



# Project Well Aqua Welfare Society Arsenic-Safe Water



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## PROJECT WELL PROGRESS IN 2006

In 2001, Project Well began developing a sustainable program involving construction of modified conventional dugwells to provide arsenic-safe water in the most affected villages of West Bengal until piped water systems are eventually installed. During the pilot program, arsenic and coliform bacteria concentrations of dugwell water have been measured and the water has been treated by chlorine. However, the level of dugwell use is not optimal, in large part due to lack of awareness of the importance of drinking arsenic-safe water.

*The goal of Project Well and Aqua Welfare Society for 2006 was to maximize utility of the existing dugwells.*

## Public Awareness Programs in 2006

This past year, there were several public awareness programs at various schools and community gathering places. On July 14, at Kolsur High School, 109 students from class 11 attended (top photo) and on the 24<sup>th</sup> of August, at Kolsur Girls' High School, 53 students from class 10 attended (middle photo). On September 1, similar programs were held at the Jodurhati Adorsho Bidyapith and at Pingaleshwar High School located in a very underdeveloped area in Baerachapa; the schoolteachers also attended these awareness programs. During the school visits, it was observed that the teachers were not fully informed about arsenic and its impact on health and socio-economy. Large-scale awareness programs are required to educate people from all walks of life including students and their mentors. In addition, several group meetings on health, named "Shashtho Shawbha" (*i.e.* "Health Meeting"), were also conducted. These programs drew many people who were educated on water-related public health issues, including arsenic health effects, dugwells, and the use of chlorine and earthen filters in water treatment, as well as sanitation and personal hygiene—important factors that play a significant role in water borne diseases. Documentaries like 'sabdhaneyr mar neyi', a movie produced by UNICEF in the regional Bengali language was also shown during these meetings.



*A public awareness program on July 14, 2006 drew 109 students from class 11 at Kolsur High School.*



*On August 24, 2006, 53 students from class 10 at Kolsur Girls' School attended an awareness program.*

## Recent Publications

1. Meera M Hira-Smith, Yan Yuan, Xavier Savarimuthu, Jane Liaw, Alpana Hira, Cynthia Green, Timir Hore, Protap Chakraborty, Ondine S. von Ehrenstein, Allan H Smith (2006). Arsenic Concentrations and Bacterial Contamination in a Pilot Shallow Dugwell Program in West Bengal, India. *Journal of Environmental Science and Health Part A Tox Hazard Subst Environ.* Jan. 2007, Vol.42, No.1.
2. Von Ehrenstein Ondine S; Jenny Alisa M; Basu Arin; Smith Kirk R; Hira-Smith Meera; Smith Allan H Capacity building in environmental health research in India and Nepal. *International journal of occupational and environmental health : official journal of the International Commission on Occupational Health* (2006), 12 (4), 300-6.
3. Project Well Guidelines: Electronic and hard copies upon request (in development).
4. Xavier Savarimuthu, Meera M Hira-Smith, Yan Yuan, Ondine S. von Ehrenstein, Subhankar Das, Nilima Ghosh, D N Guha Mazumder, Allan H Smith "Seasonal Variation of Arsenic Concentration in Tube Wells in West Bengal, India". *Journal of Health, Population and Nutrition.* (2006 September).



*Group meetings, such as this one held at CBG#PW6, drew villagers who learned about arsenic health effects via educational videos and a PowerPoint presentation.*





Community awareness programs, or Shastho Shawbha (“health meeting”) at PW#23 (shown above) and PW#44 were held on November 21. During these meetings, a Bengali movie was shown and interrupted halfway to present a talk on health issues regarding arsenic and bacteria-contaminated water. Over 100 adults and 100 children attended the two events. Two more Shastho Shawbha (SS) meetings were held on November 23. The first Shastho Shawbha was held November 16 at CBG#PW6 (picture on page 1, bottom). Attendees were captivated and interested in learning more about health issues and attending future awareness meetings.

