



BANGLADESH

Bangladesh — where simple changes in practice could save lives

Many Bangladeshis don't realise that when water is contaminated during collection, storage and consumption it causes diarrhoeal disease, which kills 62 in 1000 under fives

Bangladesh faces no shortage of water. The country is the floodplain delta of three large rivers – the Ganges, Brahmaputra and Meghna, so the landscape is dominated by an abundance of rivers and standing water.

But this does not mean the population of 160 million Bangladeshis enjoys safe drinking water. Diarrhoeal disease is the country's biggest killer, taking the lives of 62 in 1000 under fives. What's more 20 million people are at risk of arsenic exposure because the groundwater exceeds the standard 0.05 mg/L. Chronic ingestion of arsenic

Basic lack of maintenance, poor hygiene practice and lack of technical support from institutions means drinking water is often contaminated with faecal bacteria

can lead to skin, lung and bladder cancers and cardiovascular disease.

Bangladesh is a disaster-prone country with frequent flash and monsoon floods, cyclones and tidal surges. Every year about 20 to 40 percent of the country is flooded, causing serious damage and contamination to water supply systems, which then need disinfection – but supplies of chemicals are often in short supply. During such times intensive public service campaigns alert people to boil their drinking water – but fuel is limited and costly. Outbreaks of water-borne diseases are inevitable.

While 80% of the country has an 'improved water system'¹ this does not guarantee safe drinking water. Out of 300 municipalities fewer than half (136) have a piped water system.

In rural Bangladesh there are an estimated 10 million point source based water supply systems (tubewells, dug wells, rainwater harvesting systems and pond sand filters) which are operated and maintained by individuals or user groups. Basic lack of maintenance, poor hygiene practice and lack of technical support from institutions means water is often contaminated with faecal bacteria.

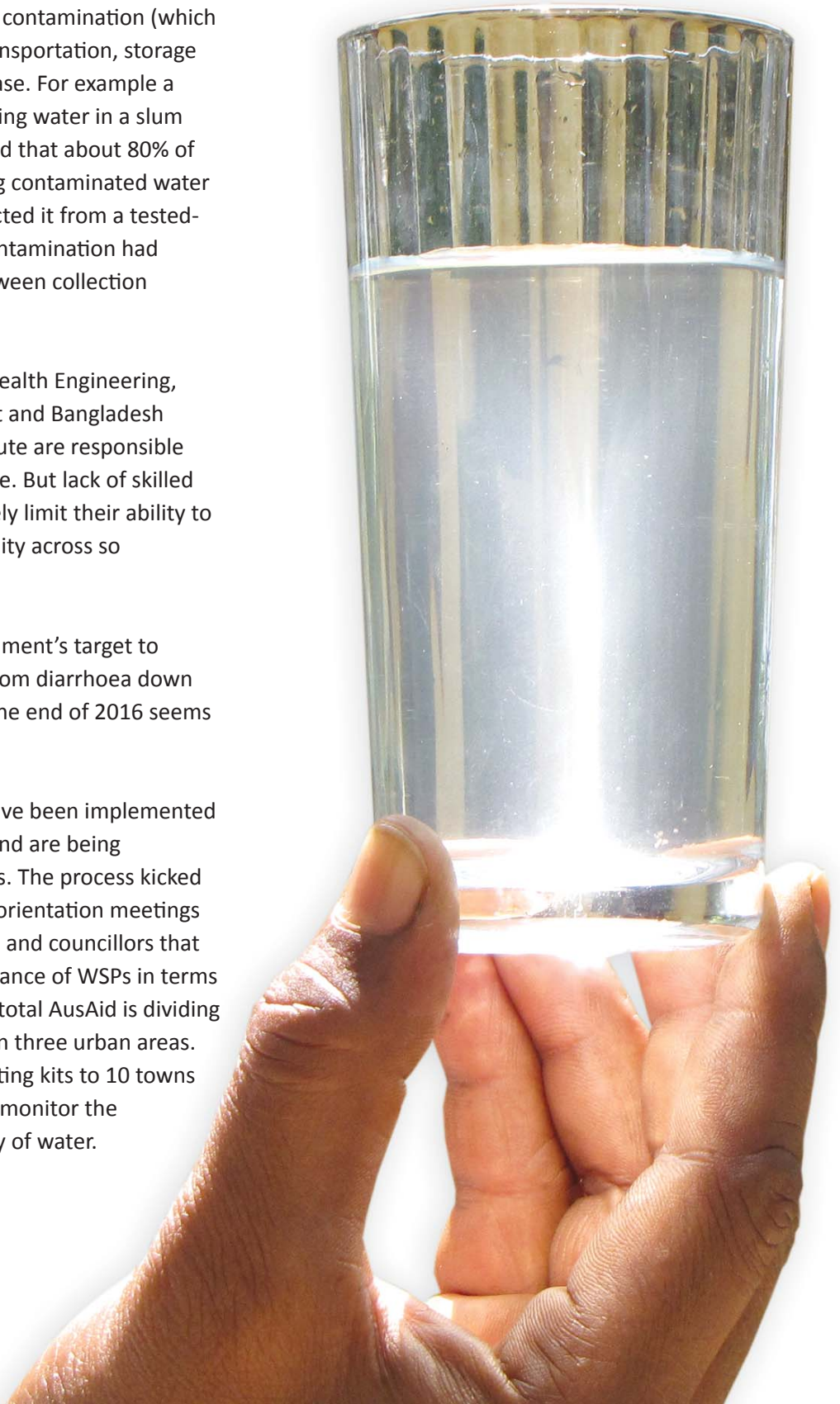
¹Piped water supply to households with single or multiple taps, yard connections or shared connections; public stand post or safe water points like hand pump tubewells, protected dugwells (ring well), pond sand filters, protected springs and rainwater harvesting systems.

