

Death in India Lurks in Poisoned Water on the Rim of Coal Fields

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December 5, 2014 – Death crept without warning to the mud huts of Jogaeal in central India.

One by one, children began to die, often in agony and exhibiting similar symptoms: convulsions, burning pain in the extremities, nausea, vomiting, fever and diarrhea. By the end of 2011, parents buried 53 of them in this forested hill country village occupied mostly by subsistence farmers and day laborers.

That scenario played out in three other villages in and around the contiguous coal-mining districts of Singrauli and Sonbhadra about 600 miles (965 kilometers) southeast of New Delhi. At least a dozen more kids with similar symptoms succumbed, along with several adults. Outrage at the deaths sparked an investigation by the chief medical officers of the Sonbhadra district regional government – and the results only deepened the outrage.

Most were tied to drinking polluted water, according to reports obtained by Bloomberg News in October. They stopped short of identifying the pollutants but independent scientists who have conducted exhaustive toxicology tests in the region say they know the



A woman complaining of muscle pains consistent with metal contamination waits in a hospital in the Sonbhadra district of Uttar Pradesh, India.
Photographer: Redux/Bloomberg

chief culprit: mercury.

An October 2012 study by the New Delhi-based Centre for Science and Environment, a public-interest research group, found mercury levels in some village drinking water samples to be 26 times higher than the Bureau of Indian Standard's safe limit for human consumption. Fish taken from a lake near villages where residents routinely catch and eat them showed mercury levels twice what the Indian government deems safe, according to that report.

The Indian government has long been aware of this. In a three-year study conducted in 1990s, the state-run Indian Institute of Toxicology Research found dangerous levels of mercury in



A factory in Anapara in the Sonbhadra district of Uttar Pradesh, India.
Photographer: Redux/Bloomberg

blood, hair and nails of people in the Singrauli region. Yet pollution continues to grow. United Nations data show India is second only to China in annual mercury emissions.

Corporations First

All of this reinforces the criticism that India's drive to modernize through extractive industries such as coal and uranium mining puts the priorities of corporations ahead of the health of its citizens.

India doesn't yet "include the cost of the effects of pollution on human and ecosystem health at all" when it performs cost-benefit analysis for industrial projects, said Kritee, a Colorado-based senior scientist at the U.S. Environmental Defense Fund who has studied mercury pollution for years. Until that changes, "environmental and human health will come second," according to Kritee, who uses only one name.

Statistics back this up. The World Bank estimates that environmental degradation costs India 5.7 percent of its gross domestic product every year – and is responsible for about a quarter of the 1.6 million annual deaths among children.

How mercury and other pollutants got here is no

mystery. What these victims shared was proximity to the sprawling Govind Ballabh Pant Sagar reservoir and the rivers that feed it. Flanked by mines, coal-burning power plants and heavy industry, these waters collect toxic effluent from plant discharges and absorb mercury that's a residue from burning coal.

They are ranked by an Indian government report as among the most polluted waters in the nation – and they serve as the region's chief source of drinking water and fish. The reservoir is the region's "main source of water" and "is seriously polluted with discharge of fly ash and other effluents from the industries," according to the National Green Tribunal, created in 2010 by the Indian parliament to address environmental concerns. "There are thermal power plants and nearly 1,000 other polluting industries. This position is really not in dispute."

Warning Signs

"The symptoms of mercury poisoning have already started showing in people in the area and it's time the authorities need to sit up and take notice," said Ramakant Sahu, a Centre scientist who helped to conduct extensive testing for toxic chemicals. "Mercury and other metals have been accumulating for years. The warning signs are all there."

No one knows the full extent of pollution-related illnesses and deaths in these villages because no government agency has conducted the kind of exhaustive study required to get to the bottom of the matter. Amarendra Bahadur Singh, the current chief medical officer of the Sonbhadra district, said he planned to recommend such a study to his superiors.

The non-profit Centre estimates that many of the 1.1 million residents who live in proximity to the

reservoir and its tributaries may be at risk.