An interactive workshop on drinking water management for arsenic-afflicted villages of West Bengal was held at Kolsur High School on November 26. Representatives from 35 community-based dugwell groups attended, along with members of various organizations including Aqua Welfare Society, Project Well, All India Institute of Public Health and Hygiene, Arsenic Task Force of West Bengal, Regional Occupational Health Center, DNG Foundation, West Bengal Voluntary Health Association, Bengal Engineering & Science University, Howrah, and Swanirbhawr. The purpose of the meeting was to discuss strategies to increase the use and sustainability of arsenic-safe water.

### Dugwell Construction and Status in 2006

This past year, all 45 dugwells were surveyed to determine the acceptance of dugwells and opinions of the community. Out of the 45 dugwells, three were replaced due to poor water quality resulting from faulty construction and/or the use of poor materials in 2003 (see table and pictures below). Twenty four dugwells continue to be used and the remaining are still not being used and/or are under-utilized for drinking due to the presence of odor in the water. Eight dugwells were closed because alternate water supplies were installed after dugwell construction. In 2007, twenty four new dugwells will be constructed at new sites.

#### Dugwells Replaced in 2006

Dugwell ID	Construction Year	Owner	Village	Replaced by
PW01KDK1	2003	Mukul Halidar	N. Kamdebkati	PW46KDK1-R
PW08KDK7	2003	Sukanto Mondol	N. Kamdebkati	PW47KDK7-R
PW18KLS7	2003	Ismail Mondol	Chandalati	PW48KLS7-R

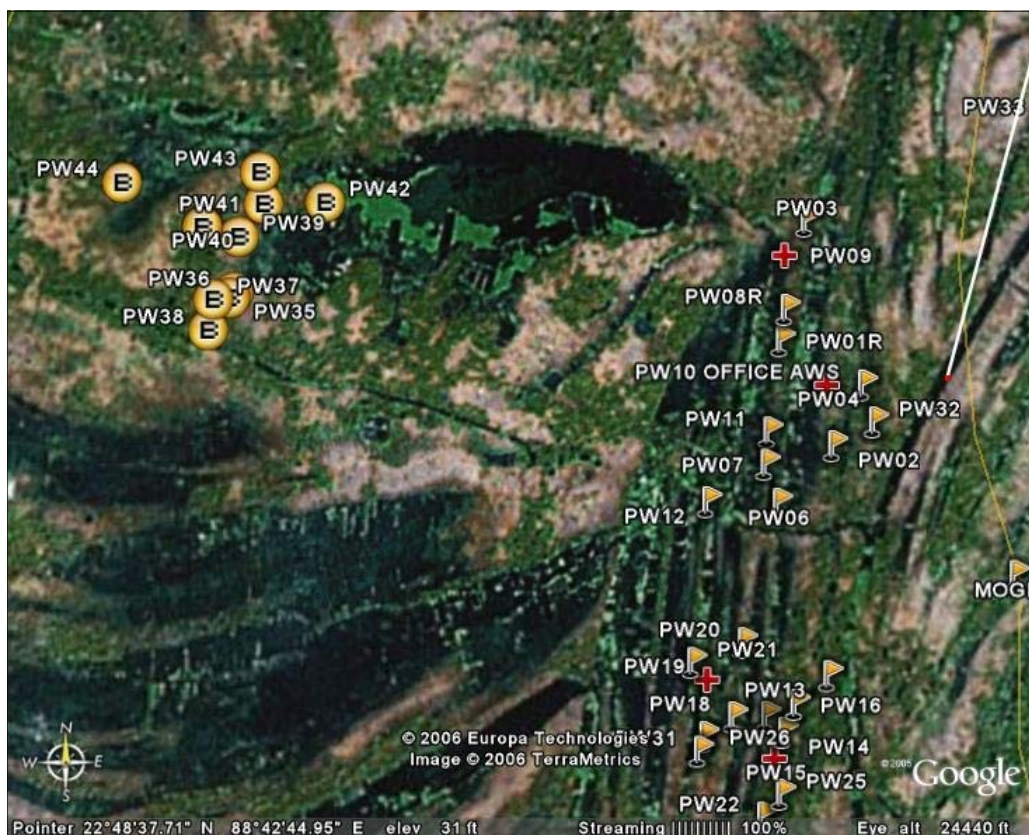
**Left:** PW46KDK1-R was built to replace PW01KDK1. **Center:** PW47KDK7-R replaced PW08KDK7. **Right:** PW48KLS7-R replaced PW18KLS7.





