

New Bangladesh Disaster: Wells That Pump Poison
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IAPUR, Bangladesh -- A month ago, the young mother found out that her own slow dying was nothing unusual, that tens of thousands of Bangladeshi villagers were suffering the same ghastly decay, with their skin spotted like spoiled fruit and warts and sores covering their hands and feet.

Bangladesh is in the midst of what some experts say could be the biggest mass poisoning in history. Dangerous levels of arsenic have been found in the ground water, entering millions of people sip by sip as they drink from a vast system of tube wells. Most of these hand-operated pumps are 10 to 20 years old, which is about how long it takes the arsenic to do its lethal work, killing with one of several cancers.

The unfolding crisis is the unintended consequence of a colossally successful safe-water program. For 25 years, the government along with UNICEF and other aid groups has weaned villagers from disease-carrying pond water and helped them to sink pipes into underground aquifers. The naturally occurring arsenic that tainted these subterranean sources was overlooked.

Doctors and aid workers told Pinjira Begum, 25, of this calamity as they explained to her how seriously ill she was. But news that her misery had a hideous amount of company was of no consolation to a mother of three with a 4-month-old baby in her arms. Too many other indignities were rushing into her life.

Her husband had decided she is no longer of use to him. "She was pretty once, but now she is too thin and smells bad and is uglier by the day," he said.

On Oct. 21, using a man's traditional right in these Islamic hinterlands, Masud Rahman, 25, took a second wife. Now, as Pinjira's fevered body seems to melt in the bed, her husband sleeps a few feet away with a new bride.

These days, such heart-breaking stories are in frightfully large supply in Bangladesh and the neighboring Indian state of West Bengal. People come out of their one-room mud-floored homes and show the skin lesions on the palms of their hands and soles of their feet. These ulcers are advanced signs of arsenic poisoning.

Estimating how many lives the arsenic will eventually claim is a multiplication problem with as yet too many unknowns: how many people are drinking the poison, how long have they been doing it and when will they stop.

"Arsenic in drinking water poses the highest cancer risk ever found," said Dr. Allan H. Smith, an epidemiologist at the University of

California at Berkeley who this year has made three trips to Bangladesh for the World Health Organization. "But we still don't know how many millions have been exposed -- and at what levels.

"We could be talking about hundreds of thousands of deaths. We just don't know. The cumulative dose is what kills. Every day that people continue to drink the contaminated water could result in more arsenic-related deaths down the road in 5, 10 or 25 years. This really is a major emergency."

Babar N. Kabir, a World Bank hydrologist who is assessing the problem, believes he is being conservative when he estimates that 18 million people are now poisoning themselves. In late August, the World Bank announced that it would provide Bangladesh with a \$32.4 million credit for an arsenic mitigation project because "in a bizarre turn of events, tube wells have been secretly poisoning villagers." The government will use much of the money to test every one of the nation's 3.5 million to 4 million wells. Due to variations in the underground rock and soil, the arsenic can be absent in one place and appear in another barely 10 yards away.

"It is a coordinator's nightmare, trying to collect all these samples and get accurate measurements," said Kabir, who is among those managing the effort. "Of course, what do you tell people whose water is contaminated? They are going to want to know what you expect them to drink."

The World Health Organization's safety standard for arsenic in water is a maximum of 0.01 milligrams per liter. But some countries, including Bangladesh and India, consider five times that amount to be acceptable. Early samplings have found this higher level of arsenic in parts of 43 of Bangladesh's 64 districts.

"If this were the United States, they'd call out the National Guard and get everyone bottled water," said Willard R. Chappell, a physicist who is one of the world's leading experts on arsenic contamination. "But Bangladesh doesn't have the resources."

Bangladesh has a per capita income of \$266. Some 70% of its 126 million people are small-scale farmers, toiling in the endless rice paddies and sugar cane fields of the world's largest delta landscape. In the south, vast river systems weave across each other like giant braids before emptying into the Bay of Bengal.

