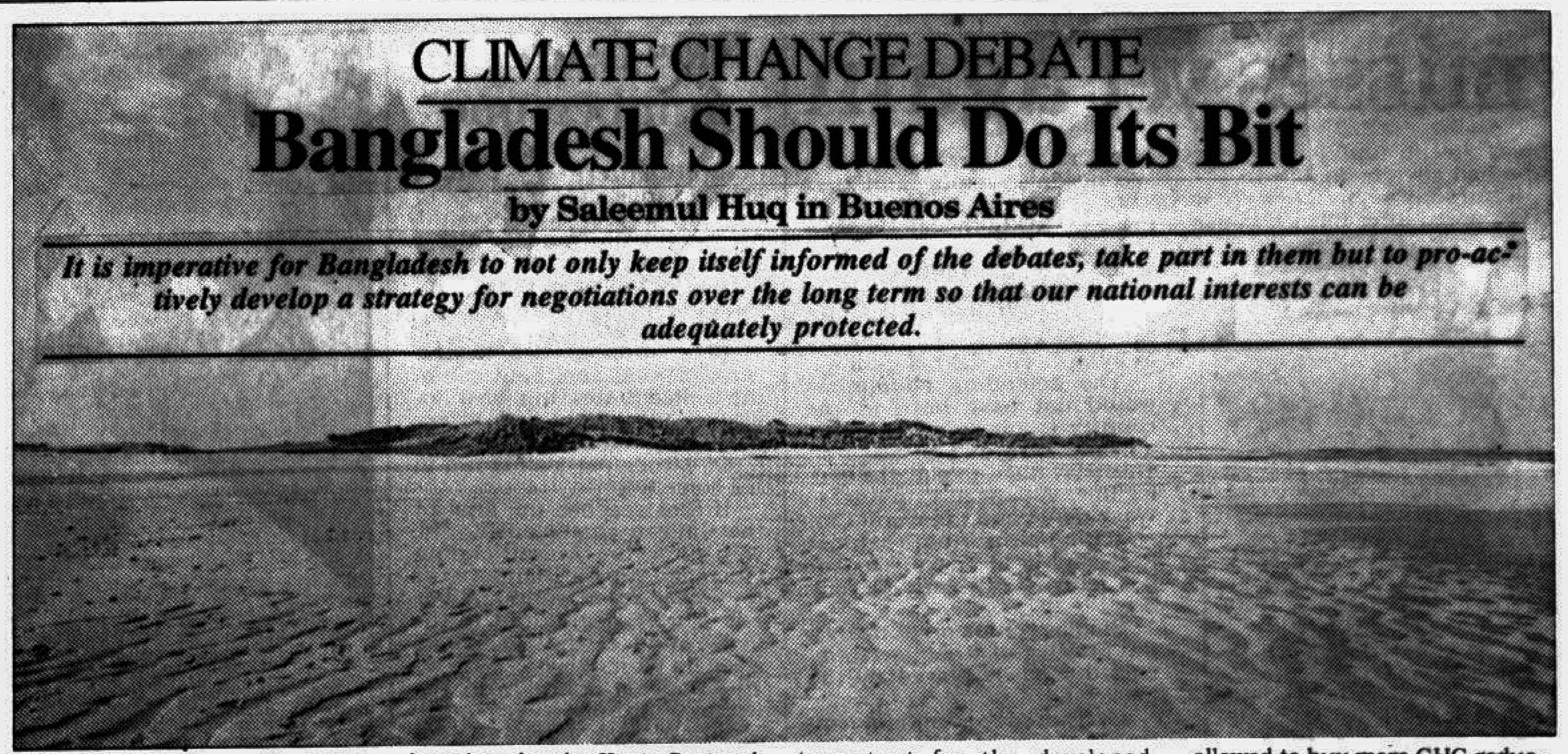
CLIMATE CHANGE DEBATE

Bangladesh Should Do Its Bit

by Saleemul Huq in Buenos Aires

It is imperative for Bangladesh to not only keep itself informed of the debates, take part in them but to pro-actively develop a strategy for negotiations over the long term so that our national interests can be adeqùately protected.



