

# The Impacts of Mining on Water Sources and Women's Health in India

## Introduction

The issues related to water shortage and the mining industry over utilizing its fair share and contaminating precious fresh water supplies for the rest of the country, is causing major health concerns among the Indian women. The shortage of water in India to support her growing population, is not a new phenomenon. According to the estimate in scientific research carried out by the Institute of Economic Growth, University Enclave, Delhi, the gap between demand and supplies of water would be 26.20m ham by the year 2025, with widespread scarcity, and growing competition and conflicts over the use of water between and within sectors as major fall-outs<sup>1</sup>. Water is the life source for every living human being, as it is essential for agriculture as well as domestic use and human consumption. The literature suggests that women receive less than their male counter parts for various influences including lower socio-economic background, cultural influences, work environment and family responsibilities. Studies have indicated that women are under-privileged when it comes to water consumption due to the historical and cultural values and as a result are predisposed to various health complications with pregnancy and the reproductive system. To assist in understanding the water problem and women's health issues associated with mining, this paper will explore the various health issues women are experiencing as demonstrated in a case study conducted by the Rural Reconstruction and Development Society (RRDS) of Sydapuram Mandal District, Andra Pradesh. The paper explores the mica mining industries over utilizing groundwater sources, contaminating rivers and fresh water supplies and the impacts of health status amongst the local women in the district.

## Mining and Water – An Indian Perspective

It is estimated that at least 200 million Indian people do not have access to safe, clean water due to polluted and untreated industrial waste, pesticides, fertilizers and domestic waste<sup>2</sup>. The mining sector requires water usage for extraction or processing of mineral or excretion of sewage. Use of water and accessibility to water is a user pays system, where by those who can afford to buy quality water are able to do so. Hence industries such as mining are paying for their water, yet heavily contributing to the shortage in a country where access is already limited.

The excessive water use and pollution of the state owned company NALCO aluminum plant and bauxite mine – since 1981 – in the Damanjodi and Kahipur bauxite mining in Orissa, has a high demand for aluminum output, bauxite, and raw material for aluminum production. Therefore, requiring large amounts of water for operation which influences the impact of water quality, ecology and biodiversity, natural resources, infrastructure and livelihood of the district. The mining industry has not only displaced the owners of the land but polluted the local water resources breaching the state regulations of human rights to water.

In Placimada, Kerela the multi-national company of Coca Cola is utilizing ground water for bottling and making their fizzy drinks. FIAN International highlights the decrease in water supplies for the local, links to the contamination of local water resources have identified an

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<sup>1</sup> Institute of Economic Growth, University Enclave, Delhi, - 110007 E-mail: <mailto:%20eeu@ieg.ernet.in>

<sup>2</sup> FIAN International, *Bread for the World: Investigating some alledged violations of the Human Rights to Water in India – Reporting the International fact finding mission to India,2003*

increase of salinity, calcium, and magnesium unsuitable for drinking or use in agriculture<sup>3</sup>. Health problems such as skin irritation have been reported in the area, and the lack of suitable water for agriculture decreases production, reducing accessibility to food, increasing the risks of malnutrition and related illnesses for the local people.

The dumping of waste products inappropriately onto land often contaminates groundwater by seepage of toxic chemicals. A prime example is the Bhopal explosion, where 8,000 tonnes of toxic waste still lies scattered and exposed at the premises of the Union Carbide factory. Now, decades after the world's worst industrial disaster, it has seeped into the city's groundwater<sup>4</sup>. Exposing thousands of people to toxic water, which is being used by those who cannot afford to buy suitable water for consumption or daily use. The future health implications will explode from skin diseases to more fatal conditions impeding birth defects, infectious diseases and chronic illnesses such as cancer.