Water is everything to Bangladeshis, source of their bounty and cause of their cataclysms. In the wet summers, the snowmelt from the Himalayas joins with ferocious rains in floods that can drench two-thirds of the land. In dry months, the sun can parch the paddies so badly that only famine wields a scythe. Until the 1970s, most villagers drank from hand-dug wells or natural ponds that they often shared with bathing cows and water buffaloes. Cholera and diarrheal diseases flourished in this water and each year hundreds of thousands of deaths originated in the earthen pitchers that villagers carried to their porches.

To many, the solution to these onrushes of mortality were simple contraptions called tube wells. These are cylinders that are sunk into the ground, some with wide diameters for irrigation, others more narrow for pumping clean drinking water from the ever-replenished aquifers.

UNICEF was the main proponent of these wells, creating its own designs and providing the materials to the Bangladeshi government, which, in turn, paid the drilling costs. This partnership sank 1 million tube wells; 2.5 million to 3 million more were installed privately, some with loans on easy terms from other aid agencies.

"Never, or at least up to now, did anyone expect arsenic to be in the ground water," said Aung Chein, UNICEF's project officer for water in Bangladesh. "One tested only surface water, especially to see if rivers and streams were polluted by chemicals and industrial waste."

While some experts now fault UNICEF for failing to do exhaustive testing, there is no denying that the tube well program saved millions of lives. UNICEF was able to boast that 97 percent of Bangladeshis were now within walking distance of "safe" water. Reliable statistics are hard to come by here, but there is general agreement that mortality rates attributed to diarrhea, the nation's major killer, have plunged. Convinced with great effort that ground water is the safest to drink, villagers are now beginning to be told that this is not necessarily so. Some people react with outrage, some stoicism. Almost all are baffled.

In Miapur, in northwest Bangladesh, the government recently sealed up 8 contaminated wells only to have villagers undo the work. Pinjira Begum -- losing her hair, losing her strength, losing her husband -- continues to drink arsenic-laced water from the pump that sits beside a fruit tree behind her house. "They tell me the water has made me sick, but others use this well and they are not sick," she said. The arsenic's slow creep affects people differently, with some family members showing signs of the poisoning while others do not. Begum's husband seems fine, though their 10-year-old girl already has telltale spotting across her chest.

Some doctors suggest that nutrition may be a critical factor in who gets sick, but many villagers are inclined to attribute such things to the will of Allah or their own superstitions. There are those who believe a poisoned well is a sign that a snake has been struck during the digging.

"In most places, certainly in the interior villages, people don't know anything about the arsenic," said Khushi Kabir, who heads a coalition of private, non-profit groups dealing with environmental issues. "It took a long time to get people to use tube well water and it will take a long time to get them to change."

In Bilkeda, 25 miles west of the city of Pabna and a long hike from anything that could be called a road, Salim Uddin Mondal said that yes, his well had been tested and found to be contaminated. Still, he, his wife and their 7 children use it. His tube well, like his farm animals, was a sign of his relative prosperity. The nearest safe water was now 50 yards away, requiring either a trip through a neighbor's front yard or a shortcut through a stand of jackfruit. This was too much of an inconvenience for Mondal, even though arsenic had already disfigured his hands until the palms were as hard and bumpy as cauliflower.

"If I die, I will die, but I will not go to fetch water from another man's house," he said as his family listened, nodding in agreement.

In nearby Char Ruppur, Belal Hossain, 17, suffers from nerve damage, an occasional effect of arsenic. His gait is crooked and his arms are bowed like a set of parentheses. His mother died on Sept. 25, and now he himself wonders what hard days lie ahead. He listened as his father described her death.

"Her fingers began festering and she had them removed," said Maqbal Hossain. "Then she got this cough. There was a burning sensation all over her body, especially the elbow joints. The sores never went away. These hurt her terribly."

There is no treatment for the poisoning, doctors say, though if a person stops drinking the arsenic at an early enough stage, physical decay can be arrested.

