

## ARSENIC ALERT

## 40 Million at Risk: Needed Awareness Campaign

by Quamrul Islam Chowdhury

**There is no definite cure for arsenic poisoning but uncontaminated water and nutritious food over a period of time nurture sufferers back to health. Unfortunately, there are few alternative water supplies in the affected districts and most of the people in the area can't afford nutritious food.**

changes in the soil. SOES scientists advise that if catastrophe is to be averted, ground water pumping must be reduced relying more on surface water use for irrigation. As water table falls, pyrites — a mineral which holds the arsenic — begin to oxidise and leach the poison, contaminating thousands of shallow wells in West Bengal in India. Bangladesh is now hit by this mass poisoning sickening hundreds of thousands of rural people.

**Symptoms of Arsenic Poisoning**

Physicians say the arsenic affected person develops fatigue, nausea, severe leg and stomach cramps, wart-like lesions on palms and soles of feet, skin and organ cancers and nerve disorders. And so on. Clinical investigation into the cause of arsenic poisoning revealed that the poor, already suffering from malnutrition, are the worst affected. At the early stage of illness, an arsenic poisoned person is affected by a variety of diseases including melanosis, keratitis, conjunctivitis, bronchitis and gastroenteritis. Peripheral neuropathies and hepatopathy are the next stages of this poisoning. At the final stage gangrene in the limbs and malignancy in neoplasm lead the poisoned person to death.

**Bangladesh Situation**

National Institute of Preventive and Social Medicine [NIPSOM] Dhaka have tested in December 1996, 1000 samples of tubewell water in 17 rural districts and found arsenic in 180 such samples. By June 1997 the number of affected districts rose to 19 out of another sample drawn from 24 districts. The arsenic toxicity in the water of the 17 affected rural districts — Bagerhat, Khulna, Satkhira, Jessore, Jhenidah, Chuadanga, Meherpur, Kushtha, Pabna, Raishahri, Chapainawabganj, Narayanganj, Faridpur, Rambari, Chandpur, Laxmipur, and Noakhali — is 25 to 35 times higher than the safety level set by the World Health Organisation (WHO). Permissible level of arsenic in water is 0.05 ppm, according to experts.

Bangladesh Energy Commission found the level of arsenic at between 1.5 and 2 ppm in tubewell waters in districts bordering with West Bengal of India. The situation is so worsening that even dangerous level of arsenic toxicity was found in the water of a tubewell of Bangladesh Health Minister Salauddin Yusuf's village home in Khulna. This tubewell has

already been sealed by the district Public Health Engineering Department. The number of arsenic poisoned tubewells is on the rise creating a panic across this rural belt.

Dhaka Community Hospital (DCH) has been conducting research works on it. The result of their investigation shows that the number of arsenic affected people is horrifying. Public health is in jeopardy in areas where arsenic poisoning is extensive. DCH conducted its research on arsenic poisoning among residents in four villages under Ishurdi thana of Pabna district, eight villages and legalities of Kushtha district and one village of Meherpur district.

Water samples collected from the arsenic infected areas of the country contained more than normal percentage of arsenic. The results of the tests shows that 28 per cent of the affected people have more than 100 to 1500 per cent arsenic in their urine, 47 per cent have eight to 20 times in their nails and 98 per cent have 100 to 15,000 per cent more than normal arsenic in their skin. Twenty per cent of water samples contained arsenic which is 100 to 900 per cent more than the allowable quantity. Dhaka Community Hospital screened 920 patients suffering from skin diseases of whom 150 were suspected to have been suffering from arsenic poisoning. Samples of urine, nails, hair and skin were collected from 95 of those 105 patients. Water samples from 41 tubewells were also collected from the arsenic affected areas. These samples were examined at the Bangladesh Centre for Scientific Investigation and Research (BCSIR) and the laboratory of the School of Environmental Science of the Jadavpur University, West Bengal, India.

