

APSU

Arsenic Policy Support Unit

Selected papers on the social aspects of arsenic and arsenic mitigation in Bangladesh

SELECTED PAPERS ON THE SOCIAL ASPECTS OF ARSENIC AND ARSENIC MITIGATION IN BANGLADESH

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FOREWORD

This document contains three reports on social aspects of arsenic that were funded by the Arsenic Policy Support Unit (APSU) of the Local Government Division, Ministry of Local Government, Rural Development and Cooperatives, Government of Bangladesh. APSU was established to support the Government of Bangladesh and other stakeholders to improve coordination in arsenic mitigation and to undertake key studies and capacity-building to ensure that key knowledge gaps were filled.

Arsenic contamination of drinking water has profound social implications and consequences. The social aspects of arsenic have not attracted the attention they deserve as most activity and discourse has focused on the technical and scientific issues related to arsenic. Effective and sustainable arsenic mitigation is a key social development issue and therefore social aspects must be adequately addressed in understanding the impact of arsenic and the delivery of mitigation.

The poor are at greatest risk from arsenic. Due to poor nutrition they are often more susceptible to arsenicosis and often have limited access to water supplies, particularly where arsenic contamination means they have to negotiate access to new water supplies. Arsenicosis has serious social and economic consequences for patients, as their ability to work is affected and social exclusion is common. Access to health care services for arsenicosis remains difficult for many poor people and they face many problems in gaining appropriate treatment. As a consequence of these factors, arsenic can be a shock from which poor people are unable to recover.

Community involvement in the planning of arsenic mitigation and in particular the voice of women has been limited to date. Ensuring participation by the poorest is critical and there remains much to be done to ensure equitable access is secured for the poor. Arsenic mitigation programmes need to understand the social consequences of arsenic contamination of drinking water and identify ways by which services can be provided to affected communities, including the poorest and most vulnerable.

The three chapters in this document discuss the poverty, gender and human rights aspects of arsenic and arsenic mitigation. The first chapter presents a review of knowledge of the key social issues related to arsenic and the current practice in addressing these from Bangladesh and West Bengal. This provides an overall context of what is currently known and what actions can be taken to address social aspects.

The second chapter presents the findings from field research in Bangladesh to explore the gender aspects of arsenic and arsenic mitigation. It highlights key experiences of poor women and men of how arsenic has affected their lives and how they are able to participate in arsenic mitigation. The chapter also highlights the ongoing problems of exclusion and gender differentials in increased workloads as a result of arsenic.

The final chapter explores the relationship between arsenic contamination of drinking water and human rights, which was prepared in 2004. It identifies the different rights on which arsenic contamination may impinge and presents key strategic directions for addressing arsenic and human rights.

In addition to these three documents, a number of other APSU documents have addressed social aspects of arsenic. These include a study on the social aspects of accessing health

care for arsenicosis patients, which was undertaken by NIPSOM and BIDS and is published separately. The Risk Assessment of Arsenic Mitigation Options (RAAMO) study includes a social acceptability survey of arsenic mitigation options, and Not Just Red or Green: an analysis of arsenic data from 15 Upazilas in Bangladesh includes analysis of KAP and other social data.

It is hoped that this document, with others prepared by APSU, will help planners, implementers and researchers in the ongoing work to provide effective arsenic mitigation. The document will be available in both electronic form via the APSU website and in hard copy.

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BY FATEMA MANNAN**

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CHAPTER 1:

SOCIAL ASPECTS OF THE ARSENIC CONTAMINATION OF DRINKING WATER: A REVIEW OF KNOWLEDGE AND PRACTICE IN BANGLADESH AND WEST BENGAL

Suzanne Hanchett, Planning Alternatives for Change

Report prepared August 2004

1.1 EXECUTIVE SUMMARY

This report describes briefly the state of present knowledge of the social and socio-economic aspects of arsenic contamination of groundwater used for domestic water supply. It is based on a three-week literature review (published literature, programme descriptions or reports, and unpublished documents) and discussions with over 50 professionals concerned with arsenic.

Three types of issues are covered in this study:

1. Social, cultural, and/or economic factors influencing the impact of arsenic-contaminated groundwater consumption on people's lives, and particularly their health (for example socio-economic patterns of illness and social factors influencing health-related behaviour);
2. Social factors influencing people's response: especially in relation to other priorities, perceptions of arsenic, and social roles and relationships; and
3. Institutional and programme/project approaches to solve arsenic-related problems.

1.1.1 Key findings relating to health issues

- Poor people are more affected than others by arsenic-related diseases.
- Prevalence of skin lesions is higher among men than among women, as is prevalence of lung disease, when populations are exposed to concentrations of arsenic above 50 µg/l in their drinking water. Prevalence odds ratios of lung disease are higher for women.
- Epidemiological studies are the most reliable sources of information to establish prevalence rates, but those studies in progress have not yet published most of their results. Patient surveys are useful but tend to be biased, depending on how study respondents are identified.
- Women are more socially damaged than men by arsenic related illnesses, no doubt because of their generally lower social status. If unmarried, they find it difficult to find a husband; and if married they may be abandoned or divorced. Women are less likely to

talk about arsenic related health problems and are more likely to attend to the health needs of others than those they themselves face.

- Economic consequences of illness deserve attention. Many who are ill are either too weak to work or lose employment opportunities because of widespread fears of contagion. These problems affect both men and women and are, of course, most severe among the poor.
- Some professionals consider that mental health problems, such as depression, may also result from intense social isolation or ostracism of arsenicosis patients. Such problems, however, have not been scientifically studied.

1.1.2 Key findings related to social factors

- People have multiple urgent and competing concerns. Arsenic may not be a priority for many poor households.
- There remain concerns regarding the ability of the poorest households in particular to be able to enter into cost-sharing for improved water supplies. However, at the same time, a key theme emerged of the benefits of financial contributions in improving motivation to sustain arsenic mitigation, that contributions provide poor people with some rights in relation to access to the water supply, and may reduce elite domination.
- Perceptions of arsenicosis as disease remains of particular concern, since 53% of rural populations that have been studied think arsenicosis is contagious. This has major implications for behaviour change potential in relation to arsenic and suggests that more work needs to be done to improve understanding.
- There is shame associated with red tubewells, which may have implications for families with arsenic contaminated tubewells. This is in contrast to pride built up over the years in having and using tubewell water, which had been considered to be safe, and which became a status symbol.
- Some professionals consider that communities find health problems due to arsenic ingestion rather abstract concepts and difficult to understand, because arsenic has no taste, smell or colour.
- There are problems associated with the word 'poison' (*bish*), which is commonly used to describe the effect of arsenic in awareness campaigns. Some people interviewed considered that this term caused more confusion than enlightenment, since its connotations are: strong smell, distinctive colour, and particular taste. Arsenic in water has none of these characteristics; nor does it kill instantly.
- Social roles and relationships are even more important than individual perceptions in determining people's behaviour – water use or any other behaviour. As domestic water use and collection are traditional and significant responsibilities of women, it is essential that women be involved in planning where and how alternative water sources will be used; however, women are not always involved to the extent that they should be.

1.1.3 Professionals' perceptions of biggest challenges

Among the professionals who were interviewed, nine key broad issues were said to pose the 'biggest challenges':

- Raising public awareness and changing water use behaviour.
- Safe, affordable, and convenient alternative options and how communities and agencies should identify these.
- Building self-help and community mobilisation.
- Shift to community-based water sources from the familiar and trusted tubewell located at or close to the home.
- Developing comprehensive, coordinated approaches to project implementation.
- Including women and poor people in planning.
- Staff training to build sufficient skills for public education and mobilisation.
- Problems facing arsenicosis patients, both economic and social.
- The need for decentralisation; and ensuring that local government bodies can provide quality support to mitigation programmes.

Two matters not much discussed in interviews are:

- *Why* people are not sufficiently aware or motivated (except that people haven't seen patients); and
- The need for socially bold and innovative approaches: social change potential in arsenic programmes/projects (for example including women, the poor, and Union Parishads)

1.1.4 Community mobilisation

As regards community mobilisation to cope with a local arsenic problem, a number of key points emerged:

- Communities can undertake most or all of the mitigation activities required, if they perceive a need.
- Careful, labour-intensive, trust-building efforts are needed if outside agents are to do community mobilisation. Special staff skills and training are needed, and much time as well.
- Some programme learning points from previous experience came out in interviews, for example that it is a mistake just to test and mark tubewells without informing the public of the reason for doing so or giving people an idea of what they can do. Other learning points were: not situating an arsenic mitigation device within a private compound (*bari*) and forming a committee and obtaining local commitments to share costs before actually doing any construction or installation (in cases where local cost-sharing is expected and required).
- It was suggested that more use be made of available 'social capital'. Influential people, for example, may want to help but need to learn more to identify how they could guide their communities in solving their arsenic related problems. Such people may be very

useful in engendering change, but they need guidance and information. Other people may be willing to help as volunteers, if they feel it would be in the public interest to do so.

1.1.5 Decentralisation

Solving the arsenic problem, it is argued, will require a return to the frequently discussed issues of decentralisation and devolution of authority to local government institutions, especially the Union Parishad. Some already are actively supporting mitigation projects, but many are not. Panchayats in India, compared to the Union Parishads of Bangladesh, have greater authority and more local resources and responsibilities. They must give permission for development activities to go on within their areas. In Bangladesh the Swiss Development Corporation is funding a new project, to be implemented by DASCOH, which is ultimately intended to strengthen the capacity of arsenic-affected Union Parishads in North-western districts (Rajshahi and Chapai Nawabganj) to engage in participatory local decision making for the betterment of their Unions.

If they had suitable resources and training, local government personnel could greatly help in arsenic mitigation in at least three ways:

1. They could join in and/or guide decision making;
2. They could coordinate local-level, externally initiated activities; and
3. They could help to arrange/facilitate water quality monitoring. A model to consider in planning for accessible and effective routine water quality modeling is the village laboratory. Twenty such laboratories are presently operating with support from UNICEF in West Bengal.

1.1.6 Conclusions and Recommendations

- Mitigation programmes should adopt a 'social change approach' to their work. This will help in ensuring that the wide range of social and socio-economic issues associated with arsenic are adequately addressed and that sustainable mitigation programmes are developed.
- Epidemiological studies will be very useful in assessing public health risk, but there remains much to learn about the health impact of arsenic on the total population relative to other health problems, and also about gender and poverty related dimensions of arsenic-related and other health problems.
- It would be wise to distinguish two types of arsenic-related programme interventions: (1) emergency diagnostic, treatment, and social support activities in 'hot spots' (where large numbers of cases have been identified) and (2) prevention-oriented activities in arsenic-contaminated areas, where no patients have been identified.
- Promote local, regional, and national information sharing among all stakeholders. Local and regional information sharing is very weak at present.
- The public should be as well informed as possible, and people should be encouraged to discuss the issues they perceive to be related to arsenic in groundwater.

1.1.6.1 Knowledge Gaps

- Girls are missing from many patient surveys, and there is almost no knowledge of their experiences, burdens, or other social factors in relation to the arsenic problem.
- Actual priorities of people in affected areas should be investigated through PRA types of studies.
- Dietary habits and nutrition's influence on arsenic-related illness need further study.
- The different roles of women and men, and the attitudes of both men and women towards about women seeking health care – both need further study.
- Gender differences in arsenic-related illness will be revealed in epidemiological studies: differential risk factors and age-adjusted prevalence odds ratios deserve close attention.

1.1.6.2 Practical and Strategic Recommendations

- In 'hot spots' there is a need to emphasis services, not studies.
- Experiment with local level water quality testing.
- Do more thorough staff training in all aspects of arsenic mitigation.
- Improved monitoring and evaluation of arsenic mitigation programmes is needed to ensure that best practice is followed and lessons are learnt.
- Public awareness is still at too low a level: new ideas are needed to build knowledge and influence behaviour.

There are some key suggestions on how to engage women in a meaningful way in arsenic mitigation activities:

1. Hire female staff in arsenic mitigation programmes and projects.
2. Use PRA; ensure that staff have appropriate and adequate skills to work with communities and especially women.
3. Reach women in convenient ways through courtyard sessions and Upazila workshops. Avoid meetings in places where women will find it difficult to attend for contribute.
4. Encourage men to respect women's views in arsenic mitigation and water source selection.
5. Urge people to include women in decision-making bodies, including local government and committees.
6. Female Union Parishad members could provide leadership and assistance to arsenic mitigation programmes, provided they have adequate training.

1.2 INTRODUCTION

'Whatever we do, socio-economic conditions affect it'. (Professor Feroze Ahmed, BUET)

'The social side will determine our effectiveness, and whether the people think we are effective'. (Mr. Pradip Kumar De, Chief Engineer (Water Quality Management), Public Health Engineering Directorate, West Bengal, India)

'Development of such technology is only possible when a combination is made between bureaucrats, technocrats and villagers with proper village participation'. (Dr. Dipankar Chakraborti, School of Environmental Studies, Jadavpur University, Howrah, West Bengal)

"All these projects must include social awareness. They're for human beings, and it's human beings who are doing them". (Dr. I. Zuberi, Rajshahi University)

The Bangladesh *National Policy for Arsenic Mitigation 2004 and the Implementation Plan for Arsenic Mitigation in Bangladesh* outlines the main challenges posed by arsenic contamination of groundwater and provides a framework for addressing these challenges. It includes consideration of social issues associated with the arsenic problem and mandates improved coordination of the efforts of all concerned agencies and organisations, both governmental and non-governmental.

Like the *National Policy for Arsenic Mitigation*, the Bangladesh *National Water Policy* (1998) relates water management goals to overall social development. This policy urges citizens to develop 'a state of knowledge and capability that will enable the country to design future water resources management plans by itself with economic efficiency, gender equity, social justice, and environmental awareness to facilitate achievement of the water management objectives through broad public participation....'

This report summarises current understanding of the social aspects of the arsenic problem in Bangladesh. Some comparable information on West Bengal, India, also is reviewed. The 'social aspects' as defined here include:

- Social, cultural, and economic factors that influence the impact of arsenic-related illness on people's lives and socio-economic patterns identified in epidemiological studies;
- People's perceptions and priorities and other social, cultural, and economic factors that influence the public's responses to the crisis; and,
- The institutions and programmes that can or do address the problem – the people who manage and implement them, and their apparent social effectiveness.

After reviewing these issues, the report presents some programme and research recommendations.

1.2.1 Methods of information collection

This report was prepared by Dr. Suzanne Hanchett, a consultant to the Arsenic Policy Support Unit (APSU) over a three-week period in June 2004. It is based on a literature review, discussions with professionals working in the arsenic field, and the consultant's own previous research and evaluation studies, including field observations. To date only a few studies have been done on the social issues associated with the arsenic problem.

Epidemiological studies, which always shed light on the social distribution of illness, are crucial to understanding social impacts of arsenic contamination of groundwater; but findings from current epidemiological studies are only partially published.

Information was collected through semi-structured individual and group discussions with various types of professionals. Most have field experience and extensive knowledge of arsenic mitigation project operations; some are academic researchers and some, consultants or environmental activists (some interviewees fit in more than one category). Interviews were conducted mainly in Dhaka, but some were done in West Bengal. A full list of the persons interviewed is attached as Annex 1.1. These interviews and group discussions supplement the literature review by giving professionals' perceptions of the most pressing social issues they presently encounter in their working lives.

1.2.2 The predominant mitigation strategy in use

In Bangladesh and West Bengal, most arsenic mitigation projects follow a general strategy, which can be summarised as follows. After gathering preliminary data on locations likely to be affected, organizations test tubewell water (with field kits in most Bangladesh projects, or at laboratories in India). The field staff undertaking testing usually inform people of test results and advise them not to use arsenic-contaminated water. They often paint the heads of affected tubewells red colour and the safe ones, green. The local population may or may not understand the messages given by the field staff, depending on how well the messages are communicated, how much time is taken to communicate, and the water users' own capacity to understand abstract information.

There may be some screening for arsenicosis patients, who are then probably referred to health services. Screening may be done either in public health camps or through house-to-house surveys. The persons identified as possibly having arsenic-related illnesses may or may not attend referral appointments. If they do attend, the doctors they meet may or may not know anything about arsenic-related illnesses. The organization undertaking the screening may (or may not) follow up on identified patients and coax them to go for further assessment and treatment.

Commonly, but not universally, some kind of local water user group or committee is formed, although this is done with varying degrees of thoroughness and public involvement. Usually after committee formation - but sometimes before or without it - an alternative water source or water treatment system is recommended and/or provided. The formation of committee and provision of arsenic-safe water frequently occurs some time after initial screening. All responsibility for operation and maintenance of that facility will be handed over to the 'community' within varying periods of time, but sometimes immediately after completion. It is not clear to what extent affected communities are trained or otherwise prepared to assume this responsibility.

Arsenic mitigation projects differ considerably in the degree to which they involve the general public in decision-making at each of these stages. It can also be assumed that there may be significant variation in the effectiveness of individual programmes between different geographical areas of operation

Public education ('software'), technical interventions ('hardware'), medical services, and research are all needed to solve the arsenic problem and must work in a complementary manner, as the Bangladesh National Policy for Arsenic Mitigation (2004) recognises. In an unknown number of cases, however, mitigation options are simply provided to people without sufficient public education, so people do not understand why they are there or how to use them. In other cases, communities are informed that they have an arsenic problem but

no mitigation option is provided. The gap between mitigation services and health services is far too wide; but the gap seems likely to close up in future years, as health professionals now are getting included in training and action programmes.

1.2.3 Organization of this report

A review of epidemiological studies is presented in Section 2, in order to assess the significance of the health threat posed by arsenic contamination of drinking water and the relationship between socio-economic factors (especially poverty and gender) and arsenic-related illness. This is followed by a discussion in Section 3 of people's perceptions and socio-cultural factors influencing the public's willingness to stop using shallow tubewells and shift to new types of drinking/cooking water sources. An emphasis is placed upon the sexual division of labour and women's specific concerns as domestic water managers. This is followed by a summary in Section 4 of the main points arising in discussions with professionals about social aspects of arsenic. Section 5 reviews some principles of community mobilisation and issues associated with training. The need for local institutions to improve their capacity to undertake resource management and water quality testing is discussed in Section 6.

1.3 HEALTH ISSUES

The overall morbidity rate within Bangladesh is estimated to be 165.1 per 1000 population. It was estimated in 1994-95 that, on average, people in rural areas are ill 91 days of every year (males 90 days and females 92 days); and both men and women miss an average of 18 working days per year because of illness (BBS 1997). Arsenic-related illness is, of course, only one of many health problems affecting the Bangladesh population. Diarrhoea accounted for 5.5 percent of all morbidity in 1997; and diarrhoea prevalence was 16.5 per 1000 (BBS 1997). The prevalence rates during this period for some other water-and sanitation-related diseases were: dysentery 9.3/1000 and typhoid 2.6/1000 (BBS 1996).

1.3.1 Epidemiological studies of arsenic-related morbidity

In the few epidemiological studies that have been published to date it is possible to find some information on rates and prevalence of various arsenicosis symptoms. Risk increases greatly with the concentration of arsenic in water. In the Columbia University cohort study of 12,000 people in Narayanganj District, age-adjusted prevalence of skin lesions was found to be 10/1000 for men and 2+/1000 for women, with prevalence rates greatly increasing with age to slightly under 20/1000 in all persons over age 60. Those consuming arsenic every day in amounts over 495.3 µg/l have a mean prevalence odds ratio of 5.8 of developing skin lesions (Columbia University 2003). One cross-sectional study in South 24 Parganas, West Bengal, which included 7683 people, of whom 4216 were drinking water with more than 50 µg/l arsenic content, found almost 12% of the more highly exposed group to have lung disease. Other arsenic-related symptoms (pigmentation 9%, keratosis 4%, hepatomegaly 10%, neuropathy 5%, and others) were all found at significantly higher rates in the more exposed group (Mazumder *et al.* 2001).

Using the results from patient screening in a health camp in Damurhuda Upazila, Chuadanga District, Dhaka Community Hospital found that overall prevalence of arsenic symptoms was 0.458/1000 (Dhaka Community Hospital 2002:4). ICDDR,B Matlab study findings, which are scheduled for publication in October 2004, will add to the relatively meagre scientific knowledge base. A preliminary report indicates an overall arsenicosis prevalence of 3.5/1000, with the prevalence significantly higher (4.75/1000) in those aged 15 and above (Yunus 2003).

A study in a Jessore village with a population of 3606, where 87% of tubewells had arsenic concentrations over 50 µg/l, found 10% of villagers to have arsenicosis symptoms. Of those showing symptoms, 95.5% had melanosis, 68.9% had keratosis and 0.8% had basal cell epithelioma (cancer) (Ahmad *et al.* 2002: p95). In Sharsha Upazila, Jessore, a household survey by Asia Arsenic Network (AAN) has confirmed 312 arsenicosis diagnoses in the total population of 303,976 (0.103%, or 10.3/1000). Patients are found in large numbers only in one union (Bagachra), however, which had 259 patients in a total population of 7588 (3.4% or 34/1000). Frequently found symptoms in the total of 312 were: melanosis 92%, hyperkeratosis 61%, and leukomelanosis 35%. Cancerous and pre-cancerous lesions were observed in 6.4% of the patients (AAN 2004:21,31). In Murshidabad District, West Bengal, out of 25274 people screened, 4813 (19%) were registered as arsenicosis patients (Dipankar Chakraborti, personal communication).

Acute, arsenic-related symptoms, such as lesions, are not yet found in all communities that have high levels of arsenic in drinking water, but they certainly are found in specific 'hot spots', where arsenic health problems may be as serious and visible as other health problems. There remains a lack of quantitative evidence, but there is a wealth of anecdotal evidence to this effect. For example, in Chandalhathi Village of North 24 Parganas, West

Bengal, 30% of the women have been widowed over the past decade or two from arsenic-related disease, according to Alpana Hira Davidson (personal communication). In Samta Village, of Jessore District, 10% of the population has skin lesions or other visible symptoms, although in a similarly arsenic-affected area in the same Upazila, where concentration of over 700 µg/l of arsenic were found in the water, relatively few arsenicosis patients were found (AAN 2004).

It is generally recognised that poor people are more likely to be afflicted than others exposed to the same levels of arsenic in drinking water. The Asia Arsenic Network has found this in Sharsha Upazila, Jessore. In the well-studied Samta Village the majority of serious arsenicosis cases are found in the poorest section (*Poschim Para*). Preliminary results from the Columbia University cohort study in Narayanganj District demonstrate a strong association between poverty (indicated by landlessness, income, and no education) and the prevalence of skin lesions (Columbia University 2003). ICDDR,B Matlab data, when published, is likely to include socio-economic information on patients (Dr Yunus, personal communication). All large-scale, national patient screening to date has been done without collecting socio-economic information on patients; so the only reliable information on this point comes from limited regional studies.