THE fourth Conference of Parties (COP4) of the United Nations Framework Convention on Climate Change (UNFCCC) began on 2 November in Buenos Aires, Argentina and completed after the High Level Ministerial segment meet from 10 to 13 November. The COP4 follows the COP3 meeting held in Kyoto, Japan on December 1997 where the countries of the world agreed on the historic Kyoto Protocol which for the first time set quantified target for reduction of greenhouse gas (GHG) emissions from the developed countries (referred to as Annex B countries in the Protocol). These targets were agreed by the developed countries in Kyoto in December 1997 but have yet to be ratified by their respective parliaments.

Issues of the Debate

The main issue of contention is their insistence that the developing countries also agree to "meaningful participation" (which means voluntary targets) before the developed countries will ratify the Kyoto Protocol. The developing countries in turn argue that the UNFCCC which is the original treaty which all countries, including developed as well as developing have signed and ratified, allows for "equal but differentiated" responsibility between the developed and developing countries in controlling emissions of GHGs. What this means is that the main treaty recognizes that, although all countries of the world must act together to solve the problem of global warming. Nevertheless the developed countries, having been responsible for contributing the majority of the cumulative GHGs in the atmosphere, have the primary responsibility to act first while the developing countries have time to develop before they need to restrict their own emissions.

Even though these principles were acknowledged and agreed in both the UNFCCC and the Kyoto Protocol, the Congress of the United States of America in particular has enacted a law whereby the USA will not sign the Kyoto Protocol until the developing countries also agree to some voluntary reductions of their emissions. Their argument is that even though the developed countries still continue to be the major emitter of GHGs the developing countries (particularly China and India with their huge coal reserves) will overtake the developed countries within another one or two decades. Hence the developing countries (particularly China and India) should also undertake voluntary restrictions on GHG emissions.

The developing countries (through the Group of 77 which is their negotiating caucus) has been arguing in Buenos Aires that before they agree to any voluntary commitments they would like to see real progress from the developed countries in meeting their existing targets. This debate is currently going orr amongst the delegations of the different countries and is expected to be resolved by the ministers when they arrive in the second half of the meeting.

Other Contentious Issues

In addition to the issue of "meaningful participation" of developing countries there are a number of other contentious issues being negotiated which include the following:

Flexibility Mechanisms: These include three mechanisms, namely: (I) Emissions Trading which has been allowed under the Kyoto Protocol between the Annex B (i.e. developed) countries, (ii) Joint Implementation (JI) which allows sharing of GHG reduction benefits between developed and developing countries if a developed country enterprise invests in GHG reduction in a developing country and the (iii) Clean Development Mechanism (CDM) which would allow trading of GHG reduction between developed and developing countries.

All of these flexibility mechanisms are seen as being important for the developed countries to enable them (particularly their private sector enterprises) to purchase GHG reductions at cheaper prices in developing countries rather than doing so more expensively in their own countries. The developing countries, while accepting the principle (particularly favouring the Clean Development Mechanism), still feel that the developed countries should be first required to carry out significant reductions of GHGs in their own countries before they are allowed to buy more GHG reductions from developing countries. The European Union favours this approach while the USA wants uncontrolled access to all the flexibility mechanisms as soon as possible.

Transfer of Technology: This is also an issue of debate as the original UNFCCC and the Kyoto Protocol both give assurance of transfer of technology as well as new and additional financial resources for those purposes but nothing concrete has followed. The developing countries therefore would like to see firm commitments to financial resources to allow meaningful transfer of technology.

Adaptation: The UNFCCC as well as the Kyoto Protocol both recognize the need to give particular attention to those countries which are both developing as well as being specially vulnerable to climate change which includes Bangladesh. The Clean Development Mechanism makes explicit reference to allowing some of the proceeds of trading the GHG reductions to be set aside for adaptation purposes.

Bangladesh's Perspective:

The government of Bangladesh is represented at the Buenos Aires meeting by a delegation headed by the Secretary of the Ministry of Environment and Forest and with a representative from the Department of Environment. In addition there are a number of NGO representatives also taking part as part of the Climate Action Network South Asia (CANSA). Both the government as well as the NGO representatives have worked together to put forward their views amongst the other delegates, particularly amongst the G77 country delegates, that more attention needs to be given to meaningful transfer of financial resources to the vulnerable countries and that adaptation issues need to be given greater prominence.

