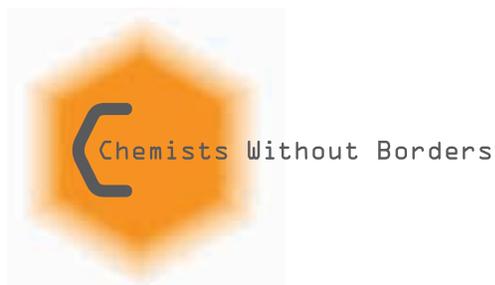


# The Chain Reaction

Humanitarian Solutions Worldwide

Newsletter 24 • September 18, 2017



## Update on CWB Bangladesh Arsenic Project - A Plan to Scale Nationwide

BY RAY KRONQUIST



**Human Rights:** We claim that clean water is the right of every human being. Yet, around 20 million people in Bangladesh alone are suffering the consequences of consuming water contaminated with arsenic.

**Health effects of arsenic:** Arsenic poisoning results in long term damage to health leading to early death. It seems that no organ escapes the menace of arsenic; skin blemishes, and a variety of cancers, respiratory and cardiovascular illnesses are all effects of arsenic poisoning.

**Where does the arsenic in the wells come from?** In general, it is not from industrial pollution but from the arsenic that is a natural component in the Earth's crust.

**History:** As Chemists Without Borders, we have been working in Bangladesh on this problem for the past three years. In the Fall of 2014, we started our Bangladesh Arsenic Education Project, wherein we visited high schools and educated the students about the health hazards of arsenic. The high school students also learned how to use a field test kit to measure arsenic concentration in drinking water. Then they tested a number of actual wells in the neighborhood of the school.

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### Our Mission

Chemists Without Borders solves humanitarian problems by mobilizing the resources and expertise of the global chemistry community and its networks.

### Our Vision

A global support network of volunteers providing mentoring, information and advice to ensure every person, everywhere, has affordable, consistent and persistent access to:

- Essential medicines and vaccines
- Sufficient safe water
- A sustainable energy supply
- Education in green chemistry and business which people can apply in their daily lives and teach to others
- Safe processes in work environments where chemical hazards exist
- Emergency support, including essential supplies and technology

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During this phase of the project, we discovered that two of the school wells had arsenic concentrations of 250ppb (parts per billion), which were 5 times the allowed level in Bangladesh and 25 times the level allowed by the World Health Organization (WHO).

After we discovered that these school wells were so contaminated with arsenic, we discontinued the education project, in order to focus on finding ways of remediating the arsenic contamination at these schools.

In 2016, we were able to get funding from Rotary Club Khulshi in Chittagong, Bangladesh and from Rotary Club Shallotte in North Carolina to replace the wells at the two schools with ring wells that provided water that satisfied the Bangladesh arsenic level requirements. That phase of the project is described in Chemists Without Borders Newsletter 19 for the well at Sitakunda High School and in Newsletter 21 for the well at Terail High School.

**Current Strategy:** Below are the critical questions we are answering now:

### **What can be done?**

The first step is testing the water in the wells for arsenic. If high levels of arsenic are found, the well can sometimes be replaced by a second well that is free of arsenic as we did at the two high schools discussed above.

Another solution is to run the water through a sophisticated filtration system which removes arsenic and most other possible contaminants.

### **Why hasn't that been done throughout Bangladesh?**

It is largely because of cost. There are about one million public wells and ten million private wells in Bangladesh. Some have been replaced with safe wells, but many have not.

### **So what is this model Chemists Without Borders is proposing?**

We do the following things:

1. We concentrate on getting safe water only to the high schools. We do this by using sophisticated filtration systems on the high school well, rather than replacing the hundreds of contaminated wells in the high school district. Thus, our model is very inexpensive compared to a mass well replacement.
2. We teach high school students how to test wells. They are then able to test the community wells (tests cost \$1.00 per well) in the district. While the students volunteer their time, they are also gaining valuable experience working on the project. This system allows us to identify the wells that are contaminated with arsenic and educate the locals about the arsenic contamination.
3. We then set up a home delivery service, with the high school students delivering the safe water from the high school well to the homes that use wells contaminated with arsenic. They will use a simple delivery vehicle in a business model pioneered by Drinkwell Systems.

### **Why is this model so cost effective?**

1. We don't try to replace all contaminated wells, which would be very expensive.
2. We don't deliver water to all the homes, just the ones that use wells contaminated with arsenic.
3. We don't deliver all the water the family uses, just enough for drinking and cooking.

So you see, we maximize the resources available and minimize the work and the cost, but still provide water for drinking and

cooking to the people who are consuming arsenic-contaminated water.



Delivery of water to the homes by Drinkwell Systems

### **What is our next step?**

We are starting, in collaboration with YouthMappers (a student club at the Asian University for Women in Chittagong), to execute the model in Teriail High School District. The university students will train the high school students, who will do the work of mapping and testing the wells and delivering water to the homes that need it.