There is very little information on arsenic-related mortality. One forthcoming study report by the 'Project to Remove Arsenic from Village Drinking Water Supplies', based at Bengal Engineering College, Howrah, does, however, include mortality statistics. These are taken from its Project's 75-village working area, which covers three districts of West Bengal – Mushirabad, Nadia, and North 24 Parganas. According to this report, 11.4% of male deaths and 2.3% of female deaths have been caused by arsenic-related illnesses, but the time period these statistics cover was not indicated in the available material. A significant finding of this study is that, the percentages of death that are arsenic-related increase as household income declines. For example, preliminary data indicate that 4.3-4.5% of male deaths (and 0.8-1.1% female deaths) that have occurred in households with incomes of Rs. 2000/month or less were associated with arsenic poisoning. Among households with monthly incomes of Rs. 2000-5000 only 0.2-1.4% of male deaths were attributed to arsenic-related illness. There have been no recorded deaths from arsenic-related illness in households with monthly incomes of Rs. 5000 or more.

1.3.2 Gender and arsenicosis: epidemiological studies

Epidemiological studies to date present somewhat contradictory information on the different ways that arsenic tends to affect males and females. Studies of large populations all find prevalence of arsenicosis symptoms to be significantly higher among males than among females (DCH & UP SHON 2000; Mazumder *et al.* 2001; Columbia University 2003; Yunus 2003; AAN 2004). One smaller study, however, has identified larger percentages of women than men among arsenic-affected patients in Bhanga Upazila, Faridpur District (58.6% of 488 patients), and in Barura Upazila, Comilla (62% of 58 patients) (WHO 2002).

It is important to recognise that in any public screening procedure or health camp women will not receive as much attention as men because of their greater reluctance to be examined by male physicians. Furthermore, smaller study populations will have statistically variable characteristics. Thus the data from large-scale, scientifically sampled populations are generally more reliable.

Prevalence indicators are useful but relatively crude measures of health problems. Two studies using other analytic techniques suggest greater risk among females. One report on a large study in West Bengal covered respiratory symptoms among non-smokers. It found that *prevalence* of symptoms was higher among males, but that the age-adjusted *prevalence odds ratio* that was higher for females (Mazumder *et al.* 2001). This apparent contradiction

may be explained as follows. If men live longer, there will be proportionally more men with symptoms; but at any given age level, women may be at higher risk (Dr Abdullah Brooks, personal communication). Another report, on a cross-sectional study in Nawabganj District, found that 'Exposed females, being lower in weight and less likely to be literate, were more affected by low arsenic doses than male exposed respondents' (Ahmad 2002b). These reports deserve further evaluation by epidemiologists before any programme decisions can be made based on their findings.

The Columbia University cohort study findings differ from the above-mentioned Nawabganj report. The cohort study finds age-adjusted prevalence of skin lesions to be much higher for men than for women at every dose level. For example, among those consuming 263-864 µg/l of arsenic in their drinking water, the prevalence of skin lesions for men is well over 20/1000, but the prevalence for women is only slightly over 5/1000 (Columbia University 2003).

Risk factors contributing to higher prevalence of skin lesions among men have been analysed in the Columbia University cohort study. Body Mass Index (BMI) was found to have an effect on risk of skin lesions. Smoking was an especially significant factor in developing lesions. Use of pesticides and fertilizer were studied but found not to be significant in one preliminary report (Columbia University 2003).

1.3.3 Social issues associated with arsenicosis in women

The relevant socio-cultural background for women in Bangladesh can be summed up briefly: women of all groups generally have lower status and less social value than men. Women tend to eat last and least in their households. Therefore if they live in poor families they are the most likely family members to be malnourished. Women are on average less well educated, younger, and have less earning power than their husbands. Male-female status differences can be expected to produce large differences in how patients of different sex are treated, as illustrated in Box 1.1.

Box 1.1

I have compared two family cases. In one the main male member had arsenicosis, and his wife nursed him. But in the other family the wife had arsenicosis, and her husband divorced her.

BAMWSP Gender Specialist, June 2004

As a consequence of their lower status, the needs of women for health care are taken less seriously by others, and at times even by women themselves. In two group discussions participants mentioned that Bangladeshi women of all socio-economic classes do not speak much about their health problems. It is considered not feminine to bother people with one's health problems, even when feeling very ill. The cultural value, rather, is on women's attending carefully to others' health needs. There was some disagreement as to whether women accept this standard willingly, or whether it is foisted upon them by thoughtless husbands and others who do not want to be bothered escorting women to medical appointments. This is illustrated in Box 1.2.

Box 1.2

Regarding women, according to our culture, even a rich woman won't tell anyone that she's sick. But if my husband or son is sick, I make a big fuss. A woman may be almost dead, but she won't create problems for her family by saying she's sick. *We really don't address the root problem.* (Professional woman in group discussion, June 2004)

If the wife is sick for a long time, family affairs are neglected. But if the husband is sick, we expect the wife to carry on. (Man in group discussion, June 2004)

Females who have visible arsenicosis symptoms are said to be more likely to suffer socially than males, although both can be and are socially rejected. As one interviewee put it, men's higher social standing gives them impunity: whatever they do, 'they are more easily forgiven'.

A serious but rarely mentioned consequence for women having arsenicosis lesions is that they have difficulty finding work in jobs where they have close contact with the people they work for, for instance as maids or tailors. In a discussion with the NGO Arsenic Information and Support Unit (NAISU) an example was given of a woman who lost her job as a tailor in Dhaka because of her symptoms. For self-supporting women or female household heads, this sort of difficulty will be economically catastrophic.

More often discussed are difficulties arsenic-affected women experience in marriage arrangements or in being abandoned/divorced by their husbands. In fact, such family difficulties *are* the 'social issues' that first come to mind when most people talk about the social side of the arsenic problem. Difficulties with getting married or staying married are, of course, very serious. Women with such difficulties will face dire economic consequences if they are poor, or even semi-poor. Furthermore, any women whether poor or not, would be publicly humiliated by such events.

Khalid Hassan (2004) in a field report on the comments of 13 arsenicosis patients mentions an important difference between family attitudes and community attitudes. The report notes that 'Compared to men the female arsenicosis patients suffer more social consequences in Sirajdikhan Upazila'. The report goes on to say: 'Unfortunately most of it comes from their own households. ...Community people are empathetic to the arsenicosis patients. But sometimes the husbands of the patients are not exactly as concerned or sympathetic as [they] should be'. This observation, if widely valid, poses a true challenge to any awareness-raising programme, for it suggests that changes in community attitudes may not actually benefit women's lives. One certainly hopes that increased community awareness would improve the likelihood of husbands' helping their wives to get needed medical care. These field observations suggest, however, that such an outcome is not guaranteed even in a carefully managed awareness programme.

1.3.4 Arsenicosis and poverty

Not only are poor people more affected by arsenicosis; but also arsenic-related weakness and illness causes further economic damage, as people suffering from arsenicosis are increasingly unable to work (Ahmed 2002). Among poor families adults are reluctant to take medical treatment because their families cannot manage without their daily pay. During one field visit, a group of low-income patients sent one person to the Upazila health centre to collect monthly medicines for all, because the travel costs were too difficult to bear (World

Health Organization and UNICEF Bangladesh 2003). Some families are rendered destitute when their earning members die of arsenic-related disease. Most field workers in highly affected areas have seen and reported on people living and dying under such unfortunate circumstances (for example, see Chakraborti 2002 and Box 1.3).

Box 1.3

“Even if they die, the earning members won’t come to Kolkata [for treatment], because there wouldn’t be anyone to support their families.”

-Dr. Dipankar Chakraborti. June 2004

As many with direct experience of these problems know, poor people in Bangladesh and India have overwhelming burdens of both economic hardship and illness. Most water and sanitation illnesses and deaths are more prevalent among the poor (DPHE-Danida 1999:44-47).

1.3.4 Other health problems associated with arsenic

There are suggestions that the social consequences of suffering from arsenicosis can result in mental health problems. A recent newspaper article mentioned the “psychological pain” caused by social isolation or rejection of those with visible symptoms of arsenic-related illness (*Ittefaq* 2004). One physician working on the Columbia University cohort study said that he did not encounter much social rejection, but he did know one man who was deeply troubled when others he joined for worship in a mosque moved away from him. There are occasional reports of young women committing suicide when no one will marry them. One example from the BAMWSP working area is presented in Box 1.4.

Box 1.4

A teenage girl got married and went away to live in her in-laws’ home. When she got married there were few signs of de-pigmentation on her body. Her in-laws did not suspect that anything was wrong with her. She worked from dawn to dusk, drank arsenic-contaminated water, and ate foods with little protein content. One day her husband and others noticed that she was ill and could not do domestic work. They saw her hands and thought she had leprosy. Then and there they started avoiding her, stopped touching her or eating any food she cooked. They called her father to take her and demanded a lot of money from him for supposedly cheating them.

The poor girl went back to her father’s home, but she did not get her childhood and youth back again. Rather, she was resented as an additional mouth to feed in a family of eight or nine already living hand-to-mouth. They saw her as a ‘bad omen girl’. The community ostracised the whole family.

The girl took all the blame onto her own shoulders and one day hung herself, to free her family. But she will never know that a family who violates the suicide taboo is cursed and abandoned by society.

Dipankar Chakraborti, when interviewed in June 2004, described a case in which 11 members of one family had Bowens cancer. A son of that family committed suicide because (he concludes) other boys were teasing him for not going out to the fields to work like others.

1.3.6 Health risk substitution associated with alternative water sources

As at least two studies have demonstrated, and many have feared ever since the arsenic ‘crisis’ became a public issue, there are health risks associated with abandonment of tubewell water. Drinking water hazards that can replace arsenic include: pathogens, toxins

from cyanobacteria in surface water, and chemical pollutants. The health effects of pathogens are acute, and are well known to cause both diarrhoea and child mortality.

If not adequately covered or sealed, dug well water is easily polluted. One study of 72 randomly sampled water sources investigated the sanitary integrity and water quality of dug wells and deep tubewells. Thermotolerant coliforms were detected in very few of the deep tubewells but were present in 94% of the dug wells. Arsenic above the Bangladesh governmental standard (50 µg/l) was found in one dug well, and above the World Health Organization standard (10 µg/l), in three. Dug wells are a popular alternative water option in arsenic-affected areas. This study concludes that this option, like others, can supply good water quality but only if properly situated, operated, and maintained. However, 'in worst case conditions, deep tubewells can safeguard health better than dug wells' (APSU 2004).

1.4 SOCIAL FACTORS AND RESPONSES TO THE ARSENIC PROBLEM

Social factors ultimately will determine the sustainability and thus the long-term impact of mitigation projects. Virtually all professionals interviewed in this review have come to understand this fact.

1.4.1 Poor people's priorities

It is not known at present how concerned people are about the problem of arsenic in drinking water. Some reports mention widespread 'panic'. Others, including comments from several professionals interviewed for this study, feel that people are not as concerned or 'aware' as they should be. If arsenic-affected people are not overly disturbed about this problem, what does concern them? Some indication of poor people's overall life priorities can be found in Chapter 2 of the Interim *Poverty Reduction Strategy Paper*, which is currently being revised into a full PRSP, 'Participatory Consultations on Poverty Reduction Strategy'. In brief, citizens' priority concerns are as follows:

- ◆ Physical infrastructure (roads, transportation, telephones, other facilities)
- ◆ Law and order, amidst incidence of organized crime, extortion, economic violence
- ◆ Need for more effective, decentralised local government
- ◆ Education: poor quality of; and widening education gap between rich and poor
- ◆ Health services: poor quality of, at Upazila and District levels
- ◆ Safe water supply and environmental sanitation
- ◆ Lack of coordination among development agencies and institutions at local level
- ◆ Unemployment and economic opportunity
- ◆ Need for more pro-poor collective action ('social capital')
- ◆ Wish for more democratisation of political processes (Bangladesh I-PRSP, p. 22)

This list, while it does include safe water supply, helps us to understand why people may have difficulty giving an arsenic contamination problem high priority. The poor are preoccupied with meeting basic survival needs, as demonstrated in box 1.5. Several interviewees working in patient identification or mitigation programmes have commented on the fact that very poor people do not have the time or money for health care unless their problems are extremely serious. Even then, the struggle to avoid hunger is likely to prevail over other uses of time and money.

Box 1.5

The project was target oriented with a goal to mitigate arsenic problem. In reality, many problems are more acute in rural perspective. As other problems were not addressed adequately, in some cases people did not give so much importance to [arsenic] as the project desired (Majumder and Kahali 2003:24).

For poor people in areas covered by mitigation programmes, requirements to pay for mitigation options may pose insurmountable problems. Unlike more the more affluent, poor households usually cannot afford to install individual arsenic removal devices or their own, personal safe water systems. One programme staff member interviewed pointed out professional noted that 'the current government policy [for arsenic mitigation] is to not subsidise household level options [such as arsenic removal technologies or rainwater]. So poor people cannot buy any [options] for their own families'. The policy is to provide fully subsidised community-managed arsenic mitigation facilities in the 'emergency phase'. In the

medium and long-term responses, cost-sharing will be required in line with the 1998 *National Policy for Safe Water Supply and Sanitation*.

Most current mitigation programmes expect rural communities to share costs of any community-level or household-level mitigation option provided. Some professionals interviewed suggest that the poor may have difficulty contributing their full share of the amounts required under cost-sharing arrangements. According to one interviewee: 'In the end, they are dependent on the whims of the rich'. Several programme staff members alluded to situations in which local elites try to 'capture' or dominate mitigation options. Some rich people, who are able, try to pay all the costs in order to control an option.

Two or three people interviewed mentioned the need to make sure that *all* users pay, at least according to their abilities, so that all have clear rights to use new safe water sources. One or two interviewees felt differently, however, saying that dependency of the poor on the rich offered some modicum of security. They felt that it was unwise for a programme to interfere in this side of village life to any great extent, as rich people are likely to give the poor use rights for free. Commenting on these situations as 'invisible obstructions' to programme effectiveness, Mr. Azad (a UNICEF consultant) said: 'The voice of the poor isn't heard. They're getting some charity, but they deserve more than that'. The range of views from the people interviewed reflects the range of opinion in the broader professional community regarding cost-sharing.

1.4.2 People's perceptions of arsenic

There have been a few studies of people's perceptions about arsenic. Most have found that those with better educational backgrounds have a greater understanding of the risks associated with consumption of arsenic-contaminated water. It has been found, however, that a carefully managed public education programme can compensate for educational differences and raise awareness levels of the less or un-educated (and poor) to the same level as others' (Hanchett *et al.* 2002).

People have their own ideas about arsenic. Those in highly affected areas who know people with arsenic related illnesses are likely to think differently from those elsewhere. Attitudes toward male and female patients have been discussed above, in Section 2. According to one survey, some 47% (and 53% of rural respondents) in Bangladesh consider arsenic related illness to be contagious. The same belief is reported from West Bengal. Such beliefs cause emotional pain and interfere with normal social life even in places covered by awareness-raising programmes (Asian Development Bank 2003; Rosenboom 2004).

Even if they 'know' about arsenic, people may be reluctant to touch, take food, or share a bed with a patient; and high percentages express reluctance to form marital connections with families of arsenic patients. Some people appear to regard arsenic-related illness as a 'curse of God' and may ostracise the afflicted. A case study from West Bengal, for example, described a funeral, in which the deceased (who had died from a arsenic-related illness) was not touched in a normal way because of fears of contagion or curse. In one evaluation study it was found, nonetheless, that an intensive public education programme in Sirajdikhan Upazila had lessened the tendency to ostracise arsenicosis patients, according to some patients' own reports (World Health Organization and UNICEF Bangladesh 2003).

According to some reports, there is a degree of shame associated with having a family's tubewell water contaminated by arsenic. One person from NAISU said, 'I have seen people remove the colour from their tubewell after testing, because they cannot get their children married [if it is painted red]. It is very embarrassing. I saw this in Natore District'. Other examples of changing or removing the paint are reported in evaluation studies as well (for example see World Health Organization & UNICEF Bangladesh 2003).

According to one NAISU staff member, in some places where arsenic awareness is raised: 'A girl's family is beginning to ask about arsenic in the prospective groom's home'. Another in the same group discussion added 'We have seen whole communities shunned or excluded from society'. A NAISU newsletter, the *Arsenic Bulletin* (published in Bangla), included a report about *Bagan Para* in Achintya Nagar Village, of Jhenaidah Sadar Upazila in Jhenaidah District. It was reported that this place has so many arsenicosis patients, that local people have re-named it as 'Arsenic Para' (*Arsenic Bulletin*, July 2001).

In areas where the drinking water is contaminated but there are no known patients, many people have trouble grasping the seriousness of the risk to their health. As arsenic has no smell, colour, or taste, some choose to disregard warnings. This tendency seems, according to personal reports, to be most pronounced among uneducated people. 'Arsenic' to many is a very abstract and remote concept. Some think it is a fault of the pumping mechanism itself, or the specific well. Geological information about groundwater, aquifers and other scientific concepts and terms seem to be hard to grasp.

1.4.2.1 Sources of knowledge about arsenic

A survey funded by the Asian Development Bank of 536 adults in two rural and two urban areas of four districts (Shatkhira, Faridpur, Comilla, and Manikganj) found that people's main sources of information about arsenic were: television (57%), radio (27%), government health workers (23%), and neighbours or relatives (19%). Men were somewhat more likely to get information from television and radio than women (60% and 33% vs. 54% and 20%, respectively); and women were more likely than men to depend on information from neighbours or relatives (20% vs. 18%, respectively). Survey respondents were approximately 75% rural and 25% urban.

The same survey asked people what they knew about arsenic. Responses from men and women were generally similar, with the relatively high percentage of people recognising arsenicosis as a dangerous disease, off-set by the low percentage of people recognition of arsenic as a poison as indicated in Table 1.1. Recognition of arsenic as a poison was higher among men, but still only just over 10% of men interviewed considered arsenic as a poison.

Table 1.1 Level of knowledge on arsenic by sex (multiple responses)

Knowledge of arsenic	Sex of the Respondent				Total	
	Male (N=274)		Female (N = 258)			
	No.	%	No.	%	No.	%
It is a dangerous disease	209	76.3	218	84.5	427	80.3
People dies if they drink arsenic contaminated water for a certain period	133	48.5	113	43.8	246	46.2
Arsenic is a poison	31	11.3	15	5.8	46	8.6
People suffer from itching/scabies/sores if they drink this water	15	5.5	13	5.0	28	5.3
This is a disease which cause decaying	2	0.7	7	2.7	9	1.7
Black spots appear on the skins if one drinks arsenic contaminated water	2	0.7	3	1.2	5	0.9
This water causes different types of diseases	1	0.4	0	0	1	0.2
This problem arises when excessive iron comes out from the tube well's water	1	0.4	2	0.8	3	0.6
Black and grayish spots is seen on the skin if someone is affected with arsenic	6	2.2	1	0.4	7	1.3

Source: Social Survey data, Asian Development Bank, SSTA No. 4170-BAN: Arsenic Mitigation Review and Strategy Formulation (from Ms. Shireen Akhter)

1.4.2.2 Describing arsenic as 'poison'

An interesting issue that arose during the interviews with professionals concerned explaining to people that arsenic is a 'poison', using the Bengali word *bish*. One ethnographic researcher, Ms. Aasma Afroz Shathi, of ICDDR,B's Matlab Project, claims that the use of this word is confusing. According to Ms. Shathi, most people think that 'poisonous' items, such as pesticides, have distinctive smells and colour; and they kill quickly when ingested. It is, she says, a sort of 'miscommunication' to use the word 'poison' in connection with arsenic, because people have difficulty grasping the idea that a 'poison' can have no colour or special taste. It seems impossible to many that good-tasting water should ever be 'poisonous'. In pursuing this matter with other professionals, the consultant found most disagreeing with this point of view, and feeling that it was all right to use the word 'poison'. Several said, however, that they do modify the description, always saying it is 'one type of poison', rather than simply using the word *bish*. In one group discussion someone expressed the view that it was quite difficult to translate the phrase 'slow-acting poison' into Bengali, although that is the expression that they felt was needed.

In the Columbia University cohort study they do not use the word 'poison' in communicating with the public about arsenic. They avoid the word 'poison' in order to not frighten people. The Project Director, Dr. Tariqul Islam, noted that 'We use the colour sort of idea to explain about arsenic in water... We say it's like colour, fertilizer, or pesticides'. Comparing arsenic to dye or colour makes sense in this area, he claimed, since many of the people in the areas where they work are involved in the textile industry. The point came up that makers of pesticides actually refer to their product as 'medicine' (*oshud*). He mentioned also that arsenic is an ingredient in some homeopathic medicines, so many would resent its being called a 'poison'.

1.4.2.3 Studies underway

Some studies are under way to analyse the social dynamics at play in arsenic affected villages. These include research by at least two Ph.D. candidates (Sultana; Davidson) whose studies are described briefly in Section 8.6. ICDDR,B is about to start an ethnographic study in some affected remote villages in Matlab, Chandpur District.

1.4.3 Women's interests and women's capacity to participate

Most of the answers to the questions about why people change their domestic water use behaviour (or do not) are literally in the hands and minds of women. Women make decisions about collection, storage, and distribution of domestic water. It is they, and they alone in the great majority of cases, who will or will not change to safer sources. Men typically have more economic power than women, but domestic water is a woman's responsibility, one she takes seriously as a contribution to family health and well-being. Women throughout Bangladesh have learned that surface water is unsafe; and they appreciate the reduction of diarrhoea that has come with tubewell water use.

Perceptions and social behaviour have complex influences. They are strongly conditioned by social roles and traditions. People get some of their ideas through social networks, some from mass media, and some from their own deliberations. Perhaps even more importantly, people's capacity to respond to warnings about arsenic are constrained by their available resources, especially money and - in the case of women - time.

Women who are not ill, or who do not know patients, have at least four major problems in responding to the news that their tubewell water is contaminated with arsenic. First, they may or may not be welcomed at public meetings where the problem is explained in detail. As a consequence they may not learn much about the problem unless courtyard sessions or other activities are arranged to inform them. Second, being generally less well educated than men, they often have difficulty understanding or remembering the messages conveyed. Third, they are very busy with household work and greatly appreciate the convenience of their familiar water source, the shallow tubewell. Lastly, they are vulnerable to violence if they venture too far from their homes; so their personal security needs may prevail over their concerns about getting safe water from a distant source. This last problem is even more significant for girls aged 8 to 15, who often share their mother's housework responsibilities. If a new and safe water source is too inconvenient for any of the above-mentioned reasons, it is likely that the majority of women will continue to use arsenic affected water rather than use this source (Jakariya 2003). Social pressures on men may also limit their ability to assist women, as illustrated in Box 1.6.

Box 1.6

Four brothers lived in a family in a village. All were married. The youngest brother was newly married and felt sympathetic with his wife, who was pregnant. She had the job of lifting water from a dug well and pouring it into the cattle bowl outside their home. One day he started to help her to pull her water pot up from the well, because the ground was very slippery, and the pregnant woman would have to cross the yard carrying the large, heavy pot.

As he helped her with this task, the other three sisters-in-law mocked the man for doing womanly work. His elder brothers feared that his manliness was suffering. Observing her husband taking this abuse, the wife grabbed the rope, pulled up water pot from the well, and marched across the yard to fill the cattle bowl by herself. The young man then sat smartly away from his wife and took up the manly work of smoking a *hooka*.