India's Ministry of Environment and Forests plans to aggressively attack the nation's pollution problems with a soon- to-be-rolled-out requirement that all companies that emit pollutants install sensors at discharge points, said federal environment minister Prakash Javadekar in response to a Bloomberg News inquiry about pollution issues in the mining districts. The system, for which the government hasn't set an installation deadline, will give enforcement agencies around- the-clock ability to monitor violations "in real time and take action," said Javadekar. "That will be a revolutionary step."

Dread in the Villages

The events in Dadihara, about 35 miles from Jogaeal, illustrate the fear and confusion that run through villages where industrial contamination of water is blamed for illness and death. In November 2011, 7-year-old Subhash Chand grew desperately ill.

First came convulsions, then pains in his limbs so searing that he cried throughout the night, tended by his mother Leelavati who squatted beside him in the courtyard of their red- tiled hut. In the morning she carried him five miles to the local government hospital where doctors prescribed malaria medicine and sent them home.

When the convulsions flared again, they put Subhash on a bicycle for a return to the hospital. He died en route. His mother buried him in the woods near his home. Autopsies are rare here and there is no official cause of death. Yet residents here, where several adults have also sickened and died, now believe the water was the culprit.

"The doctors said it was because of dirty



Soni, 12, whose feet and hands sometimes feel as though they're on fire, has begun to exhibit signs of what Centre scientists said they fear is mercury poisoning, based on tests they ran on her.

Photographer: Redux/Bloomberg

water," said Leelavati, holding a soiled photograph of her son, his only remembrance. "We buried all his belongings, the medical papers, his shoes and his clothes. The sight of these only added to our grief."

That mercury can be deadly is well known. The most infamous example is the 1956 poisoning in Minamata, Japan, which eventually killed more than 1,500 people who ate fish contaminated by mercury dumped into a bay by a Japanese corporation. Mercury's harmful effects include brain damage, lack of coordination and seizures, according to the U.S. Agency for Toxic Substances and Disease Registry. Tingling or burning sensations of the extremities are common.

Missing Water Trucks

For many, India's Ministry of Environment and Forests plan to curb industrial pollution is overdue. According to the Centre's Sahu, efforts by the central and regional governments to curb

on fire – has begun to exhibit signs of what Centre scientists said they fear is mercury poisoning based on tests they ran on her.

Scenic Pollution

Seen from the air, Govind Ballabh, among India's largest man-made lakes, is a placid expanse of scenic green, stretching more than 30 miles southwest from the towering ramparts of the Rihand Dam. Leggy storks and shorebirds forage its banks. Carp and catfish, prized by local subsistence fishermen, ply the murky depths.

Up close, this impression gives way to a less pastoral reality. Ringed by vast coal mines and belching power plants, Govind Ballabh makes possible the industrial ambitions of a region that annually provides about 5 percent of India's total power capacity.

Spills of coal ash -- also known as fly ash -- often darken the lake. Chemical and other companies dump toxic effluent into the reservoir's waters and power plants produce mercury along with electricity. The mercury mixes with organic compounds that turn it into methyl mercury – more toxic to humans and animals, say scientists, because it is more ingestible.

The dam and reservoir were inaugurated in 1962 by India's first prime minister Jawaharlal Nehru as the nation began a modernization push. The project was initially meant for hydroelectric power and irrigation to the region. After the discovery of vast coal reserves, mines, factories and more power plants followed.

Some residents are old enough to remember the days when the rivers ran clear and the reservoir flowed free of contaminants. "We've been drinking this same water for years," said



Waste pours into the reservoir in the Sonbhadra district of Uttar Pradesh.

Photographer: Redux/Bloomberg

dangerous pollution and address collateral issues have been fitful and ineffective.

Polluters are occasionally issued shutdown warnings by regional environmental watchdogs but actual shutdowns and fines are rare, said locals and scientists who've studied the region. There has been no meaningful effort to clean up the lake.

Measures to protect villagers against having to drink contaminated water often meet with failure. In May, for example, the National Green Tribunal ordered companies operating in the Singrauli and Sonbhadra mining districts to truck in clean water to residents in the wake of continuing outbreaks of polluted- water-related illnesses.

Yet locals say they often don't see the tankers for days or weeks. "They don't come and we must drink the water we have," said Tejbali, a resident of the village of Kirwani who sometimes rows his boat across the reservoir to take a day job at a chemical plant.