Likely Outcome:

The most likely outcome from the Buenos Aires meeting is that most of the contentious issues are unlikely to be resolved completely although it may be expected that some level of consensus will be reached on the technology transfer issue. On the flexibility mechanisms, particularly the Clean Development Mechanism it is unlikely to be agreed upon in Buenos Aires but a work plan will most likely be agreed which would allow it to become operational by the fifth conference of parties to be held in October 1999. It is in the nature of such multi-lateral negotiations that they are very slow with many hiccups and obstacles in the path. Nevertheless the Climate Change negotiations are among the most important not only for the planet, but most importantly for Bangladesh, as it is one of the most vulnerable countries to climate change. It is therefore imperative for Bangladesh to not only keep itself informed of the debates, take part in them but to pro-actively develop a strategy for negotiations over the long term so that our national interests can be adequately protected. In the ultimate analysis no one is going to look after our interests if we don't do it ourselves.

The writer is executive director of the Bangladesh Centre for Advanced Studies, a research and policy institute working on environment and development issues.

Alternative Sources of Arsenic-safe Drinking Water

by Dr. H. K. Das

According to a DPHE report, more than 60 per cent of shallow hand tubewells in different affected areas are arsenic-safe, with a concentration below the accepted standard of 0.05 milligram arsenic per litre. However, from the groundwater source, the best options for arsenic-safe drinking water are the use of (a) arsenic-safe shallow hand tubewells, (b) deep tubewells and (c) sanitary-protected ring wells if sub-soil water level fluctuations permit use of such ring wells throughout the year.

FOR a long time, people are familiar with water-borne diseases due to pathogenic organisms mostly present in surface water. Groundwater is generally free from organisms which are capable of causing diseases and from minerals and substances which may produce adverse health effects. But recently it has been reported in newspapers and by government, non-government and private organisations that groundwater in most districts in the country is contaminated by arsenic.

What is Arsenic?

Arsenic, a naturally occurring tasteless and odourless element, exists in the Earth's crust at average levels of between two and five thousand micrograms per litre. As a component of underground rock and soil, arsenic works its way into groundwater and enters the food chain through either potable water or edible plants that have absorbed the mineral. We all have some arsenic in our bodies. Daily consumption of water with greater than 50 micrograms per litre of arsenic -- less than one per cent of the fatal dose -- can lead to problems with the skin, and circulatory and nervous systems. If arsenic builds up to higher toxic levels, organ cancers, neural disorders, and organ damage -- often fatal -- can result.

Arsenic pollution

Arsenic is a likely dietary constituent and is present in many foods such as meat, fish, poultry, grain and cereals. Arsenic is often present in organic forms, which are less toxic than inorganic arsenic.

It is a toxic chemical and may pollute air, soil, sediments and water causing health hazards to both human and other living organisms. Air pollution by arsenic is caused through various industrial processes like smelting, manufacturing of insecticides and drugs. Contamination of leaching of arsenical wastes from mining operations, industrial and agricultural processes have been found in some countries. Arsenic is found to occur in nature as mineral from which, by way of erosion and deposition, soil may be contaminated. Water pollution by arsenic in attributed to both human activities and geohydrolithological phenomena.

While reports of arsenic pollution has been widely reported in newspapers, magazines, journals, etc. causing panic among the public in respect of drinking water and proper treatment of patients, various national and international organisations, government agencies, donors, NGOs and educational institutions have come forward to test tubewell water in different methods for determination of arsenic concentrations in the country's different districts. Their findings reveal increase of arsenic contamination, both quantitative and qualitative, at an alarming rate. Groundwater arsenic contamination was detected only in seven districts in 1996, in the middle of 1997, the number shot up to 48. On the contrary, a Directorate of Public Health Engineering (DPHE) report said that 25 out of the country's 64 districts are safe from arsenic. The most affected districts are Noakhali, Chandpur, Lakhsmipur, Faridpur, Kushtia, Pabna, and Jessore. It is feared that one-third of the total population are at risk of arsenic poisoning while tens of thousands have already shown symptoms of being 'poisoned' by this deadly substance, mainly from shallow tubewell water source. Some 220,000 people are suffering from arsenic-related diseases ranging from melanosis to skin cancer, it was reported, and about 57 per cent of them are victims of arsenical skin lesions.