Women's sense of responsibility for careful water use as a way of protecting their families can be so strong, according to some reports, that women may be blamed or even blame themselves for any and all problems with water-related illness, including arsenicosis (Tomizawa 2001). Farzana Sultana (in preparation) sums up some pertinent points:

“It is often noted that women’s role in water resources management is generally high, but their role in policy-making and decision making at multiple scales is low compared to men. Participation of women, from different social backgrounds and locations, is thus needed at different levels to ensure proper consultation and distribution of benefits.... It is important to ensure that participation in local projects does not result in gross increases in workloads and burdens for the poor. Furthermore, it should be recognized that women’s interests in water are not just for drinking and domestic water but for productive water as well....”

Comments by experts interviewed in this review confirm these general observations and the weak role of women in most arsenic mitigation projects. It should be noted, however, that a number of programmes throughout Bangladesh have succeeded in bringing women into public decision-making processes and groups. Direct election of women to Union Parishads is the best example. In the case of arsenic mitigation, it seems self-evident that excluding women is a serious mistake.

1.5 WHAT THE EXPERTS SEE AS THEIR BIGGEST CHALLENGES

Programmes to combat the arsenic problem are planned and implemented by people with their own expertise, opinions, and organizational constraints. Almost every professional interviewed for this study was asked the question, ‘What do you consider to be the biggest challenge in arsenic work nowadays?’ People were asked to focus on socially related challenges. A brief summary of the eight most frequently mentioned challenges is presented below in Table 1.2. Some comments were made in group discussions with one speaking and others indicating agreement with gestures; so the counts are not precise.

Table 1.2 Most challenging issues mentioned in descending order of frequency

Issue	Nationality of Respondent (rough counts)	
	Bangladesh (out of 35+)	West Bengal (out of 7)
1. Raising public awareness to the point that people actually change their water-use habits and possibly decide to pay for safe water.	18	4
2. No single alternative water option will suit all situations; arranging safe, affordable, convenient and otherwise acceptable domestic water options.	8	
3. Guiding people to develop ways of solving their own arsenic problems; helping people to develop the necessary self-confidence and self-help capacity.	8	
4. The shift from familiar household-level drinking water sources to community-based sources creates the need for community-based systems to manage community solutions in a sustainable way.	6	
5a. Lack of decentralisation of public services interferes with programme implementation; Union Parishad has no authority over arsenic mitigation activities; Government mandated arsenic committees are mostly inactive but should be involved.	7	
5b. Indian Panchayats do have authority and often are actively over-seeing arsenic mitigation activities; but they tend to be very target-oriented, not strong on “quality” of processes/planning; some let politics interfere, but some do not.		2
6. Given the complexity of the arsenic problem – that it is geological, medical, <i>and</i> social, there is a need for comprehensive approach; strong coordination needed among various types of mitigation/awareness raising organisations; information sharing needed; cross-cutting issues not getting enough attention.	7	
7. Participatory local planning processes are often too weak; the voices of women and/or poor people are rarely heard.	6	1
8. Better staff training is needed; present staff ‘orientations’ are not sufficient; evidence-based messages should be communicated to the public by specialists.	5	
9. Economic and social problems of arsenicosis patients	3	2

A great many well-articulated comments were made by the professionals interviewed. The table above summarises only their main points. A more complete list of comments can be found in Annex 1.2.

This list provides us with some understanding of the conventional wisdom within the world of professionals now working on the arsenic problem. If social aspects are to be considered in the future, this is a sort of general baseline of social thinking among the experts. Given plenty of time to express themselves, these intelligent, well educated, and experienced people all made thoughtful and lengthy comments. No two have exactly the same point of view; and there are, of course, plenty of debates and disagreements. Nonetheless, we now have a general picture of what is on the experts' minds – and also what is not.

As Table 1.2 indicates, many of those interviewed expressed frustration, even exasperation that the public is not responding vigorously to the news of this 'crisis'. Water-user group formation efforts reportedly work in some places but not in others, with the worrying result that community-based water supplies may not be properly maintained in the long run. People who supposedly 'know' about arsenic are said not be sufficiently 'aware' to actually change to safer drinking water sources. Some find people reluctant to take advantage of mitigation options even if offered for free (and perhaps because they are free). The Chief Engineer of the West Bengal Public Health Engineering Directorate observed that whereas people in his state once were up in arms and demanding more and better quality water, many had become complacent after seeing that the 'poison' did not produce rampant disease and death two decades after the problem was publicly recognised.

Whereas higher governmental officials may tend to blame the public's lack of awareness or motivation for unsatisfactory results, others acknowledge that service providers and policy makers themselves share responsibility for some of the inadequacies. The arsenic problem by now has produced a crowded field in which numerous types of agencies – governmental, UN, NGO, religious, and volunteer groups – rush into villages to implement schemes in a highly un-coordinated manner. Their differing messages, tubewell testing methods and results, and ideas about how to solve the problem confuse the people they intend to 'help'. It is clear, then, that the experts' organisations/agencies do not communicate or collaborate to a sufficient degree, as illustrated in Box 1.7. Sometimes two or more organisations will offer competing or conflicting services in one place. For example, there are examples from both Bangladesh and West Bengal where a carefully organised pond sand filter system or dug well was abandoned when a new agency appeared without warning and installed a deep tubewell. Such coordination problems are guaranteed to produce confusion, not motivation, as noted in the *National Policy for Arsenic Mitigation 2004*.

A few interviewees expressed concern that project efforts may not always benefit poor people; and more than a few admitted that women's voices are not often heard in local-level planning discussions. Very few offered suggestions on how to overcome these types of social challenges.

Box 1.7
In spite of NINE awareness programs held by Project Well and LKP, covering a small area, some of the dug wells are not being used as expected. Why? 1) *Installation of too many options in the same area due to lack of coordination between NGOs working in the villages and lack of proper planning...* 2) *Subsidizing is an essential concern....[If] villagers contribute either by cash and/or by labour or raw material, [this] enhances the sense of ownership of the water supply*

Most of the community-based projects are heavily supported by the NGOs or other organisations that initiate them; but these organisations are only temporary custodians of the new, safe water sources provided. There are numerous discussions and debates under way among the experts concerning what social institutions will ensure a permanent, safe drinking/cooking water supply to people in arsenic affected areas. Are governmental or non-governmental agencies likely to provide the most appropriate and sustainable mitigation services? Should people, even the poorest, be required to pay something or not? What is the local body most likely to take on long-term responsibility for operation and maintenance of an alternative, safe water source once installed -- the Union Parishad (or Gram Panchayat, in India), a volunteer user group, or some other entity? Is a paid caretaker

absolutely necessary? Experts expressed a general sense that local government needs to be involved, but few had specific ideas about how such involvement could produce the desired long-term sense of local responsibility for maintaining arsenic-free water sources. As will be discussed below in Section 6, some community organising experiments are being scaled-up as strategies to combat the arsenic problem.

Pertinent matters *not* raised by many experts were: (1) social factors likely to influence people's awareness levels or motivation to change water sources; and (2) a sense that an arsenic awareness or mitigation programme may need to try some bold and socially innovative approaches if it is to actually reach all those who are at risk or suffering because of arsenic-contaminated tubewell water. Activities are considered mainly in a technical light – developing and introducing an option, persuading people to pay for it and use it, arranging to have it taken care of properly. The possible benefits of adopting a social change perspective are rarely considered. (3) Health professionals are focussed on patient diagnosis and care, if they deal with arsenic-related illness at all; and most seem to have a limited understanding of the connection between arsenic-related health/illness and social life.

1.6 COMMUNITY MOBILISATION AND STAFF TRAINING

Increased use of community-based safe water options either will require new forms of village cooperation, or will place new responsibilities on existing local/social institutions. This shift in village life is recognised by mitigation programme planners; and many are trying to facilitate the development of water user groups and other potential management agents.

It is important to understand that, if they perceive a need to do so, Bangladesh rural communities have the capacity to mobilise themselves to resolve water resource management problems with little or no external assistance. Development agencies tend to be pessimistic about this potential, but there is clear evidence that it does exist. A persuasive study was done in the 1990s under the auspices of the Bangladesh Water Development Board's Systems Rehabilitation Project/SRP (Duyne 2004 and 1998). This study analyses a number of cases of large-scale, locally initiated surface water management activities to prevent flood damage, conserve water, improve irrigation, and so on. More importantly, the study notes that rural people collectively and actively strive to manage their environment. Furthermore, local people are not passive in relation to external interventions in their regions; rather, they try to assess and even manipulate externally (including government) initiated projects in terms of their own perceived needs and interests. Most (if not all) regions have some respected leaders. These may be elected persons or others, who can and will act to protect or advance collective interests, frequent reports of local corruption and so on notwithstanding.

One report on the response to the arsenic problem in Charigram and Singair unions of Singair Upazila, Manikganj District, described a situation in which local people drew upon their past history with the Social Mobilization for Sanitation campaign and mobilised themselves. (Hoque 2000) The national campaign went on from 1988 to 1999 and reached these unions in 1995-97. The two unions had illiteracy rates (indicative of poverty) of 60% and 37% respectively. They had learned from the sanitation campaign how to form local action committees; and did so with apparent effectiveness. Local and Upazila/Thana government and elected officials were actively involved, as were the often-inactive WATSAN committees. Women and men both actively participated.

Overall, community and multi-partner participation in arsenic mitigation was high, as in the social mobilization for sanitation. Volunteer women, social and elected political leaders, schools students, and health workers participated in the planning, promotion and implementation of the activities as members of the UWATSAN (Union level) and VWATSAN (village level) Committees or as their nominated volunteers. The elected Union Parishad Chairmen and women volunteers played the key roles in planning and implementation of the activities. They discussed the impacts, mitigation issues, water supply options and sharing of the costs at courtyard and/or schools meetings. Selected messages were also disseminated through rallies and public announcements (mikings). The Sub-district Administrator (Thana Nirbahi Officer) facilitated awareness, motivation, planning, coordination and monitoring at sub-district level. He also participated in mass awareness meetings. His involvement also influenced interest in other unions (Hoque 2000:489).

WELL (2002) reports on a programme from Banaripara Upazila, Barisal District, in which government officials, teachers, and others were interviewed long after the sanitation campaign. This study confirms that Social Mobilization for Sanitation did indeed activate people at all levels of government and society to work for sanitation improvements and lends credibility to the Manikganj situation description presented above.

In situations without such a history of self-mobilisation, external agents probably will be needed to help people to develop ways of managing their new community water sources.

Facilitating such local group formation, however, is a very labour-intensive and time-consuming activity. It requires staff with appropriate negotiation and communication skills and a carefully managed process of building up trusting mutually respectful relationships with residents. Self-help is the objective, not just compliance with externally imposed ideas. There are wider social development benefits to be derived from this approach beyond the public health benefits. In the Asia Arsenic Network's rural piped supply project in Putkhali Union, of Jessore District, for example, the pipeline committee is being encouraged to register with the Social Welfare Department and conduct various social development activities. At least one other local development project, LGED's Small Scale Water Resources Sector Development Project (SSWDRSP), has found that people's interest in single-issue committees or groups is likely to dwindle over time; so the cooperative associations formed under this project are encouraged to promote savings, micro-credit and other popular local improvement efforts.

Where there is a lack of either local leadership or external agencies to facilitate community involvement and participation, mitigation options when provided may still fail as illustrated in Box 1.8.

Box 1.8

Morolpara is a section of Krishnakathi Village, Jamalpur Union, Tala Upazila, in Shatkhira District. Ninety percent of the inhabitants of Morolpara are reportedly affected with arsenicosis. Shafiqul Islam of the locality, age 35 years, is in critical condition. Several members of his family have died of arsenic-related illnesses. Most of the people know about arsenic but have no option but to drink arsenic-contaminated water. The people accept the situation as their fate. In 1993 the then-District Commissioner, now Civil Surgeon, and other senior officials visited the area. One pond sand filter was installed, but it was abandoned within a few months. The people are not in harmony. They have neither local leadership nor outside initiatives to save their situation. (NAISU, *Arsenic Bulletin*, April-June 2003)

In Bangladesh and West Bengal there are good community mobilisation models to follow, and effective techniques are documented (for example, see Watsan Partnership Project 2000a,b,c and UNICEF, in press). If the implementing agency works with partner organisations, it is of the utmost importance that they be genuinely willing to mix with local people, and that their work be closely monitored and objectively evaluated. Such methods have been followed in a number of programmes with reportedly good results. Benefits of a participatory approach are summed up in a report from the All India Institute of Hygiene and Public Health's Community Based Project to Mitigate Arsenic Pollution in West Bengal (Majumder and Kahali 2003:24):

'Earlier in the arsenic affected village people were contacted by various agencies for various purposes to relieve the people from arsenic problem. As a result people became confused. They could not decide whom to hear and what [was] to be done. In this project, a definite approach had been taken so that the health, technical, socio-cultural and economical aspects could be delivered from a single outlet in an integrated form. This obviously cleared much confusion of the community groups and they got much constructive guidelines on the **dos and don'ts** to get relief from the arsenic hazards. *The benefits of this approach may not be very visible within such a short period but is expected at the end and would prove worthy for any community-based project or programme*'.

Box 1.9**Learning from Experience: Some Programme Managers' and Staff Comments**

- We made some dug wells and ring wells without much communication. After we saw they weren't being used, we realised how important it was to communicate. This was in 2001.
- We've re-interviewed some of our old patients. Some are still taking water from their old, arsenic-affected tubewells and 'have no idea'. We were not able to continue meeting them regularly.
- It is a big mistake just to test and mark tubewells, and then go away.
- In one upazila [our partner organisation] has done most of the construction without getting any user contributions, although they had informal agreements that the people would contribute. Now the people have gone to their MP and are complaining that the project demands money from them.
- At first we set up water user committees after installing the arsenic removal units. Now we do it before installing.... The approach has become tighter over time....We require that they promise in writing to collect funds, so that users pay.

In interviews with professionals several were kind enough to mention learning from mistakes as shown in Box 1.9. They particularly noted the dangers of *not* following participatory, self-help oriented community approaches. Water sources have, at times, been installed without any explanation given to the people expected to use them; and if they were unfamiliar systems, they were not used or allowed to degenerate. In several cases options have been installed before local people were fully committed to contributing funds, with disappointing results. Several interviewees mentioned that if water user committees are not formed and activated before installation of arsenic mitigation options, they may never become truly involved or have any sense that they are responsible for operation and maintenance.

Making payments and sharing costs, is one form of community 'participation'. A great many people interviewed said that if people (no matter how poor) do not pay for something, they do not value it. A similar lesson forms the basis of many family planning condom-distribution

programmes. In some projects, those concerning arsenic mitigation and other water supply projects as well, a firm commitment by future users to make a financial contribution is required before construction (or installation) can begin.

1.6.1 A project implemented directly by DPHE

In eight Upazilas covered by the DPHE-UNICEF arsenic mitigation project the local development agent is DPHE itself, rather than a partner NGO. This experiment will be very worthwhile, as DPHE has very limited capacity to conduct any village level activities because of the small number of Upazila office staff and the agency's technical orientation. All experiences of this unusual programme should be carefully evaluated for their learning potential. If successful, this would provide a model for greater DPHE involvement in establishing sustainable, arsenic-free water supplies.

1.6.2 Staff training

Some documents and personal comments underscore the urgent need to train staff carefully before attempting community-based work on arsenic. In a field that has rapidly expanded and which utilises numerous diverse types of groups to implement programmes, staff training appears to be a weak point. This came out, for example, in an October 2003 workshop organised by NAISU. The workshop participants included several NGOs, journalists, local government representatives and DPHE Sub-assistant Engineers from the Faridpur and Madaripur regions. One of the concluding insights from the workshop was that 'Most of the personnel working on arsenic issues are incapable to disseminate the arsenic related information at field level' (NGO Forum and WaterAid Bangladesh 2003b).

At least one evaluation study has made a similar observation: 'Many of the 'trainers' and 'animators' had very brief exposure to understand and to consider [how to communicate effectively]; the deficiency of their knowledge on arsenic and possible impacts of arsenic and regarding mitigation were apparent.... Also they had no technical idea how the process of 'awareness generation' works' (Zuberi 2003). These comments raise serious questions about the quality of current programmes and highlight the need to monitor carefully and evaluate objectively all field level activities. They also demonstrate a widespread need for more and better staff training, perhaps in all or most arsenic mitigation projects.

A related issue is the training of Ministry of Health and Family Welfare personnel. Until very recently there was very little knowledge among health professionals about the symptoms or treatment of arsenic-related illnesses. In 2003 the Directorate General of Health Services (DGHS) conducted training on arsenicosis diagnosis and management for approximately 300 doctors. Further training is planned now that a World Health Organization protocol has been completed and approved for use. Some 5000-10,000 copies have been printed. UNICEF and WHO together will contribute to further training for doctors; and BAMWSP plans to conduct some training for doctors in some or all of the 189 Upazilas that it covers. Emphasis in this and other training should be on 'training of trainers' in order to broaden the knowledge base among medical professionals (Han Heijnen, personal communication).

As patient diagnoses are to be confirmed with water tests for arsenic contamination, some 150-160 Upazila health centres have been provided with field test kits by the World Health Organization. Training has been arranged for doctors and laboratory technicians in the use of the test kits.

The impact of training efforts requires close scrutiny, as medical professionals are urgently needed to share in solving the public health challenges posed by arsenic in ground water. Indeed, some training might be directed to ways that medical, engineering, and social development specialists can work together to the public's benefit.

1.6.3 Using available 'social capital'

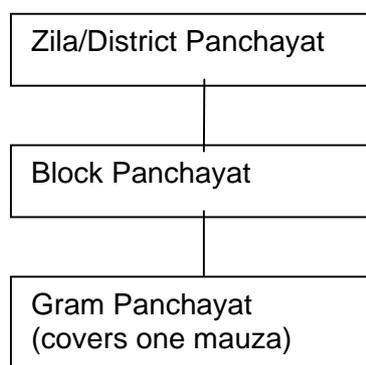
As one interviewee, Ms. Qumrun Nahar, mentioned in a group discussion, the Bangladesh countryside abounds with human talent. There are many untapped human resources and networks that represent 'social capital' with great potential to help solve the arsenic problem. Among the population, the trained tubewell testers could build on their existing knowledge base if properly trained and guided. Health and family planning workers are beginning to be involved.

Voluntary organisation members also could help. 'Some influential people are ready to contribute, but they do not know how. We have to identify these people', said Qumrun Nahar, 'and give them responsibility. Ask them how they would like to assist poor people. We think too much about external resources. We must support people in building up their own capacity. Train them about the advantages and disadvantages of various [arsenic mitigation] options'.

1.7 CURRENT AND POTENTIAL ROLES OF LOCAL INSTITUTIONS

Decentralisation of services and ‘devolution’ of authority to local government are perpetual themes of public policy discussions in Bangladesh. These themes emerge once again in discussions about the arsenic problem. Various governments have given and then re-claimed control over critical local-level resources and decision-making in a kind of see-saw pattern. India, on the other hand, actually did change its system in the late 1970s to one in which increased authority and resources are controlled by a three-tiered set of directly elected bodies that start at the Mauza/village and go up through the sub-district (Block) to the District, as indicated in Figure 1.1.

Figure 1.1 Elected Local Government Bodies, India



The Union Parishad, Bangladesh’s only elected local government body, covers a territory that is larger than the Indian Gram Panchayat but smaller than the Block Panchayat. (The Mauza is a common unit in both countries: it is the smallest population cluster counted in the census. It typically consists of a few small villages or one or two larger villages).

Programme staff and managers were asked about the present helpfulness of local government bodies. Comments were mixed, both positive and negative, as might be expected. As one programme manager in West Bengal said, ‘It depends on the personalities’. The Bengal Engineering College arsenic mitigation project does not work directly with Panchayats, but they do require a written agreement from the Gram Panchayat in order to install an arsenic removal unit onto a tubewell. All public tubewells are considered the property of the Gram Panchayat. Another West Bengal project, Project Well, takes a different approach. Project Well reportedly ‘always involves’ the Gram Panchayat in setting up a local project. The Gram Panchayat grants permission for the work of project personnel, participates in discussions, and shares in decisions about the siting of mitigation options (Alpana Hira Davidson, personal communication). The arsenic mitigation programme of the All India Institute for Hygiene and Public Health reportedly requires that the community group formed in each project village include at least one member from the Gram Panchayat (Majumder and Kahali 2003:22).

According to one former Public Health Engineering Directorate Chief Engineer, Mr. Priyatosh Mitra, all levels of Panchayat organisation, including the Zila Panchayat, are ‘very strong and active’. There was not enough time for the present study to go into any depth on the roles of the Panchayats; but even these brief glimpses show that the Gram Panchayat has considerably more resources and responsibilities than the Bangladesh Union Parishad. Roles of the Gram Panchayat and other Indian local government bodies deserve further study, since Bangladesh is likely to develop a similar system in the future.

Union Parishad Chairmen and Members were often mentioned in a positive and hopeful light by interviewees. They were, however, often said to be merely 'informed' rather than included in project activities. Many described them as helpful and involved in efforts to solve local arsenic problems to the extent they were able. One World Health Organization PRA study found that Union Parishad Chairmen and members 'had no idea about the arsenic problem or what to do. When we did the training they felt proud and wanted to learn more' (Khalid Hassan, personal communication). According to a DASCOPH staff member (Sultan Mohammad Joinal), getting the Union Parishad involved in arsenic-related problem solving is far more challenging than technical problem solving and installing options.

1.7.1 DASCOPH LGI project in north-western districts

A new Swiss Development Corporation funded programme is starting its field activities in 457 villages of Rajshahi and Chapai Nawabganj districts following a cultural principle of 'asking others' opinions (*motamot*) as a way to show respect and motivate people, including Union Parishad Chairmen and members. This programme, implemented by DASCOPH, will build on a basis of Village Development Committees (VDCs) already established and activated as part of the recently completed Watsan Partnership Project in the same region. The work will be in heavily arsenic-affected areas only. The project, unlike most others, is taking a 'process-oriented approach'. It is hoped that over a period of several years the VDCs will prepare their local action plans with budgets. Multiple issues are to be addressed, not just arsenic problems.

Once these plans are developed, the Union Parishad Chairmen and Members will be asked to contribute by adding their 'opinions'. Those that seem likely to work in a participatory way with their constituents, as represented in the VDCs, will be supported with training and in other ways. It is hoped that in the long term, the Union Parishads will take responsibility for provision of arsenic-free water, and for routine water quality testing as well. Mitigation options may be provided later on, but will not be provided at early stages of the project (Sultan Mohammad Joinal, personal communication). The ultimate goal of the project is to improve local governance in areas with arsenic-related problems.

1.7.2 The urgent need for local water quality monitoring capacity

The water supply sector in rural Bangladesh is now up against the task of sustaining a remarkably high coverage with the population having access to improved water supply and a very good service level, due to the advent of arsenic in its main source for drinking water. It is also likely to undergo a transition from point sources to community-based systems, which requires a new set of institutional [partnerships], and substantial capacity building (Minnatullah 2003:7).

Solving the arsenic problem is not just a matter of installing mitigation options. It also requires planning for maintenance and continued use of those options, and regular water quality testing. It is not realistic to assume that any remote entity, even an Upazila body, will care enough to maintain any specific rural water source. Rural people must do these jobs themselves. As things are presently set up, however, local government institutions do not have the capacity to face this problem.