Once we validate the model, we will replicate it in the 30 other high school districts in Sitakunda Upazila, then later in other regions of Bangladesh.

### **How can YOU contribute?**

Considering the magnitude and impact of the project, the costs are not considerable. However, they are significant for an NGO like ours. Every monetary contribution makes a difference and we commit to investing the donations we receive in the best interest of the project.

Most of the work is done by volunteers, but we still have organizational expenses of about \$50 per day. This means that your donation of \$50 keeps us going for another day, \$250 for a week, and \$1000 for a month. [You can make your donation of any amount here.](#)

You can also contribute by volunteering. We are always looking for motivated individuals who are energized to spread awareness about our project and help us sustain our work. We also appreciate any ideas, suggestions and comments that you would like to share with us.

For more information contact: Ray Kronquist, the President of Chemists Without Borders at [ray@kronquist.com](mailto:ray@kronquist.com) (Tel: +1-408-929-9066)

### **What is the value of this model?**

The beauty of this model is that it is simple, yet effective, ambitious, yet realistic, extensive, yet cost-effective.

More importantly, it is Bangladeshi youths who fuel this project, making it not just about water, but about the empowerment of youths.

# Studying Water Quality in US to Avoid Future Flints

BY SATINDER AHUJA

## **Problem to be Solved:**

In 2015, high levels of lead were found in the water supply in Flint, Michigan. In an effort to save money, Flint had begun drawing its water from the local river in April 2014 instead of buying Lake Huron water from the city of Detroit. Residents started complaining about burning skin, hand tremors, hair loss, and even seizures. Children were diagnosed with anemia. Lead is particularly harmful to kids as it impacts their rapidly growing brains. But Flint is hardly the only city with a lead-contaminated water supply.

In Sebring, OH, routine laboratory tests in August 2015 found unsafe levels of lead in the town's drinking water after workers had stopped adding a particular chemical to prevent corrosion of lead water pipes. Unsafe levels of lead have turned up in tap water in city after city: Washington, DC, in 2001; Durham and Greenville, NC, in 2006; Columbia, SC, 2005; and Jackson, MS, in 2015. Unfortunately, a number of man-made inorganic and organic compounds from arsenic to zinc can pollute air, water, and food. These contaminants include chemicals from industry and sewage, fertilizers, insecticides, pesticides, herbicides, detergents, gasoline combustion products, and pharmaceuticals, including endocrine disruptors. We need to avoid future Flints and prevent any other kind of water contamination in public water supplies.

## **Project Description:**

The goal of the project is to involve young volunteers in water quality issues. I will ask them to contact their municipality and request a water quality report. I will review this report with them and let them know if there are some elements of concern that are not being monitored. This will provide a list of water quality in various counties in US. Our aim is to enlarge that list to represent all of US so we can raise the awareness of water quality in our country.

I will also ask them to look into source of water supply and infrastructure to determine where problems like Flint can occur be cause of lead pipes, etc.

## **What has been done?**

Two volunteers Adam Cooper and Nehemiah Stafford are already working on it. Dr. Ahuja organized and chaired a symposium on Monitoring Water Quality and Infrastructure to Prevent Future Flints on August 22, 2017 at American Chemical Society meeting in Washington DC. Marc Edwards was the featured speaker. He spoke on Lessons Learned from Horror Stories of Water Contamination. Adam and Sut presented a paper on Investigating the Missing Link: Effects of Noncompliance and Aging Private Infrastructure on Water Quality Monitoring. In addition, Steve Chambreau hosted a lunch for CWB.

## **Benefits:**

Problems from lead contamination occurred in Flint because change in water supply was made without monitoring what impact such change would have on drinking water. Similar problems can be avoided. This will assure better health of our citizens.

## **Future Plans:**

We need more volunteers who are willing to help investigate potential problems.

## **Needs of the Project:**

A budget of \$1000 will be helpful to offset travel and other costs that would be incurred by our volunteers.

## **Contact Information:**

For more information or to make offers of help, you can contact Dr Sut Ahuja, Vice President, Special Projects ([sutahuja@atmc.net](mailto:sutahuja@atmc.net)).

## Rotary Club Presentation Project

BY RAY KRONQUIST

The first article in this newsletter described the work that Chemists Without Borders has done and plans to do to solve the problem in Bangladesh of arsenic contamination of drinking water. In 2016, we were able to get funding from Rotary Club Khulshi in Chittagong, Bangladesh and from Rotary Club Shallotte in North Carolina to replace the wells at the two schools with ring wells that provided water that satisfied the Bangladesh arsenic level requirements.

