



## RESEARCH ARTICLE

# THE ADVANTAGES, DISADVANTAGES AND CHALLENGES OF BANNING RAT HOLE MINING IN THE JAINTIA HILLS OF MEGHALAYA

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### ABSTRACT

Coal mines are site specific and they are located in the ecologically sensitive areas where forests are rich in Biodiversity. Coal mining is not a curse in the state, as mining had a positive effect in the state of Meghalaya. It is one of the most important sources of energy in the state. The mining activity in Jaintia hills have adverse effect on land use and socio-economic activities. The study revealed that rat-hole mining activity had initiated environmental degradation in the region due to deforestation, biodiversity loss, pressure on local resources and soil erosion. The damage caused to the local ecosystem is permanent. Unsystematic shallow mining is one of the most important factors affecting the water body due to waste dumps. Coal in the state of Meghalaya possesses high degree of sulphur. Rat hole mining is technically simpler done by the tribals of Meghalaya. The National Green Tribunal banned rat hole mining in Jaintia Hills from April 2014.

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## INTRODUCTION

Coal is a fossil fuel created by living organisms millions of years ago and buried in sediments. Coal seams can be of 100m thick and can extend across tens of thousands of square kilometers. Coal is one of the extensively utilized minerals in Meghalaya. Coal deposit in the state is found all along the southern fringe of Shillong plateau, East and West Jaintia Hills District is the major producer of coal. Coal extraction is done by primitive mining method commonly known as "rat-hole" mining. Rat hole or coyote hole mining refers to inexpensive extractions that are technically simpler. Rat hole mining is an illegally digging method of coal mining. Most of the mining activities are controlled by individuals who own the land. Mining is done by family members or community people and not Government undertaken. Rat hole mining is done mainly by tribal's of North East India. This is so named because they dig a hole similar to that of rat holes to mine. Mining operation, undoubtedly has brought wealth and employment opportunity in the area, but simultaneously has led to extensive environmental degradation and disruption of traditional values in the society. The water bodies of the area are the greatest victims of the coal mining. Coals in the northeastern states of India with its unusual physico chemical characteristics have been playing an important role in the Indian economy for the last few decades. (Saikia *et al.*, 2014a)

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Most coal mining Districts in India have been declared as critically polluted areas (CAPs) by MoEF. (Centre for Science and Environment, CSE (2012))

## MATERIALS AND METHODS

Both primary and secondary data was used for the present study. Primary data was collected from the villagers through direct interview method and field observation. For secondary data books, research journals, internet was used for the present study.

## RESULTS AND DISCUSSION

The Jaintia Hills, one of the seven districts of Meghalaya occupies the eastern part of the state. It covers an area of 3819 Km which is 17.03% of the total geographical area of the state. The Jaintia Hills District of Meghalaya is a major coal producing area with an estimated coal reserve of about 40 million tones. Sutnga, Lakadong, Musiang-Lamare, Khliehriat, Ladrymbai, Rymbai, Byrwai, Bapung etc. are the main coal bearing areas of the District. In these areas coal is found imbedded in sedimentary rocks, sandstones and shale of the Eocene age. The coal of Jaintia Hills is of high caloric value with high level of sulphur. The coal is sub-bituminous in character i.e. the coal may be dull, dark brown to black, soft and crumbly at the lower end range, to bright jet black, hard and relatively strong at the upper end. Composition of the coal

revealed by chemical analysis indicates moisture content between 0.4% to 9.2%, ash content between 1.3% to 24.7% and sulphur content between 2.7% to 5.0%. The caloric value ranges from 5,694 to 8230 kilo calories/kilogram. In rat hole mining method the land is first cleaned by cutting and removing the ground vegetation and then pits ranging from 5 to 100m<sup>2</sup> are vertically into the ground to reach the coal seam. Thereafter, horizontal tunnels are made into the seam for extraction of coal, which is brought into the pit with the help of a wheel barrow or a conical basket. Most of the mining activities are small scale ventures controlled by individuals who own the land. Like unorganized cottage industries these coal mines have mushroomed in this region. Whenever the landowner needs some emergency cash, forest is cleared and a shaft of diameter varying from 3m to 10m is dug into the coal seam. These burrows or holes are big enough to accommodate just one person to crawl in with tools and basket or wheeled cart to carry out coal to the depots located near the main road. There are approximately 5000 coal mines in the district. 99% of the workers are migrants from Bangladesh, Nepal, Bihar, Assam and Jharkhand. The number of Nepali workers estimated as 1,50,000 (Madhavan, 2005). According to an estimate from a NGO 70,000 children in the age between 7 to 17 are working in these private mines as casual labor under private contractors without any security to their lives. (Impulse: An exploratory study of children engaged in Rat Hole Mining in the coal mines of Jaintia Hills, 2012) Between 1975 and 2016, there has been decrease in forest area by 12.5%, while area under mining has increased three fold.

**Advantages.**

Rat hole mining is of advantage because of low capital investment unlike organized sectors, low maintenance and operational costs. Large diameter holes can be dug easily. Advantages include benefits due to geographical location and availability of coal on the surface and it is relatively cheaper. The landowners can get cash very easily from their private mines. It also provides employment for people who are unemployed in the mining regions. The coal ash obtained from the mines is used in cement factories. Coal is the easiest forms of energy and is present in abundance in this region and will remain an important source of energy system. Coal will play and remain an important source of energy system in developing countries that sustainable development for the future. Since 1900 coal industry has created jobs and employment to the people of this region. The location of Jaintia Hills in the border of Bangladesh facilitates the easy export of coal to the international market and infiltration of cheaper labor into the coal mines.