Often householders are simply unaware of the relationship between water contamination (which occurs during collection, transportation, storage and consumption) and disease. For example a study of the quality of drinking water in a slum area of Chittagong City found that about 80% of households were consuming contaminated water even though they had collected it from a tested-safe source, proving that contamination had occurred at some stage between collection and consumption.

The Department of Public Health Engineering, Department of Environment and Bangladesh Standards and Testing Institute are responsible for water quality surveillance. But lack of skilled staff and investment severely limit their ability to monitor drinking water quality across so many systems.

In such a climate the government's target to bring under five mortality from diarrhoea down from 62 to 46 per 1000 by the end of 2016 seems highly ambitious.

The AusAid funded WSPs have been implemented in 10 urban systems so far and are being developed in 12 more towns. The process kicked off in November 2010 with orientation meetings and workshops with mayors and councillors that aimed to explain the importance of WSPs in terms of public health impacts. In total AusAid is dividing BT 500,000 (\$6821) between three urban areas. WHO is also distributing testing kits to 10 towns to allow local authorities to monitor the bacterial count and turbidity of water.





Washing the dishes in the busy Dhakatia river

Independence day

Innovative tariff collection system gives paurashava (district authority) the ability to invest in far reaching changes

Chandpur paurashava in central east Bangladesh is near the confluence of the country's two mightiest rivers – the Padma and the Meghna.

The paurashava is divided by the Dhakatia river (a tributary of the Meghna), a busy thoroughfare with boats continually ferrying sand, fruit, vegetables, rice, jute, household goods and people. Along its banks itinerant snake charmers moor their houseboats, cows and goats graze, people wash dishes and bathe.



**Findings of February 2011
treatment works inspection at Chandpur
treatment plant**

- Evidence of human faeces and solid waste within 30 metres of all well fields
- Pump houses not provided with alternative power source
- Leakages in the well joints and supply pipelines
- Storage ponds accessible to the public and animals
- Aeration chamber and filter bed in unsanitary condition
- Cover of clear water reservoir not insect proof
- Valve chambers contained debris/faecal matters
- Most connections had human excreta within 10 metres
- Stagnant pools of water found around most connections

For the past 80 years the water supply for Chandpur has been pumped from this river and treated at the plant built by the British in 1931. There it is stored in natural ponds where alum is used before sedimentation and filtration are carried out. Treated water is stored in an underground reservoir and chlorinated before being pumped to an overhead tank and supply mains.

But until engineers were introduced to the concept of water safety plans earlier this year they knew little about the vital importance of safe drinking water.

“Before the WSP there were gaps in our knowledge regarding why water was unsafe. We didn’t care much – we just supplied the water,” says executive engineer AHM Shamsuddoha. “Once we learned about water borne diseases we realised it was important to supply safe water – hence the vital need for a WSP.”



The Chandpur treatment works have changed little since they were constructed by the British 80 years ago

For the engineering team, the February 2011 assessment of the system was enlightening. They learned about the dangers posed by the leakages in the pipeline and sluice vault chamber: “This means when there’s no pressure in the pipe contaminated water will backflow into the pipeline,” Shamsuddoha says. And they discovered common bad practices at household level including uncovered storage tanks and having septic tanks close to underground reservoirs.

