

More Information on US-India Engineering Fellowship Opportunity

Gadgil Lab for Energy and Water Research,
University of California, Berkeley

<http://GadgilLab.berkeley.edu>

From 1970 on, there was a massive switch to handpumped wells for drinking water in South Asia

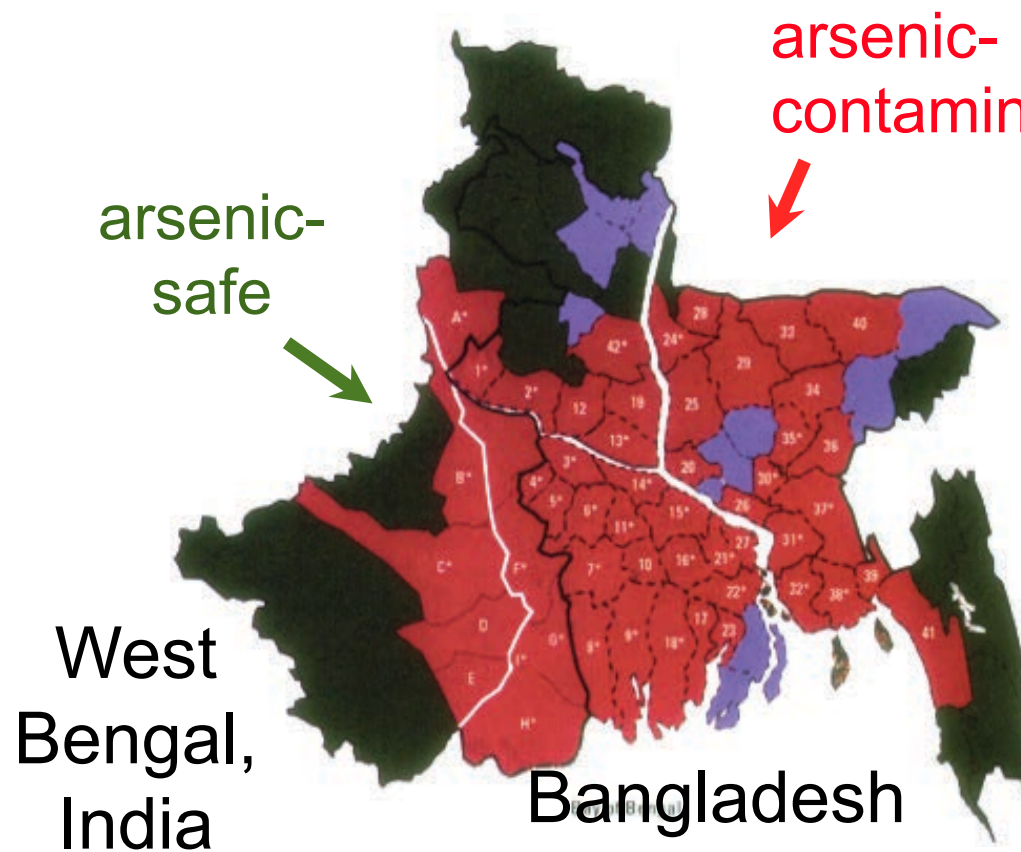


> 10 million tubewells were installed in Bangladesh alone in response to severe microbial contamination of surface waters

This led to the *largest mass poisoning in human history* when naturally occurring arsenic was found

> 70 million people are being poisoned in Bangladesh
One estimate is 20% of adult deaths are now from arsenic*

* Argos et al, Lancet 2010



Arsenic is so toxic that
WHO-MCL is 10 ppb

Bangladesh water has
levels up to 2000 ppb!

(Map Credit: Chowdhury et al., 2000, Environ. Health Perspect)