Safe drinking water options

Available options for alternative water supply in the arsenic-affected areas include arsenic avoidance and treatment of contaminated water. The following four alternative sources may be considered:

1. Arsenic-safe ground water;
2. Arsenic-safe surface water;
3. Arsenic-safe rain water, and
4. Removal of arsenic from ground water.

Arsenic safe ground water: Groundwater normally is free from pathogenic micro-organisms and available in adequate quantity in shallow aquifers for cost-effective water supply systems for scattered rural population. Tubewell has proved to be the best option for water supply and achieved remarkable success by providing safe drinking water for 79 per cent of the country's rural population. It is less expensive and easy to operate. Besides, the installation requires less time and effort. Unfortunately, when rural people, aware of its importance to avoid diarrhoeal diseases, have developed the habit of drinking tubewell water, arsenic in excess of acceptable limit has been found in tubewell water in many parts of the country. Groundwater in the shallow aquifer in 44 out of 64 districts are mostly arsenic affected. The deep aquifers have been found to be relatively free from arsenic contamination. However, if the deep aquifers are recharged by vertical infiltration of contaminated water from the shallow aquifers above, they, too, could be contaminated. The recharge of deep aquifers by percolation through coarse media and replenishment by horizonal movement of water could keep them arsenic-free even after prolonged water abstraction.

According to a DPHE report, more than 60 per cent of shallow hand tubewells in different affected areas are arsenic-safe, with a concentration below the accepted standard of 0.05 milligram arsenic per litre.

However, from the groundwater source, the best options for arsenic-safe drinking water are the use of (a) arsenic-safe shallow hand tubewells, (b) deep tubewells and (c) sanitary-protected ring wells if sub-soil water level fluctuations permit use of such ring wells throughout the year.

Arsenic-safe surface water: Bangladesh is a land of rivers. The rivers, canals, ponds, natural depressions (haors/baors etc.) occupy about two million hectares or 20 per cent of the country's surface. Surface water sources are relatively free from arsenic contamination, but are extremely polluted by pathogenic micro-organisms and other severe contaminants which cause water-borne and water-related diseases. Faecal coliform counts of unprotected surface waters vary between 500 and several thousands per 100 ml water, a lot higher than the WHO guideline in drinking water of zero and 1-3 per 100 ml. All surface sources need extensive treatment, and establishment of treatment plant for scattered rural pollution is not feasible because the surface water supply scheme is not cost effective and its implementation is also time consuming. However, there are two prospective ways to get arsenic-safe drinking water from surface sources: (a) disinfection and (b) filtration.

a. Disinfection: Surface water can be disinfected by boiling, ultraviolet radiation i. e. sunlight and UV lamps, and using chemicals, such as chlorine, iodine etc.

b. Filtration: Surface water can be filtered by a special type of small slow Sand Filters, commonly known as Pond Sand Filters which are package-type small filter units developed to treat surface waters for domestic consumption in the country's coastal areas. In this system, surface water is discharged by handpump tubewell or by other means into a small reservoir underlain by a sand bed and the filtered water is collected through a tap. At present, 375 units are in operation in the coastal region to serve more than 200 people per unit. The low-cost system is extremely efficient in removing turbidity and bacterial contamination and may be considered for small rural communities in the arsenic-affected areas.

Arsenic safe rain water: The country's average annual rainfall in about 2200 mm, 75 per cent of it occurs between May and September. In a water supply system completely based on rain water, the excess rain water in wet season is stored for use during the dry period. Large water capacity storage tanks are required to develop a supply system completely based on rain water-based. Rain water harvesting technology, while not complicated, is less popular. Only in some areas of the Chittagong Hill-Tracts the techniques are in use. In this system, water storage tanks and their proper maintenance are important.

Rain water can be stored by making sanitary protected ponds. A community based drinking water supply schemes based on rain water storage ponds having provision for withdrawal of water through handpumps and treatment through filter is a good option. It would be cost effective and feasible in rural areas.

Arsenic removal methodologies: Most of the reported arsenic problems in water supplies in the world are found in groundwater, usually the preferred drinking water source in rural areas.

Arsenic occurs is aquatic environment in Arsenic (III) and Arsenic (V) forms. These forms are considered to be the most important in selection of a removal methodology.