"We know what causes the damage and we know what to do about it -- provide safe water," said Smith, the epidemiologist. "We just need to do it."

There is no shortage of proposals, such as harvesting rain water and installing filters. But some seemingly simple ideas have simply failed. Chlorine tablets were distributed until it was shown that high concentrations of chlorine were more dangerous than the arsenic. Boiling surface water was advised, but this required an amount of fuel that few villagers could afford.

"This is why the governments are afraid to tell the people, because they have no solution," said Dipankar Chakraborty, an analytical chemist.

Chakraborty, an impassioned gadfly, has been arsenic's great Cassandra. He had done research on this chemical element in the United States. Then, in 1988, during a visit to his parents in West Bengal, he learned that arsenic was suspected in the health problems of several villages. He collected water samples and took them abroad for sophisticated analyses in laboratories at the University of Antwerp.

"The more I surveyed, the more I saw the calamity," said Chakraborty, who now runs an environmental science program at Jadavpur University in Calcutta. "government did not agree. They said I was creating a panic."

Chakraborty surmised that arsenic-bearing minerals rested in sediments washed down from the Himalayas through the Ganges River system. Heavy use of tube wells lowered the water table, he said, and as oxygen filled the gap, a chemical reaction separated the arsenic from the minerals.

Recently, other scientists have disputed this, theorizing that the lowering of the water table had no role in the poisoning. Rather, they say, the arsenic was naturally present in the water and is freed by bacteria that break down the mineral sediment. Whatever the cause, Chakraborty has continued to test wells and question villagers. He now estimates that 6 million Indians in West Bengal are drinking contaminated water-and 300,000 already show signs of the poisoning.

Early in his research, he grew sure the arsenic not only sluiced through West Bengal but also crossed its eastern border. In 1994, he began sending letters to the Bangladeshi government as well as Unicef and the World Health Organization. He was generally dismissed as an alarmist. Some government officials in both India and Bangladesh admit their response to the situation was slow. "Maybe it was a lack of administrative support, maybe a lack of political will," said K.J. Nath, who has dealt with the issue for the government's All India Institute of Hygiene and Public Health.

Indian officials have begun sealing contaminated wells, replacing them with longer pipes into a deeper aquifer. But they too face the problem of supplying an alternative. Besides, India is a medical encyclopedia of health problems.

"One has to be rational and realistic," adds Nath. "India has 17 million people affected by tuberculosis, 7 million affected by diarrheal disease, 2 million by malaria. In that context, arsenic in West Bengal is not so serious."

In Bangladesh, the government appointed an arsenic committee in 1993, and some limited testing was done. "Within the limits of the bureaucracy, we did what we could do," said Amin Uddin, retired now as the government's chief engineer. "We were concerned about creating a scare. If you tell people there is arsenic in the water, they won't even use it for bathing. They'll be afraid their hair will fall out."

Water-quality experts seem divided about whether negligence was involved in overlooking the arsenic. Although a few scientists say that studies detailing a similar, if smaller, arsenic problem in Taiwan were overlooked, most find it hard to fault anyone for not anticipating the current catastrophe.

Another view comes from Kazi Matin Ahmed, a Bangladeshi scientist who is studying the arsenic situation for the British Geological Survey.

"These wells were introduced into the ground water in good faith and they've saved countless lives," he said. "But, saying that, you could have rightly expected UNICEF to have known a lot sooner about the arsenic, especially after Dr. Dipankar Chakraborty had issued his warnings. At the very least, someone must be blamed for bad management of such a vast system of water supply."

At UNICEF's headquarters in Dhaka, officials say it is unproductive to dwell on the past. They point out that the organization has taken a leading role among the many groups now studying the arsenic problem and looking for other ways to supply water. In the meantime, UNICEF and the government continue to install tube wells.

"We are wedded to safe water, not tube wells, but at this time tube wells remain a good, affordable idea and our program will go on," said Shahida Azfar, the organization's chief representative in Bangladesh.

One change has been made, however.

Water is now tested for arsenic before and after any pump is installed.