**Social Fallout**

As the mysterious sores first appeared on Anil Chandra Das's work-toughened hands, the grizzled rice farmer of Noapara, long hardened against the aches and pains of life in rural Bangladesh, just ignored them. But the lesions didn't go away. Instead, the small purple scabs on his palms began cracking and bleeding. Then the headaches started, accompanied by chest congestion and stomach cramps. And finally, last March, the man whom neighbours remember for his breezy storytelling, lapsed into a deathly silence. "He just laid in bed all day and we looked into his eyes. Then one day he

didn't open his eyes any more. And we all began to cry," said Ila Rani Das, 16, Anil's daughter. Fighting tears, Ila recalled how her eldest brother, Shyamol, 20, died in August of the same grim symptoms. She held up her palms, the purple sores were there. She is not alone.

The social fallout is creating havoc. Amina Begum, 35, a vic-

timic — men like Abdus Samad, 33, who lost both his hands and social status to arsenic. "My parents told me one day to leave home when I got sick," recalled Samad, a sad, wiry man whose hands and feet are still cracked with sores months after drinking from safe, arsenic-free well. Shunned, his wife and he built a tin-roofed hut on remote corner



Palms and feet of a victim: Signs of scourge

tim who developed dark brown spot on her skin is socially shunned. She is not also alone. Girls with such spots are unable to find husbands, married women showing signs of arsenic poisoning are often sent back to their parents by their in-laws; young men are refused jobs in rural areas. It happens over the heads of most of the villagers plagued by the epidemic.

of his father's property. "Everybody thinks it might be contagious like leprosy," Samad said bitterly. "I washed my plates in boiling water for nothing."

Rasheda K. Chowdhury, Chairperson of Environment and Development Alliance said, the life of entire rural community has been affected by this catastrophe. She emphasized

afford nutritious food.

Dr Mujibul Huq, Head of Dermatology Department, Dhaka Medical College Hospital said, with proper medication and access to pure drinking water, arsenic-affected patients can be cured but it is important to take advice from the experts at the early stage. Medicine for this is scarce now and steps have been taken to make those available, he added.

Water Development Board geologist Mizanur Rahman suggested rainwater harvest as a preventive. Storage and utilization of rainwater is a low-cost technology to counter arsenic contamination in the water, Rahman said. It is particularly pertinent to the monsoon season. A daily consumption can not be met with small filters, the government should take up a crash programme for mobilizing mass awareness. Rahman expressed his concern regarding disposal of the arsenic waste gathered in the filters. If the arsenic waste is randomly disposed, this can create further havoc through contamination of drains, ponds and other water bodies. Another blunder is to be avoided: don't simply sink the tubewells deeper to tap fresh water from a lower level. If you sink a tubewell deeper, this could serve to contaminate the water below.

The cast of characters in the emerging health disaster includes armies of quack doctors who prey on the poisoned victims, knowing that arsenic has no real cure other than switching to clean drinking water.

**Conclusion**

Once one of our paramount leaders, Moulana Abdul Hamid Khan Basani warned the proponents of the Green Revolution about the danger of over extraction of ground water. The policy-makers in 1960s did not pay heed to the warning of the wise old man whose words now come true. The Green Revolution is no more a hero, it has turned into a villain. By drilling hundreds of thousands of expensive tubewells to irrigate its high-yielding crops during the dry season, scientists now say the government has unwittingly exposed millions of its rural people to naturally occurring poisons in the ground water. There is no time to the decision-makers to lapse. They have to now act, act and act. They have to avert this mass poisoning.

The general secretary of Environmental Journalists of Bangladesh, the writer is a senior correspondent of BSS and a leading environmental activist.

This is a specially prepared version for the Daily Star of the report presented at the ESCAP sponsored Regional Workshop on Promotion of Environmental Awareness in Rural Communities held at Bangkok on June 30—July 2, 1997.