Arsenic (III) is generally found in anaerobic (oxygen-free) ground water and Arsenic (V) in aerobic (oxygenated) conditions. The chemical behaviour of the two forms is different from each other. The Arsenic (III) cannot be removed from water effectively. The effective removal of arsenic from water requires the complete oxidation of Arsenic (III) to Arsenic (V).

Oxidation of Arsenic (V) by dissolved oxygen in water is a very slow process. In oxygen-free ground water, part of arsenic may be in an Arsenic (III) form. Accordingly, selection of an appropriate oxidizing agent is very important. There are various means of oxidation available, but in the treatment of drinking water there are important considerations such as limited list of chemicals, residuals of oxidants, oxidation byproducts, and oxidation of other inorganic and organic water constituents. National drinking water and treatment regulations will, therefore, be important in the selection of the oxidant. Sunlight can be used to promote oxidation.

There are several conventional treatment methods which can be used for removal of arsenic from drinking water. These methods are as follows:

Co-precipitation technique

On availability of oxidants, it is considered that bleaching powder solution would be most appropriate for oxidizing Arsenic (III) to Arsenic (V) during removal. As there remains some residual effects of chlorine in water, the dosage of chlorine must be restricted within 0.5 mg/L. Such a dose will also restrict the residual effect of chlorine to less than 0.2 mg/L in the treated water. Moreover, chlorine dose will reduce the bacteriological contamination, if any, during the process.

The next step of co-precipitation process is coagulation. The common use of alum or iron (ferric) salt drinking water treatment is primarily for coagulation of particles and colloids in the water. Both metal salts undergo hydrolysis to various products and can be filtered off completely. Dissolved substances, such as phosphates, heavy metals, and humic substances, can also be precipitated by absorption, or they may be even precipitated directly.

Arsenic removal by metal ions is the best-known and most frequently applied technique. The best result is achieved with Arsenic (V) and ferric salts if the pH value is between 7.2 to 7.5. Ferric salts are more effective in removing arsenic than alum on a weight basis and in both cases. Arsenic (V) is more effectively removed than Arsenic (III). However, alum is widely available in the country's rural areas than iron salts.

An arsenic monitoring study, carried out by DPHE-Danida urban water and sanitation unit in Noakhali, showed that alum to the tune of 200-300 mg/L could be added for effective coagulation. The addition of rapid mixing for 30 seconds followed by very slow mixing for 10 minutes for development of flocs must be carried out. Such flocs are then allowed to settle at the bottom.

The supernatant water is then required to be filtered through selected filtering media. The filtering system, used during the study, comprised coarse sands, sand-gravel and gravel.

The pH control is necessary during the process of co-precipitation. Generally, pH in the range from seven to eight is considered to be ideal. When pH of water goes below seven, the removal of arsenic at optimum dose of alum is unsatisfactory. In this system, the fast and slow mixing after addition of coagulants is important.

Iron-cum-Arsenic Removal Plants

Application of coagulation technique has been studied at different places in the country. The DPHE-Danida urban water and sanitation project has installed hand pump attached model of Arsenic Removal Unit (ARU) in Noakhali Pourashava on a pilot basis. Alum is added to raw water as flocculent with a dose of 100-1500 mg/L. No other chemicals was added to the water. The removal efficiency was approximately 70 per cent, bringing the arsenic concentration down below the Bangladesh standard of 0.05 mg/litre.

If alum is added to the raw water as flocculent with a dose of 200-300 mg/L, and the ARU is supplying drinking and cooking water to 25 families (15L/C/d), the per month operational cost for purchasing alum will be in the range of ten taka per family.

The use of naturally occurring iron in ground water is the most promising method in removal of arsenic by absorption. It has been found that hand tubewell water in 65 per cent of the area contains iron in excess of 2 mg/L. Iron and arsenic coexist in ground water.

Performance of some small and big scale Iron-cum-Arsenic Removal Plants (IRPs) in the country suggests that arsenic removal by absorption of iron flocs is quite reliable and effective.

Community type arsenic-iron removal plants attached to hand tubewells can be installed to remove both arsenic and iron from groundwater. This is the only feasible option available for arsenic removal from hand tubewell water for rural water supply in the country's socio-economic context.