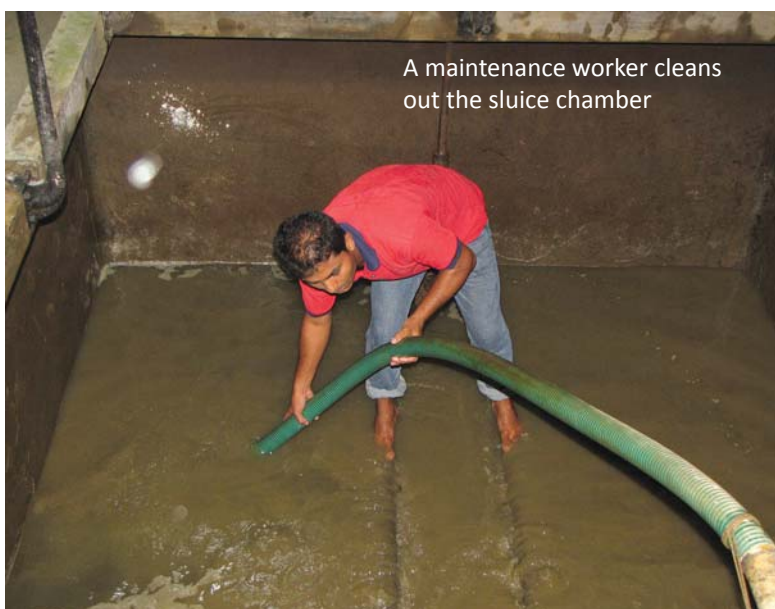
Thanks to the pourashava’s exemplary tariff collection system the mayor is confident about being able to invest in the much needed corrections. Three years ago it instigated a computerised billing system and it now boasts a 98% collection rate. The tariff varies from 150 BGT (\$2) a month for a one inch pipe to 1500 BGT (\$20) a month for a two inch pipe. The connection fee ranges from 3000 BGT (\$40) for a half inch pipe to 10,000 BGT (\$136) for a two inch pipe, bringing the total monthly income to 1.5m BGT (\$20,460), half of which it is investing in water quality improvements. Each zone is able to collect an unlimited volume of water for five hours a day in two parts.

WSP factfile for Chandpur paurashava water supply system

- The treatment plant was established in 1931
- It has four production tubewells
- The paurashava has a population of 163,235
- There are 5,851 connections
- Water supply section consists of one executive and one assistant engineer, one water superintendent, two billing clerks, three plumbers, three pump operators and seven mechanics
- Consulting firm Devcon employed to oversee implementation of WSP
- Inspection was carried out in February 2011
- Community awareness raising programme has been launched. Visited 20-30 households and organised four community consultations with about 30 in each consultation. They share knowledge such as the importance of cleaning storage tanks and household hygiene.
- Team is currently drawing up detailed WSP and has repaired leaks in the distribution line



The February 2011 inspection revealed unsanitary conditions including debris and faecal matter in the valve chambers



A maintenance worker cleans out the sluice chamber



Chandpur residents can collect water from the standpipe for five hours in a day



“We used to believe water is life. This is no longer true. Nowadays we know safe water is life,” says the mayor Nasir Uddin Ahammed. “Community outbreaks of such diseases as diarrhoea, jaundice, dysentery were very common because of unsafe water. Once it was identified that polluted water was causing the diseases then more emphasis was placed on purifying water.

“Last year we spent almost 50% of our income on operation, maintenance and expansion. We are totally independent of the government and trying to continue to be self reliant. If we can continue like this for five to seven years we will not require any help from government,” he adds.

Improvements to water quality have taken on a greater urgency because households are unlikely to be able to continue boiling their drinking water at home for zero cost: the government has announced it is stopping supplying unlimited

free gas to new builds and is likely to terminate current connections too, forcing people to buy costly gas canisters. “If we can implement the WSP properly not only will water borne diseases be reduced but the majority who are now boiling water will stop doing that thereby conserving fuel. So it will also have an impact on the economy,” says Shamsuddoha.

Migration from rural areas is putting pressure on the paurashava’s water supply system which currently covers 11 square kilometres. The town has spread to an area of 22 square km and house connections have doubled to almost 6000 in five years. While there are no plans to install a generator to cope with the four hour daily power cuts, construction will start soon to build another two treatment centres so that more houses can be connected.





‘We don’t know how to be clean’

The burden of disease in rural Bangladesh can be lifted with a few simple changes in practice

In the small remote village of Kapaura near Bangladesh’s NE border with India, Jahanara Begum collects several urns of water from the tubewell just outside her family’s house. Although the groundwater is tested as safe Jahanara’s family are continually beset by stomach cramps and diarrhoea.