His 12-year-old daughter, Soni -- whose feet and hands sometimes feel as though they're

Tejbali. Mercury can't be seen or smelled in food or water. Nor can arsenic and the slew of other heavy metals that have been found in toxicology tests here.

"The children want to eat fish and we get it from the reservoir," said Tejbali, who goes by one name. "How can I deny them?"

Confirmed Contamination

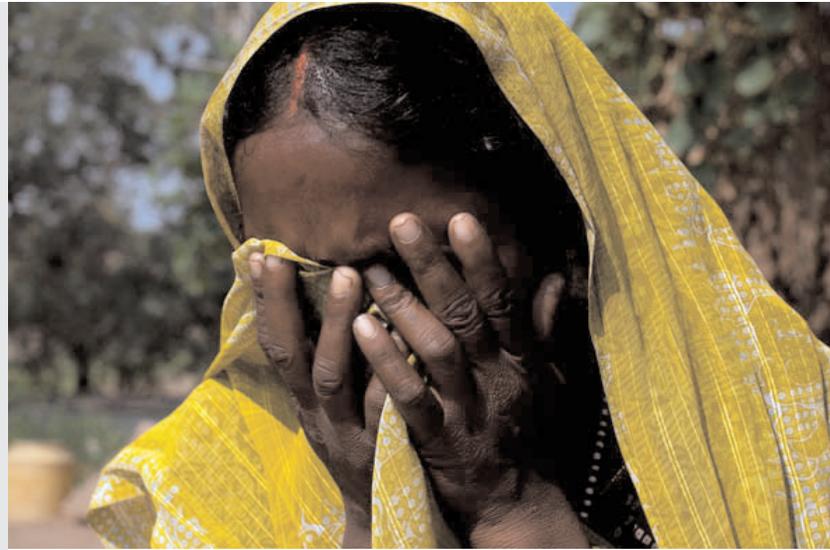
It was the death of so many children in 2011 that convinced residents that something far more sinister was at work than the normal litany of factors -- poor hygiene, malnutrition and substandard medical care -- that contribute to high mortality rates here from diseases such as malaria, polio and influenza.

Investigators dug in and concluded the villagers were right. In those two separate reports obtained by Bloomberg in October, the chief medical officers of the Sonbhadra district blamed polluted water of the reservoir and other water bodies in the region for the deaths.

"The hand-pumps in the villages mostly didn't work and the villagers were dependent on wells for drinking water," according to one of the reports. "Because these wells were very close to the Rihand reservoir, it's possible the polluted water of the reservoir seeped into the wells."

"All the villages around the dam are in danger," said Rajeev Ranjan, the head doctor at the 30-bed government hospital in Myorpur, who was a witness to the deaths in Dadihara and another village. "It is confirmed the water is polluted, it's contaminated."

Ranjan's boss, Singh, the Sonbhadra district's current chief medical officer who is recommending to his superiors a "multi-



"We buried all his belongings, the medical papers, his shoes and his clothes. The sight of these only added to our grief," Leelavati said.
Photographer: Redux/Bloomberg

disciplinary study on this," said companies should be held accountable for pollution if a study confirms widespread contamination. "It's not within my right to go and stop anyone from dumping garbage in the water bodies. But if we have enough evidence, we can build a case against this practice," said Singh.

Suffering in Kirwani

It will not come too soon for many villagers experiencing the dread and anxiety that they or their relatives will be the next to fall. In Kirwani, a pastoral hamlet ringed by factories, Tejbali has to constantly watch his daughter Soni.

On many days, she seems normal, attending school and playing in the fields fronting the mud hut she shares with seven others in her family. And then there are the bad days when she screams in pain as spasms wreck her left arm and leg. The burning in her limbs adds to her agony. She's begun to stumble when she walks. Seizures that began four years ago have become



Water treatment in the Sonbhadra district of Uttar Pradesh.
Photographer: Redux/Bloomberg

more frequent.

Standing in their darkened two-room hut, his face illuminated by a flashlight, Tejbali wondered aloud how long his daughter can survive. “It’s painful,” he said, lights from a chemical plant flickering across the Govind Ballabh reservoir. “But what can I do? I don’t even know what’s wrong with her.”