Water quality monitoring (for key parameters, including but not limited to arsenic) from now on will be an ongoing need, as noted in Box 1.10. An important question remains: Who will take responsibility for this important new task? It is not appropriate for temporary NGO project staff to take on such responsibility for this new function, which is comparable to basic

Box 1.10

We formerly did not do routine tubewell water quality testing. We assumed that ground water was potable, but now we know it is not true. It is a huge work, to test 1 *lakh* of tubewells, but water quality monitoring is a permanent work burden for us now. (Pradip Kumar De, Chief Engineer, West Bengal Public Health Engineering Directorate)

health or educational services in the necessity to reach all the population in affected areas. A most logical entity is local government; but endowing the Union Parishads with such duties would require great changes in their resource allocations and in their *modus operandi*. There is an urgent need to determine not only *what* to do, but *who* will do it in the most sustainable manner.

In one case, at least, genuine local NGOs have taken on this responsibility. In West Bengal, UNICEF has initiated an interesting experiment with village-level water quality testing, using spectrophotometric analysis. Twenty village laboratories have been established on the premises of some established and successful sanitation equipment production facilities, most of them managed by NGOs (two are managed by semi-governmental corporations under the authority of the Panchayat and Rural Development Department of West Bengal.) Laboratory technicians are recruited from among area residents; they are university graduates with chemistry backgrounds. The laboratory technicians have received intensive training and re-training, as needed, from technical staff of UNICEF. Capital costs have been provided by UNICEF, but local people pay for their own water tests. One such facility in North 24 Parganas District was visited by the consultant and found to be fully operational. According to Priyatosh Mitra, a UNICEF consultant, only smaller and very local NGOs would be suitable to manage such facilities. The West Bengal experience with village-level water testing laboratories deserves to be part of the ongoing discussion about ways to develop appropriate methods of water quality measurement in Bangladesh.

1.7.3 Arsenic Mitigation Committees and others

On 30 November 2000 the Government of Bangladesh issued a Government Order establishing Arsenic Mitigation Committees at three administrative levels: Union, Upazila, and District. The Arsenic Mitigation Committee is one of 23 mandated committees established under such government orders.

Several people interviewed expressed a wish that such committees were more active than they usually are, and a keen interest in identifying how to motivate them. It is probably true, however, that some members of these committees are unaware that their names are on the required lists. Furthermore, if they do try to meet and discuss the arsenic problem, they are not likely to have very clear ideas about it or what they can do. It is even more likely that their constituents, the residents of their wards, do not know about the existence of the committees. Insofar as they do 'meet', it is not as independently active decision-making bodies, but rather as participants in routine Union Parishad meetings or at Upazila meetings chaired by a UNO (World Health Organization and UNICEF Bangladesh 2003). This can lead to problems noted in Box 1.11.

Box 1.11

Government has done a big job by making this proclamation, but it is not functioning. Maybe government should make another proclamation to make the committees active.

Some union parishad chairmen we have met say they don't know what to do. If there is any demand from the community, they try to stop it, to avoid them, because they don't know what to do.

--Two people's comments in a group discussion

Two specific measures are needed to make these committees effective agents. One is to provide them with sufficient information and support, to build their capacity to help their communities. The other is to resolve possibly confusing differences with Water and Sanitation Committees. The main problem in bringing the two together is that both are mandated to work on domestic water provision. It is not likely that a typical union will have enough community leaders to fully activate both committees in parallel, not to mention the other 21 required committees. Another problem is that the two types of committees have been set up in different ways. The WATSAN committees are to be formed in a three-tiered Union, Upazila, and District system, whereas the Arsenic Mitigation Committees

are set up to work in four tiers: Union, Ward, Upazila, and District.

Detailed considerations aside, it surely must be difficult for a Union Parishad to set its own agenda and work in a self-help style when it is burdened with so many instructions from the governmental bureaucracy. The Bangladesh system as it stands, with the general lack of support for development of local institutional expertise and operational ability, tends to defeat the creation of meaningful public participation in important decisions relating to the arsenic problem.

1.8 CONCLUSIONS AND RECOMMENDATIONS

This study has consisted of one consultant undertaking a literature review and discussing the social aspect of the arsenic problem with more than 50 professionals in Bangladesh plus others in West Bengal over a three-week period.

In order to solve the arsenic problem in the long term, it will be necessary for intervention agents to adopt a *social change perspective*. It is not enough to have elite professionals from outside come in and meet with elite members of rural society, virtually all males. A bolder approach is needed to community mobilisation, one which includes women of all socio-economic levels, and one which seriously tries to address the perceived needs of poor sections by actually talking with the poor.

The Bengal Delta region's arsenic problems are bringing up a need to *decentralise* key services to the most local possible level, which at present is the Union in Bangladesh and the Gram Panchayat in India. *Devolution of authority, capacity-building, and endowment with adequate resources* are essential to the success of any such effort. Many are skeptical, but transparency and accountability can reduce chances of problems, as Minnatullah (2003) has argued. Union Panchayat Members and Chairmen have been found in many places to need information and training. Providing this would help to motivate them to help the people of their localities to solve any arsenic-related problems. Local government, especially the Union Panchayat - both Chairmen and ward Members, especially female ward Members - should receive adequate training and motivation to enable them to guide local-level arsenic related efforts. In order to improve programme coordination, the Union Parishad Members (once trained and motivated) should be the focal point and should have adequate authority to have the final word on what happens in their unions. Their responsibilities could include oversight of local-level water quality testing.

Prevalence of arsenic-related illnesses needs to be considered in the light of overall morbidity rates in the population. There are problems in making such comparisons, given the lack of a national arsenicosis prevalence study. For instance, in one study in an area where the population were drinking water with arsenic concentrations over 50 µg/l, the prevalence of arsenicosis among men (10/1000) was similar to the national prevalence of dysentery (around 9/1000), although women had a much lower arsenicosis prevalence. However, such comparisons can be misleading in the sense that specific areas may be more affected by dysentery and have higher local prevalence rates. Nonetheless, epidemiological studies, most of whose data are yet to be published, already show that highly exposed populations are developing health problems associated with arsenic toxicity. The poor are affected to a far greater extent than non-poor; and prevalence of acute symptoms is much higher among males than females.

Two kinds of arsenic-affected situations exist at present. One is the 'hot spot', where patients are many and suffering is acute and widespread. 'Hot spots' can be whole villages or certain sections (*paras*) of villages – often the sections where most families are poor. The needs of such populations (for safe water, medical attention, and other coping strategies) are very clear, and local receptivity to interventions may be strong. The second type of situation is more common at present. High arsenic concentrations in drinking/cooking water put large populations at risk for arsenic-related illness, but there are no visible signs of arsenic-related illness. If the public does not recognise that there is a problem, these kinds of situations challenge programme staff to develop preventive approaches and raise awareness, hopefully motivating people to protect themselves. Both situations receive priority attention in current mitigation projects; but the needs of the two types differ, so strategies also should be different.

Virtually all arsenic-related interventions are in rural areas. Urban areas, where many still use privately owned shallow tubewells, deserve programme attention as well.

Nine challenging social issues were repeatedly mentioned in discussions with professionals. Many of these also were mentioned in documents reviewed:

1. Raising public awareness to a level that people are motivated to change drinking and cooking water sources;
2. Difficulties of identifying safe, affordable, and convenient alternative water options;
3. Guiding people in self-help activities;
4. The shift from household-based tubewell use to community-based water sources;
5. The ambiguous position of the Union Parishad in arsenic mitigation programmes and the need for more decentralisation of service provision, including water quality management;
6. Developing a comprehensive, multi-faceted approach to the arsenic problem and forming systems in which medical, social development, and technical services are well coordinated;
7. Including women and the poor in local-level planning processes; making these processes fully participatory;
8. Weaknesses in staff training; and
9. Economic, social, and health problems of arsenicosis patients.

These and other issues raised in this report deserve further attention among all stakeholders – government, donors and people most affected by the problem of arsenic in domestic water. The work of many agencies and groups is now done without much coordination from others. If research findings and programme experiences were shared in strong professional/regional networks, information sharing would benefit services over-all. *Local or regional* information sharing is probably more urgently needed than sharing in Dhaka, which occurs naturally to a large extent as the same people attend numerous meetings.

In educating the people on arsenic related matters, we should not make the same mistakes that were made in the past in promoting tubewells. People should be made to understand what safe water is, and alternative ways to get it. *Spreading a high standard of information about what is 'safe water'* is essential. The way it should be done is evident from many programmes' experience in water and sanitation and other fields. People should be taught that water is not as simple as many think, and there is a lot to understand and think about. A collective knowledge base has to be developed for sustainability at the community level. Given opportunities to learn, the public should be expected to discuss this issue on its own. It is hoped that awareness of arsenic-related risks will someday be as widespread as knowledge of oral saline treatment for diarrhoea is now. Messages should promote widespread understanding, not fear. Knowledge should not be restricted to influential individuals, committee members, or literate people. Those who do understand can teach others; and the more motivated (which will include some illiterate people) should have access to any and all information they think they need.

1.8.1 Further recommendations

1.8.1.1 Knowledge gaps

Nothing systematic at all is known about the situation of girls. They seem to be the most neglected and the most socially vulnerable of all types of people who are affected by arsenic. Careful investigation of girls' situations is needed, to see what can be done to improve their chances of getting attention from health services and access to arsenic-free water. Schooling is a girls' strategic need related to improving their overall social status.

The actual priorities and levels of awareness of people living in arsenic-affected areas but not showing many arsenicosis symptoms deserves further study. Their interests and concerns could be easily identified by PRA types of methods. Such investigations, probably already undertaken by organisations focussed on community mobilisation, would help to bring out the public's perspective on the arsenic problem. Knowledge of where the arsenic issue ranks in the overall perception of priorities could help to tailor programmes closely to people's perceived interests.

More information is needed on the general relationship between arsenicosis risk and dietary habits and general nutrition. It is hoped that the epidemiological studies in progress (such as those being conducted by Columbia University and ICDDR,B) will provide relevant information. More information, both quantitative and qualitative, is needed, in order to understand why low socio-economic status is so strongly associated with high risk of arsenic-related illness.

Further analysis is needed on the subject of the differing arsenic-related social and health concerns in the broad context of male-female status and relationships. Gender differences among poor, middle class, and rich people affected by arsenicosis should be studied separately. The attitudes of both men and women toward women's illnesses and health care service utilisation should be investigated.

It will be important to know more about gender differences in arsenicosis prevalence rates (higher among men) as compared to 'prevalence odds risks' (possibly higher among women), as discussed briefly in Section 2.

1.8.1.2 Practical and strategic matters

In 'hot spots', where there are many people affected by arsenic-related illness, it is essential to provide as much health care and information as possible as soon as possible. As many such severely affected populations are poor and illiterate, information and help needs to be provided in a way that people can understand and make use of it.

It is essential that sustainable ways of doing repeated water quality testing be developed for rural areas and also for urban area residents using shallow tubewells. There are various ways of approaching this problem. It can be put in the hands of the Union Parishad. Or it can be managed by sincere local organisations operating laboratories of the type UNICEF has established in West Bengal. Or it could be in the hands of entrepreneurs – perhaps trained tubewell testers provisioned with field test kits and ensured of a steady market supply of affordable and reliable kits. However it is done, some way must be found to conduct this service within rural areas themselves, so that people will have access and actually use it.

Staff training for all types of programme groups needs further attention. There should be a big push to ensure that everyone who meets the public knows how to communicate and has adequate information about arsenic, its sources, and its effects on the human body.

It is generally agreed that there is a great need for improved monitoring of all types of arsenic mitigation services, both governmental and non-governmental. Objective evaluation studies should be done regularly and widely distributed, so that everyone can learn from programme experiences.

The arsenic awareness campaign has begun in Bangladesh, but it still needs improvement. There is a need for approaches that are sure to reach the poor and women, who tend to be less well educated than the more affluent and men.

The key to improving public compliance with safe water use is to include women in decision-making processes about mitigation options and to introduce options in ways that they will find convenient, affordable, and contributory to their families' well-being and comfort. Experience from programmes that do include women can provide guidance on how to bring women into public decision-making processes. Some simple suggestions are to do the following¹:

- ◆ Engage women staff to work at the field level and support their work with conveyance assistance and other security arrangements.
- ◆ When entering a new working area, meet women and men separately, and use some PRA (or similar) techniques to ensure that both women's and men's ideas and preferences concerning domestic water are documented.
- ◆ Women can be consulted in courtyard sessions; and it is recommended to invite them to one-day workshops, perhaps in an Upazila town, with conveyance provided, so they can talk without being interrupted. It will be virtually impossible for women to attend public meetings in bazars or market places; so decision-making meetings should not be held in such places.
- ◆ If men and women are meeting separately, the organisation implementing the programme should present women's views to men as deserving of attention and consideration, while also soliciting men's opinions about the same matters. Facilitate mutually respectful communication.
- ◆ Eventually in many areas it will be possible to recruit women to join decision-making committees, and the implementing organisation should strongly urge their inclusion.
- ◆ Female Union Parishad members in many cases will be willing and able to help as catalysts in engaging women as decision-makers, if they themselves are well enough informed about the local arsenic problem and are supported in doing so.
- ◆ Do not install mitigation options or dig new, reserved ponds in or next to rural markets or bazaars. Very few women would go to such places for any reason.

In general it is recommended that every effort be made to promote a self-help, self-confident approach to the arsenic problem and safe drinking water in the Bangladesh countryside. This problem is so vast, that it can only be solved with the full and active participation of all, whatever their position in the social or administrative hierarchy. The need for smoothly coordinated and collaborative efforts has been recognised in the *National Policy for Arsenic Mitigation* (GOB, 2004). Making this idea a reality is a great challenge, but the human resources are available to meet it if carefully developed and encouraged.

¹ Many thanks to Begum Shamsun Nahar for helping with these suggestions.

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Chapter 5. Challenges to Intervention

Chapter 6. Joint Plan of Action

Chapter 8. Stakeholders

Chapter 10. Frequently Asked Questions

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² An email message was sent by Suzanne Hanchett to UNIDO requesting information on this report, 12 June 2004. Message sent to C.Gurkok@unido.org. Mr. Sengupta now may be posted at WHO Southeast Asia Regional Office, New Delhi.

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Ph.D. research in progress

- 1) Ph.D. candidate: Farhana Sultana
Topic: Gender and class issues in the arsenic crisis
University: Department of Geography, University of Minnesota

- 2) Ph.D. candidate: Alpana Hira Davidson
Topic: Case studies of three arsenic-affected villages in West Bengal
University: Department of Geography, Calcutta University

ANNEX 1.1

LIST OF PEOPLE INTERVIEWED

1. Aasma Afroz Shathi, Research Officer, Matlab Project, ICDDR,B
2. M. Feroze Ahmed, Ph.D., Professor at BUET & Project Director, International Training Network Centre for Water Supply and Waste Management
3. Afzalunessa, Training Specialist, Bangladesh Arsenic Mitigation Water Supply Project
4. Md. Akhtaruzzaman, Media/Consultant Specialist, Bangladesh Arsenic Mitigation Water Supply Project
5. Shireen Akhter, M.S.S., Planning Alternatives for Change
6. Alauddin, MBBS, Medical Officer, Columbia University Arsenic Cohort Study in Bangladesh
7. Ayesha Hussain, Emergency Program Coordinator, Bangladesh Arsenic Mitigation Water Supply Project
8. Abu Shahjalal Azad, Consultant (Arsenic), WES Section, UNICEF Bangladesh
9. Azahar Ali, DPHE-Danida Water and Sanitation Project
10. H.K. Banik, Coordinator, Eight-upazila DPHE arsenic mitigation project (2003 interview)
11. Begum Shamsun Nahar, Gender and Development Specialist, Small Scale Water Resources Development Sector Project (SSWRDSP), LGED
12. B.K. Bhattacharya, Assistant Chief Engineer, Public Health Engineering Directorate, Government of West Bengal, India
13. Shaha Bilquis, MIS Officer, Bangladesh Arsenic Mitigation Water Supply Project
14. Jiptha Boiragee, Project Coordinator, Arsenic Project, DASCOH
15. Dr. Dipankar Chakraborti, Director, School of Environmental Studies, Jadavpur University, Kolkata
16. Alpana Hira Davidson, Professor of Geography, Shibpur Dinobundhoo College, Howra, West Bengal & Project Well
17. Pradip Kumar De, Chief Engineer (WQM), Public Health Engineering Directorate, Government of West Bengal, India
18. Paul Edwards, Chief, WES, UNICEF-Bangladesh
19. Mr. A.K.M. Fariduzzaman, Project Engineer, Arsenic Mitigation Project, Gono Unnayan Proteshto (GUP)
20. Dr. M.H. Faruquee, Deputy Country Representative, Asia Arsenic Network (Dhaka)
21. Dr. Farzana Begum, Project Officer, Public Health Sector, Dhaka Community Hospital
22. Mr. Carel de Groot, Sector Program Coordinator, Danida Sector Program Support Office
23. Dr. Anirban Gupta, Director & Principal Investigator, Project to Remove Arsenic from Village Drinking Water Supplies, India; Bengal Engineering College, Department of Civil Engineering, Howrah, West Bengal
24. S.M.A. Hanifi, Matlab Project, ICDDR,B
25. Mr. Kamrun Hassan, Project Manager, Arsenic Mitigation Project, Gono Unnayan Proteshto (GUP)
26. Mr. A.F.M. Khalid Hassan, Program Officer, World Health Organization (Environmental Health and Sanitation Office)
27. Md. Sazzad Hossain, Training Specialist, NGOs Arsenic Information & Support Unit (NAISU), NGO Forum and WaterAid Bangladesh
28. Mr. S.M. Ithishamul Huq, Executive Engineer, Programme & Coordination, Department of Public Health Engineering
29. Md. Jabed Yousuf, Project Director, Dhaka Community Hospital
30. Kamruzzaman, Assistant Engineer, Rural Water Supply, Department of Public Health Engineering (and Bangladesh Arsenic Mitigation Water Supply Project)

31. Fatema Mannan Lubna, Training Officer, NGOs Arsenic Information & Support Unit (NAISU), NGO Forum and WaterAid Bangladesh
32. Mahfuzar Rahman, Ph.D., Arsenic and Environmental Epidemiologist, Public Health Sciences Division, ICDDR,B
33. Priyatosh Mitra, Consultant, Arsenic Mitigation, UNICEF-Kolkata
34. Mohidul Hoque Khan, Managing Director, Pathway Consulting Services & Member of Bangladesh Poribesh Andalon (BAPA)
35. Joy Morgan, Social Development Officer, WES, UNICEF Bangladesh
36. Sampa Mukherjee, Deganga (Deulia Village, Deganga Block, North 24-Parganas District) Office & Sani-Mart, West Bengal Comprehensive Rural Development Corp.
37. Munir Ahmed, Program Co-ordinator, BRAC Health Program
38. Umme Muslima, Gender Specialist, Bangladesh Arsenic Mitigation Water Supply Project
39. Nasima Akter, Ph.D. Coordinator, Environmental Research Unit, Research and Evaluation Division, BRAC
40. Nasima Akter, Project Coordinator, NGOs Arsenic Information & Support Unit (NAISU), NGO Forum and WaterAid Bangladesh
41. A.F.M. Nezam Uddin, Monitoring Officer, NGOs Arsenic Information & Support Unit (NAISU), NGO Forum and WaterAid Bangladesh
42. Qumrun Nahar, Program Officer (WES), UNICEF-Bangladesh
43. Prof. K.J. Nath, Chairman, Arsenic Task Force, Government of West Bengal
44. Mr. Lutfar Rahman, Senior Social Development Officer, Department of Public Health Engineering
45. Ms. Savitri Roy, Coordinator, Training Department, Dhaka Community Hospital
46. Dr. Ziaul Hasan Rumi, Technical Specialist, NGOs Arsenic Information & Support Unit (NAISU), NGO Forum and WaterAid Bangladesh
47. Rajoshi Shaha, Technical Officer, West Bengal Comprehensive Rural Development Corp.
48. Shafiqul Islam, Team Leader, Arsenic Unit, UNICEF-Bangladesh, Water & Environmental Sanitation
49. Syed Shafique Ahmed, General Secretary, Citizens Forum on Water and Sanitation Initiatives in Bangladesh
50. Shah Noor Mahmud, Sector Specialist, BRAC Health Programme
51. Md. Adubakr Siddique, MBBS, Medical Officer, Columbia University Arsenic Cohort Study in Bangladesh
52. Sultan Mohammad Joinal, project Coordinator, DASCOH, Sustainable Solutions for the Delivery of Safe Drinking Water
53. Md. Tariqul Islam, MBBS, Project Director, Columbia University Arsenic Cohort Study in Bangladesh
54. Mohammad Yunus, MBBS, Senior Scientist and Head, Matlab Health Research Programme, ICDDR,B
55. Mr. Ziaul Islam, Project Manager, Industry Health, School Health, and Family Health, Dhaka Community Hospital
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4. Sudipta Barman, Bengal Engineering College, Kolkata
5. Mr. Priyatosh Mitra, Consultant, UNICEF West Bengal
6. Paul Edwards, Chief, Water & Environmental Sanitation, UNICEF, Bangladesh

7. Dr. Muhammod Abdus Sabur, Health & Population Sector Manager, DFID Bangladesh
8. Meera Hira Smith, Project Well
9. Dr. W. Abdullah Brooks, Health & Child Survival Advisor, ICDDR,B
10. Mohidul Hoque Khan, Bangladesh Poribesh Andalon/BAPA
11. Shireen Akhter, Planning Alternatives for Change
12. Begum Shamsun Nahar, Gender and Development Specialist, Small Scale Water Resources Sector Development Project (SSWRDSP), Local Government Engineering Department/LGED
13. Dr Guy Howard, International Specialist, Arsenic Policy Support Unit

ANNEX 1.2 CHALLENGES IDENTIFIED BY EXPERTS

June 2004 Interviewees' Comments on 'Biggest Challenges' (social) facing those concerned with problem of arsenic in drinking water; Bangladesh and West Bengal comments.

Estimated number of people responding to this question in Bangladesh was 35 and in West Bengal, 7 (in both group and individual interviews). Many mentioned more than one issue.