### **Disadvantages**

Rat hole mining can cause long term harm to the environment in a number of ways. One type of damage is scarring and disruption of the land surface. Rat hole mining activity, had environmental degradation in the region due to deforestation, biodiversity loss, waste land generation, pollution due to dust and noise. There is immense pressure on local resources. Due to deforestation there is soil erosion. Loss of biodiversity in this region has led to an alarming loss to different flora and fauna. Biodiversity loss is an irreversible process and the state faces a crisis in this aspect. Biodiversity is an important factor for sustainable development. The uses of biodiversity covers a wide array of goods and services provided directly at genetic level, species level or at ecosystem level. Toxic elements like

sulfur, pyrite generated by the process of coal mining causes temporary or permanent harm or death to human and other animals as well as plants. Some of these elements act as mutagens that cause mutations or changes in the DNA molecules. These toxic elements may also act as teratogens that cause harm or birth defects to the fetus or embryo. Air pollution caused by coal combustion act on the respiratory system, contributing to serious health effects which include asthma, lung disease and lung cancer.

In the year 2007 Meghalaya State Pollution Control Board, Shillong reported a case of massive fish death in Lukhariver which was attributed to AMD contaminating the stream water and sediments. In addition to high sulphur content, North Eastern coals have a high content of volatile matter and vitrinite content, yielding double the amount of tar in comparison to the other Indian coals. (Baruah and Khare, 2010) The depth of the rat hole mines ranges between 50 to 200 feet. It is dangerous descending the mine with the help of makeshift wooden ladders which runs along the wet and slippery stone walls. The villages stand on earth having a network of cavities underneath. There is lack of experienced cable tool drillers. The absence of state enforcement of labor laws has also encouraged local entrepreneurs to exploit the cheapest sources of labor i.e. children. According to surveys conducted by NGO Impulse, tens of thousands of children under the age of 16 are believed to be working in the Jaintia Hills, many coming from Nepal and Bangladesh. (Swier and Sing, 2004) Rat hole mining is dangerous as the mines collapse and the workers are trapped in and killed. Disadvantage of mining includes deforestation, erosion and loss of biodiversity. The major source of carbon dioxide in the environment is coal mining which is the primary cause of global warming. Particulate matters from the mines causes chronic bronchitis and premature deaths.

### **Challenges**

Coal contributes to one of the most important energy source and is likely to remain as an important source of energy for the coming decades. Mining in Meghalaya is facing significant challenges in its operation factors and economy. Coal mining has remained stagnant from the month of April 2014 after NGT put a blanket ban on mining in the state of Meghalaya. As per the NGT rules the challenges for the Government to continue mining in this region of the country must have safety rules, improved occupational health, safety standards. NGT supports environmental issues as well as human rights issues which have to be taken into consideration for mining operation. Coal contributes largely towards economic development of the state. A holistic approach of mining activities, taking care of the surrounding eco-system will help the state. Mining impacts are to be looked in conjunction with socio-economic issues within the wider framework of sustainable development. This can be achieved through coordinated programmes dealing with ecological research, exploitation of use of biodiversity and associated goods and services for sustainable development. Rat hole mining is one of the basic resource generating sectors in Jaintia Hills. Banning of mining has affected thousands of people in the District. Mining has the potential to shape and affect economics directly and indirectly. Mining brings employment, Government revenues and opportunities for economic growth. As a result of ban in rat hole mining the state is passing through a very difficult phase in economy. Thousands of

workers have lost their jobs and the truck drivers engaged in transportation of coal are idle after the ban.

Environment plays a pivotal role on the welfare of human life and national economy. The functioning of human life and ecological balance is determined by a complex of environmental factors. The toxic pollutants released from these mines have adversely affected the environment destroying both terrestrial and aquatic resources. Lack of safety norms have led to respiratory problems to the miners. Top soils of the region have undergone degeneration; hence regeneration of the soil by planting herbaceous monocots such as lemon grass and citronella can enhance soil fertility in mine spoils. Khleihriat and Latrymbai showed less diversity of fish and other aquatic species. (Swier and Singh, 2004)

### Conclusion

Mining has been an age old practice in the State of Meghalaya and thousands of people earn their livelihood through this activity. Mining have a significant impact on the economic, social aspects. Organized mining in this region will provide communities with jobs, economic growth and improvement in people's life. Although mining activities bring about economic development in the area at the same time there is degradation of the land. As mining affects the eco-system, it is important to conduct suitable assessment studies to learn the potential adverse impact of mining on the flora and fauna. Environmental management strategies that can be useful in mitigation of the environmental problems and rehabilitation of the degraded ecosystems of the area can be implemented. The rivers and streams of Jaintia Hills, Meghalaya are the greatest victims of the coal mining. Degradation of water quality in the

area is evidenced by low pH (range from 3 to 5), high conductivity, high concentration of sulphates, iron and other toxic metals, low dissolved oxygen and high BOD. Mine drainage is affecting aquatic life from elimination of most of the species except few tolerant ones. NGT mining policy would provide scope for the mining of minerals in a scientific and sustainable manner taking into account the interest of the state and its people. Extensive afforestation of the mined areas with local tolerant plant species will be of great help in Eco restoration of the degraded eco-systems.

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