## Some Suggestions for Scientists

by Dr Mahboob Hossain

Now it has been established that the arsenic poisoning of ground water in Bangladesh is a great national concern. At least some people have died and we do not know how many are being affected or going to get fatal diseases because of arsenic poisoning of ground water. Permanent solution of this big problem may be time consuming and difficult, but we need to know, immediately at least the temporary solution of the problem. I mean what the people should do before drinking arsenic contaminated water. Considering the economic ability of the people of our country I wanted to know the rapid, easiest and cheapest method of water treatment through Internet. I hope the following suggestions from the scientists and students of various countries (including Bangladeshi living abroad) will be helpful for the scientists, students and social workers who are fighting to combat the menace of ground water poisoning by arsenic in Bangladesh.

Many of them suggested to use charcoal, activated carbon and capacitor etc. for relatively large scale water treatment. Among them one person suggested to get distilled water (as a small scale water treatment) for drinking from arsenic contaminated water using a very inexpensive and easy device and that is the use of polythene paper and solar energy. It deserves mention that scientists of BCSIR already have this inexpensive device which need to be popularised. Being a microbiologist I whole heartedly support this device because I believe it frees water from arsenic and from microbes as well which cause hepatitis, typhoid, diarrhea and other infectious diseases. Moreover, it will free nitrate from water which could cause cancer if beyond the acceptable limit. Following are the specific suggestions as I received.

"I should stress that the method I propose deals only with the arsenite anion  $\text{AsO}_3^{3-}$ , which I believe is the toxic form. I say nothing about arsenate  $\text{AsO}_4^{3-}$  which I believe is less important. But I believe the principle is correct. I think that a form of rock like dolomite can be found with a trace of some other metal ion like iron or manganese that will also precipitate the arsenite  $\text{AsO}_3^{3-}$  anion. And such a solution is cost effective in Bangladesh at the village level."

On November 21, 1996 Mr Carol Umber wrote, "Filter the contaminated drinking water through charcoal. As you know, charcoal is easy to make. Your people are probably already making it. Change the charcoal in the bed monthly until you have a better fix on how often to change it by using [expensive] testing. Hope this helps."

On November 22, 1996 Dr Anis Ahmed from Washington (former Lecturer of Environmental Engineering of BUET) wrote, "Although chemical precipitation and ion exchange are pretty much known technology for removal of arsenic from ground water, these are also expensive. We talked about co-

precipitation and think that this may be promising. If you have high iron and/or manganese in ground water, if you remove iron and/or manganese, arsenic may also be removed (co-precipitation). When exposed to air, dissolved iron in ground water will be converted to ferric-oxide which forms a precipitate. The precipitate acts as adsorption site for the arsenic and some would be removed with the iron precipitate. The precipitation of iron is enhanced at pH greater than 7.

"Another way to remove arsenic is the use of activated carbon. This may not be available or may be too expensive. However, I think you can just use wood carbon. Although how best it would work can only be found through trials. One problem with wood carbon is that it would make the water dark. However, if you have a sand filter that would take care of that. The wood carbon would have to be replaced soon as the carbon is saturated with arsenic and the water starts showing elevated arsenic levels. The wood carbon should be placed in a canister for ease of handling. This can be an idea for a cottage industry."

"One idea of elevated pH is to use wood ash (this is abundant in rural areas where cooking is done using wood as fuel). Of course, you would have to use a sand filter to remove the ash before water is made available for drinking."

On November 24 Tom Liberman from Ontario, Canada wrote, "I can point you in the general direction, though I can't give you direct answers off the top of my head. Basically, you need to complex the soluble arsenic into a relatively harmless form. Arsenic poisons mainly occur by going after, and binding with sulfhydryl groups (-SH) on vital enzymes in the body; just like most heavy-metal (Hg, thallium) poisons do. The simplest way of countering this is to provide an excess of sulfur to the arsenic, effectively satiating and neutralising it before it binds with the body's SH groups. Ever heard of BAL? It stands for British Anti-Lewisite. Lewisite is (is) an organo-arsenical blistering agent/poison gas (actually liquid) used in WWI. BAL (also known as dimercaprol) was the antidote. BAL looks like this:  $\text{CH}_2\text{SH}-\text{CHSH}-\text{CH}_2\text{OH}$ . Notice the two SH groups? It's an effective antidote in As, Hg poisoning. It 'chelates' or complexes with heavy metal ions, rendering them harmless."