Summary and rough tally of responses, by Suzanne Hanchett, based on detailed interview notes:

'Biggest Challenge': Specific Comments	Number (multiple responses)	
	B'desh	W.B.
1. Raising public awareness		
Raising public awareness levels: 'motivating people' to consistently use arsenic-free water; Making people understand what arsenic is, and how arsenic affects the body; Making people understand that they could be harmed if they haven't met patients or seen people die from arsenicosis; people don't understand hidden toxic effects of arsenic; Educating people about their geology Insufficient public demand (from people or elected representatives) for safe water and mitigation measures; People are too complacent	10	
Lack of immediate, visible health effects reduces public's interest in the arsenic problem. People haven't seen many patients, and almost never have seen arsenic-related deaths; so they don't feel as concerned about this as they do about diarrhea or dysentery.	2	
Weak public response to efforts to promote mitigation options despite meetings & subsidies, or even distribution of free equipment; Changing behaviour (compared to introducing tubewells initially, HIV/AIDS, vaccinations); getting people to start drinking safe water It's easier to promote latrine use, because it's not an entirely new concept.	5	
Persuading people to use safe water for cooking, not just drinking	1	1
Reversal of messages about 'safety' of tubewell water; 'Behavioral reversal'; Overcoming people's sense that having/using a tubewell is high-status; Same 'messengers' communicating opposite messages	3	
Guiding people to do 'something different from the past' according to their choices	1	
Promoting awareness among poor people , who tend to be poorly educated and have many other priorities	1	

Getting illiterate people to understand , rather than depending on others to interpret messages. (Many women and poor people are illiterate); changing poor people's 'mind-set'	4	
Explaining arsenic without using the word 'poison' (<i>bish</i>)	2	
Guiding people to do 'something different from the past' according to their choices		
Persuading people to pay for water, since they've become used to getting it for free		
If people don't pay for something, they don't value or take care of it;		
2. Safe water options & Tubewell screening		
Lack of standardized tubewell testing kits/ methods; different testers give different results	3	
Lack of any one feasible safe water option that will suit all situations; How to provide people with alternative sources of safe water that they can <i>afford</i> and will actually use. Arranging safe water options that poor people can afford & supporting them in getting/using them. Getting safe water options to the people. Getting people to accept options.	7	
User-friendly technology; options that suit needs in a particular place; water that tastes good; Convenient, preferably household options needed. Building demand for available options	3	1
Increased responsibility of women when distant/new sources are used	1	
Developing mitigation options that will out-last our programme intervention (sustainability)	1	
3.Promoting a self-help attitude		
Figuring out 'how people themselves can solve their own problems;' helping people to 'develop confidence in themselves,' and to realise that they can't get something for free. Community should raise their own needs. Community mobilization	6	
4. Shift to Community-based systems		
Shift to community-managed water sources from household-based sources; need for 'community mobilization'; Actually <i>activating</i> committees, rather than just forming them. Make local O&M sustainable through some permanent local arrangement after paid NGO staff stop working in an area. Who will take care of the things we've installed after we leave?	6	
Need for continual water quality testing after intervention programmes are phased-out Figuring out how to get domestic water tested at convenient locations	1	3
Making use of available social capital' to solve the problem and improve general awareness	1	
Too few masons now, who know how to install dug wells	1	
5. Governance and policy		
Decentralization - a basic issue here; UP's lack of knowledge, role, or authority in arsenic mitigation; Inactivity of many arsenic mitigation committees: need to activate them.	5	
Panchayats: have authority and help in some places; but are too target-oriented and less focused on quality		1

It would be wise to separate policy-making & policy-implementation agents in Bangladesh	2	
6. Comprehensive and coordinated approach needed		
Information-sharing among different programmes/projects; we need to share information on 'best practices' There should be a 'single stream of communication'.	3	
Arsenic is a three-part problem: geological, medical, and social A 'comprehensive approach is needed.' 'Coordinating technical and community aspects' 'Cross-cutting issues' not getting enough attention. 'Mistrust is the root of many coordination problems': NGOs, gvt, different gvt agencies, etc. don't trust each other	5	
Developing a 'coordinated approach' to water resource management & related environmental issues; not over-using water from deep aquifers; Respecting nature.	1	1
Forming a strong connection between health and engineering is difficult in a working environment that is very 'project-based.'	1	
6. Participatory planning needed		
Setting up a genuine, participatory decision-making system that includes all -- poor people, women: it's really not happening. This is a A program organization challenge.' Avoiding elite domination. Local-level institutional development	3	
The 'voice of the poor is not heard. They get charity but deserve more than that.'	1	
Giving attention to remote villages, where few NGOs actually go & the largest almost never go.	1	
Women's views not considered most of the time; women not visible in public planning meetings; Community mobilization that includes <i>both</i> men and women; Women not involved in decision-making or contributing funds	4	
Creating intervention programs that are not constrained by inappropriate requirements, and not overly target-oriented or bureaucratic.	1	
Building trusting relationships with local people: can take a year or more	3	
8. Building organisational capacity		
Learning from experience; supporting and studying demonstration projects; Impartial evaluation studies needed; Spot checks (unannounced) needed to monitor NGO field activities;	1	
Supervision and monitoring too weak in all government programmes	1	
Better staff training, based on 'evidence-based messages,' not just 'orientations.' Many without expertise are working in the field, but arsenic requires 'a specialized person.'	5	

It has been difficult (but possible) to train rural university graduates as laboratory technicians in village-level water quality testing labs		1
Raising gender awareness within BAMWSP	1	
9. Arsenic-related illnesses: social consequences of		
Facing the massive public health challenge posed by such a large population at risk of arsenic poisoning.	1	
Not 'panicking' when arsenic-related illness is diagnosed	1	
Social acceptance of arsenicosis patients	1	
Some patients are starving; cannot afford medical care		2
Mitigation & patient management; Identifying those with skin lesions and getting them the care they need	2	
Young/adolescent girls not likely to be covered by health-camp patient identification activities, because they don't go into public places/crowds.		1
Reduced activity and productivity of people with arsenicosis	1	
Study is needed, of which types of people are most affected. We did screening without taking socio-economic status into account.	1	
10. Overall comments about arsenic related activities, approaches		
More action, less talk	1	1
'We're working in a system that is not prepared to take social aspects into consideration.'	1	

CHAPTER 2:

GENDER CONCERNS IN ARSENIC MITIGATION IN BANGLADESH: TRENDS AND CHALLENGES

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Report prepared December 2005

2.1 INTRODUCTION

Bangladesh is facing a drinking water crisis from naturally-occurring arsenic in groundwater that provides drinking water to millions of people. It is estimated that between 25-30 million people are at risk of consuming contaminated water with arsenic levels greater than the Bangladesh government standards (Ahmed *et al.* 2005). Groundwater became widely available through proliferation of tubewells (that pump up groundwater for consumption and use) in the last few decades. Mass campaigns were undertaken by the state, NGOs and donors to move the population away from consuming bacteriologically contaminated surface water sources to what was deemed safe groundwater (Ahmed & Ahmed 2002; Smith *et al.* 2000).

Heralded as a public health success story as morbidity and mortality rates from water-borne diseases fell dramatically over the years, tubewells became the mainstay in rural drinking water supply systems. There are now estimated 10 million tubewells throughout the country, both public and privately owned. The convenience of tubewells, as well as the status symbol associated with it, has made it a popular water supply system in rural areas. It has particularly been favored by women, whose drudgery in procuring water was lessened with increasing numbers of tubewells in villages over the years (Caldwell *et al.* 2003).

While the situation of accessing safe potable water improved with increasing numbers of tubewells, the discovery of arsenic has challenged the provision of safe drinking water, as people face arsenic poisoning from consuming contaminated water. It is estimated that about 2 million tubewells are showing some level of arsenic contamination that is rendering them unsafe for consumption (Ahmed *et al.* 2005). As a result, accessing safe water sources has become a critical problem in many arsenic-affected areas.

Tubewell water was not tested for arsenic for years and arsenic was discovered in high quantities only in the 1990s. Arsenic occurs mostly in the shallow aquifers (approximately 10-70 meters below surface), which is where the vast majority of the drinking water tubewells tap into (Paul & De 2000; Alam *et al.* 2002; WSP 2002; Kinley & Hossain 2003). There is also considerable spatial heterogeneity in arsenic contamination levels across the country, and this variation can occur at small spatial scales (even sub-village scales). Thus, statistics of arsenic being present in 270 out of 464 Upazilas in the country need to be tempered with the fact that the level of arsenic as well as percentage of wells contaminated can vary considerably within each Upazila.

Official attempts at identifying contaminated tubewells have been to screen tubewells and paint contaminated ones red and usable ones green (i.e. below Bangladesh government's standards of 0.05 mg/L of arsenic). Due to the heterogeneity of arsenic in the aquifer, there

is spatial heterogeneity in both the distribution and clustering of red and green wells, as well as in the absolute quantities of arsenic in each well's water. Thus, in relatively low contamination areas, there can be clusters of 100% red wells (with arsenic at ranging from high levels to just above the standard); conversely, there may be all-green tubewell clusters in areas identified to be highly contaminated. Thus, the scale of analysis and level of detail are important (also identified by Rosenboom 2004).

While identification of tubewells continues, identification of patients with arsenic poisoning is also underway. The official estimates indicate that up to 40,000 patients have already been identified, and such incidences are expected to rise as more patients are screened and identified. Present statistics indicate that there may be escalating cases of cancer from chronic arsenic exposure in the future.

Studies have found that social and economic loss for people in arsenic areas are acute and rapidly worsening (Ahmed 2002; WHO 2000). Poorer households have been found to have higher percentages of arsenicosis cases (Chakraborti *et al.* 2002; WHO 2000). Many rural areas where arsenic contamination is very acute with large numbers of arsenicosis victims, people have been reported to be shunned or ostracized (e.g. New York Times 1998; Jakariya 2003; NAISU Bulletins). While both men and women are suffering, recent research indicates that arsenic poisoning has led to greater ostracization of afflicted women and girls, whose marriageability has decreased and divorces increased. Social stigmatization is disproportionately felt by women in most arsenic-affected areas (Hanchett *et al.* 2002; Hanchett 2004; Sultana 2006a). Gendered location thus makes a difference in arsenic contaminated areas, where gender differentiated impacts are being observed.

Women's general lack of resources to deal with the ramifications of the arsenic problem can compound poverty and gender to increase their marginalization and suffering. The link between water, social hardship, and gender thus needs further investigation. Gendered analyses of the arsenic problem will provide information that has hitherto been inadequate in research and mitigation discussions in the country.

Scholars have generally noted that women, particularly marginalized and poor women, bear the brunt of environmental degradation and natural resources crises. Access to knowledge, information, management options, choice and ownership of natural resources are complicated and vary by location, culture, institutions, and resources (Agarwal 1992; Rocheleau *et al.* 1996; Jackson 1993; Cleaver 2000). Gender is a critical factor in shaping how people access, control and use natural resources, technologies, and decision-making processes. Thus, the implications of water scarcity and water poisoning for women and men vary across social strata and locations, and need to be analyzed in context (Meinzen-Dick & Zwarteveen 1998; Van Koppen & Mahmud 1996; Jordans & Zwarteveen 1997; Bruns & Meinzen-Dick 2000).

It is also important to note that discourses of 'gender' are often problematically used in water resources management and development literatures to mean only 'women', whereas it should be a comparative study of both men and women in any given context and in relation to other pertinent axes of social differentiation, such as class, caste, age, etc. (Agarwal 1992; Cornwall 2000; Marchand & Parpart 1995; Mohanty 1991).

2.2 OBJECTIVES OF THIS STUDY

The objective of this research is to produce a report on the gender aspects of arsenic in Bangladesh based on field research, as identified in the Terms of Reference (Annex 2). An APSU report by Hanchett (2004) highlighted the importance of heeding gender concerns in arsenic mitigation. The report underscored the need for more thorough gender analysis of

the arsenic situation in Bangladesh. The 2004 National Policy for Arsenic Mitigation also identifies the need to pay closer attention to gender issues in arsenic mitigation and programs. Yet no detailed and systematic gender analysis has been undertaken to date, and such a gender study is critical at this stage to shed light on the situation and better inform policy-makers and programs.

This report aims to provide some initial findings of such an explicit gender analysis. The particular foci of this report are on gendered knowledge, perception and awareness, gendered coping mechanisms, gender and community management, and gender and health concerns related to the arsenic crisis.

2.3 METHODOLOGY

This study is a component of the Ph.D. dissertation research of the author, consisting of rural fieldwork in arsenic affected areas of Bangladesh. Fieldwork for the study was initiated by site selection visits in October-November 2004, after research of available arsenic mitigation data and reports and interviews with relevant officials and organizations involved was underway.

Organizations and NGOs working on arsenic mitigation were contacted and detailed information on their projects and approaches were obtained. By visiting various project sites and other non-project areas where there are high levels of arsenic contamination and drinking water problems, site selection for rural fieldwork was undertaken in November. Villages in the Upazilas of Araihasar (Narayanganj), Chaugachha (Jessore), Agailjhara (Barisal) and Ghior (Manikganj) were selected as they cover different parts of the country and cover differences in geological, social, and arsenic mitigation set-ups. All have fairly high arsenic contamination but different levels of arsenic mitigation and awareness interventions.

For each area, detailed background information, hydrogeological and contamination data, and relevant project/intervention data from the various organizations involved in each area were collected to the extent possible. Three of the four areas are also the project sites of the Asia Arsenic Network (Jessore), NGO Forum (Manikganj), and Columbia University Cohort Project with Dhaka University (Narayanganj) and they lent support in sharing information about their field sites and providing some logistical support.

In the four Upazilas, villages were selected that met the criteria of having high arsenic contamination, where there is a drinking water problem due to arsenic, and either have external mitigation projects ongoing or nothing at all. Clusters of villages were selected for the surveys in order to get a wide range of opinions, perceptions and experiences vis-à-vis arsenic in the same area. Basic demographical information is provided in Annex 1.

In the field, a semi-structured questionnaire survey was developed, piloted and finalized. Research Assistants were hired in each area to assist with implementation of the surveys. A total of six local RAs with basic educational background and experience were selected and trained for this purpose; they were allowed to conduct interviews on their own after training.

Both purposive and random sampling was undertaken with the survey questionnaires; a total of 13 villages were covered and 250 surveys conducted, with respondents being both male and female. A final sample size of 232 was selected, as some surveys were incomplete. A total of 134 women and 98 men were thus included in the interviews. In-depth case studies were also collected with several households in each area. In addition, focus group discussions with men and women (separately and collectively) were conducted in each area, for a total of 12 focus group discussions; these were all taped and transcribed. Informal conversations and interviews were also conducted in each village, especially with key

informants (such as NGO staff, village elders and leaders, politicians, project users, etc.). In addition, participant observation afforded further insights and information, as did selected case studies of interventions.

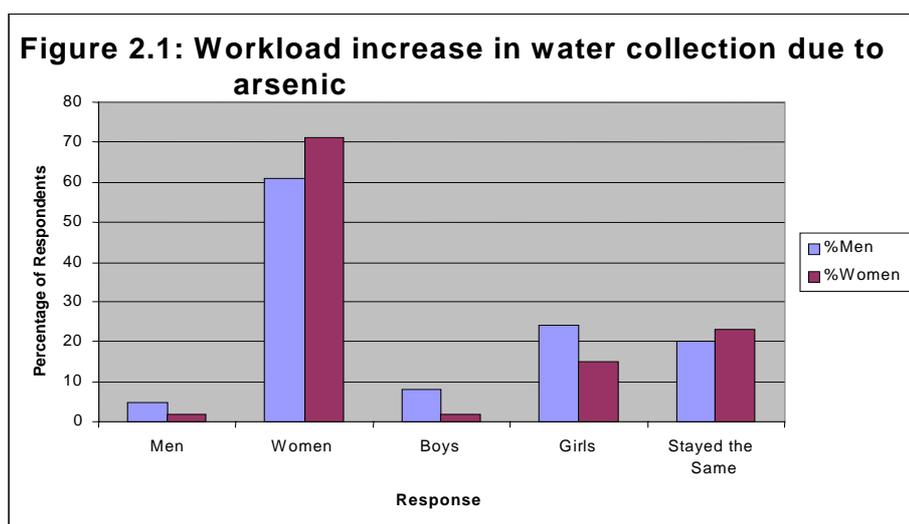
Rural fieldwork was completed in February 2005 and data collation, input, analysis and interpretation commenced thereafter. Survey data was entered into SPSS software package for statistical analysis; Excel was also used for some of the quantitative analysis. Qualitative data was coded and quantified when appropriate, as well as analyzed separately. This report uses both quantitative and qualitative data, as they complement each other in providing a more comprehensive picture of the issues. Where people are quoted or described, all names have been changed to protect their identity.

2.4 RESEARCH FINDINGS AND DISCUSSION

2.4.1 Gender division of labour and coping mechanisms

In rural Bangladesh, domestic water collection and management is predominantly undertaken by women and girls, who spend considerable amount of time and energy under various conditions on a daily basis to collect drinking water for their families (Crow and Sultana 2002). It is rare for men to participate in domestic water collection. Certain notions of masculinity and femininity are associated with who does what types of tasks with water: men predominantly undertake irrigation and agricultural water management, while women generally are responsible for domestic water issues. This gender division of labour is seen in many places globally.

In rural Bangladesh, such socio-culturally defined gender roles are generally not challenged in the broader gender division of labour, even during the arsenic crisis (Sultana 2006). Nearly all respondents in this study agreed that the workload of women and girls has got worse due to Arsenic (Figure 2.1): about 70% agreed that workload has increased for women and about 20% agreed it has got worse for girls.



While most men and women interviewed agreed that mostly women and girls collect drinking water, men reported a higher percentage of their own and young boys' involvements in collecting water (6% and 27% respectively from men compared to 1.5% and 18% respectively from women). It could be that men self-report greater involvement, or it could be a matter of women's perception to what extent men are actually involved; thus, fewer women thought that men participated in drinking water collection. However, approximately 30% of

the respondents, both male and female, claimed that men do occasionally help in getting drinking water in light of increased hardship in procuring water due to arsenic contamination of large numbers of tubewells in their villages.

In responding to whether men should help more due to the arsenic situation, a striking similar percentage is seen in the responses across men and women: 80% said men should help more, and 20% said no. The reasons given in the affirmative are often qualified that men should help only when women are ill, unable, too busy, or it is too difficult for them; those opposed argued that fetching water is a woman's job and society looks down on men for doing a woman's task (Box 2.1).

In general, older women expressed less eagerness to have men participate in collecting drinking water, while younger men appeared to be more supportive of helping women. Poorer people were more supportive of gender equality in this respect than the slightly better off; this could perhaps be related to perceived social status concerns for the wealthier people if men in their household participated in drinking water collection. Such sentiments in stabilizing entrenched gender division of labour and gender identity in water management may come under challenge in the future as water scarcity forces more active participation of all household members in procuring safe water.

Box 2.1

"Even if we are ill our men will not fetch water for us. It is not a man's job to fetch water, but it would be nice if they did sometimes. But we do not ask." – Woman in focus group discussion, January 2005

"Men should help us, to understand our hardship. And also because he too drinks the water" – Woman in interview December 2004

"Why should men fetch the water? That is a woman's job" – Woman in interview, January 2005

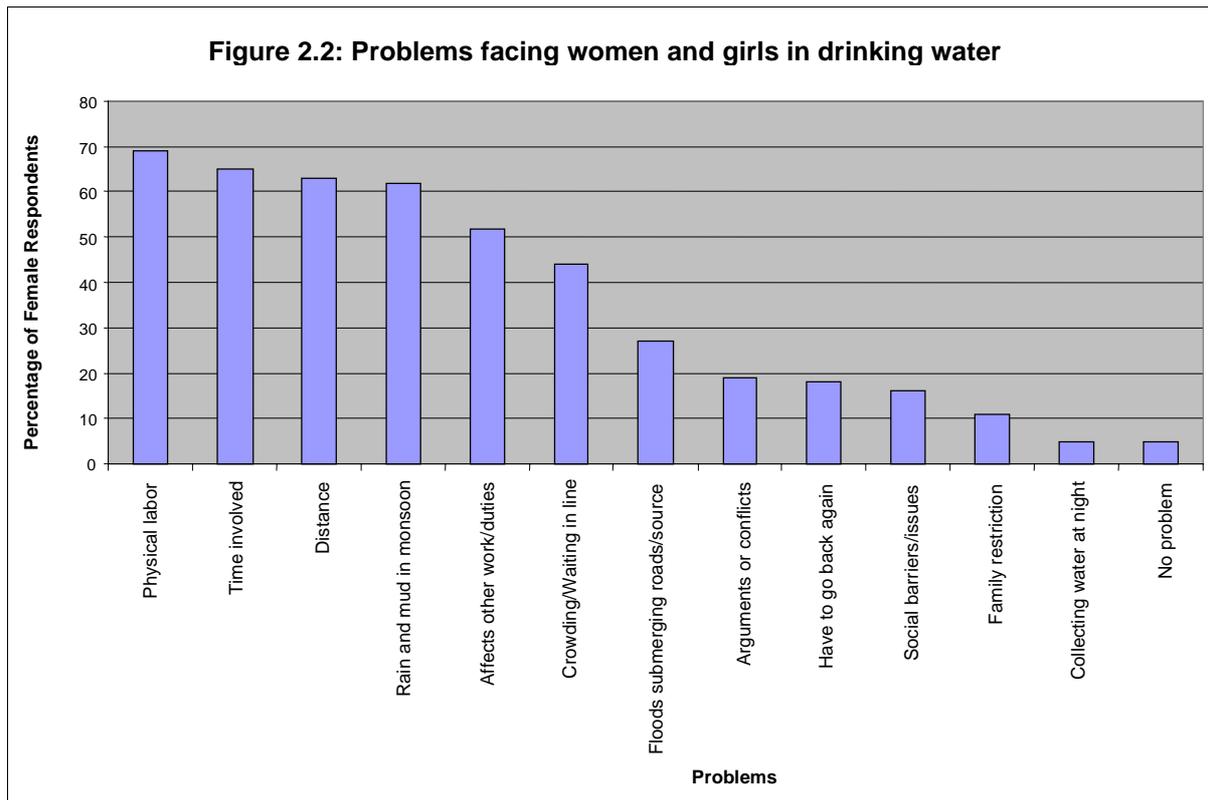
"I would die before I fetched water for a woman. If I did, people would think I am mad." – Man in interview, November 2004

"Sometimes I help my wife get water, or my son does. This arsenic problem is for all of us" – Man in interview, December 2004.

2.4.2 Workload in relation to collecting water

Figure 2.2 shows the general problems that people face in collecting domestic water. Overall, the issues women raised in both interviews and conversations were: physical labour, time, distance, crowding and waiting in line, other work/duties being affected, having to go back again for water, leaving children behind, rain and mud in the monsoon, crowding and waiting in line at the water source, and arguments and conflicts. The latter can involve exchange of words in accessing water points and walking over someone else's yard, the amount of water taken, not cleaning up after taking water, crowding at similar water collection times, and pre-existing family feuds that can manifest themselves at water points.

As a result, women have to endure such issues as they negotiate water access and use, and increasingly so as more pressure is placed on fewer safe water sources in each village compared to before. Such emotional and social issues often do not come up in a cursory glance of the water problems in the countryside, but are important to note in how women cope with the arsenic crisis.