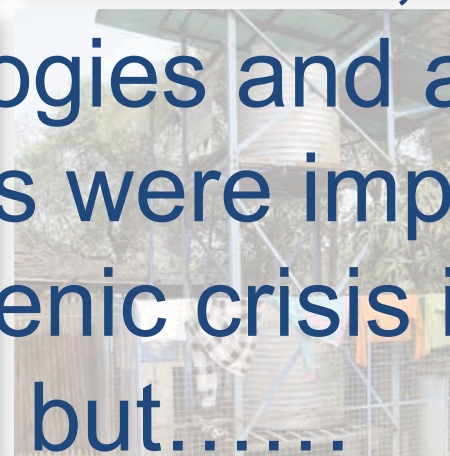
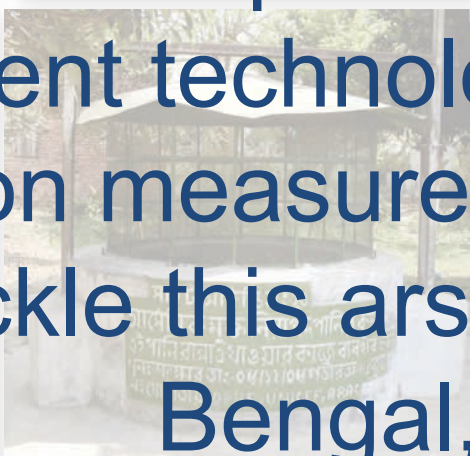
Symptoms of arsenicosis began in the early 1990s



Arsenicosis causes painful skin lesions, lowers childrens' IQ, gangrene and amputation, cancers, (+ other effects), and death. 4



In the last couple of decades, dozens of different technologies and arsenic mitigation measures were implemented to tackle this arsenic crisis in rural Bengal, but.....





... >95% of these failed within 1 year!

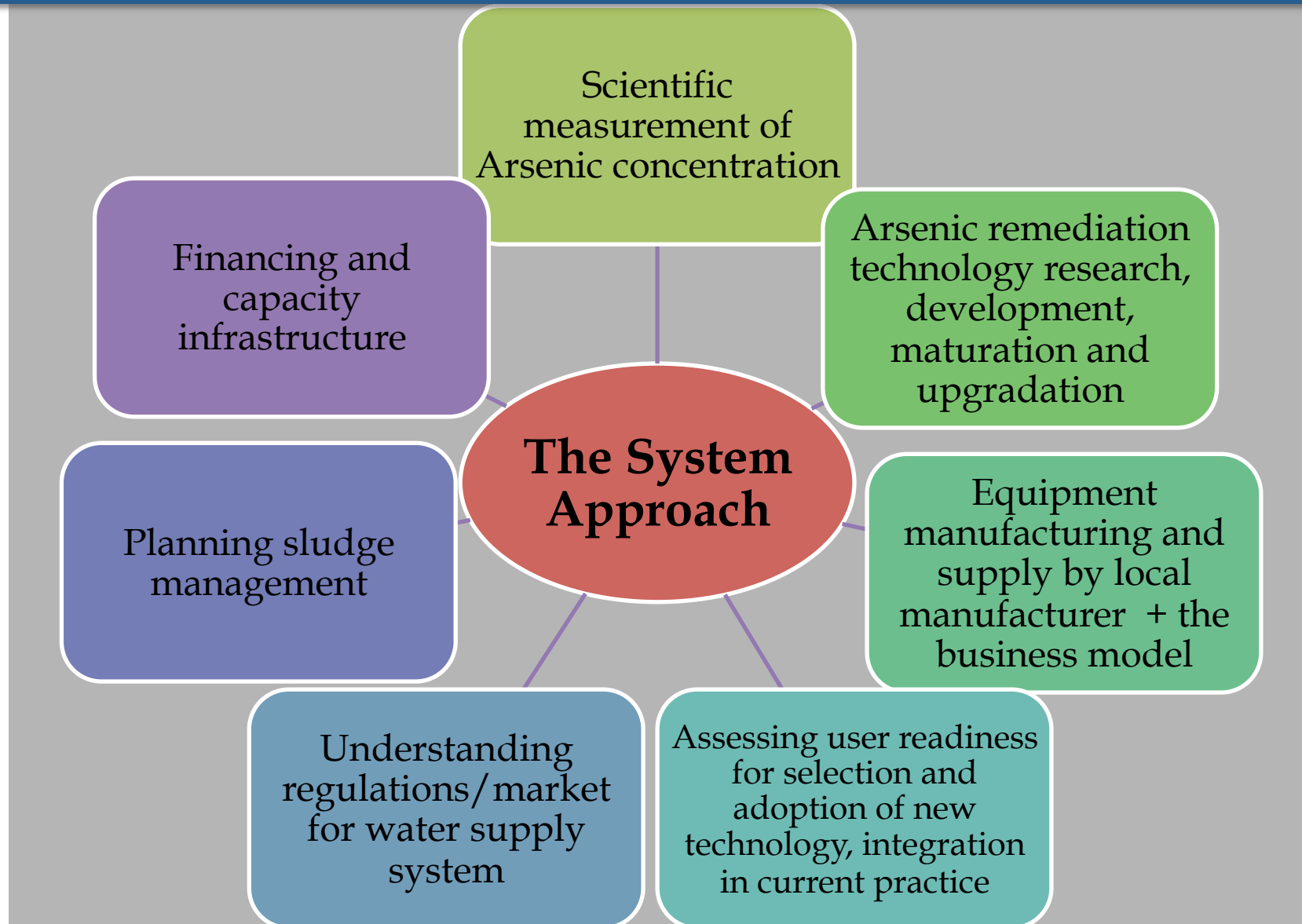
*Ph.D. Thesis, Abhijit Das, Jadavpur University, 2012