On November 27, 1996 Scott Hurd wrote, "I know you said not to recommend drinking distilled water because of its high cost but what if it is possible to make it simply? Using some clear plastic sheeting and some dark plastic sheeting (or other dark water impermeable material) you may be able to make a solar still that will meet your needs. Hope this helps."

Finally, I would like to request the scientists of all disciplines to take united, immediate and effective step to save millions of people of our motherland from arsenic poisoning of water."

The writer is a Research Fellow, Bangladesh Centre for Advanced Studies.

## Tom and Jerry



## Metropolitan

### Asiatic Society to compile 'encyclopedia of Bangladesh'

The Asiatic Society of Bangladesh (ASB) has undertaken a five-year project for compiling an encyclopedia entitled 'Encyclopedia of Bangladesh' in ten volumes in Bangla and English, reports BSS.

A five-day workshop has been organised by the ASB on July 25-29 to get the draft project design discussed by panels of experts with a view to making the design as sound as possible academically. The participating scholars representing almost all disciplines will be grouped into six subject panels.

According to the ASB source, a large number of scholars from home and abroad will participate in the process of the preparation of the encyclopedia, the first of its kind in Bangladesh. The panels of the workshop will be on natural sciences, biological sciences, arts and humanities, history and heritage, society and economy and state and governance.

### Day temp likely to fall

Under the influence of well-marked low over north west Bay off Bangladesh-West Bengal coast, heavy to very heavy fall is likely at places over Khulna, Barisal and Chittagong divisions in the next 12 hours till 6 pm today, reports UNB.

Met Office says moderate or moderately heavy rain or thundershower accompanied by temporary gusty or squally wind may occur at most places over Dhaka, Khulna, Barisal, Chittagong, and Sylhet divisions and at many places over Rajshahi.

Day temperature is likely to fall by 1-2 degree Celsius across the country.

Country's highest temperature 32.0 degrees Celsius was recorded at Bogra and the lowest 22.0 degrees at Cox's Bazar.

Meantime, Cox's Bazar experienced the highest 239 mm rain in the last 24 hours till 6 pm yesterday. Kutubdia had 113 mm rain, Khepupara 112, Chittagong 101, Sandwip 68, Majidcourt 59, Jessor 32 and Barisal 13 mm shower during the period.

The sun sets today at 6:47 pm and rises tomorrow at 5:23 am.

Maximum and minimum temperatures and humidity recorded in some major cities and towns yesterday were:

City/Town	Temperature in Celsius	Humidity in percentage
Dhaka	29.4	61
Chittagong	27.0	97
Rajshahi	31.5	98
Khulna	26.7	93
Barisal	26.4	98
Sylhet	30.0	85
Cox's Bazar	29.5	97

### Youths urged to resist conspiracy against country's sovereignty

Awami League general secretary and LGRD Minister Zillur Rahman yesterday called upon youths to unitedly resist the conspiracy against the sovereignty of the country, reported BSS.

He was addressing the inaugural session of the Triennial Conference '97 of Dhaka district Juba League at the Engineers' Institute in the city.

He said BNP leader Khaleda Zia, along with Jamaat-e-Islami, has been hatching conspiracy to turn Bangladesh into

The Minister said Khaleda Zia has been opposing all the people programmes of the government as she and her party do not pursue the politics of people's welfare.

The inaugural session was also addressed, among others, by Bangladesh Juba League chairman Sheikh Fazlul Karim Selim MP.