nothing but white lies, and MCL is violating the environment laws and its mitigation claims are totally baseless. However, during fieldwork, it was observed that although MCL has taken lots of initiation to control pollution, it failed in reaching at complete solution.

Table 3. Respondents' response toward MCL's initiation to mitigate the pollution caused by mining.

NAME OF THE VILLAGE	MCL TAKING INITIATIVES TO MITIGATE POLLUTION		TOTAL
	YES	NO	
Balanga Khamar	6 (8)	69 (92)	75 (100)
Langijoda	5 (6.67)	70 (93.33)	75 (100)
Hensamul	5 (6.67)	70 (93.33)	75 (100)
Naraharipur	0	75 (100)	75 (100)
Danara	0	75 (100)	75 (100)
Jambu Bahali	0	75 (100)	75 (100)
Total	16 (3.56)	434 (96.44)	450 (100)

Abbreviation: MCL, Mahanadi Coalfields Limited.

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To examine the existing air pollution scenario, this study has taken the 10-year air ambient quality data measured by State Pollution Control Board (SPCB), Odisha. As per the study conducted by Goswami,³⁶ SPM had reached an alarming level of 1848 kg/km² in Talcher region in Odisha. The data collected from Odisha Pollution Control Board show that nitrogen dioxide (NO₂) and sulfur dioxide (SO₂) levels for most of the coal mining areas are within the prescribed limits; however, high concentration of SPM and dust levels is a major problem in and around the mining areas of Talcher. Fugitive dust emissions, in particular, have been a major cause of concern.

Periodic sampling of air quality in MCL region is being done by the Regional office of State Pollution Control Board, Angul, Odisha. A brief comparison is made using their sampling results for Jagannath Opencast Project which is presented in [Tables 4](#) and [5](#) and can be considered as a representation for the other opencast mining works in the surrounding region of Talcher coalfield. The highest concentrations of particulate matter are found within the mine with concentrations gradually diminishing with increasing distance from the mine,³⁷ and hence, the expected concentration within the Jagannath Opencast Project is much higher than the values reported in the above tables.

Impact on local biodiversity

The development of coal mines has led to the loss of forest cover and simultaneously affected biodiversity and wildlife corridors in these forest areas. According to the Ministry of Coal (MoC), about 60% of coal resources are located in the forest areas (MoC, 2005). Most coal blocks allocated in the last few years have been in or adjoining forest areas. Of all the coal

leases acquired by CIL, 28% lay under forest region, ie, out of which 2 00 000 ha are coal leases and 55 000 ha lay under forest cover (Greenpeace Report, 2012).

The MoC estimated that given the rising demand the need for forestland for mining will increase from about 22 000 ha in 2005 to 75 000 ha by 2025. In Angul-Talcher region in Odisha, for instance, forest cover has reduced by 11% between 1973 and 2007 due to coal mining (Singh, 2010). Coal mining, especially opencast mining and the evacuation of coal, requires large tracts of land for extraction processes, industrial purposes such as thermal power plants and captive plants, as well as ancillary processes such as OB dumps, pipelines, railway lines, and public works. It destroys not only the standing forests but also animal corridors, which diverted the streams.

Mining has affected the local environment and associated biota through the removal of vegetation and topsoil, the displacement of fauna, the release of pollutants, and the generation of noise. Mining of coal, both surface and subsurface, causes enormous damage to the flora, fauna, hydrological relations, and soil biological properties of the systems. Destruction of forests during mining operation is invariably accompanied by an extensive damage and loss to the system. The OB of coal mines when dumped in unmined areas creates mine spoils which ultimately affects the surrounding vegetation.

The destruction of ecosystem in postmining period has brought a great loss to the wildlife and their habitat. Both directly and indirectly it has damaged the wildlife. These animals live in communities that depend on each other. Survival of these species can depend on local ecosystem, soil conditions, local climate, altitude, and other features of the local habitat. The impacts stem primarily from disturbing, removing, and redistributing the land surface. Some impacts are short term and confined to the mine site; others may have far-reaching, long-term effects. The most direct effect on wildlife is destruction or displacement of species in areas of excavation and heaping of mine wastes. As per villagers view, most of the wildlife species are extinct. Mobile wildlife species, such as game animals, birds, and predators, have left these areas. More sedentary animals, such as invertebrates, many reptiles, burrowing rodents, and small mammals, are severely affected. The fragmentation of habitats due to mining activities has made difficult for some animals for their ecological move. In some cases, the isolation has led to local decline of species or genetic effects such as inbreeding. Species that require large patches of forest simply disappeared.

CONCLUSIONS

Environmental degradation is inevitable while it is associated with developmental activities such as coal mining. In this study, it was observed that in comparison with control villages, the mining-affected villages witnessed varied environmental issues. With increased production of coal, the environment of mining-affected villages is degrading hurriedly. Although the mining authorities claimed that they have taken varied precautionary measures to control the level of pollution, it still is responsible for air-related, water-related, and noise-related pollutions. Although the concentration of SPM and RSPM in some areas is going beyond the permissible limits, this ultimately is responsible for numerous respiratory diseases. Even it has decreased the average life span of project-affected persons. Similarly, the groundwater quality in Talcher-Anugul industrial complex has crossed more than 100 which is not at all suitable for drinking. The rise in suspended sediments, COD in most of the mining areas and BOD in few cases, has crossed the specified standard in mining drainage water. This may disturb the aquatic life in local areas. The ill effect of noise pollution is not

only increasing the household repairing cost but it is also responsible for some sort of hearing as well as mental disturbances. From the existing air, water, and noise quality data; personal observation; interactions; and through photographic collection of the study area, it can be concluded that a major initiation is required to control the environmental degradation by minimizing several aspects of pollution.

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