## The Surveillance Program

The surveillance program, set up by Project Well through Aqua Welfare Society, helps in tracking the utility of the dugwells. The surveillance includes recording geocodes of the dugwell sites using a hand held GPS device and mapping the dugwells; each dugwell is assigned an identity number used for tracking. Every month, the color, odor and taste of the raw water, volume of water, date of the disinfectant application and the number of consumers are also recorded. (Theoline, the disinfectant with 5-10% chlorine, is applied every third week in a half-dose prescribed by USEPA. Detail information is available in the paper published in January 2007). The arsenic concentrations of all the dugwells are measured in March/April. Bacteriological analysis is done once, after construction and before people start drinking the water. Generally, Arcview software is used for mapping and tracking. The map developed by using Google Earth is used during the initial site selection procedure, followed by study of satellite imagery and topographical maps, before the proposed site for new dugwells are finalized. It is important to locate dugwell sites close to water bodies that are the primary sources of water for the dugwells. In the map below, not all the dugwells can be seen because they overlap due to the scale used to cover the selected area.



As previously discussed, health meetings are conducted regularly in all the villages, and to increase the number of dugwell users, the target is to complete 200 such meetings (four meetings per week) by the end of 2007. The tracking of all such information is possible with the help of maps such as the one above and the computer data entry that originates at the office of Aqua Welfare Society located in the village. The tracking record also shows the fluctuating number of working dugwells. The utility percentage goes down to 53% in September when the water turns turbid due to heavy rain. It is lower than in the hot, summer month of May, when the utility is 59%. For the rest of the year, almost 70% of the dugwells are being used but are underutilized. The number of consumers is still 30% less than the expected number. It is also a fact that there are numerous consumers whose names are not in the register so they can avoid paying the monthly contribution of Rs.10/-. 30% of the dugwells are still not being used though the quality of water is same as the others. The monthly visits and feedback from the villagers has also made it possible to introduce affordable earthen filters (Rs.80/-) that are sold at a subsidized rate to the beneficiary families. Since filters have been distributed, dugwell utility appears to have increased. This effect will be evaluated soon.



Enhancing pottery in producing earthen pots



Earthen ('mawtka') filter used to remove (chlorine) odor

**Honorary Members of Project Well**

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- Dr. Meera M Hira-Smith, MSc, PhD**, Director and Treasurer  
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- Prof. Allan H. Smith, MD, PhD**, President  
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- Prof. Richard Wilson, PhD**  
Physics, Harvard University, MA, USA

**Acknowledgements of Sponsors**

**Year 2006**

- Percussion and voice band 'Mosaique' , Chicoutimi  
(Saguenay - Lac-St-Jean), Quebec, Canada
- Kallol Club of New Jersey, USA
- Other well-wishers

**Year 2005**

- Blue Planet Run, Colorado, USA
- Dr. Allan & Dr. Meera M Hira-Smith, CA, USA
- Other well-wishers

**Honorary Members of Aqua Welfare Society,  
Kolkata, India**

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- Mr. Amal Ghosh, LLB, President
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- Dr. Xavier Savarimuthu, MSc, PhD
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- Mr. Punurdan Dutta, (tech)
- Mrs. Rajashree Hira (general member)
- Ms. Monimala Mishra (general member)

**Others**

- Mr. Suprio Das, (chartered engineer), project manager
- Mr. Sekhar Pal, coordinator and account assistant
- Mr. Dennis Baroi, (field supervisor)
- Mrs. Farida Bibi, (field worker)
- Mr. Biswajit Karmakar, (field worker)

**Project Well's Approach**

Project Well provides support for arsenic-afflicted communities by:  
 Constructing dugwells to provide arsenic-safe drinking water; provide earthen filters at subsidized rate; holding awareness workshops, campaigning and monitoring user habits until sustainable practices are established; helping form user committees and providing training, education, and support for community members in dugwell maintenance.  
*The goal is to encourage communities to take an active role in their personal welfare.*

**Dugwell Adoption Program**

**Adoption of one dugwell is US\$500**  
 (all donations are tax-deductable)  
**Please make checks payable to:**  
 Project Well  
 2211 Braemar Road, Oakland, CA 94602