Heavy metals, for example, cadmium, lead, chromium, methyl mercury and cyanide contaminating water either from air pollution settling in utilized waterways, direct disposal of industrial untreated sewage in water resources, or toxic leakages from dumped waste into the groundwater, have devastating health implications on the people and surrounding environment. Polluted seas along coastal areas contaminate fish and shell crustations which when ingested during human consumption further increases the risk of developing water contaminated diseases. The use of contaminated water for irrigation of crops increases the exposure to harmful toxins increasing the impacts on individual and community health. Gujurat mining companies have been exposed to have pumped untreated effluents into the ground water through bore wells, overflowing effluent would find its path into the river systems, streams and even percolate into the soil to expose surrounding villages and communities with high levels of mercury<sup>5</sup>. Many of the local people suffered from mercury poisoning which causes central nervous system diseases, lung damage, kidney damage, cardiovascular system problems, and has been linked to cancer. For pregnant women in particular who are exposed to high levels of Mercury are at risk of contaminating the placenta with mercury causing foetal brain damage, and increasing the chances of mental and physical disabilities of the new born child. The some of the impacts includes a decreased production of food crops, and drinkable water, suffocating natural flora and fauna as discussed.

Water is a life force that contribute to the every day living of any human being. The prevalence of shortage and pollution contamination of this lifeline in India is wide spread all over the nation. Women are particularly exposed to health complications, which are explored and discussed in the following sections of the paper.

## Case Study

Rural Reconstruction and Development Society Sydapuram, *An Overview of the Impacts of the Mining Industry in Sydapuram Mandal (Andra Pradesh): Study and Documentation*, mm&P Hyderabad, RRDS sydapuram, 2004

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<sup>3</sup> FIAN International, *Bread for the World: Investigating some alleged violations of the Human Rights to Water in India – Reporting the International fact finding mission to India*, 2003

<sup>4</sup> **Bhopal's groundwater contaminated by toxic waste**, [www.nature.com](http://www.nature.com), May 12, 2004, [www.hindu.com](http://www.hindu.com), May 20, 2004

<sup>5</sup> Extra: A supplement, Mapping the Source: India is a Mercury Pollution Hotspot, Down To Earth, [www.cseindia.org/dte-supplement/zooming\\_in.htm](http://www.cseindia.org/dte-supplement/zooming_in.htm)

The paper has conducted a review that involves investigating the impact of Mica mining in the Sydapuram Mandal of Gudur area. Mica is a group of minerals that include biotite, lepidolite, muscovite, and phlogopite and have similar chemical compositions and highly perfect cleavage that allow the crystal to be split into very thin sheets that are tough and flexible. Sheet mica is used to line the gauge glasses of high-pressure steam boilers, because of its transparency, flexibility, and resistance to heat and chemical attack. Muscovite film mica is used as a dielectric in capacitors and is an excellent electrical insulator. End uses included joint cement, paint, plastics, and well-drilling fluids. Homes and commercial buildings use joint compound to finish seams and filling blemishes in the wall board (drywall). The United States is 100% dependent on imports of mica primarily from India<sup>6</sup>.

Of particular interest is the impact of women in the area, recognizing the depletion of water has arisen awareness of the effects it is having on the local women's health status. The overview explores several villages of the area and their reliance on the mica mining industry. Eleven mines working in the area employ people to 'muck' for feldspar, perform tasks to extract mica and work in white quartz quarrying. Many of the old mines have closed down, but illegal mining continues at these old abandoned sites. In the villages of Dadichettiipalli & Eddarangapalli (Maadigas) people are dependent on the mica mine for employment, as the agricultural lands have gone to waste due to the current drought, destruction of water reservoirs from the cyclone that occurred in 2003, and the depletion of groundwater. Without water, there is nothing to assist in the growth of agriculture, without agriculture there is a decreased access to nutritious foods. This is having devastating effects on women and children, without these basic resources of life how can one live? Furthermore, the unreliable, intermittent working operations of the mica mines decrease access to childcare and hospital assistance. Children are then being taken to work with their mothers or left home unattended! Whilst at work, the women are given the crushing, sorting and dusty duties by working in the milling and processing units with limited protective clothing or equipment, exposing them to toxic, polluted air; creating complicated health implications, including various lung diseases, cancers, and the interference of toxins causing reproductive, menstrual, pre and post natal complications, anemic conditions, gastrological illnesses, and anorexic malnutrition. The researchers discovered that the people living in the village, who are generally of the lower-socio economic society, where complaining of the bore and well water looking 'murky' in colour, and causing the community gastro-intestinal problems. They are aware of the effects of drinking and utilising this water, but say 'they have very little choice'. According to the survey, in the village of Turimerla, the people 'complained that the mining has contaminated their drinking water sources even the water from the bore wells is highly contaminated'. Complaints of gastro-intestinal problems and fatigue were common amongst the villagers, who state they had consumed the water after filtering! In Kalichedu village one third of the mining employees are women, many of them widowed as their 'husbands have succumbed to silicosis-tuberculosis'. RRDS approached the local Primary Health Centre, where they spoke with Dr. A.V Krishnaiah stated that a large proportion of patients attending the clinic came with complaints of nausea, vomiting and diarrhea suspecting a link with local water resources.

