Quest Journals
Journal of Research in Environmental and Earth Sciences
Volume 7 ~ Issue 8 (2021) pp: 26-30
ISSN(Online) :2348-2532
www.questjournals.org

Research Paper

The Environmental Impact of Uranium Mining in Meghalaya – A case of Domiasiat, West Khasi Hills District

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ABSTRACT –
Mining of uranium in Meghalaya has got a global attention. Even for the developed countries in the world, it came as a surprise for them because they did not expect that this mineral is present in Meghalaya, a remote and poor state of India. The country is proud to explore and extract the uranium for its demand in nuclear powers and industries, but it was a rude shock for the local people. The exploitation and rampant destruction of the land and forests has impacted the environment. The mineral, which is God's gifted treasure, is also gone forever because the mineral is fixed in quantity. The extraction has depleted the stock. Radiations and radioactive waste materials has seeping and percolating into the nature and environment. It has affected and caused the health hazards to human beings, the animals and the living and none living organisms and species in the areas. The ecosystem has changed tremendously. It has affected and traumatized the people because they were depending their livelihoods on land but now the land has become poisonous. The Central and the State Governments should find out a solution not only to contain the spread of the harmful effects of the uranium but to protect and preserve the rights and identities of the people also.
KEYWORDS *– Uranium, radiation, health hazards, environment, resources, minerals, Domiasiat.*

Received 24 July, 2021; Revised: 07 August, 2021; Accepted 09 August, 2021 © The author(s) 2021. Published with open access at www.questjournals.org

I. INTRODUCTION

Before we are exploring the state of Meghalaya, the author would like to make the readers know about the history and its background. Meghalaya got the full fledged state on January 21st, 1972 and become one of the states in the Union of India. The total geographical area of Meghalaya is 22,429 square kilometres, and it lies between 20.1°N and 26.5°N latitude and 85.49°E and 92.52°E longitude. The total number of population in the state is 2,966,889, according to the Census of India, 2011. The inhabitants of the state are mainly the tribal people, which includes the Khasi, Jaiñtia and Garo.

The state is rich in the natural resources, both renewable and non renewable. However, these non renewable natural resources are in the verge of extinction from the state of Meghalaya like the Dinosaurs that has been disappeared from the Earth long time ago, because it has been eaten up by the greedy people and the Governments of the country. The availability of this resource or mineral is fixed and when once it is used or exploited, it could not be created or regenerated any longer and uranium is one of these examples.

The reason why this mineral is lost and disappeared from the earth's treasure house is because the Atomic Mineral Directorate for Exploration and Research as well as the Uranium Corporation of India Limited (UCIL) had made an intensive drilling since the year 1990s in Domiasiat (comprises the villages and localities Wahkaji, Wahkyn, Tyrnai, Lostoin, Kylleng, Pyndengsohiong Mawthabah, Nongtynniaw, Nongjri, etc) in West Khasi Hills District, Meghalaya.

It has been estimated that about 131 km distance of drilling have been done in the areas, about 1800 boreholes has been dug up and the total extraction of uranium ore is about 16,000 tonnes. This includes 9,500 tonnes at Domiasiat, 5,300 tonnes at Wahkyn, 570 tonnes at Tyrnai and 760 tonnes at Lostoin [1].

Purpose of the study –

The purpose of the study in this paper is to provide a general information about the danger of uranium and its effects on humans and other living and non living organisms and species. Also to create an awareness among the masses about the environmental impact and health hazards of uranium. The destruction and degradation of the environment and the ecosystem. The informations that is intended to provide here are mainly

from the secondary sources, which are available in the form of books, journals, articles, news and new items, and from the internet.

Objectives – Firstly, the objective of the paper is to find out the linkages between mining of uranium and environmental degradation and secondly, the impact of uranium mining on health and health related issues.

II. DATA AND METHODOLOGY –

ln this paper, the data that the author used are mainly from the secondary data. The data and materials are available in the public domains. The method in the study is by observation. The data are extracted from the public domains and stitched together the pieces to reach to a final conclusion. This method is found to be useful and helpful during the period of Covid-19 pandemic.

III. RESULTS AND DISCUSSIONS

Even the literatures that are available on the nexus of mining activity and the environmental impact in the context of an underdeveloped economy are not so many. A detail and comprehensive study is needed in this field to fill and to plug the gap. A few studies having reference on mining of uranium, environmental impact, impact on the health and health related issues are mentioned and reviewed in this paper.

Impact on Health due to Exposure to Radiations and Radioactive Wastes –

The impact of uranium mining on health and health related issues are at an alarming rate in Domiasiat area. The people are relatively fragile due to the exposure to radiations and radioactive wastes emitting from the mine and waste materials disposed off at the site. This has affected on the health of human beings, air quality, land, water, tress and fruits, flora and fauna, animals and wildlife. It is a very distressing thing to see and imagine that mining of uranium could lead and bring such problems to a community.