Column Filter: Professor Shafiullah of Jahangirnagar University has developed a low-cost column filter based on the Absorption-Filtration Method. Arsenic is totally removed by passing contaminated water (0.05-2 ppm) through this column. The cost of production is US$ 1.56. Considering the low cost and efficacy, about 500 units have been distributed among the affected people of Faridpur.

He has also designed special tubewell strainers. The packed strainers were tested for removal efficiency at 1.6 ppm arsenic concentration. The results show that after a hydration period of twenty days one single strainer is capable of removing 100 per cent arsenic from 1.6 ppm concentration at the maximum draw rate of 1.5 L/min. which is about the same as that of hand tubewell at its maximum rate of use. The cost of the strainer will be about 120 US dollars and it has a theoretical life of 20 years.

Sorptive technique: Several other sorptive media are reported to have removed arsenic from water. These are activated alumina, activated carbon, hydrated ferric oxide and silicon oxides. The efficiency of such sorptive media depends on the use of oxidizing agent as aid to sorption of arsenic. The main problem in all sorptive techniques is the efficient removing of Arsenic (III). Approximately, more than half of the arsenic found in the country's ground water is present in Arsenic (III) form although this can vary from 10 to 90 per cent.

Alleviated Alumina: Fixed-bed adsorption with granular activated alumina may be a preferable technique for removal of arsenic. It is a porus oxide with specific surface area that can be used for arsenic adsorption, especially if the pH is below 6.5 to 7.0 and the strongly competing anions, such as phosphate, fluoride, and sulphate occur at low level. It can be regenerated with caustic soda and sulphuric acid. The great advantage of activated alumina is its simple operation over one to three months before regeneration is required, making it more feasible for small-scale plants.

Ion-exchange: The process is similar to that of activated alumina, the medium used here is a synthetic resin. Due to its different dissociation equilibria, only Arsenic (V) will be present as an anion. However, with one or two changes in the medium, the pH range can be varied. Arsenic (V) is bound effectively, while Arsenic (III) passes through a column of anion-exchange resin. The effect is used to develop a procedure for analytical differentiation of Arsenic (III) and Arsenic (V). As the resin becomes exhausted it needs to be regenerated. The loaded resin is regenerated by 0.5 N HCl to remove the Arsenic (V) completely. The removal capacity depends on sulphate content in water as sulphate is ion-exchanged before arsenic.

Membrane or desalting techniques: These techniques, such as reverse osmosis and electrodialysis, can be effective processes, but may be applied only if partial or total desalting is necessary in addition to arsenic separation. Reverse osmosis and electrodialysis are capable of removing all kinds of dissolved solids from the water, thus resulting in demineralized water not suitable for drinking unless reconditioned.

Microbiological processes

Arsenic in water can be removed by microbiological processes. The conventional physical-chemical methods of arsenic removal often fail to meet the WHO international daily maximum acceptable limit of 0.07 mg/L. Microbiological methods, on the other hand, are highly efficient and offer considerable promise.

Two main types of metal-microbe interactions could be potentially used for the removal of arsenic from ground water. They are (a) microbial oxidation of Arsenic (III) to Arsenic (V) and its subsequent precipitation, and (b) bioaccumulation of arsenic by microbial biomass.

There are a number of micro-organisms which can oxidize arsenite at neutral pH. The oxidation method could either be operated in a immobilized reactor system or in a simple form as a biological pond. The essence of the latter method is the development of a reactor containing the arsenic contaminated water collected in a pond. A cheap source of organic substrate such as beet pulp, or sugarcane juice could be added to the pond water along with iron fillings. The addition of iron fillings results in solubilization of iron (as ferrous) which, in turn, promotes the development of a variety of iron-oxidizing bacteria, e.g. *lepothrix ochracea*, *gallionella ferruginea* etc. The iron-oxidizing bacteria oxidizes ferrous iron to ferric iron which absorbs the arsenic and can easily settle in the pond. Overflow of water can typically contain arsenic levels of less than 0.05 mg/L. The method could be highly useful for waters containing arsenic in the range up to 4 mg/L, close to the maximum found in the country.