This paper demonstrates the types of illness women are facing in the areas of Gudur, and raises many issues related to use of water, contamination of water and equity of water distribution. Mining companies are able to utilize water by payment, whilst those who work for them have to survive the grime of pollution they have created causing harmful illnesses and poor living conditions.

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<sup>6</sup> *Women in Mining, About Minerals, MINERALS AND THEIR PRODUCTS,*  
<http://www.womeninmining.org/products.htm#MICA>

## Discussion

### *Women's role Vs Water Related Illness*

Gender refers to the social and psychological dimensions of the relationships between men and women these relationships are shaped by society and its history, norms, culture, institutions, education and socialisation, economy, laws, and politics. Biological differences between men and women as the two 'sexes' are obvious reality. However, the notion of 'gender' conveys the wide variation throughout history and across the world in which different societies attribute economic, cultural, and socio-political meanings to what is often people's strong identity of 'femininity' or 'masculinity'. Therefore it is evident that gender, poverty, water and a poor health status are all intertwined.<sup>7</sup> Women are not only primarily responsible for water supply but, as caretakers for children and the sick, women often bear a disproportionate burden of family responsibilities. Often the females of families have decreased access to water due to cultural family practices, yet an increased exposure to polluted water in order to provide for the cooking, bathing, cleaning clothes etc. Further increasing the risk of contracting a water-borne disease as a result of her role in daily activities. Predisposing her to a life of illness and stress. The Convention of Elimination of All Forms of Discrimination against Women (United Nations 1987) and the Platform for Action, explored water accessibility and gender during the Fourth World Conference on Women in Beijing (United Nations 1995). They came to the following agreement about the "gender performance" of water allocation

- both genders have equal access to water and benefit equally,
- both genders bear equal costs for using water,
- both genders participate equally in (paid and unpaid) water management and decision-making.

During the convention, discussions on gender and water, especially water for productive purposes, quickly reach the point in which gender characteristics *not* obviously related to water seem more important, such as women's limited education or women's limited access to land. Education, land, and other factors emerge spontaneously as *prior* social conditions, or ultimate desired impacts, of effective Integrated Water Resources Management<sup>8</sup>. The Indian case study reports of water shortage in the Gudur district causing various complaints of gastrointestinal problems, furthermore the decreased water supply has left an agricultural society deprived of accessible foods. The women in these areas have a high prevalence of malnutrition, anemia, Vitamin A, iodine, protein deficiencies – all of which increases the risk of reproductive problems, difficulties in labor (e.g. obstructed labor), and of maternal mortalities. Women suffering from such ailments are often forced to continue their daily activities of rearing children, maintaining the living environment, providing meals for the family, even continue working in poor work conditions in order to generate an income for basic necessities such as food and clothing. Illness decreases the ability to fulfill such requirements, and working capabilities and influences the development of health and well being of the woman, her children and family unit.