The people felt disgusted and disappointed at the adamant of the authorities by allowing the mining company to extract the uranium from their lands. To express their anger about the adamant of the authorities and from the fear of the radiations and its impact on human health and health issues, environmental degradation, etc. agitations have been organized, including the local people and civil rights groups and are fighting hard and helplessly not to allow the UCIL, which is commonly known as the "Agents of Death" to continue mining of uranium in the area [2].

Late Mrs. Spelity Lyngdoh Langrin, 95 years of age, is one of the persons in the area and also she had become as an icon of the people in the state of Meghalaya to fight against uranium mining. Since the 1980s, she has started noticing the hazardous impact of uranium mining activity caused around her. There is an impact on the health of her family members, on her cattle she had reared and most of them died [3].

Patra also mentioned in his article that uranium mining in the state of Meghalaya has affected the environment, the people and the economy. He further highlighted the impact of uranium mining in the areas is visible through, in terms of air pollution, biodiversity loss such as wildlife and agro-diversity, genetic contamination, loss of landscape/aesthetic degradation, soil contamination, soil erosion, deforestation and loss of vegetation cover, surface water pollution/decreasing water (physico-chemical, biological) quality, groundwater pollution or depletion, large-scale disturbance of hydro and geological systems, reduced ecological/hydrological connectivity, mine tailing spills. There is also a complete exposure to unknown or uncertain complex risks such as radiation, etc. and other environmental related diseases [4].

These problems has been noticed since the beginning of the drilling and digging of the uranium in the areas, the leakage of the radiations from the mine has percolating to the environment and spreading to the people and villages in the areas, who are unknown about the dangers and the problems caused by uranium. It has affected and disturbed the environment to a large extent. The living and none living things, who are present in the environment and ecosystem are absorbed the radiations. They had been affected by various types of diseases and sufferings and they are dying everyday. But no one knows about these problems caused by uranium mining because the people in the areas and in the state are ignorant, illiterate and blindly believed the government and the company, who are continuing to fool them and forcing the people about the importance of uranium and the nuclear plant and power in the country and the economy.

The boreholes that the mining company had dug up for extraction of uranium ore were left uncovered for a long time. The leakage of uranium radiations is seeping into the environment continuously. This has affected the lives of many living and none living things in the areas. It had destroyed and disturbed the entire environment and endangered the people of the areas to move and explore around into their own land [5].

It has been reported that the leakage of uranium radiations are not only coming from the mines but from the tanks and the storage facilities that they are storing the waste materials and waste products of the uranium. These tanks and storage facilities are producing the radiations, toxic airs and effluents into the air and atmosphere, the environment and contaminated the areas where both the people and animals are inhaled the

toxic airs of uranium and they are dying of a slow dead. However, sadly and shamefully to cover up this matter from the public, the Khasi Hills Autonomous District Council (KHADC), which is one of the traditional institutions in the state, looking after the welfare of the indigenous people here, especially to the land and forests, have entrusted the matter to the Forest Special Committee and the Forest and Environment Department to investigate the leakage but the report they are given is unsatisfactory. Thus, the effects of radiation from the leakage on the health of people, on land and water bodies in the area remain unchecked and uncontrolled.

According to Bremley W.B. Lyngdoh, an environment economist, who had conducted his studied in the area on the contamination level of uranium leakage and its radiation by measuring it with the use of a Geiger counter instrument. A Geiger counter is an instrument used for detecting and measuring ionizing radiation. It is widely and prominently used as a hand-held radiation survey instrument and it is one of the world's best known radiation detection instruments [6]. Through this instrument, he found that the radiation level in the area of leakage is 1,093 counts per minute. The radiation level fluctuated between 235 and 315 counts per minute in the areas and it's surrounding. He also informed that a count of 100 per minute is considered as a warning level [7]. The radiation levels here are found to be above 200 to 1000 plus counts per minute, which is perhaps the most dangerous thing to imagine that it had already affected the environment, the living and non living things, including humans.

Thus, prolonged exposure to such high-dose of radiation levels has definitely posed serious health risks to the people. Signs of health hazards of exposure to radiation are visible in the villages located around the area of mining. The villagers are bearing the brunt of the radiation exposures. This has impacted and changed the cells of human beings and retarded the functioning of glands, organs, etc. in the human body and led to genetic disorders and abnormalities [7] and [8].

Further, it has been mentioned that due to the exposure to radiations leakage, women and mothers in the area are often facing the problems of miscarriages, deformities in the new-born children, cancer are rampant in the areas, ulcers, skin diseases, epilepsy and malformed of limbs. People also often died of mysterious illnesses. But the people in these areas continued to suffer from medical attentions and treatments because the government could not provide these facilities to them [2] and [9].

Environmental Impact of Mining on –

(a) Land Use – Mining projects altered the landscape, the natural resources and the environment. This happens due to the magnitude of the mining, time frame and the nature of the mining project and process that they carried out. The primary goal of the mining is the extraction of non renewable natural resources and this implies permanent environmental change, regardless of the technology or methods employed. Mining involves conversion of land and agricultural land into townships, roads, stockyards, and so on. Besides, mining involves the removal of trees and vegetation and topsoil that leads to the degradation of forests and environment. Thus, mining projects has made a tremendous transformation on land and landscape. This leads to the loss of vegetation, forest covers and permanent depletion and degradation of the resource base.