Down a path in the same village, 55-year-old Panna Lal exhibits similar symptoms. He’s forced to bathe in hot water even on summer days that are more than 100 degrees Fahrenheit (37.8 degrees Celsius) because cold water increases the pain in his legs. When the burning is intense, he wets a cloth and wraps it around his feet.

“It feels like a fire inside, feels like I’m walking on burning coal,” said Lal, seated and fanning away mosquitoes in the courtyard of his tiny brick house, a single yellow bulb providing light. His wife and daughter are sick with similar symptoms.

Some of India’s biggest corporations operate in these corridors of pollution. Coal India Ltd., the world’s largest coal miner, controls more than one billion tons of reserves here through a

subsidiary, Northern Coalfields Ltd.

NTPC Ltd., the Indian national power company, runs coal-powered electricity plants. Another state-run enterprise, Uttar Pradesh Rajya Vidyut Utpadan Nigam Ltd., operates a 1,630-megawatt coal-powered plant near the town of Anpara.

Northern Coalfields follows Indian mining regulations in the operations of its mines and mining dumps, said Tapas Nag, Northern Coalfields’s managing director. Nag said he believes reports of high rates of diseases in the mining districts are exaggerated. “Maybe there is some misconception based on some reports earlier by some NGOs,” he said.

A spokesman for state-run NTPC said it adheres to all environment rules and whenever the authorities point toward a violation, it takes prompt action to rectify it.

Uttar Pradesh Rajya Vidyut’s technical director Murlidhar Bhagchandani said the company operates its power plants and ash dumps in compliance with the law. “The ash dumps have been created with all the approvals...We invite independent agencies to do monthly checks on our environment compliance. We are constantly under the watch of the regulator.”

Fishing in the Fly Ash

To see what some residents are up against, a visit to Anpara is instructive. Tall towers belch a constant stream of smoke and steam into the air. Giant iron and steel pipes emerge from the plant, running about five miles, portions elevated on stilts, to a series of fields rimmed by low dikes. There, a slushy gray mix of ash gushes out with a

roar into dumps called ash ponds.

On a recent cloudy, humid afternoon, cows and goats roamed the ash fields and five school-age girls were building castles from the waste as an elderly man, sitting in his hut not 10 yards from the pond, tried to warn them away.

Fly ash, which contains traces of arsenic and low-level radiation, is a leading contributor to air, water and soil pollution and land degradation, causing “disruption of ecological cycles” while “setting off environmental hazards,” according to India’s Planning Commission, a government advisory organization headed by the country’s prime minister.

Ram Narayan Panika, 40, lives in one of two houses at the edge of the Anpara ash pond. Two decades ago, 100 houses crowded this field. Now it holds hundreds of tons of ash. His house is littered with the stuff.

“Everyone has left, and I will be forced to take my family away very soon,” he said, standing barefoot atop the slurry pipes that run above his house. “I think the ash has gone in to the water. It gets in to our hut, our food. It’s everywhere.”

He sometimes filters drinking water from a nearby hand pump through a cloth but often drinks it without filtering. Panika has pain and a burning sensation in his hands and feet, he says, while his 12-year-old son Pradeep Kumar has skin lesions.

The ash isn’t just a problem for Panika. When the ponds overflow, the ash ends up in the reservoir. Fishermen often wade in looking for their quarry, ignoring the pollution. On the day reporters spoke with Panika, a bare-chested man floated on a tire tube amid the ash, hoping to net fish.



Hardened ash next to the reservoir in the Sonbhadra district of Uttar Pradesh.

Photographer: Redux/Bloomberg

Shiv Balak, 20, and his wife, who work as construction workers, wade in to the gray chest-deep water, dragging out the ash and sand, packing it in to sacks once used for potatoes. He collects 80 rupees (about \$1.29) for every bag from a local contractor. They’ve collected 29 sacks today. Balak doesn’t know where the concoction is used.

“I’m healthy so far and I do what I can to earn some money,” Balak said. “The water and the sand come from the power plant so it must be dirty. I don’t have any health problems now, but who knows about the future.”

Sometimes, he pulls out dead fish from the pond. He doesn’t always eat them – but sometimes he does.

– Editors: Jason Rogers, Ken Wells, Will Wade