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<sup>7</sup> *The Convention of Elimination of All Forms of Discrimination against Women (United Nations 1987) and the Platform for Action, United Nations, 4<sup>th</sup> World Conference on Women 1995*

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## *Contamination of Water*

The effects of untreated effluent of mining industries pumping into public water ways, releasing harmful gas emission into the atmosphere, uncontrolled toxic dust, or dumping wastage which leeches dangerous chemicals into the groundwater table, has fatal implications to the people living in the surrounding areas. The infamous Bhopal gas tragedy threatens the health of an entire new generation of the city's inhabitants, out of non-disposed toxic waste contaminating groundwater. One article states Abdul Jabbar, a crusader for the rights of survivors of the tragedy, "We believe that around 40,000 people in localities close to the plant have been drinking the contaminated water for the last several years"<sup>9</sup>. Toxic water includes the contamination of heavy metals such as lead, mercury and uranium and other pollutants such as arsenic and cyanide.

- **Lead:** a build up of lead through consumption develops in the skeleton which is highly dangerous for infants and children up to the age of six years. High levels of lead in the blood lead to central nervous system disorders, decreased vitamin D metabolism, anemia and cancer. For pregnant women the high prevalence of lead in the blood may cross over the placenta increasing the risks of birth defects and difficulties during labor.
- **Mercury:** high levels of mercury can cause brain damage, paralysis, delirium, and incoherent speech. Exposure to mercury through food, water and air can cause significant harm to human health. Methyl mercury, which is the most commonly found form of mercury in the environment, can cause permanent damage to the central nervous system, lungs and kidneys. Methyl mercury intake through fish can put unborn fetuses at great risk. The mercury can cross the placental barrier and cause foetal brain damage without any symptoms in the expectant mother. Newly born infants may experience mental and physical disabilities and delayed development of motor and verbal skills. The symptoms of methyl mercury poisoning are varied and difficult to detect as they can mimic other illnesses. In relatively mild cases, the condition is barely distinguishable from common ailments. Some common symptoms are headache, fatigue, numbness of extremities, depression, memory loss, and in extreme cases, madness, coma or death<sup>10</sup>.
- **Uranium:** The exposure of radioactive wastes to water has fatal health implications such as increased risks of birth defects, brain damage and cancers. In Jharkhand women are delivering physically and mentally challenged children due to the impact of radiation from uranium mines.<sup>11</sup>

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<sup>9</sup> Source: *Christian Science Monitor*, May 16, 2004  
*Indo-Asian News Service*, April 17, 2004

<sup>10</sup>A Down To Earth Supplement: **Mapping the Scourge**  
**India is a mercury pollution hotspot**, <http://www.cseindia.org/dte-supplement/footage.htm>

<sup>11</sup> *Women near mines suffer untold misery* **The Hindu**, India, April 26 2003

- Arsenic: occurs naturally or is possibly aggravated by over powering aquifers and by phosphorus from fertilizers. High concentrations of arsenic in water can have an adverse effect on health. A few years back, high concentrations of this element was found in drinking water in six districts in West Bengal. A majority of people in the area was found suffering from arsenic skin lesions. It was felt that arsenic contamination in the groundwater was due to natural causes. The government is trying to provide an alternative drinking water source and a method through which the arsenic content from water can be removed<sup>12</sup>.
- Cyanide: is used during gold and silver mining to assist in the dissolving of heavy metals during processing. It is highly toxic to humans, as it causes a decrease in Vitamin B12, thyroid damage, decrease in iodine uptake, essential for hormone production and stability – an imbalance of hormones disrupts the reproductive system. Exposure during pregnancy increases the risk of birth defects and complications pre and post natal care.

In overcrowded, poor living conditions as often found in and around mining sites of India, where the unorganized and migrant labourer's dwellings are situated, the contamination of water resources may also be of human waste. Most intestinal (enteric) diseases are infectious and are transmitted through faecal waste. Pathogens – which include virus, bacteria, protozoa, and parasitic worms – are disease-producing agents found in the faeces of infected persons. These diseases are more prevalent in areas with poor sanitary conditions. These pathogens travel through water sources and interfuses directly through persons handling food and water. Since these diseases are highly infectious, extreme care and hygiene should be maintained by people looking after an infected patient. Hepatitis, cholera, dysentery, and typhoid are the more common water-borne diseases that affect large populations in the tropical regions<sup>13</sup>.

