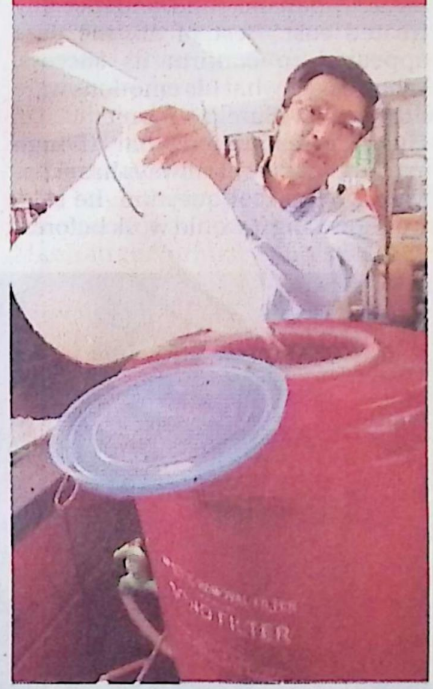
Winning the Water problem by a Bangladeshi scientist

Samuel Ross

HAVING discovered that millions of Bangladeshis could be poisoned through arsenic in their drinking water, a non-profit foundation launched a prize for the man who could prevent the crisis. The prize was won by a Bangladeshi chemist who has not only cleaned up the water, but also gave all of his million-dollar prize money away.

It has been called the greatest mass poisoning in human history, bigger than the 1984 chemical spill in Bhopal, India, and bigger than Chernobyl. In an effort to prevent the crippling cholera and typhoid outbreaks of the 1940s and 50s, the Bangladeshi government, financed by UNICEF and the World Bank, began digging tube wells - deep incisions into the Earth's surface - to bypass contaminated surface water and pump up cleaner water from below. Since the 1970s, millions of such wells have been dug and, although initially unpopular, were made the primary source of Bangladeshi drinking water through massive awareness campaigns. What wasn't known at the time, or as some allege, was not adequately tested, was that the groundwater in the wells contained high levels of arsenic, in some cases as much as four hundred times the amount deemed safe. The World Health Organization (WHO) now estimates that between 35 and 77 million Bangladeshis are being slowly poisoned, and the Dhaka Department of Dermatology and Venereology estimates that as many as 200,000 people may die each year as a result.

Since the scale of the disaster has become known, numerous proposals have been put forward to ameliorate the catastrophe. One is to



deepen the existing wells and thereby bypass the tainted water. With millions of wells to deepen, however, the cost could be astronomical with no guarantee of success. Another is to build elaborate rainwater collection systems, but UNICEF has cautioned that there is not enough rainfall in the country to do this. A third and final solution is to develop effective filters for the existing well water. **But, as of 2001, the World Bank stated that there is "no proven affordable arsenic removal technology available yet."**

Enter the Grainger Foundation of Lake Forest, Illinois. In 2005, the non-profit foundation announced the Grainger Challenge Prize for Sustainability, a million-dollar award for the most effective, inexpensive, reliable, and environmentally friendly solution to the arsenic problem facing Bangladesh and similar countries with tube-well-related problems. The United States' National Academy of Engineering was designated its arbitrator and in a little less than a year it received more than 70 entries. In February 2007, after exhaustive tests conducted by United States Environmental Protection Agency, the NAE finally announced the winner: Dr. Abul Hussam, a chemistry professor at George Mason University in Fairfax, Virginia.

His filter, a marvel of effectiveness and simplicity, costs only $35 to produce and can remove arsenic, iron, manganese, and many other toxic substances. Each unit can filter nearly 500 liters per day, enough water for sixty people. Perhaps most important of all, it is simple to operate and can work without interruption for at least five years.

Dr. Hussam's interest in finding a solution to arsenic poisoning in fact began long before the competition was announced.

As a child he grew up in rural Bangladesh, drinking from one of the government's tube wells that he later suspected, after the first reports of contamination aired, might be contaminated. His father, a physician by training, inspired him with a love of chemistry, teaching him basic chemical principles and conducting experiments out of books with him. "By the time I was in eighth grade, I knew I wanted to be a chemist."

In 1982 he received his PhD in analytical chemistry from the University of Minnesota and in 1997 set out to see if his suspicions were founded and if the health of his and family members, who still drank from the well, was in danger.