There is a need to develop a Sustainable
Technology System

= *Effective, Robust, Financially Viable, Locally
Affordable, Scalable, and Socially Embedded*

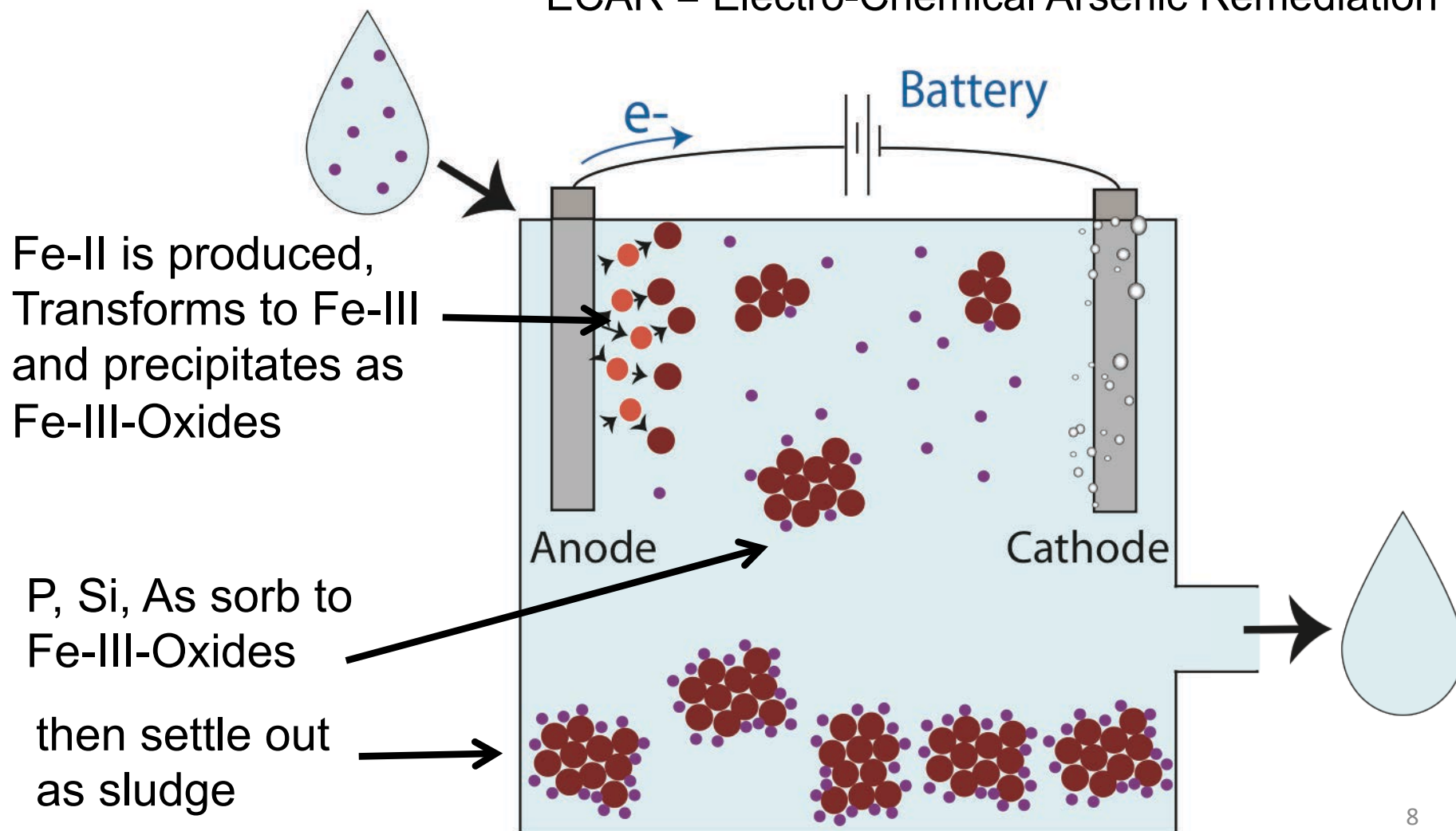


The Gadgil Lab is working with public and private partners, developing a full system approach