(b) Soil Degradation – Another problem arising from mining is the degradation of the soil. Due to unscientific mining and poorly managed of the land, it involved the destruction and disturbance of the nature, ecosystem and the environment. The most serious environmental concerns in the area of mining and the state of Meghalaya as a whole is that mining and quarrying will bring destruction to the environment. With the loss of vegetation and deforestation leads to soil degradation. This changes the biodiversity in the environment and the ecosystem.

Soil degradation incorporated a number of environmental problems such as soil erosion. Soil erosion, on the other hand, is caused by water and wind, etc. Therefore, the loss of topsoil made a permanent destruction to the land. The land become a barren land. Soil degradation also hampered the agricultural productivity. It also altered the land and agricultural land and made them useless for cultivation [5] and [10].

(c) Water Bodies and Water Qualities – The impact of uranium mining in the area also has changed the water bodies and water qualities. The mineral wastes and dusts from the mines polluted the air, water and settling down on steams, ponds, rivers. This has adversely affected the water supply and water resources in the area where the people needed for drinking and irrigation purposes. It is also unsafe for the people to use because the sources of water supply are polluting and contaminating. The mining project has continued to contaminate the water bodies for a long time now. So, free access and availability of safe drinking water of the people also become impossible. Shortage of drinking water made the people to live and face the worst situation in their life. It automatically brings down their life and standards of living to a low level.

It has been reported that the fishes and other living species have died in these water bodies because of the pollution and contamination of the water. So, there is a great lost for the people in the area who are depending their livelihoods mainly on these rivers [9].

(d) Air Qualities – The environmental impact of uranium mining is immensely and immeasurable. Because it has caused widespread damage to environment, the natural resources, trees, fruits, vegetables, flowers, and the vegetation. The whole atmosphere is full of gasses, radiations and radioactive waste materials. The waste disposal conducted and done by the mining company is a serious concern. It is illegal and unscientific method of disposal of wastes and waste materials. No proper maintenance and repair of the tanks and storage facilities. Leakages of radiations and radioactive wastes have been reported as mentioned above. This has caused, hampered and reduced the air quality not only in the area of mining but it is also a great concern for environmentalists in the whole world about the poor maintenance of the mining company. It may lead to a global warming. Bad air quality is a major concerned for the people because it is injurious to their health to breathe, animals, plants life and the climate.

Eugine (2004) have mentioned that contamination in air may disturb the whole atmospheric system. It polluted the atmosphere and its impact is very dangerous not only on man and other living organisms but on environment itself. It created the health hazards and a threat to life, damaging both plants and animals including humans. Air pollution also affected the respiratory system and various types of diseases emerged such as bronchitis, emphysema, asthma and lung cancer, etc. It's also affected the central nervous system of animals and human beings [10].

Suggestions and Policy implications

(1) It has been found that there is no mining policy to deal with uranium. It is suggested that the government should frame and have a uranium mining policy to enable it for extraction of this sensitive mineral.
(2) It has been found that the machines and technologies used for the exploration and extraction of uranium are old and outdated. It is suggested that new scientific methods should applied. New machine, new technology and new innovation should be introduced to enable them to check and contain the leakage and spread of radiation.
(3) It has been found that there is no hospitals and healthcare facilities which are specialized with the sufferings and diseases affected by uranium. Therefore, it is suggested that the special care facilities should be setup side by side to cater the needs and requirements of the people in the areas.
(4) It has been found that the waste disposal, storage facilities and treatment plants are unscientific where the leakage of toxic airs, effluents, radiations and radioactive wastes are frequently happened. So, it is important to suggest that the government should enforce rules and regulations to check the crime done by the mining company.
(5) It has been found also that there is no care about the environment and the ecosystem in the areas because there are signs of soil erosion, soil degradation, deforestation and environmental degradation. The living and none living organisms are endangered and dying. It is necessary to suggest that the government should take a step to protect and preserve the environment properly otherwise the future generations will be at risks.
(6) It has been found that governments and the mining company are not respecting the rights, identities and interests of the (tribal) people. Therefore, it is necessary to give a suggestion that they should not encroach, interfere and pollute their rights and identities. They should respect the rights to live and life as enshrined in the constitution of the country.

IV. CONCLUSION

Mining in general is both a blessing and a curse or boon and bane to the state and the country. It's a blessing because it generates a huge amount of revenue and makes the economy flourished and developed. It is a curse because it affects the people and alters the environment completely. The management and effort to make the environment and economy sustainability is impossible.

So mining of uranium is a new chapter in the state. There is a sense of fear and helplessness among the people in the areas and even in the state. Many people come together to fight against the government's decision for allowing the mining company to extract uranium but it become futile and useless. Uranium had been dug up and extracted. The fear is not only about the radiations and health hazards of uranium but another Chernobyl disasters are in the waiting.

Acknowledgements

Conflict of interest

There is no conflict of interest in this paper.

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