



Project Well

Arsenic-Safe Water



January 2006

www.projectwellusa.org



Left: Local residents crowd around PW44/KH10 (Sponsor: Blue Planet Run).



Right: A little boy drinks the water from PW36/KH2 (Sponsor: Blue Planet Run)

Project Well Progress in 2005

Project Well has been providing arsenic-safe drinking water to villages in West Bengal for four years. The program began in 2001 and is now responsible for 45 wells in the district of North 24 Parganas in West Bengal, India. In the past year, 11 dugwells were constructed in Kharo and Kolsur, in the Kumro-Khashipur and Kolsur Panchayat of the Deganga Block (pictures on page 2). Details on the dugwell design can be found in a 2003 publication in the *Journal of Environmental Science and Health*, available on the Project Well website.

The dugwells are regularly monitored for arsenic, and the average levels of arsenic of the 45 dugwells, from 2001 to 2005, is 16 $\mu\text{g/L}$. In comparison, the average level of arsenic in 20 tubewells tested prior to the selection of sites in 2003 was 437 $\mu\text{g/L}$, and for 17 tubewells tested in 2004 was 140 $\mu\text{g/L}$. Water from two dugwells was analysed for 13 heavy metals including antimony, arsenic, beryllium, cadmium, chromium (total), copper, lead, mercury, nickel, selenium, silver, thallium, and zinc. All the heavy metals in the samples were found to be below detection limits.

The bacteriological analysis of the dugwells constructed in 2004 (8 wells) and 2005 (11 wells) were done for total and fecal coliform. Out of the 19 dugwells tested, 12 showed a 'zero' fecal coliform count and the other 7 dugwells had an average fecal coliform count of 2287 (per 100 mL). The count is high perhaps because these dugwells are all still fairly new, except one, and a common characteristic of these dugwells is that they have a slight 'organic' odor. The seven high-count dugwells are labeled as "R&D" (research and development) and the water has been treated with lime, followed by one month of vigorous treatment with disinfectant. Water in the 7 dugwells will be usable only after another round of bacteriological tests scheduled for February 2006. The 'zero' counts of fecal coliform in the other 12 dugwells can be attributed to (a) the use of a shroud of sand that surrounds the concrete cylinder; (b) the use of disinfectant once a

month; and (c) the introduction of the flexible pipe to withdraw water. The floating flexible pipe is thought to reduce the growth of bacteria and minimize inflow of sand from the bottom of the well. Since the volume of water fluctuates and is a cause of concern mainly over the hot summer season, it is recommended that the use of a flexible pipe in combination with an increase in well depth to 30-35 feet (the average depth of the current dugwells is 19 feet) may resolve the problem of low quality summertime water.

Project Well continues to be active in the community, organizing awareness programs, and meeting with other organizations and local government officials. A few of the means of educating the prospective user communities in 2005 was by door-to-door campaigning (Picture 5, page 3) and distribution of the Bengali (regional language) version of the colorful 2004 newsletter. Picture 6 (page 3) shows the sharing of experiences and findings with a group of overseas visitors, mainly to discuss the problems encountered in the field. The meeting was held at Kamdebkhathi in front of the main office of the Aqua Welfare Society (AWS), the local non-government organization and counterpart of Project Well.

Presently, training programs are implemented in areas where cooperation and participation levels of the user community are strong. Field workers are regularly visiting the user community, updating the registers of the users and non-users, and educating non-users on the advantages of using dugwell water. The villagers are also taught how to monitor and maintain the dugwells, and are applying theoline (containing 5% chlorine, following the USEPA standard) once a month to prevent and control the growth of bacteria.

The goal of Project Well for 2006 is to maximize utility of the existing dugwells. Construction of new wells will resume in 2007. For more information, please visit <http://projectwellusa.org>.



PW43/ KH9



PW42/ KH8



PW38/ KH4



PW35/ KH1



PW39/ KH5



PW37/ KH3



PW41/ KH7



PW40/ KH6

For Public Education

1. Because arsenic is colorless and odorless, it is impossible to detect by the user.
2. Boiling water does not get rid of arsenic
3. Eating foods cooked in arsenic contaminated water can be a significant route of exposure, so it suggested that food be prepared using safe water.
4. Susceptibility to arsenicosis depends on the amount of contaminated water consumed, the length of time the water has been consumed, and the concentration of arsenic in the water.
5. Symptoms of chronic arsenic poisoning can take years to develop and a person can drink contaminated water and not look or feel sick right away. This makes it difficult to diagnose, but some typical manifestations are shown and described here.
6. Other health factors, such as malnutrition, may have a synergistic, worsening effect.
7. There is no effective treatment for diseases caused by arsenic.
8. Therefore, it is necessary for the complete cessation of ingesting arsenic-contaminated water.
9. Arsenicosis is not contagious and people cannot contract it by touching or embracing.

Water from a Project Well formulated dugwell is naturally low in arsenic concentrations and is a safe, alternative source to use for drinking and cooking purposes.