We invented a technology based on electrocoagulation, called ECAR, to fit within a sustainable, scalable system

ECAR = Electro-Chemical Arsenic Remediation



ECAR is backed with robust new science

- *Electrochemical Arsenic Remediation: Field Trials in West Bengal*, Amrose, Bandaru, Delaire, van Genuchten, Dutta, Deb Sarakar, Orr, Roy, Das, Gadgil, **Science of the Total Environment**, 488-489:539-546, **2014**.
- *Fe(III) Nucleation in the Presence of Bivalent Cations and Oxyanions Leads to Subnanoscale 7 Å Polymers*, van Genuchten, Gadgil, Pena, **Environmental Science and Technology**, 48:11828–11836, **2014**.
- *Structure of Fe(III) precipitates generated by the electrolytic dissolution of Fe(0) in the presence of groundwater ions*, van Genuchten, Pena, Amrose, Gadgil, **Geochimica et Cosmochimica Acta**, 127 :285–304, **2014**.
- *Arsenic removal from groundwater using iron electrocoagulation: effect of charge dosage rate*, Amrose, Gadgil, Srinivasan, Kowolik, Muller, Huang, and Kostecki. **Journal of Environmental Science and Health, Part A**, 48(9):1019-1030, **2013**.
- *Modeling As(III) oxidation and removal with iron electrocoagulation in groundwater*, Li, van Genuchten, Addy, Yao, Gao, and Gadgil. **Environmental Science and Technology**, 46(21):12038–12045, **2012**.
- *Removing arsenic from synthetic groundwater with iron electrocoagulation: An Fe and As k-edge EXAFS study*, van Genuchten, Addy, Pena, and Gadgil. **Environmental Science and Technology**, 46(2):986–994, **2012**.

ECAR prototypes have progressed from
beaker scale (2006) ...



Berkeley, 2006

... to a 100L batch reactor (tested in India, 2010) ...



West Bengal, 2010



.. to a practical
scale 600L batch
reactor (2013).

Jadavpur University, Kolkata, 2013

The 600L reactor was tested at Dhapdhapi High School (West Bengal, India) from 2012 – 2013