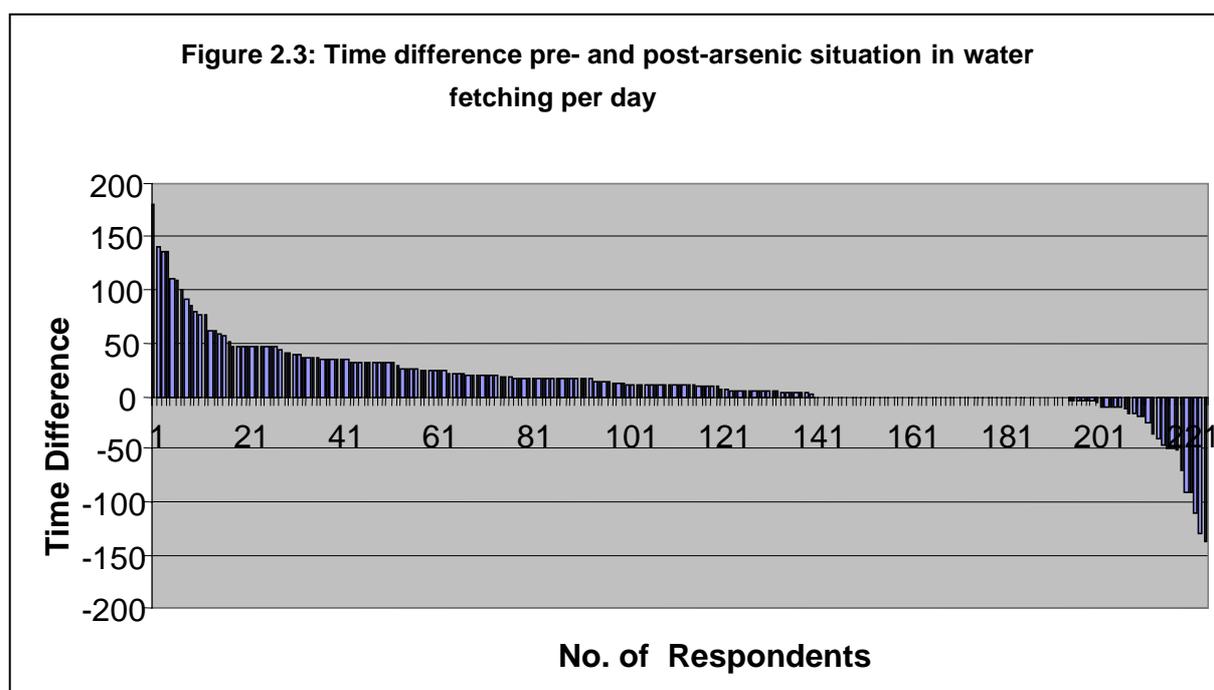
Approximately 84% of the respondents had to switch water sources due to arsenic. On average, respondents noted that time expended for water collection has gone up due to the arsenic situation. In general, average time to fetch water per trip was 7 minutes before arsenic; this has gone up to an average of 14 minutes now, which is a 100% increase. Most households make anywhere from 2 to 10 trips to fetch water, so total time per day varies considerably between households. The total time spent per day to fetch water now ranges from 10 – 200 minutes, with the mean being approximately 41 minutes (compared to an average of about 27 minutes before) (Table 2.1). However, there is great variation in how this compares with the time needed before arsenic was found.

Figure 2.3 shows the differences in time for water collection when pre- and post-arsenic situations are compared. With changing water sources, for 13% of the respondents the time spent has gone down (range -1 to -136 minutes), and for 24% the time spent has remained the same; it is for the 63% people whose time has gone up that time becomes a factor (range +1 to +180 minutes). The average increase for this group is about 30 minutes per day, compared to before. This is about a 73% increase on average in time spent per day in fetching water for the group whose time went actually went up. For some households, the increase in time was perceived to be considerable, when balanced against other tasks/responsibilities, and for some women, the increase in time was double or triple what they expended in the past; some women tried to minimize this increase by reducing number of trips or amount of water fetched. Thus, the quantifiable averages can provide general information but mask the heterogeneity of experiences and perceptions that exist.

Table 2.1. Change in time needed to fetch water

	Average time per trip (minutes)	Average total time per day (minutes)
Now	14 min	41 min (range: 10 – 200)
Before	7 min	27 min (range: 5 – 180)
Increase in time	7 min	14 min (30 min for those whose time actually increased)

Figure 2.3: Time difference pre- and post-arsenic situation in water fetching per day



Of the female respondents who agreed that time involved in water fetching increased, there is a class divide: an average of 75% of the poorer people compared to 42% of the wealthier people have reported increases in time. This reflects that the poorer classes are facing greater hardship in availing safe water, as the wealthier households can install their own deep tubewells or access safer water more readily than the poorer households can; wealthier households can also employ people to fetch water for them. There is thus a class dimension to the arsenic problem. Furthermore, nearly all respondents agreed that in addition to traversing greater distances to safe water options, crowding and waiting in line at the water source have also contributed to increasing the time expended to procure water. As alternative options for safe water remain insufficient, such concerns are likely to continue in many areas.

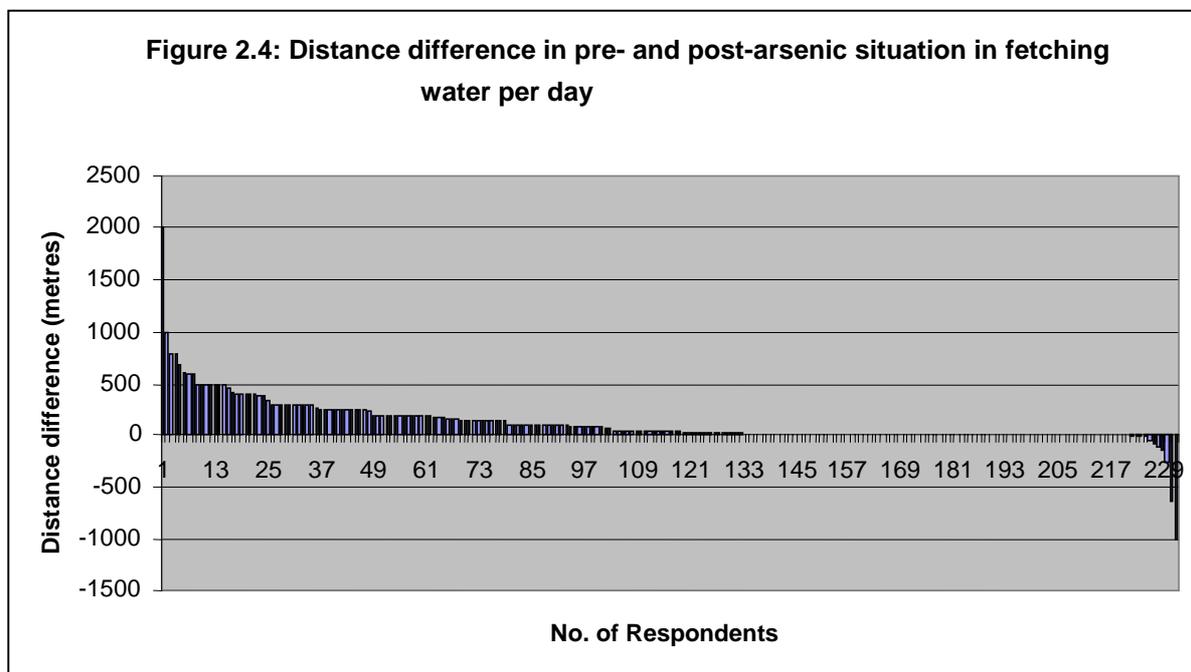
2.4.3 Distance to water sources

The average distance to water source before and after finding out about arsenic was also calculated per respondent. It is important to recognize that some people did not necessary switch to a safer source and were still drinking unsafe water, and that some people did not need to switch as their source was safe (this is discussed in more detail later). Average distance to a water source before finding out about arsenic was 50 metres (range of 1m to 1200m); the average distance now is 167 metres (range of 1m to 2000m), which is over a 200% increase in distance (Table 2.2). However, again, there is considerable variation in the actual distances that changed for each respondent. For 7% of the respondents, the distance

was reduced compared to before (range from -1m to -1000m); for 23% of the respondents, the distance did not change as they took water from the same source or a safe source in the same distance as before; and, for the remaining 60%, the distance went up to avail safe water (range from +1m to +1995m) (Figure 2.4). The mean change in distance to water source now, for all respondents, is a 117 metre increase; however, for the 60% people that it went up, the mean increase is 181 metres. In other words, for those unfortunate to have to go farther to get water, the average increase is considerable.

Table 2.2. Change in distance to water source

	Average Distance to source (metres)
Now	167 m (range: 1 - 2000)
Before	50 m (range: 1 - 1200)
Increase in distance	117 m (181 m for those whose distance actually increased)

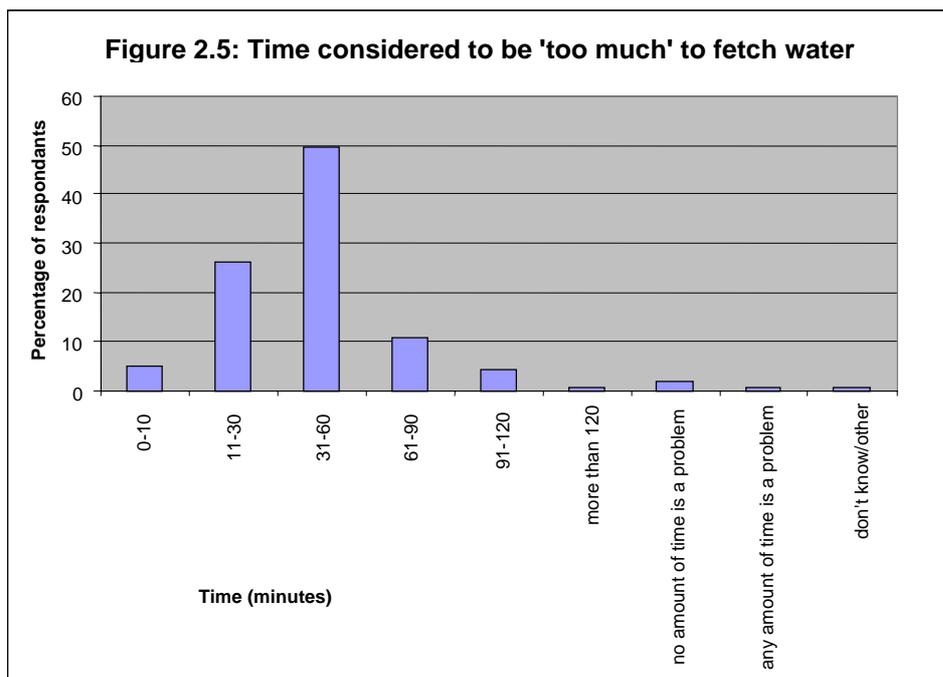


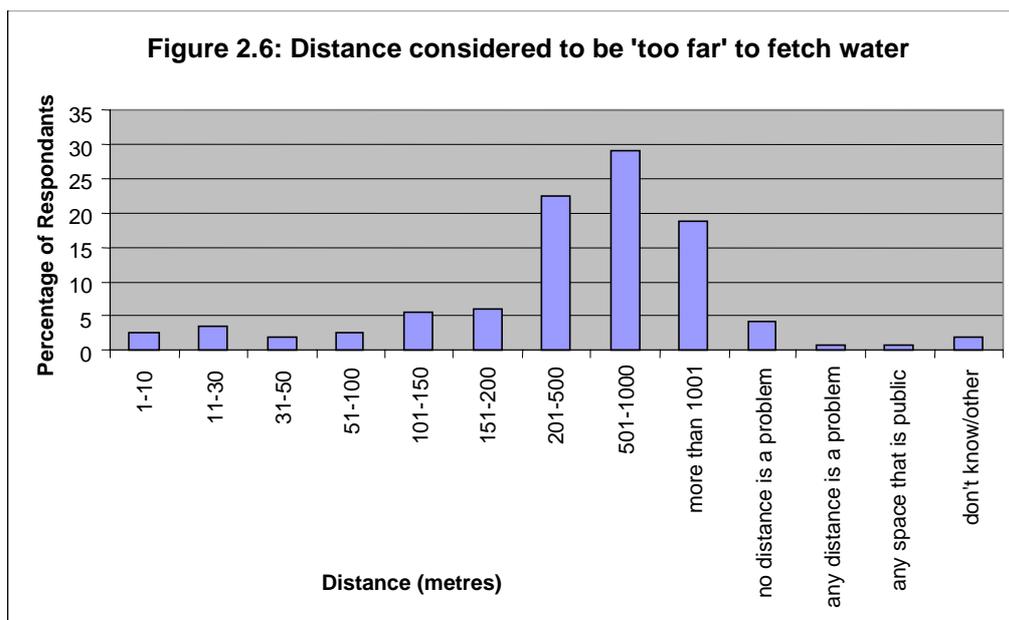
Government guidelines consider 250 users per well or source to be the practical maximum to reduce undue wait times. This is equivalent to 50 families, although the government long-term plans are to have one well per household (married couple) (Rosenboom 2004). In the present study, average number of user households per water source was found to be 40, with a range of 1-300 households per source. It is seen that 37% of the sources have 50 or more user households per source, while 63% have less than 50 user households per source. In other words, nearly a third of the water sources have user households beyond the practical maximum considered by the government, which explains the crowding and waiting time being an issue among some of the respondents.

It is important to note that there is not necessarily a significant positive correlation between time and distance increase in getting water, as a variety of factors can influence the time needed when distance is held constant; such time factors can be from the route taken, pace of walking, amount of water carried, negotiating access rights, crowding/waiting, socializing, etc. Also, people's sense of time is harder to judge as often colloquial terms such as 'couple of minutes' is used, and people sometimes found it difficult to gauge actual time spent on

each activity and could only give approximations. Distance to sources was easier to measure in absolute terms (and was done in the field). Thus, while the figures reported by the respondents are used to gauge the average time that people spend in getting water, the caveat would be that it is less likely to be absolutely accurate compared to the distance figures. But in general, it is seen that the two factors are both deemed to have worsened due to arsenic.

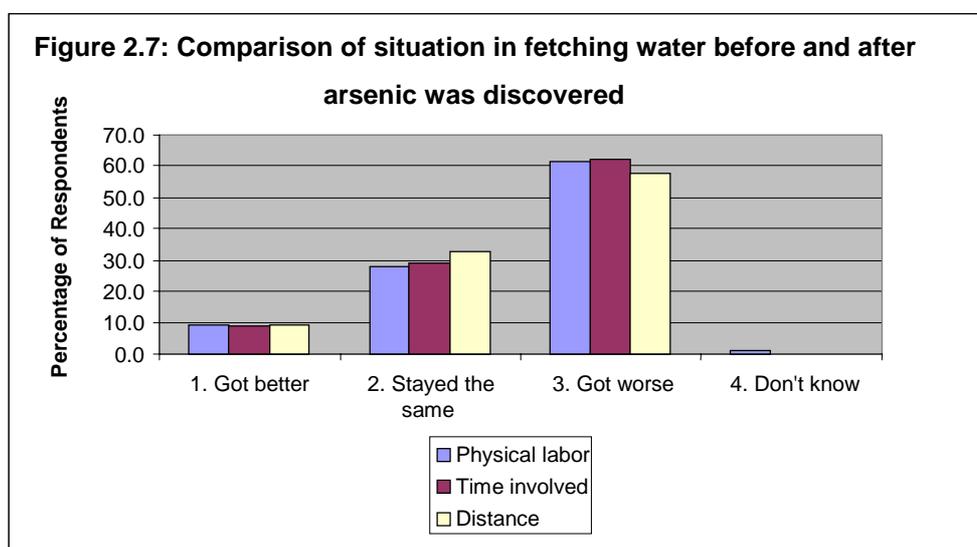
In this respect, perceptions of distance and time are important to look at in addition to actual/quantifiable figures. Ahmed *et al.* (2005) also assessed user's perception of distance to water sources, where the perception of being near/far from the water sources is often as valid in judging the situation as absolute distances. Perceptions of time and distance pertaining to fetching water show how people assess the situation in their lives. Questions on perceptions of what time and distance would be considered to be 'too much' display a range of responses (Figures 2.5 and 2.6), where it is seen that in general average trip time of 30-60 minutes and average distance of 500-1000 metres is considered to be the maximum tolerable by most people. Such perceptions could be interpreted to mean that people are willing to spend more time and effort in getting drinking water than what they already do now. Alternatively, it could be interpreted that people's sense of time and distance do not reflect actual time and distances required. Either way, such responses embody a variety of reasons and realities, which display the heterogeneity of lived experiences not captured by the quantifiable averages and statistics.





2.4.4 Changes in water collection due to arsenic mitigation

Perceptions of how the situation has changed with discovery of arsenic is also captured by opinions on whether physical hardship, collection time, and distance got better, stayed the same, or got worse (Figure 2.7). It is seen that majority of the people perceive the situation to have worsened on all three respects.



Physical distance is not the only distance that needs attention, as social distance can also become a factor in accessing water. The physical aspects of gendered hardship are compounded by social issues such as the need to negotiate access to water sources, a sense of humiliation in having to use someone else's water source, enduring insults and arguments at water points, and a sense of loss of dignity and self-worth. Many women complained about such issues. In addition, problems of collecting water in the dark when the source is outside the *bari* (homestead), as well as sense of social insecurity in traveling longer distances, mark the concerns that women and men have in dealing with the water crisis. In some instances, women face restrictions from their own family members in venturing too far to get safe water (nearly 37% of the female respondents), and are thereby

forced to resigning themselves to fetching unsafe water for their family. This is often true for younger daughters-in-law and unmarried teenaged girls, whose mobility in public areas is often of concern to their families (Box 2.2).

Box 2.2.

Mina, a young teenage mother, was getting water from a red painted tubewell in her courtyard, with her small child playing nearby. Upon asking her why she was not going to the safer deep tubewell installed in the village, she said that she was forbidden by her in-laws from going out in the public and so far away to get water. Her husband worked in the city, and they did not want an attractive young bride to be out and about to get water 2-3 times a day. They would rather that the entire family, including the child, drink contaminated water and take their chances. On asking whether it would be possible for her to go with her neighboring women to get water together, even if once a day for her child's drinking water, Mina shook her head and said it was not possible to do that everyday, and expressed worry about the situation. She wanted a deep tubewell to be installed in her homestead, like so many other women in the village.

- Fieldwork notes, December 2004

In general, women are willing to walk considerable distances, under various conditions, and several times each day to get safe water for their families. However, when the distance or trouble is too much, women often forego availing safe water at greater distances and resort to drinking contaminated water nearby; or they cut back on the amount of water fetched or the number of times trips that are made each day. But in general, majority of the women and girls were willing to continue to walk longer distances and endure greater hardship to get safe water in light of the arsenic situation (Box 2.3). In general, for most people, accessibility to safe water has got worse (as seen above); those who were able to obtain a project-donated source or purchase their own deep tubewell were able to reduce their water suffering. Of course those whose sources are still safe have not had to face changing their source, but perhaps deal with more crowding at their source. There are also those who knowingly continue to use a contaminated source and have not changed their water source at all, for various reasons (discussed later).

Box 2.3.

Amina has to wade through neck-deep water during the monsoon floods to get a *kolshi* (pitcher) of drinking water. She mentioned how frightening that was, as she was afraid of slipping or dropping the precious water she perched on her head. The single deep tubewell that is arsenic-free is in the next *para* (neighbourhood) and she has to go quite a distance through the water to get there. When it is not the floods, rain makes the path very muddy and slippery. It is slightly better in the dry season, but since it gets darker sooner, she has to rush to get other domestic work done so as to get the water for the night before the sun goes down. Amina said she always has to worry about fetching drinking water: "*Panir koshto shob shomoy.*" "Water hardship is constant".

- Fieldwork notes, January 2005

For many tubewell owners in this study, their well was identified to be contaminated and painted red (57% of the respondents); a few lucky owners' tubewells were not as highly contaminated or safe, and thus painted green (14% of the respondents); about 29% did not own their own tubewell. For many men, having a red tubewell in their homestead means that women and girls from the household have to venture out into public spaces to get water, which was a major concern for the men (45% identified this as the biggest social issue related to contamination of their tubewell). Most women identified the main concern of having a red tubewell (that they previously could use but now can not) to having to travel farther away to get water or to having to use someone else's source (32%), followed by a concern that they have to go into public spaces to access water (20%). Such concerns in owning a red tubewell meant that people who had hitherto benefited from easy access to potable water via installing a tubewell were now facing an immediate challenge of having to

avail safe water from elsewhere. For households that never had their own tubewell to begin with, it often meant having to switch to another nearby safe well or some other safe source, and thereby setting up new negotiations and relationships in order to access safe water. These can range from having to maintain a good relationship with or be related to the owner/manager of a water source, give free labour, help clean the area, or pay an occasional fee.

In general, people are willing to share water in moments of crisis, as long as it does not impinge on their needs or the needs of their family. Overall, sharing water is deemed to be a religious and customary duty, and people seem more sensitized to water hardship post-arsenic crisis. But this varies across people and places. It was observed that there are concerns that the safe water might run out if too many people took water, that owners of safer wells were bearing the costs of their operation and maintenance while others were taking water for free, that the owner's courtyard was always crowded and got very muddy during the rainy season from footprints, their privacy was being affected, and that too many people coming to get water was creating tension and arguments that affected everyone in the vicinity. One man put it as follows: "Too many women in one place means too much noise and squabbling; who wants to put up with that daily in his own home?" Thus, the arsenic situation has created an environment where social tensions can easily erupt at water sources (Box 2.4).

Box 2.4

The women in the focus group discussion were worried about the fact that nearly 80% of the tubewells in their area were painted red. This placed a lot of pressure on the ones that were painted green or unpainted. One woman said that the waiting lines at the safe wells were sometimes long, and that everyone wanted to get water first. One owner was so unhappy with this daily that he removed the head of the tubewell and would only allow his immediate family members to get water when needed. Some of the other women complained, resulting in the men getting into arguments over water access. As a result, enmity developed between some of the families. Another woman said that the tubewell she used to use was barricaded off with a fence, and now she has to walk farther to get water. However, one woman said that she benefited from a community tubewell being installed in her courtyard, as it was convenient for her, but she too did not like the constant crowding and chatter when people came to get water. She has to routinely clean up after them, and deal with the courtyard getting messy. But she thought that while some women did squabble over water, and pre-existing family feuds can result in women exchanging words at the tubewell, generally people were willing to put up with it in order to have safe water. At this point though, another woman claimed that she would rather drink arsenic water than endure the constant bickering and insults.