Apart from the risks to life posed by such afflictions these are illnesses that subsistence farming communities can ill afford: they impact on production and prevent children from attending school. Yet Jahanara is unaware of the link between unsafe drinking water and these illnesses. Nobody in the village of 88 households boils or treats their water at home.

A few simple repairs and changes in practice can rectify the situation. The tubewell has no platform, inviting contamination, especially during rains, and the pump has no cover. Jahanara doesn’t clean the container before filling it nor does she cover it during transport or storage. She bails excess water out of the urn with her hand.

A villager washes dishes and collects water from a stagnant pond alongside a local boy washing his calf

“In our house we drink water straight from the tubewell,” says Jahanara. “We don’t cover our jars. We place our jars on the ground. Our children get sick with diarrhoea and other diseases and the sickness continues one after the other. But we don’t know how to be clean for eating or drinking.”

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The village has elected an 11 member Community Based Organisation (CBO), which is actively overseeing a pilot WSP under the guidance of Bangladeshi NGO Voluntary Association for Rural Development (VARD) .

Most of Jahanara’s neighbours have already made changes by constructing or repairing simple tubewell platforms, covering the pumps and keeping the area spotlessly clean. They are now covering water jars during transportation and storage and know about hygienic water handling practices. Already they are experiencing the benefits in terms of fewer diarrhoea outbreaks.

Another group of houses appear immaculately clean – thanks to general hygiene awareness raising programmes. Yet behind them the tubewell is positioned just 20 feet from the latrine (the minimum safe distance is considered to be 30 feet) guaranteeing that underground water will be contaminated. This is the last of 12 latrines out of a total of 60 that needed moving to a safe distance.

CBO chairman Abdul Karim says: “Before VARD came to the village the situation was very bad. There were open latrines. There was no safe water. We went to each and every household and identified the problems such as open latrines and unhygienic practices and we worked on that.



Collecting drinking water from an uncovered and cracked tubewell. It is common practice for people to lower the level of the water in the urn by hand

WSP factfile for Kapaura village

- 88 households with a population of 525
- All 46 water points are shallow tubewells.
- 60 latrines – half of which are non hygienic.
- 18 households still defecate openly
- Local NGO VARD is currently implementing the WSP
- The village has elected an 11 member Community Based Organisation to implement changes and monitor progress
- There was an acute lack of awareness regarding the link between disease and safe water practices
- WSP is focused on community wide campaigning, facilitative discussion programmes with CBO representatives, schools-based programmes including audio visual materials, TV spots, leaflets, posters and training of local health and government workers to raise awareness and spread the message about how to make water safe from source to consumption
- Villagers pay fees to the CBO and contribute labour voluntarily to make improvements such as moving latrines and rebuilding tubewell platforms
- CBO has a woman cashier because the community places more trust in her handling their money
- Previously 27 tubewells had no platforms. Now just two need to be built
- 12 latrines were too close to water points – all have been moved except one
- Those households that have made improvements are experiencing fewer outbreaks of diarrhoea making them more productive and more able to attend school

“Until then we had believed everything was fine. But VARD has helped us understand that because platforms are missing and drains are not well maintained contaminated water is going underground and polluting the drinking water. So we were then able to understand and to start work. We plan to make our village a modern village by June. Now the burden of disease is less. Previously cholera, diarrhoea and dysentery were very common.”



Janara Begum and her family drink water from the tubewell without filtering or boiling

The CBO has appointed Minira Begum as cashier to collect the money for improvements because as a woman she is both closer to the community and more trustworthy. According to Karim villagers are happy to pay because they now understand that having safe drinking water will save them having to pay costly doctors' fees.

The fact that Bangladesh has some 10 million tubewells makes it impossible to apply the ten point WSP to each one. So the partners involved in implementing the WSP have adapted their strategy. Rather than sticking rigidly to the ten point plan at each tubewell, their approach involves community campaigning, schools-based programmes, audiovisual campaigns, public service announcements, leaflets and posters. They are motivating community level health workers and the lowest tier of government workers (unions) to disseminate information about the need for safe transportation, storage and handling of water.

Meanwhile at the edge of a nearby pond a local woman washes her dishes while another collects the green stagnant water in a jar to use it for cooking or even to consume it directly – without boiling, filtering or treating. Next to them a boy washes a calf that defecates directly into the water and ducks glide by. Apart from the logistical challenges of changing practices throughout rural Bangladesh it is difficult to persuade people to change, permanently, their lifetime customs.



**World Health
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