The case study demonstrates that women are suffering from various illnesses because of the presence of mica mining and the impact it is having on the local water supplies. The report is information gathered from the women in the area who describe the water as 'murky' and feel they are falling ill as a result of consumption and use. All of the above mention contaminations are likely to be contributing to the problem faced by the people of Gudur district. How much longer is the mica mining industry, the government and local people going to continue in this manner? When will women and children who are dying of preventable and treatable illnesses be attended to? The health status of these people appears only to be getting worse, and yet the industries contamination continues.

### ***Who's responsibility is it?***

Scientific studies have proved that the toxic waste, containing harmful metals like mercury and pollutants, have seeped into underground water reserves. The areas affected include Ayub Nagar, Kainchi Chhola, Arif Nagar, Dashhehra Maidan, Chandbari and Garib Nagar. Government and large corporate industries remain negligent in following environmental laws of ecologically efficient development. Thus, demonstrating the tragic need for political and social reform, as these industries continue to pollute the limited and vital life force of water in India.

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<sup>12</sup> Health impacts of water pollution Newsletter, 2004

<sup>13</sup> Health impacts of water pollution Newsletter, 2004

A positive movement of women in Rajourgarh village, Alwar district of the north Indian state of Rajasthan successfully faced the might of the local government during the year 2000. Despite fun being made of them by men for forming self-help groups and holding meetings rather than involving themselves in practical work, the women decided to find solutions to village problems. In the dry and arid Rajasthan, water has always been an issue. The women realised that water, fodder and fuel wood are natural resources and therefore related to each other. If they have enough water, they will have enough to eat (food grain) and their animals will have enough fodder. They decided upon harvesting rain water in a nearby drain and explained their plans to the men folk. Once the site for harvesting was selected, womens groups collected money for tractors and diesel. Along with men, they also provided shram daan (voluntary labour) in digging and transporting the earth for a medium-sized mud dam<sup>14</sup>.

The strength of this story demonstrates that it is possible to address the water issue, but it requires dedication, bravery and faith in order to combat the might of the economic development. The legal strategies and processes are in place throughout Indian legislature, however, the enforcement and implementation is lacking. Who's responsibility is it? The government needs to assure monitoring and evaluation of environmental, health impacts and work force issues of mining industries. The Mining industries need to follow the outlined rules and regulations in water consumption, waste management, work place occupational health and safety, employment/labour security etc. in order to protect their workers from illness. The workers need to ensure that their rights are provided, and demand the safety of their work environment and protection of the vital life force of water in their surrounding area. And the wider society needs to utilize water sparingly and be thoughtful of those who have limited access to any water at all!

## **Conclusion**

The case study article demonstrates women's exposure to contaminated water resources as a result of the mining of mica in the Gudur district. It is well understood that water plays a key role in all three-security dimensions, due to its multi-functional roles for life on this planet: in socio-economic production, in biological production, in environmental threats and as a creeping destroyer. Consequently water is intimately involved in the food security issue, human consumption and use. A lack of or contamination of water resources will directly and indirectly impact on the health and well-being of a community or area. In particular, as females of India are often the most likely to come in contact with local water supplies and resources as apart of the daily activities and roles in the family, they are also at an increased risk of developing water related illnesses. Further more, the consumption of contaminated water or food supplies has damaging effects of a pregnant woman, causing birthing complications and birth defects of the new born. The case study demonstrate the lack of safe, ecological or sustainable mining practice which continues to go unregulated by the Government of India, whilst people are suffering and living without the vital life force of usable water!

Stephanie Wright

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<sup>14</sup> Rahul Gupta, *Community-based Natural Resource Management in the Villages of Alwar District of Rajasthan*, **United Nations Development Plan News**, July 2003