- Fieldwork notes, January 2005

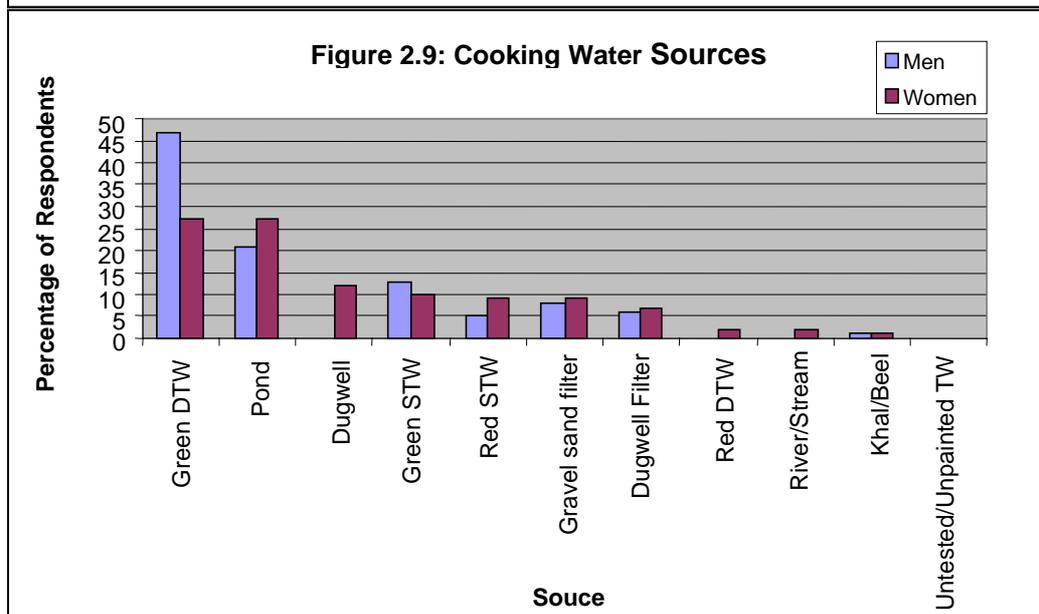
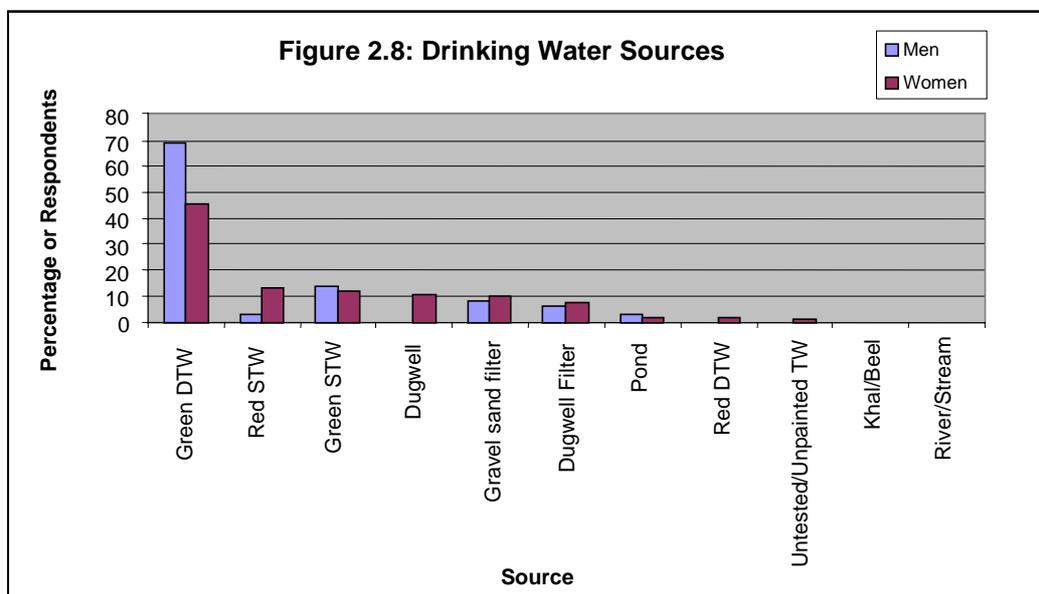
While women are facing increasing hardship to fetch water, many feel that it is their duty to bear the suffering and that they must continue at whatever cost. Nonetheless, some did lament that when it is too hard it is just easier to get whatever water they can for their family. Most women continued to use arsenic water for other tasks, such as washing, bathing, cleaning, kitchen gardens, and livestock water, and knew that the water could be used for such purposes. Sometimes few resorted to using the arsenic water for drinking and cooking as well. One frustrated mother said: "I can not spend all day getting water and leave my small children alone. I have a thousand things to do all day as it is."

2.4.5 Drinking water habits

As noted before, approximately 84% of the respondents reported that they had to switch water sources due to arsenic. A higher proportion of poorer people (28%) had to make this switch compared to better-off households (8%); this could be a result of the fact that wealthier households have greater access to their own deep tubewells that are mostly

arsenic-free, while others generally used more affordable shallow tubewells that are largely arsenic-contaminated. In terms of water use patterns, majority of the people now use safe sources for both drinking and cooking (Figures 2.8 and 2.9). Most people use safe deep tubewell or green shallow tubewells for drinking and cooking water, in addition to other safe water sources that may be provided through various projects (e.g. dugwells or sand filters). However, a small minority still uses water from red tubewells, which does raise some concern.

The majority of the respondents were more particular about availing arsenic-free water for drinking compared to water for cooking. The usage data is disaggregated by gender, showing some discrepancy, where women report a higher percentage in usage of unsafe water sources, perhaps because they fetch the water and know the exact source they are using. About 59% households get water from a single source, 35% from two sources, 5% from three sources, and 1% from 4 or more sources each day. As such, people may be exposed to various water qualities from the different sources. But most people identified one primary source they use, which is shown in the graphs. (The secondary/alternate source is discussed later.)



Despite efforts to change drinking water habits in light of the arsenic situation, some people continue to drink contaminated water. Often this is due to the fact that adequate alternative options are not available or accessible. Sometimes it is due to the trouble, burden or time/energy needed to get safe water (as discussed above). In some cases, it is due to lack of knowledge about the arsenic situation or simple unwillingness to change. Table 2.3 shows how men and women responded to whether they consumed arsenic contaminated water (drinking and cooking water). Again, it would appear that women would know more about the quality of the water they are serving or cooking with, as they collect and manage domestic water. As such, this could explain why higher percentages of women compared to men openly admitted to still using arsenic water all the time or some of the time.

Table 2.3. Do you drink or cook with water from a red tubewell?

	Men	Women
Yes	9%	17%
Sometimes	13%	19%
No	77%	63%

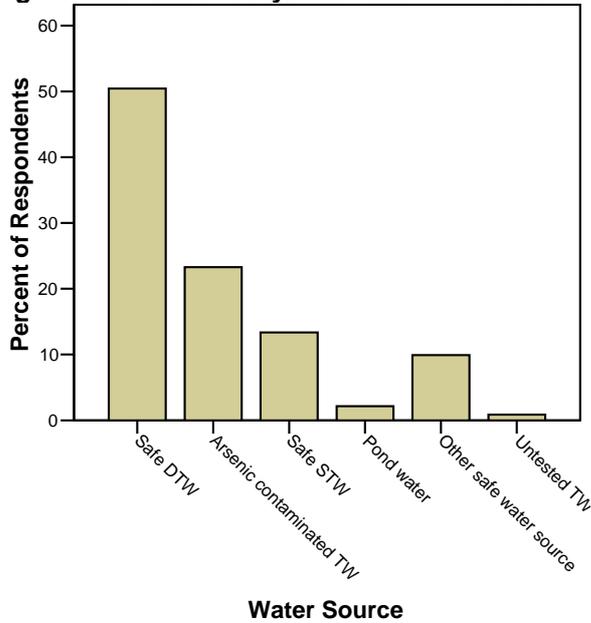
A substantial percentage of the respondents are exposed to consumption of arsenic from not only drinking and cooking but also from soaking rice (*panta bhat*) with contaminated water. Overall across all respondents, it is seen that nearly 10% drink, 8% cook, and 24% soak rice with arsenic contaminated water. This results in about 41% of the total respondents continuing to ingest arsenic through drinking and food on a regular basis (even though the quantity of arsenic in each case can vary considerably depending on the level of the arsenic in the water being used). This highlights that safe water usage is still not achieved universally even though people are generally aware of arsenic's presence. Such findings of continued usage of arsenic water was also found in the 15 Upazila study with Unicef's data (Rosenboom 2004), where it was seen that knowledge about arsenic does not necessarily result in change in practice vis-à-vis safe water habits. While the majority of respondents did change water source, the fact that a substantial minority have not needs further attention (why awareness and knowledge does not necessarily result in behavioural change). Of the people who are knowingly continuing to consume arsenic water, the main reasons given were: it was too difficult to get safe water, as it is too far away or too expensive (to join a group or purchase own source); takes too long to get safe water each day; wives/daughters have to go into public spaces and far away to get safe water; tried to find a source but was not worth the hassle, arguments, or waiting time; and did not perceive a need to change water. Some people who were aware of arsenic and still consuming arsenic water expressed anxiety and worry ("I hope we won't fall ill from this water"), whereas others were more skeptical and willing to take their chance ("We've been drinking from this tubewell for years, nothing has happened"). Such responses shed some light on the issues involved in why people continue to consume contaminated water.

Some of the women admitted to reverting back to using polluted pond and river water as all the nearby tubewells were highly contaminated with arsenic. While cooking with pond water is prevalent throughout the country, drinking pond water necessitates treating or boiling before consumption. This places additional burden on women to procure more fuelwood to boil the water, which may mean that water is insufficiently boiled. It also raises the concern whether the fear of arsenic may end up exposing more people to unsafe surface water consumption, which would again increase morbidity and mortality from diarrhea, dysentery, and other water-borne diseases. In this respect, risk substitution and total water quality/safety issues need to given greater attention (Ahmed *et al.* 2005).

In general, when the primary safe water source is unavailable, broken, under operation and maintenance, or inaccessible, the secondary/alternate water sources become important. It is observed that the secondary/alternate drinking water source is usually another safe source for most people that they can access (Figure 2.10). About 50% people use a safe deep

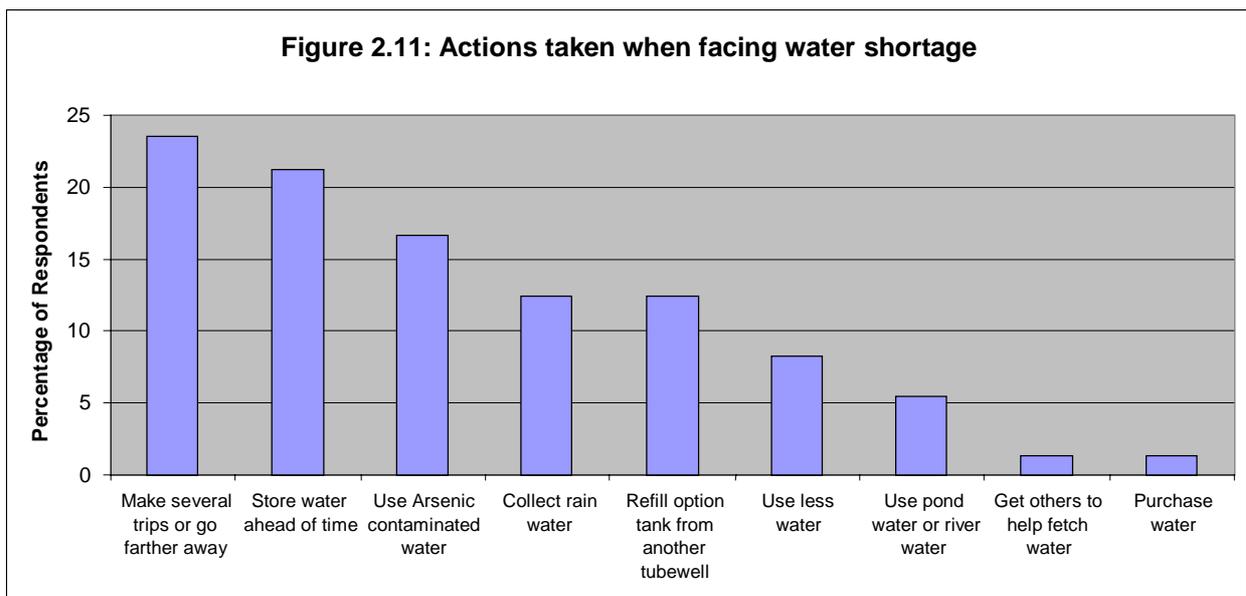
tubewell, but 22% use arsenic contaminated tubewells. While for some people this is a temporary water source, for many others it is the option that is used more often as the second source of water on a regular basis. Overall, these secondary/alternate sources increase the travel distance and trip time, where mean time goes up to 17 minute per trip and mean distance goes up to 243 metres to the source. Of course there is variation in the time and distance across cases, and people negotiate their access to secondary sources as and when needed.

Figure 2.10: Secondary/Alternate Water Source



In general, it is seen that during times of water shortage (whether temporary or seasonal), a variety of actions are taken to avail water or conserve water (Figure 2.11). While most people try to continue to use safe water, about 17% of the respondents revert to using arsenic contaminated water in such instances. Such usage patterns show that knowledge about arsenic does not necessarily lead to change in practice all of the time.

Figure 2.11: Actions taken when facing water shortage



2.4.6 Gendered socio-economic impacts

Women and men have different social standings, rights and norms that guide their behaviour within their communities. Various norms of patriarchy can influence what is gendered appropriate behaviour and conduct. Gender ideologies may be quite entrenched or vary over time, depending on the place, class, educational background of the family, local customs, etc. Nonetheless, it is generally seen that women in rural Bangladesh have less voice, decision-making powers, and rights than their male counterparts, despite advancements made in gender equality globally. As a result, women and girls have less power and fewer resources to deal with the impacts of the arsenic situation.

In terms of economic impacts, when asked whether the arsenic problem affected the poor and rich in similar ways, both men and women overwhelmingly agreed that it is a bigger problem for the poor (Box 2.5). This was due to financial expenditures for treatment as well as installing/accessing safe water source, loss of productivity and income from being ill or productive family members dying (from arsenicosis), as well as general loss of livelihood from social stigmatization. Poorer households are thus more hard-hit than wealthier households, due to the constraints on resources, finances, and power in society. This has affected poor women the most, as they generally have less resources and voice in society (Box 2.6).

Box 2.5

“We were poor before, we are poorer now. No one wants to employ my husband.” – Woman in interview, January 2005

“We can not afford to pay the fees to join the water user association, or install our own deep tubewell. What can we do but drink contaminated water?” – Man in interview November 2004

“Arsenic has made us poorer, my husband died from the disease, and now I am ill. I worry about who will look after my children” – Woman in interview December 2004

Box 2.6

About 15 women were present for the focus group discussion. They were very eager to share their stories and lamented that they were particularly suffering the hardship from arsenic in their *para*. Few of the women had just returned from fetching water from a nearby pond. The only tubewell nearby was painted red, and they were worried about drinking water from there and had reverted to using pond water. Only two of the women walked the mile or so to the mosque to get water from a green tubewell. One young woman openly said that her family continued to drink from the red tubewell; several other women also concurred at that point. They said that it was too far away to go to get water, it involved walking along the main road to the mosque, where there was a lot of crowding, and it was hard for them to leave children behind to go for so long. They were upset that other *paras* had got a community deep tubewell, given through a local project, but they had not been given one. They tried to raise enough money (5000 taka) to give to the Chairman to get a deep tubewell from the government [under BAMWSP’s scheme of cost-sharing to obtain deep tubewells that were community owned and managed]. But they were only able to raise 2500 taka as the people in the *para* so poor. As a result, they were not able to secure a safe water source for their vicinity. One upset young woman then said “*Amra eyi pani khaiya morum, tao eyi pani khaite hobe*” (“We will die from this water, but still we have to drink this water”).

- Fieldwork notes, December 2004

Social stigmatization is a problem in many arsenic affected areas, particularly where arsenicosis patients exist. Both men and women mentioned that people often do not want to eat or drink at the house that has a red tubewell. Often the first question asked is whether the water is from a safe well or not. This was deemed to be an offensive question to some women, as they claimed that they would never serve bad quality water to their guests. But they did understand the concern that outsiders might have if there is acute arsenic problem in the area or a red tubewell is in their homestead. If there is an arsenicosis patient in the household, people tend to stay away even more. General ostracization of afflicted families and patients is also common. Many people who are afflicted or have arsenicosis patients in

their family expressed that non-afflicted people do not understand that they are not contagious, and that it is hard to convince them otherwise. This reflects that there are awareness and acceptance gaps in rural societies where arsenic is acute (as discussed in greater detail in the next section).

One issue that has been under studied and needs further investigation is the impact of arsenic and arsenicosis on children. Anecdotal reports have suggested that children are often consuming arsenic water at schools and madrassas; other reports suggest that children are quite aware and carry safe water in bottles to school with them and avoid drinking arsenic water. To what extent children from afflicted families, or those showing symptoms of arsenicosis, are shunned at school or denied schooling have not been systematically documented. In this regard, how girl children may be affected differently from boy children needs particular attention. As is it, girls are often offered less educational opportunities than boys, and if arsenic plays a role in affecting this literacy rate, then it needs to be identified and addressed.

2.4.7 Gendered perception and awareness

The high spatial variability of arsenic in the aquifer, with contamination levels being dramatically different within few hundred yards, has resulted in wide variation in presence of red and green tubewells in any area (Alam *et al.* 2002; BRAC 2000). Whether or not one's own tubewell or the tubewell that is accessed from other people/places is contaminated depends on the hydrogeology and arsenic levels in the part of the aquifer directly beneath. Blanket screening of Upazilas in the last few years has resulted in the identification and marking of red and green tubewells, but many new tubewells are constantly being constructed, which are not always tested and marked (Rosenboom 2004). As such, there are untested/unmarked tubewells, which many people think are safe as they are new. The hassle involved in privately testing (or retesting) the water, and the slow poisoning effects of arsenic (since visible effects such as keratosis can take several years of chronic exposure), has further confounded the situation in adequately sensitizing people to the situation in their area.

However, awareness campaigns about arsenic and arsenicosis have in general sensitized people to the sources, transmission, and treatment in many areas, with varying degrees of success. However, understanding varies considerably amongst people, and there are gendered differences in awareness and knowledge about arsenic. In one study of the effects and outcomes of arsenic awareness campaigns, it was found that there is considerable gender gap in knowledge about arsenic contamination, transmission and mitigation (Hadi 2003). While this is likely to be related to lower literacy rate among women and their lower participation in public spaces in general in rural areas, it was more specifically seen to be correlated to land ownership, family income source and exposure to media. Hanchett *et al.* (2002) also note that while there is a spatial difference in perceptions and knowledge about arsenic, there are clear gendered differences in awareness and knowledge that are intersected with class, educational level, and place (also Rosenboom 2004 and Ahmed *et al.* 2005).

In the present study, such gender differences are also observed. For instance, when asked where arsenic came from, about 38% of the women thought it came from the tubewell itself, compared to 12% of the men; only 27% of the women said it was from the ground/aquifer, compared to 42% of the men. A gender gap is also noted in knowledge about mitigation steps taken and institutional arrangements. For instance, awareness about existence of a Union or Ward Arsenic Committee in their area showed that about 32% men said they did not know, compared to 56% women who did not know about such a set-up.

However, when the respondents were asked whether men were more aware/knowledgeable about arsenic than women, 70% of men and 52% of women agreed. While this reflects less awareness amongst women, there is higher percentage of women compared to men claiming that women also knew about and were concerned with arsenic. This could be the outcome of targeted awareness programs in recent years, a misperception on the part of men that women were not sufficiently aware, or a sense of self-awareness on the part of women irrespective of whether they actually knew or not. Either way, it is clear that more work is needed to bridge the gender gap in arsenic mitigation and awareness programs. However, awareness without sufficient alternative water options does not necessarily help people. Such sentiments were expressed in the present study.

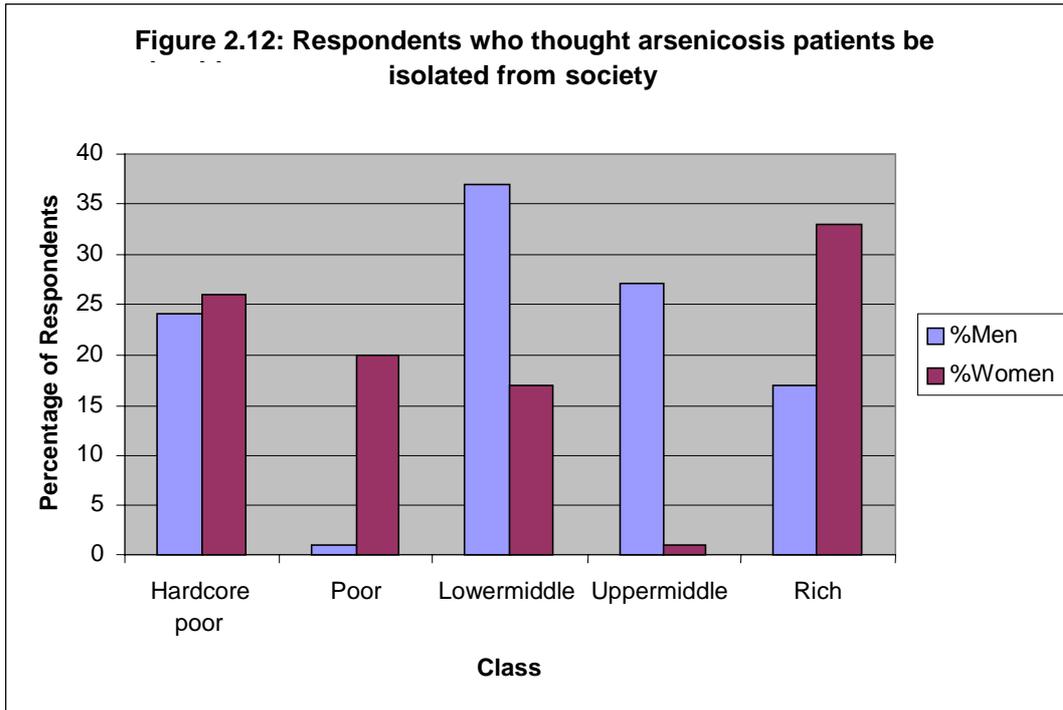
Differences in perceptions of how serious the situation is also depend on whether one has seen an arsenicosis patient or is directly afflicted. Those who are not as directly affected often are less aware and less willing to change water sources. However, even amongst people living in highly contaminated areas, where there may be several visibly afflicted patients, the decision to avail safe water is constrained by various factors (such as time, distances, social factors, etc. as discussed in the previous sections). There is also a sense of fatalism (“It is the will of God”) as well as skepticism (“No one else drinking from my well is ill so why should I change”).

When directly asked if arsenicosis was contagious or not, overall 91% men and 85% of women said it was not contagious; 9% men and 15% women thought it was contagious. This varied with class, as poorer groups thought arsenicosis was contagious more than wealthier groups (Table 2.4). Such differences could reflect that greater educational levels and involvement in formal workforce among the wealthier households resulted in their being more aware of arsenic, compared to poorer sections, who have lower levels of literacy and access to information. Rosenboom (2004) also found that income, exposure to media, and literacy play an important part in levels of awareness about arsenicosis.

Table 2.4: Do you think arsenicosis is contagious?

	Hardcore Poor		Poor		Lowermiddle		Uppermiddle		Rich	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Yes	6%	17%	12%	23%	15%	11%	0%	0%	0%	8%
No	94%	83%	88%	77%	85%	89%	100%	100%	100%	92%

What is important to note is that, with further follow-up conversations and case studies, it would often transpire that even if people originally agreed that arsenicosis was not contagious, they sometimes expressed fear that it might become so and that they would fall ill if they socialized with an afflicted person. Only the very aware or more educated persons thought that arsenicosis would not be a problem in general socializing, but there was still reluctance by the majority to fraternize with afflicted patients. As one woman put it: “Why invite in more trouble into our lives?” As such, many people thought that arsenicosis patients should be isolated from society (Figure 2.12). While this is not the majority, given that a substantial minority of the people are openly willing to shun arsenicosis patients reflects broader societal problems faced by those afflicted with arsenicosis.