The removal of arsenic from water having low (acidic) pH could be achieved with the help of certain chemolithophic bacteria, viz. *thiobacillus ferro-oxidants*, *leptospirillum ferroxodams*. These bacteria could be used for oxidizing ferrous iron and arsenic in acidic water streams. The reaction is at least 50,000 times faster than the chemical oxidation of ferrous iron under acidic conditions. The bacteria precipitate iron arsenates that are insoluble in water and thus arsenic is removed.

There are several forms of micro-organisms specially algae viz. *ceratoplyllum demursumi*, *largosiphon major*, which are known to actively assimilate arsenic from water sources. In an operation in Japan, a series of high surface area to volume ratio, light penetrable reactors were constructed to treat the arsenic-affected water. The actively growing algae in the reactors accumulated arsenic at the rate of 1g/100g.

Considering the track record of microbial metal removal technologies, it would not be unrealistic to suggest that microbiology-based techniques for arsenic removal be widely used.

The writer is an Ecotoxicologist

US Muslims Buoyed by their Growing Clout

Mary Otto writes from Washington

AMERICA'S millions of Muslims, adherents of possibly the nation's fastest-growing religion, are learning gradually to embrace politics.

The change can be seen in the hopeful politicians who flock to meet voters in Detroit-area mosques and in California Islamic centers.

At Muslim gatherings across the country, thousands of people have registered to vote.

In a departure from the past, some Muslims are entering politics themselves, and the professionals among them are learning to exercise their financial clout.

In part, the new political activism reflects the increasing number of Muslims in the country, for which estimates vary widely; the total is somewhere between 3 million and 8 million.

Part of the new activism is driven by concern about Muslim homelands, whether Kashmir, Kosovo or Palestine, or the sense that Muslims in the United States suffer from discrimination. Part of the motivation also is reaction to what they say is a formidable Zionist lobby committed to demonizing Muslims in popular culture and outweighing them in the halls of power.

In the 1996 elections, an estimated 100 Muslims won public office. Probably 10 or 20 are running for public offices in the Nov. 3 Races says Agha Saeed, a California State University political scientist.

But Saeed and other activists in the Muslim community call this year a dress rehearsal for 2000, when they hope to help elect 2,000 qualified Muslim candidates to public office.

This year, an American Muslim is running for a California congressional seat, although she is given little chance.

Not one Muslim serves in Congress. Still, a Muslim presence is growing on Capital Hill, and enough Muslims work there that Islamic prayers are offered in a congressional office building on Fridays.

In moving into politics, Muslims are copying the efforts of religious minority groups before them, such as Jews and Mormons, says John Green, director of the Ray C Bliss Institute of Applied Politics at the University of Akron in Ohio. "They seem to be following a well-trod path," he says.

A 1996 survey by the American Muslim Council found 470,000 people with Islamic names registered to vote. Many more, including the highest-ranking elected Muslim official in America, North Carolina state Sen. Larry Shaw, would not have shown up in such a survey.

If Muslims voted together, especially in areas of states like California, New York, Michigan and Virginia, they could tip elections.

Saeed, founder of the Fremont (Calif.) based American Muslim Alliance, an organization dedicated to organizing Muslims in mainstream politics, points to two races in 1996 where he said American Muslims let their strength be known.

In the US Senate race in New Jersey, Muslims rallied to Democrat Robert Torricelli after his opponent, Republican Richard Zimmer, accused him of pandering to Islamic terrorists. Torricelli had appeared at an Arab-American gathering that reportedly was attended by guests with ties to Hamas, a militant organization opposed to the state of Israel. Torricelli likened the attack to an ethnic smear.

In the South Dakota US Senate race, campaign donations from Pakistani-Americans around the country helped Democrat Tim Johnson defeat Republican Larry Pressler. During his time in the Senate, Pressler angered Pakistani-Americans when he helped write a key foreign policy amendment that ended aid to Pakistan because of the unclear weapons program in that Muslim nation.

Concerns about Mideast policy, domestic discrimination and a shortage of political representation have inspired Detroit-area Muslims to contribute to an Arab-American Political Action Committee.

"It's a new way of doing politics around here," explains the committee's president, Abed Hammoud, an assistant prosecutor in Wayne Country, Mich.

"It's generating a lot of excitement."

Courtesy : Chicago Tribune

TOM & JERRY

By Hanna-Barbera