Dugwell Maintenance

The Project Well program becomes sustainable by encouraging communities to take "ownership" of the dugwell by:

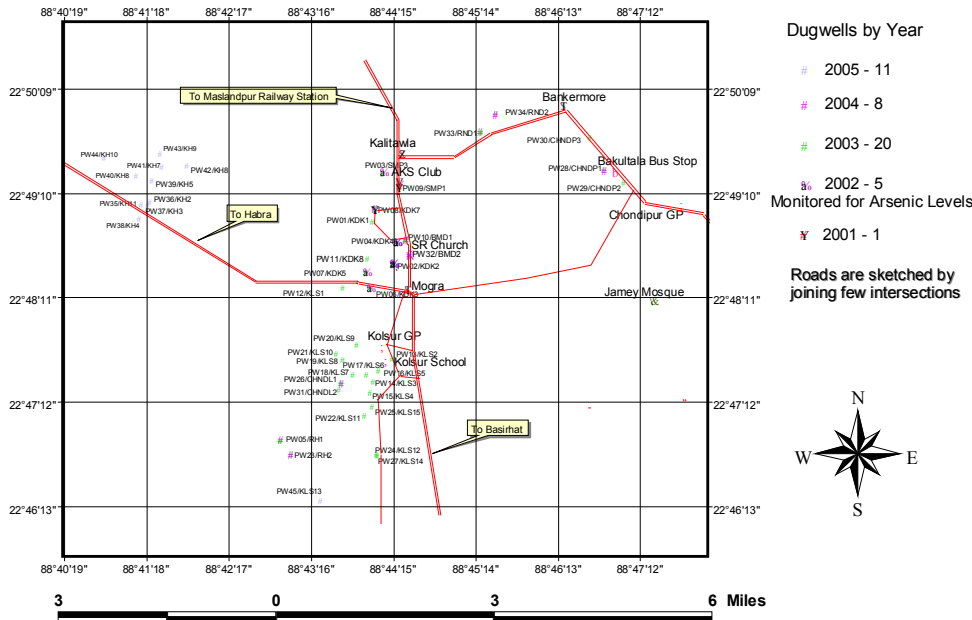
- a) Formation of a user group of 20 families, including a beneficiary committee of three.
- b) Contributions of Rs.10/- from each family for the maintenance program.
- c) Selection of one or two person(s) for training to measure the volume of water every month and apply the **bacteria-killing disinfectant**.
- d) Assigning of one person who would be responsible for collecting the maintenance fund from the users and deposit into a local bank or post office account using the dugwell ID number.
- e) Yearly testing of water for arsenic in the month of March.
- f) Yearly testing of water for bacteria in the month of July if the water is turbid.
- g) If necessary, dredging of wells in early March to avoid dugwells drying up in the summer season.

Note: If there is any odor of theoline, organic matter, or excess iron and salty taste, use of Mawtka filter (Rs 60.00 and locally available, see picture next page) is advisable.



PW45/ KLS13

**Project Well: N 24 Parganas, West Bengal, 2005
Location Map of 45 dugwells: 2001-2005**



Left: Map of dugwell locations in 24 Parganas, West Bengal, with georeferences of a few landmarks joined by main roads that are drawn arbitrarily. **Top right (Picture 3):** Earthen 'mawtkta' filter. **Bottom right (Picture 4):** Steel Neelkalem water filter (Salem, Mumbai)



Top (Picture 5): Interaction with villagers for awareness.
Bottom (Picture 6): Presentation of dugwell program to the NIH Fogarty Trainees at Kamdebkati

The "Rapid Action Awareness Program"

As of June 2005, 45 dugwells were completed that are planned to cater water to a minimum of 900 beneficiary families (20 families per dugwell). According to the Project Well database, 26 dugwells are operating, while 19 are not. Of these 19 dugwells, 12 are emitting slight organic odors that can be easily removed if a cheap earthen ('mawtkta') filter (Picture 3), or an even better standard of filters, affordable by the middle class families (Picture 4), are used. The organic odor is attributed to the faulty construction of six dugwells in 2003, when standard concrete rings and sand were not provided by the local contractor. (A crucial lesson learned from this is to engage competent contractors and a few skilled laborers).

Six dugwells completed in 2005 are still new and are undergoing observation after treatment with lime several times a month. Two dugwells were abandoned due to the installation of other alternative water options nearby, one dugwell was abandoned because it contained salty water, and two more dugwells are simply not being used despite clear water. Thus, the lack of awareness is playing a major role in decreased number of users for the new wells. The dugwell water with a slight organic or 'earthy' smell is definitely drinkable. Until the mindset and the habits of the people who prefer 'sweet' tubewell water can be changed, the number of user communities will not increase. This change can only be achieved by introducing a "Rapid Action Awareness Program" throughout the region. How will the program work? By engaging a considerable number of NGO's, like the DNG Foundation, in educating people on the health effects of arsenic in the drinking water and by providing a report to villagers on the arsenic levels of the private and public tubewells and other sources of water. The fastest method of disseminating accurate information is via video compact disks (VCD), commonly used at rural gatherings, such as meetings of women's associations (including self-help groups, sewing classes, family planning groups) and also at local clubs, educational institutions and panchayat offices.



Clean, arsenic-safe drinking water from PW43/ KH9

Project Well's Approach

Project Well provides support for arsenic-afflicted communities by:

Constructing dugwells to provide arsenic-safe drinking and cooking water

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 dug well maintenance

The goal is to encourage communities to take an active role in their personal welfare by developing healthy practices.

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Acknowledgement of Sponsors

Year 2005

Blue Planet Run, Colorado, USA
Dr. Allan H Smith & Dr. Meera M Hira Smith
And other well-wishers

Year 2004

Bay Area Prabasi, San Jose, CA, USA
Suvendu Chowdhury, San Francisco, CA
Sanskriti, Maryland, USA
And other well-wishers

Support Project Well!

Adoption of one dugwell is \$500
(all donations are tax-deductable)

- \$1000 - Gold star \$100 \$10
- \$500 - Silver star \$50 Other Amount
\$ _____
- \$250- Bronze star \$25

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