Earlier this year, we started a major project of outreach to Rotary Club chapters in many areas of the world. Members of our Chemists Without Borders presentation team have been visiting and giving presentations to these Rotary Clubs to describe our project to the club members and to ask for financial support from the clubs. A video of the presentation is available at: <https://vimeo.com/208349539>

Currently we have 27 Chemists Without Borders members on the presentation team at locations shown by the red dots on the maps below:



India/Bangladesh

Locations: Ranchi, India/ Dhaka and Chittagong, Bangladesh



Europe

Locations: Malta/ Montpellier, France/ Darmstadt and Frankfurt, Germany/ Amsterdam, Netherlands/ St. Petersburg, Russia/Brighton and Manchester, UK



United States

Locations: San Diego and San Francisco, California/ Seattle, Washington/Lubbock, Texas/ Topeka, Kansas/ Chicago, Illinois/ Cleveland, Ohio/ Allentown and Avondale, Pennsylvania/ Pine City and Scarsdale, New York/ Washington, D.C./ Catonsville, Maryland

We feel that Rotary is an ideal partner for Chemists Without Borders, since Rotary is also dedicated to solving humanitarian problems.

In addition, Rotary and Chemists Without Borders are both global organizations. We have few members in any one location, but each member is not far from a local Rotary Club. Thus, we can visit and give presentations at a large number of Rotary Club chapters around the globe.

If any of you have an interest in joining our presentation team and helping publicize and get financial support for our projects, please contact:

Ray Kronquist,  
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Thanks for your support.

### Support Chemists Without Borders!

Please support our work by making a generous donation [here](#). Chemists Without Borders is a 501(c)(3) registered with the Internal Revenue Service. All donations are tax-deductible as permitted by law.



## Last Session of Health Education Course and the Certificate Ceremony

BY SHARMIN MOMOTAJ

Chemists Without Borders and Agami, Inc. have been collaborating on a Health Education Course with a version for high school students and a simpler version for elementary school students.

This article was published originally in the Agami blog at: <http://agami.org/node/412> It describes the final class of the elementary version of the Health Education Course, conducted at an Agami school in Dhaka.

The last session of Health Education Courses was held on Thursday, 20th April, 2017 at PSD School. Conducted under a joint program of Chemists without Borders and Agami Education Foundation, in this lesson students were taught the importance of sleep. Sometimes they could not sleep properly or they wanted to sleep but couldn't due to their environment. They were taught how to keep their environment sound free and suitable for sleeping. They were reminded of the importance of exercise as it helps all to sleep better. Sleep is very important for our survival. Students were taught that if they did not sleep well, they couldn't work properly. And sleep is essential for learning too. Proper sleep helps in better learning. Finally, I reminded the students of the need to remember the lessons learnt in previous courses. Thus we concluded the last session on the importance of sleep.



The certificate distribution ceremony was held on 27th April, 2017 on Thursday. Program Director Shihnath Sarker, Executive Director Nafisa Khanam, two teachers of Pearabag PSD school named Biplobi Chakraborti and Jhorna Akhter and I, Sharmin Momotaj, were present in the ceremony. At the beginning, Mrs. Nafisa Khanam asked students some questions from the previously taught lessons. She then distributed the certificates among the students. Finally in her concluding speech, she urged the students to reflect in their daily life whatever they learnt throughout the lessons. After that I talked to the students for a while as it was my last day with them. All these children were very interested to learn new things.

## A Laboratory of One's Own

BY DR. ROLANDE HODEL

AIDSfreeAFRICA is a 501-c-3 non-profit organization working in West Africa, Cameroon since 2005. We focus on supporting pharmaceutical drug production. Over the years we have consulted seven pharmaceutical start-ups, delivered production equipment and helped with drug access. We support STEM education mainly by donating chemistry glassware and equipment to universities and high schools. Everything we have done in the past twelve years was to support existing institutions in Cameroon.

Now we decided is a good time to change this model. We borrowed the title of Virginia Woolf's book "A Room of One's Own" to announce that AIDSfreeAFRICA is building its own laboratory - for quality control of pharmaceutical drugs, water, and other useful chemistry.

We are looking for a few courageous people to join us to teach hands-on science in Cameroon.



### Qualifications needed:

- Science background, such as a teacher, professor, or industrial scientist.

- Ability to plan an experiment, and the ability to gather and bring all the equipment needed for its execution.
- Ability to raise money for trip expenses.
- Ability to adapt to the impossible, to embrace the unexpected, to tolerate a high level of uncertainty, inconvenience and personal discomfort (lack of conveniences we take for granted in America).
- Can devote time from now to May 2018 to prepare for this opportunity.
- Ability to spend 3-6 weeks between May 15 and July 15, 2018 in Cameroon.

Visit the AIDSfreeAFRICA [website](#), [blog](#), and [Facebook page](#) and send us your CV and proposal a for your teaching project to [RRHodel@aol.com](mailto:RRHodel@aol.com) and [donorservice@AIDSfreeAFRICA.org](mailto:donorservice@AIDSfreeAFRICA.org).

Thank you,  
Dr. Rolande Hodel



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