

Arsenic Mitigation in Bangladesh

KEY STATISTICS

Basic data		
	Number	Percentage
Estimated number of tube wells in Bangladesh	8,600,000	100
Tube wells tested for arsenic	4,750,000	55
Tube wells marked green (safe)	3,300,000	39
Tube wells marked red (unsafe)	1,400,000	16
Estimated total villages in country	87,319	100
Villages screened	54,041	62
Villages where < 40% of the wells are contaminated	70,610	81
Villages where 40-80% of the wells are contaminated	8,331	10
Villages where 80-99% of the wells are contaminated	6,062	7
Villages where ALL wells contaminated	2,316	3
Villages where ALL wells contaminated	2,316	3
Actions taken by people to avoid arsenic contamination*		
Using arsenic free tubewell water		55
Using treated pond, canal or river water		21
Using filtered water		5
Using rain water tanks or sand filtered water		5
No action		32

* Multiple answers possible

BACKGROUND

Naturally-occurring arsenic contaminated water was first detected in Bangladesh in 1993. The arsenic comes from arsenic-rich material in the region's river systems, deposited over thousands of years along with the sands and gravels which make up the land of Bangladesh. Arsenic contamination is not caused by tube wells, or by irrigation or application of fertilizers.

A total of 4.7 million tube wells in Bangladesh have been tested and 1.4 million of those were found to contain arsenic above the Government drinking water limit of 50 parts per billion (ppb)¹. Combined with another 200,000 unscreened tube wells, which are estimated

¹ The WHO Guideline value for arsenic in drinking water is set at 10 ppb. This is the drinking water standard adopted in many industrialized countries. However many developing countries have kept the limit at 50 ppb for practical reasons.

to also exceed this limit, it means that almost one in five tube wells is not providing safe drinking water. Nationwide, approximately 20 per cent of shallow tubewells are contaminated. There are more than 8,000 villages where 80 per cent of all tube wells are contaminated.

About 20 million people in Bangladesh are using tube wells with more than 50ppb of arsenic.

ISSUES

Health problems

Nearly 40,000 people showing the skin lesions symptoms characteristic of arsenicosis have been identified in Bangladesh. Arsenicosis symptoms can include lesions, hardening of the skin, dark spots on hands and feet, swollen limbs and loss of feeling from hands and legs.



Lesions are easily infected, pose a threat of gangrene and can be very painful. While there is a long latency of more than 20 years, lesions can appear more quickly if arsenic concentrations are very high. However, these symptoms are usually reversible if detected early and people stop drinking arsenic-contaminated water.

Long-term exposure to arsenic can cause serious health problems including internal cancers of the skin, lungs, bladder and kidney, which can be fatal. These cancers can occur without the skin lesions. Most of the deaths caused by arsenic are expected to be from lung cancer.

Studies have shown exposure to arsenic contaminated water can also cause impaired cognitive development in children. Malnourished people are twice as likely to develop arsenicosis as well-nourished people. There is no known cure for chronic arsenic poisoning. However, people suffering from arsenicosis can recover more rapidly from skin lesions when they eat nutritious food or take multi-vitamin supplements. Lotions containing urea and salicylic acid can ease the pain of skin lesions, and also help to speed recovery.

Social Impacts

People with arsenic poisoning suffer enormous social stigma in Bangladesh. Many people believe arsenic poisoning is contagious or a curse. Parents are reluctant to let their children play with children suffering arsenic poisoning and patients can be shunned within their villages. For women, the situation is worse. In Bangladesh, a woman's attractiveness lies in her beauty which is often judged by her pale complexion. This makes it harder, in some cases impossible, for single women suffering from arsenic poisoning to marry. Once married, women face the risk of divorce if they develop arsenicosis skin lesions. This can be a dire situation in Bangladesh's male-dominated society, where unmarried women are more vulnerable to poverty and social exclusion. Women are also less likely to receive early diagnosis or treatment.

Limited options

In some arsenic-affected areas there are relatively few safe water options available. Some alternatives are safer, but less convenient, than arsenic-contaminated shallow tube wells. It is hard to compete with the low-cost, easy maintenance and convenience of shallow tube wells.