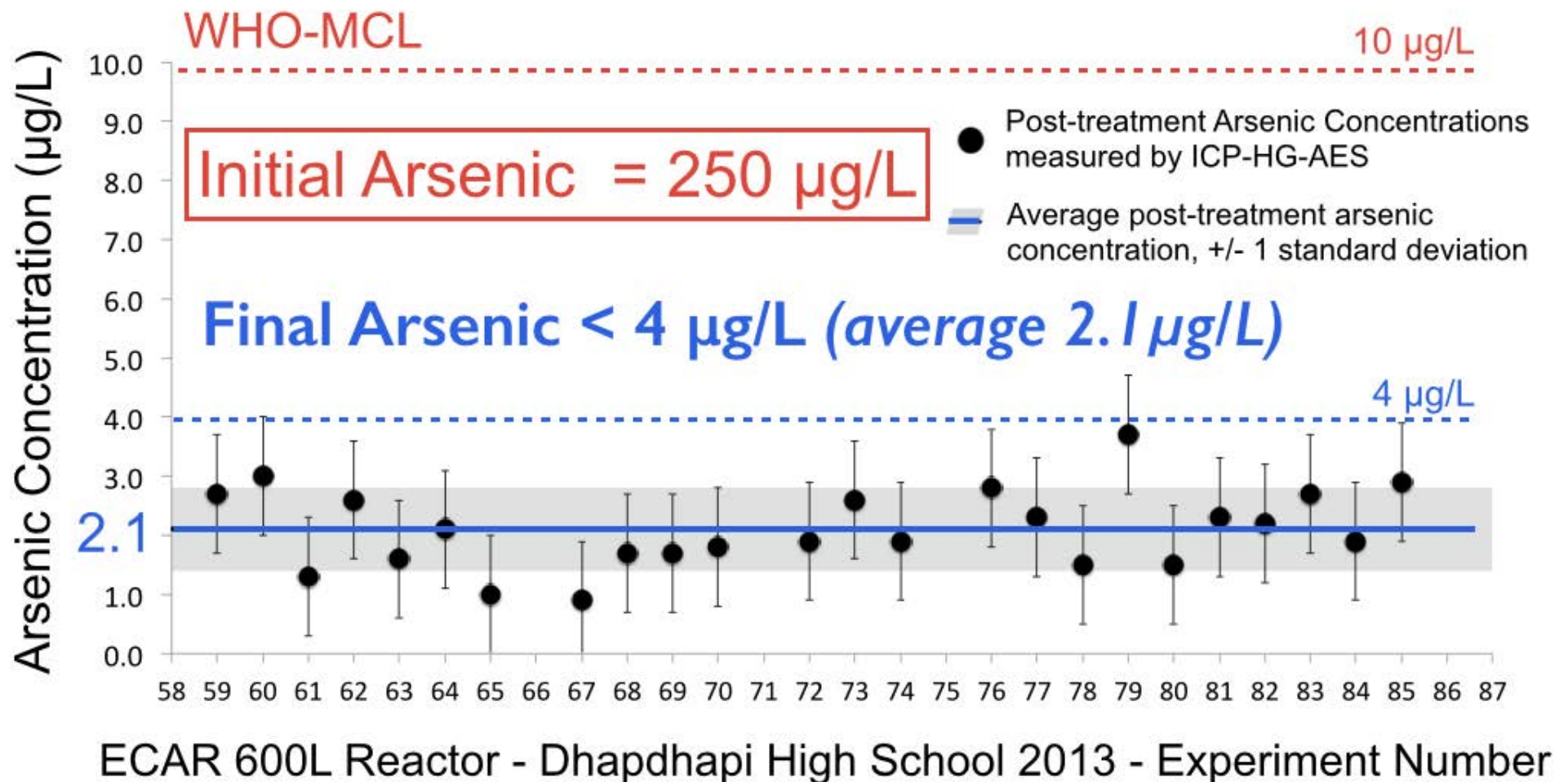


Dhapdhapi High School - West Bengal



ECAR System in the school

ECAR consistently delivered < 4 ppb arsenic – excellent performance results!



Now we are working with public and private partners to operate a 10,000 liter per day demonstration system

June 2015

Dhapdhapi High School. 2500 Students

ECAR 10,000 L per day Arsenic Removal
Treatment Plant located in this building
(dark&blue)





Our prototype has grown!



We need demonstrate operation long term,
identifying and solving problems as we go

We need an Engineering Fellow to lead our field research team for 6 mo (to 1 year)!

As a Fellow you will:

- Lead data collection at the site
- Conduct diagnostic experiments (with guidance)
- Help identify and solve engineering challenges as they occur
- Act a liason between the technical team in Berkeley and interdisciplinary partners in India

This is an excellent opportunity for any engineer interested in solving development challenges

As a Fellow you will:

- Gain leadership experience and demonstrate your ability to get things done in a developing country
- Work closely with the communities and people your work seeks to impact, gaining a more nuanced understanding of the challenges

And ...

Engage in extremely meaningful work in a beautiful place with extraordinary people!



What to expect

- You will stay in Kolkata near Jadavpur University (JU) in an apartment and travel to the school by local transport (either local train or Car).
- You will have a local project staff assigned to you by JU team, who will accompany you to the site all the time.
- You will need to be comfortable working outside of your comfort zone.
- You will work long hours, but have plenty of time to rest and do some site-seeing.
- You will receive a monthly stipend to cover living expenses (\$1500/mo) and all travel expenses will be covered.
- Position starts in India on Jan 2, 2016 (no deferments, starting mid-Dec is preferred). There will be a 3 month trial period, with an initial commitment of 6 months from the candidate, with potential to extend up to one year

What to do now

If this seems like a good fit for you (or if you have questions), please send a cover letter and resume via email to Susan Amrose (susan.amrose@gmail.com), cc to Siva Bandaru (sivaram.satyam@berkeley.edu) with “[ECAR Fellowship]” in the subject.

Note that if you proceed to the next round of consideration, we will request the name and phone number of two references we can talk to. Please have these ready.

Time is running short, so reply soon! We will review submissions on a rolling basis until Oct 18