Changing Behaviour

Previous actions to encourage people to switch from surface water to groundwater in order to reduce diarrhoeal disease were phenomenally effective: some 97 per cent of the rural population relies on tube wells for drinking water, and deaths from diarrhea have dropped dramatically. This success has now created a new challenge, as people are not interested in switching from tube wells to other arsenic-free sources. Arsenic has no taste, odour or colour, and poses only long-term health risks, unlike the immediate risks of diarrhoea.

ACTION

Bangladesh is home to UNICEF's largest arsenic response programme. UNICEF Bangladesh works with the Government's Department of Public Health Engineering (DPHE) and NGOs in some of the worst arsenic-affected areas in the country.

When arsenic was newly discovered, UNICEF supported DPHE in the first nation-wide survey of tubewells which indicated the national extent of the problem. This set the stage for a massive National Tubewell Screening Programme, in which all tube wells - public and private - in arsenic-prone areas were tested. Nearly five million wells were tested for arsenic using field test kits, approximately 1.5 million with UNICEF support. The bulk of the testing took place from 2000 through 2003, but in some cases testing continued up to 2006.

A critical early intervention was the development of the National Arsenic Communication Strategy and Campaign. UNICEF contracted a social marketing firm to develop mass media and inter-personal communication tools for a wide range of field-level workers, including school teachers, religious leaders, health care workers, and DPHE engineers. One of the most effective agents for communication was the tubewell tester: testing a well takes at least 30 minutes, during which time the tester could share basic information about arsenic with the tubewell users, dispelling common myths. At the end of the test, tubewell users could visually see evidence of the result, and wells were painted red if contaminated, and green if the water met the government limit of 50 ppb.

After the national tubewell screening campaign finished, arsenic mitigation has been increasingly mainstreamed into broad water and sanitation programmes. UNICEF's

programme, Sanitation, Hygiene Education and Water Supply in Bangladesh (SHEWA-B) directly addresses arsenic, along with other water problems. A smaller project, Deployment of Arsenic Removal Technologies (DART), examines the effectiveness and social acceptability of arsenic removal filters in some of the same areas.

SHEWA-B

The SHEWA-B programme, supported by the U.K. Department for International



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Development (DFID), uses communication materials to raise awareness about sanitation, hygiene, and safe water, primarily through a network of 10,000 Community Hygiene Promoters (CHPs). Arsenic mitigation activities in this project are fully integrated with hygiene and sanitation promotion. SHEWA-B is a large programme, covering more than 1,000 unions in 31 districts over five years.



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The programme also aims to install 21,000 new arsenic-free water points over five years, and gives priority to communities facing arsenic contamination. Safe water sources include deep tube wells, dug wells, pond or river water filters, rain water tanks and arsenic removal systems. Communities choose which option is best suited to their needs, considering costs and the possibilities of health hazards, such as contamination by other chemicals or germs. Communities are responsible for selecting sites, contributing to set-up costs and maintaining and operating the alternative sources. The project has also supported research and development of new water treatment technologies and alternative supply sources.

DART

The DART project, supported by the Canadian International Development Agency (CIDA), works in 26 unions within the SHEWA-B area, where arsenic contamination is especially serious with a lack of easy alternative water supplies. The Government of Bangladesh has approved four commercial arsenic removal filters for use in Bangladesh. The DART project distributes these filters to communities through a participatory process, and monitors their technical performance and social acceptability. Nearly 18,000 household filters, and 50 community filters, have been installed and are regularly checked for arsenic. These filters can provide more than 100,000 people previously exposed to arsenic with safe water. The project, which will end in early 2009, has already generated valuable information about the advantages and disadvantages of each of the filters.

IMPACT

Awareness about arsenic poisoning has improved dramatically, with people's basic knowledge being much higher than it was even five years ago. Now 80% of people know that arsenic can be a problem in tubewell water, up from single digits in the late 1990s before the arsenic awareness campaign began. About 70% of households who have heard of arsenic report they are taking some action to avoid arsenic - most commonly by collecting water from a tubewell known to be safe.

Testing has allowed villagers to share safe wells and to identify depths where arsenic is less prevalent. More than 100,000 safe water sources have been installed in arsenic-affected areas between 2000 and 2005. Of these, 14,000 were through UNICEF-supported projects.

Arsenicosis patients are also reporting fewer social problems as awareness increases. Although stigma for prospective marriage partners has remained, a 2004 arsenic attitudes survey revealed more than one in four parents would allow their child to marry an arsenicosis patient (up from one in 20 in 2001).

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