2.4.8 Gender and health concerns

While most of the rural areas with arsenic contamination have been targeted by some awareness and mitigation endeavours, one aspect that is still lagging behind is identification of arsenicosis patients and adequate healthcare. There appears to be considerable misperception on what arsenic does, how it affects that body, and how it can be treated and at what stages. Most of the respondents in this study had some general knowledge about skin problems that develop from arsenic, but generally were unaware of other symptoms. People who had seen arsenicosis victims or were afflicted themselves were much more aware of the health issues involved and more keen about accessing healthcare. In general, fear of arsenic causing death was prevalent – arsenic is thought to be a ‘*beesh*’ or lethal poison, as that has been the predominant way that it has been described in awareness programs. As Rosenboom (2004: 174) states: “the development of arsenicosis is influenced by diet, genetics, nutritional status and lifestyle choices, as well as the level and duration of arsenic exposure”. Thus prevalence of arsenicosis patients in different areas varies considerably.

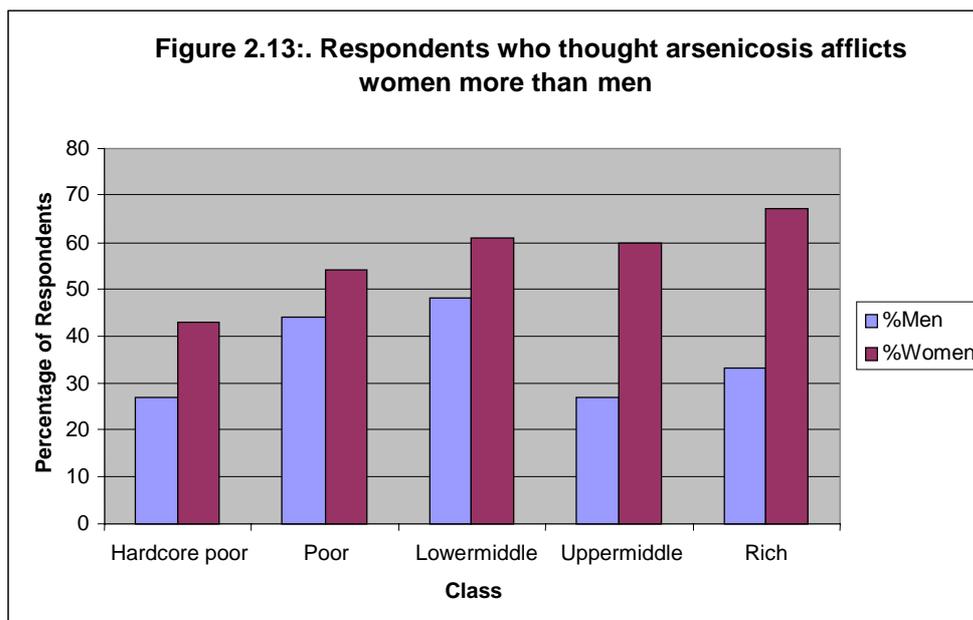
To what extent people know exactly in what ways they can help themselves in dealing with the health impacts of arsenic are still debatable. While some projects claim that through awareness and mobilization campaigns they have sensitized rural people of the causes and cures of early stages of arsenicosis, the fact that a large proportion of the population rely on information from second or third-hand sources are factors that need to be heeded. Also, given that a large majority of the population still do not have access to proper medical treatment and facilities, and rely on traditional doctors or shamans, there are concerns that many cases of arsenic poisoning may go undetected and untreated. High percentages of misdiagnosis of arsenicosis patients by field personnel also raises concerns for both patient identification and treatment (Rosenboom 2004). Misdiagnosis is a common problem that various project personnel have reported seeing, where non-arsenic related skin diseases and the like are causing panic in being labeled as arsenicosis; on the other hand, cases of arsenicosis are being misdiagnosed and patients given wrong treatment (although this is improving as more doctors are trained in diagnosis and treatment of arsenicosis). In many

cases, the treatment costs of arsenicosis, especially in an advanced stage, are prohibitive for many households, which can also influence patients availing medical assistance.

Messages informing people to consume arsenic-free water and more nutritious food to combat arsenic's effects are likely to be useful to those who can afford to do so. It is likely to be challenging for the poorer sections, who are generally malnourished to begin with and have access to even fewer resources for medical treatment. Poorer households generally have less nutritional intake, which may make them less able to stave off arsenicosis and its symptoms; this is particularly a threat for poor women. Women in many traditional settings generally tend to eat last and less food compared with men and children in the household.

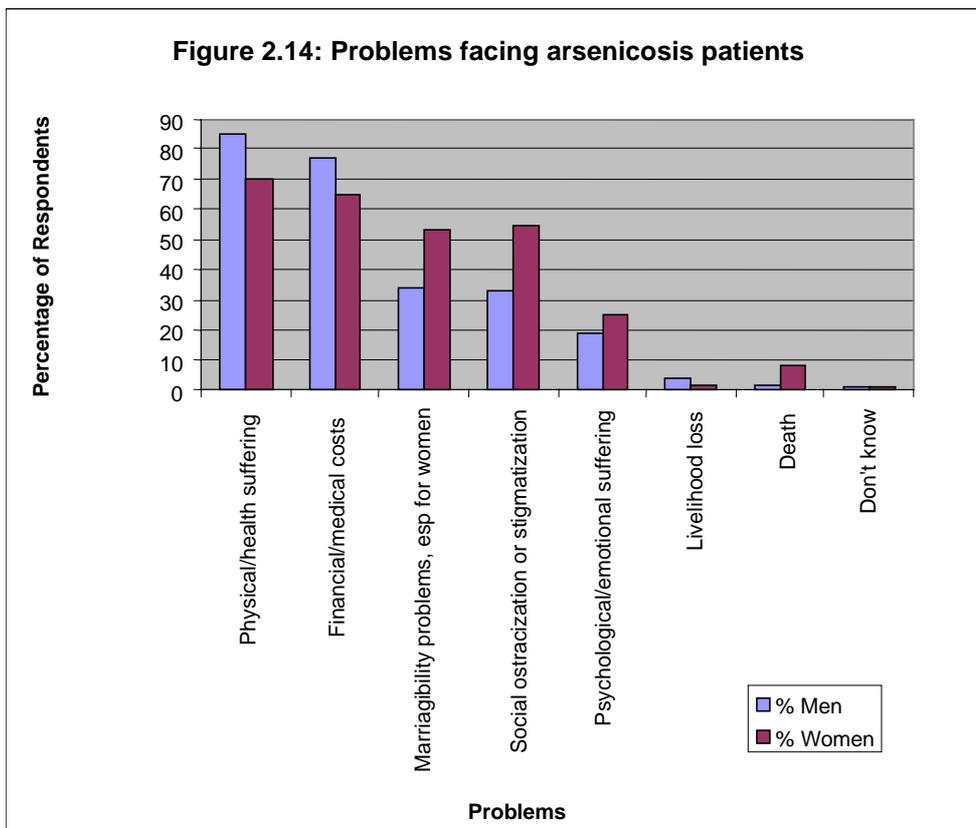
Women are also less likely to afford and get medical attention for health manifestations of arsenic poisoning; they are also less willing to share symptoms and be socially marked. Women's access to adequate healthcare is a problem throughout rural areas, not only in terms of actually being able to go to a doctor (where they often have to be chaperoned by a male member of the family), but also because their problems are often given less attention within the household to deem professional medical help. Therefore, illnesses resulting from arsenicosis, or from having to take care of an ill family member, considerably burden the livelihoods and daily tasks of rural women. One woman commented in a focus group, with which the other participants also agreed: "If a man falls ill, he can rest, but we women have to continue with our domestic duties and work even when we are ill."

While arsenicosis occurrence rates among men and women are currently being investigated by epidemiologists, studies show higher occurrence rates among men than women (Rosenboom 2004). This could be from the fact that fewer women are being diagnosed or identified, or from behavioural influences that increase susceptibility (e.g. smoking among men). In the present study, however, perceptions of who is more afflicted with arsenic revealed that female respondents thought that women are afflicted more often than men are (Figure 2.13). While such perceptions may or may not reflect actual physiological affliction or occurrence rates, the fact that such perceptions exist may hint at general fear of arsenicosis as a disease by women. While there have been claims that women are having pregnancy difficulties and stillbirths at higher rates in arsenic areas, this needs further systematic study.



When asked if men and women with arsenicosis face similar problems, both men and women respondents agreed that social acceptance and integration were major issues that

people in their community were dealing with, beyond physical and emotional suffering. Physical/health suffering was identified to be the primary problem, followed by financial costs incurred (Figure 2.14). A higher percentage of men than women agreed that these two issues were the top two critical problems. Beyond these personal issues, the next two items are largely social (social stigmatization and marriageability), where higher percentages of women compared to men deemed the issues to be significant. Nearly 53% of the women, compared to 34% of the men, identified the biggest social problem to be marriageability issues for women as well as general social ostracization, stigmatization and rejection of women. In general, respondents thought that social stigmatization of women with arsenicosis was stronger than it is for men. Women were more concerned with not being able to marry if they fall ill, or maintaining their marriage in case their husbands no longer deemed them worthy or desirable; there was a greater sense of anxiety of getting arsenicosis among women.



Thus it is generally perceived that the social implications of arsenicosis for men and women do vary. Women afflicted with skin spots or lesions (the first visible symptoms of arsenicosis) have been reported to be treated as contagious and often abandoned or denied marriage; food cooked by afflicted women has also often been refused by non-afflicted family members and neighbors. In the same village, women/girls with visible signs of arsenicosis are facing more difficulty in getting married compared to men; increased dowry is often demanded of the women/girl's family. A common expression was "*Beramma maiya anmu keno?*" (Why bring in a sick girl?). (Box 2.7)

Box 2.7

Rashida was married at a young age and came to live with her husband in this village. She drank water from the tubewell in the courtyard, as did the rest of the family. Few years ago, Rashida started to show symptoms of arsenicosis, and continued to get worse, as keratosis and melanosis showed up all over her body. Fearing that she was contagious and cursed, her husband remarried and brought home a second wife. This wife also started to show similar symptoms of arsenicosis recently, and the tubewell water was tested and found to contain high amounts of arsenic. Rashida's husband has now abandoned both wives, and taken a third wife and lives in the city. Rashida has no source of income except for the meager earnings of her eldest son; her other children are too young to work. Rashida spends most of her day unable to do much, in considerable pain, and relies on external charity and support for her medical expenses as well as household expenses.

- Fieldwork notes, November 2004

Of the respondents asked whether they would marry their sons or daughters to anyone afflicted with arsenic, about 95% of men and women said no (see also Rosenboom 2004). Reasons given ranged from thinking arsenicosis was contagious, not wanting to socialize with a sick person, ill family members requiring treatment costs, and not wanting to have more trouble/burden in the family. Some of the more aware people, however, did not think it would be a problem if arsenic-free water is available as the person would get better, if they were in the early stages of arsenicosis. Nonetheless, there was greater reluctance to associate with a female arsenicosis patient than a male one, as ill women are often shunned in general. One woman put it as follows: "An ill woman is a burden, no one wants her." There is a general sense that women are agents of bad luck, and an ill one would be a curse on the family (Box 2.8).

Box 2.8

Keramat was very worried about getting his daughter married, as she has spots on her body and showing early symptoms of arsenicosis. He lamented that many parents are in the same predicament as he is in this village. His nephew, who also has keratosis all over his body, is worried about finding a bride for himself. The entire area has been dubbed 'arsenic *para*' by outsiders for the high numbers of red tubewells and Arsenicosis patients. "No one wants to marry anyone from this *para*" said Keramat's wife. Marrying off daughters has become the biggest headache for parents though. "Who will take in a sick girl? Who wants that kind of curse?" asked Keramat. Some people try to hide the fact, but it is a general stigma to be from the area. Even non-afflicted people are being shunned, and being asked to prove they are not ill. Some parents are offering more dowry, but superstitions are prevalent, and outsiders are treating the girls as contagious and bad omen and not willing to marry them. This has been causing considerable mental anguish for the young women and girls as well as their parents, and they are often depressed about it.

- Fieldwork notes, December 2004

2.4.9 Gender and community management

Many arsenic mitigation projects are promoting community-based water management options in order to address this drinking water crisis. These technological interventions involve a range of options, such as community deep tubewells, pond sand filters, dug wells (some with the addition of a filter), rainwater harvesting systems, and arsenic removal plants. Most of these operate through the formation of user members and committees to manage the water options. While people appreciate external help and interventions, there appears to be a general desire to have better and deeper tubewells, compared to other technological options, to access safer arsenic-free water. This could be because tubewells are more familiar and convenient to use, as opposed to new, potentially more complicated systems that require higher operational and maintenance costs. The taste of water was another factor that came up in the new options, as most people have got used to the taste and smell of tubewell water. Nonetheless, those people who have become accustomed to using new

options for safe water expressed general satisfaction in having a safe water source to use in the face of the arsenic crisis.

A recent study has found wide variations between and within communities in the perceptions of the arsenic problem as well as acceptance of alternative options and initiatives to take steps to address the problems (Jakariya 2003). The general preference of the population was to switch to deep tubewells and expect the government to deliver options. It was also found that communities took initiatives to procure arsenic-free water when projects were started, or when awareness campaigns were prominent, and then reverted to consuming arsenic-contaminated water over time (also Ahmed *et al.* 2005). Often this was attributed to lack of labour power, time or difficulty in procuring arsenic-free water. In the present study, similar outcomes were also observed.

Of the total number of respondents, 63% were using water from some sort of community-based drinking water option. In terms of preference for household-based or community-based water options, a range of responses was seen among respondents. More women were interested to have household-based options, if it was affordable and available. While approximately 31% of both men and women agreed that household-based is more convenient or better, 16% of women and only 3% of men specifically stated that was to minimize time, distance and energy involved in collecting water. A larger proportion of men (43%) thought community-based options were economically more efficient as household-based is more expensive (for each household) and less feasible. Only 28% of the women agreed with such sentiments. This could reflect that, since the burden of fetching water from community options lies with the women, who have to deal with the hardship and negotiations in accessing water from such community-owned water points, they may be less keen.

In light of the costs of drilling deep tubewells to access arsenic-free water, single ownership of deep tubewells is largely out of the reach of majority of households, which is perhaps why many are more keen to have external interventions that at least offer them something, even if in the form of shared community options. Nonetheless, a general sentiment was that it would be preferred if every household had its own safe water source, whether that is piped water, safe wells, or some other form of easy access water source. The common sentiment was: "*Nijeder hole jhamela kom hoy*" ("There is less hassle if it is one's own"). However, many poorer people said that since they were unable to receive/obtain their own source, they would rather have one nearby or in the home of their neighbor. Perhaps this reflects a more realistic goal, where the community realizes that it is financially challenging to have every household have its own source, and that few households sharing a source is more affordable and reasonable. As one woman put it: "We can not afford to buy a deep tubewell, or spend money to look after it, so it would be better if it is somewhere nearby and we can all get water from it. That would be convenient for poor people like us." Such findings concur with those of Unicef and WHO (2003) reported in Ahmed *et al.* (2005).

In places where community options were operating, general opinions regarding the projects were the need to increase the number of options available, reduce the number of households dependent on each option, reduce costs involved, and configure better ways to share the water. However, among most water user group members, there was general satisfaction that they had somewhat better access to safe water supply, even if they had to pay for it (Box 2.9). But women did raise complaints that sources are often not maintained, that the people on whose land it is on tend to monopolize the source and often treat it as their personal source, and that there is crowding and time factors involved. While Ahmed *et al.* (2005) did not find any reports of rich or influential people denying poor people access to mitigation options, it should be recognized that conflicts and frictions may not be overtly reported and that such issues are gendered, where negotiating access and rights to any water source may result in gendered hardships that may always not be obvious or conveyed.

While outright denial may be less common, at what cost (both literally and figuratively) water is fetched are factors that are important for many households.

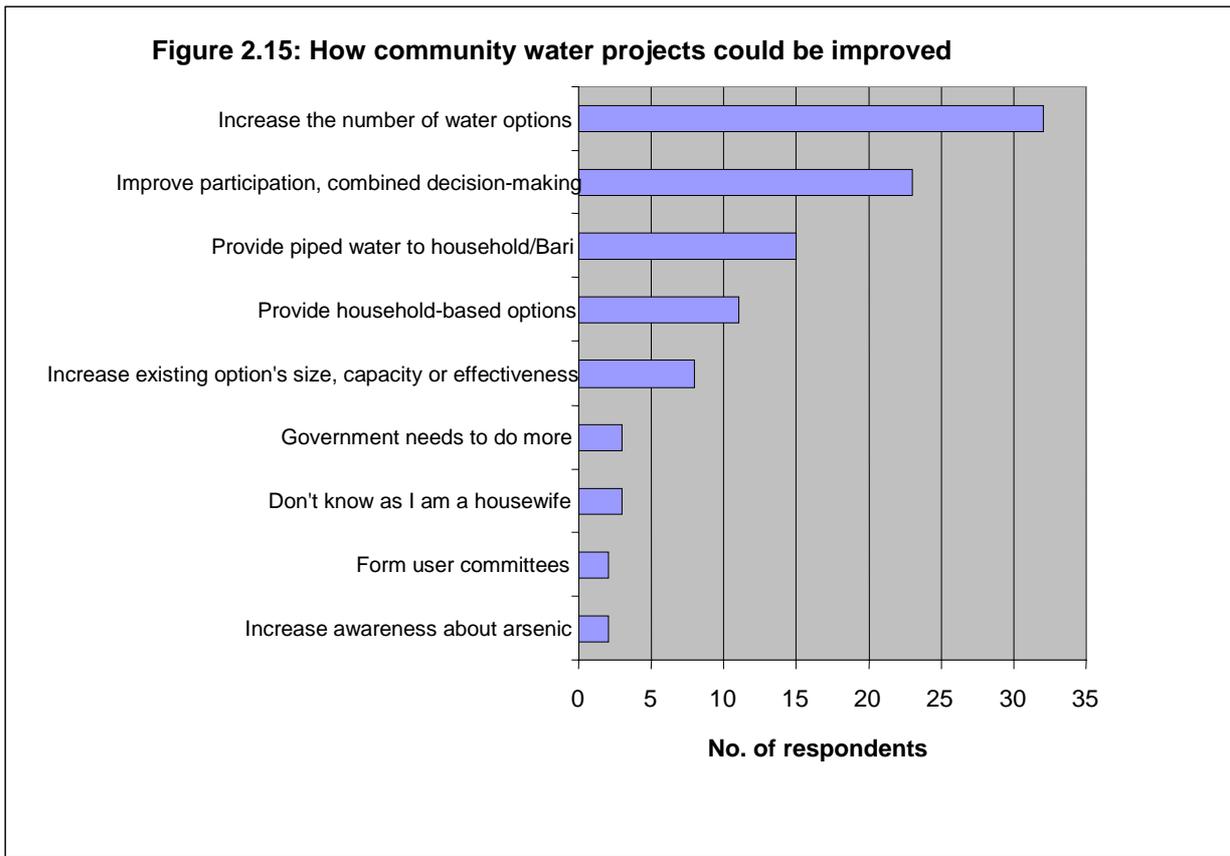
Box 2.9

Ali had come home for a quick lunch before heading out to the fields to work, but he took some time out to talk with us. He told us how the different *paras* of the village had struggled with the high levels of arsenic contamination in their tubewells. When the NGO came in and offered to install community-based options, such as dugwells, they had meetings to decide where to place it, how to form user groups, and how much to raise from who. Poorer people were asked to contribute labour if they could not give cash, and wealthier households generally gave more money. The ones who officially were involved with the project formed a user committee and have to give money regularly for operation and maintenance of the dugwell. He told us that many people did not want to give money, or could not, and now wished they were a formal user, as not everyone is allowed to take water from the dugwell. The caretaker is the man on whose land the dugwell was built, and his family monitors unauthorized users and chases them away. Ali also proudly said that he and other neighbors played a big role in the location of the dugwell. As another *para* wanted it closer to them, Ali rounded up some of his neighbors and went to the meeting, and prevented the location being any farther away from his *para*. He was happy that it was in-between the two *paras*, but lamented that it was on the roadside, and he did not like his wife to go get water from such a public place. As a result, he sends his 8-year old son most of the time to get water. When his son was asked about his experience in getting water from the dugwell, the child expressed dislike and said he had to jostle with women to get water and was made fun of sometimes by other children.

- Fieldwork notes, January 2005

For non-members, some of whom are still able to get water from community options they are not formally a part of, the experiences vary: some have little difficulty in getting water, many did not know whether they were using a privately-owned or community-owned water source, while others are told to leave or harassed (“You did not pay to become a member, so why do you come to get our water?” is a common comment they have to endure). Often these are poorer women, who may not even know about the community projects, or were not able to afford joining. In several cases, it was seen that a community deep tubewell was obtained in the name of a group of women by a wealthier household (who paid the deposit on their own), yet none of the women knew that they had the right on paper to access the tubewell and perhaps could pitch in to own the tubewell too. Such instances are common in many areas where people can deposit money to access government, BAMWSP, and other NGO/donor funded deep tubewells. However, the deep by tubewells often ends up being owned solely the family that paid the deposit. While water access is allowed by many of the owners, there are conflicts over access and amount of water taken in many instances. Thus, in the name of community, wealthier households are capturing water options and securing access to safe water, which they may or may not share with others.

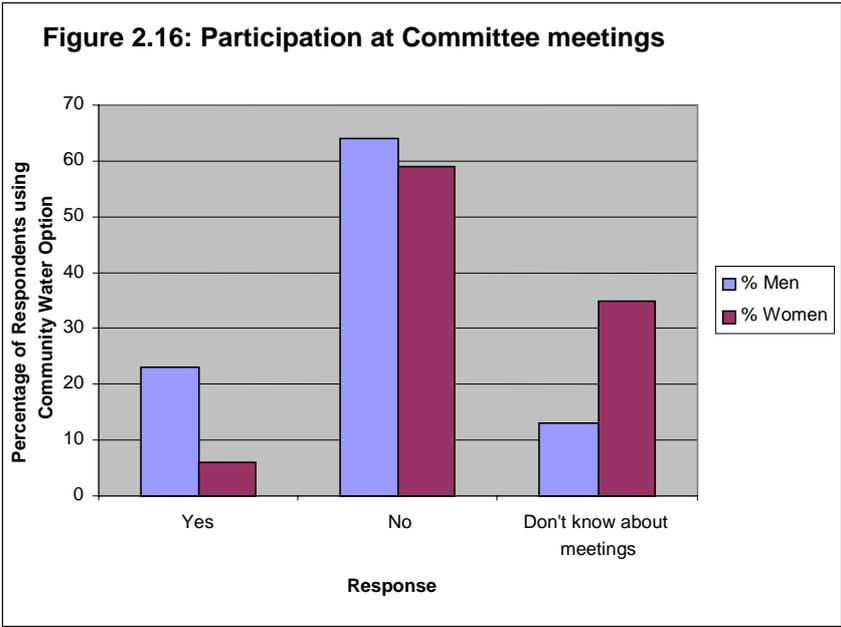
In terms of how the community projects were functioning and could be improved, many people did not have specific suggestions as they were not involved in a community project as a user member or were not sure if they were. But for those who are user members, the range of opinions on how they thought that community water projects could be improved is shown in Graph 15. These responses generally are: increasing the number of water options, improving participation and combined decision making in community water projects, providing household/bari based options (including piped water), increasing the existing option’s size, capacity or effectiveness, as well as forming functioning user committees, and increasing general awareness about arsenic.



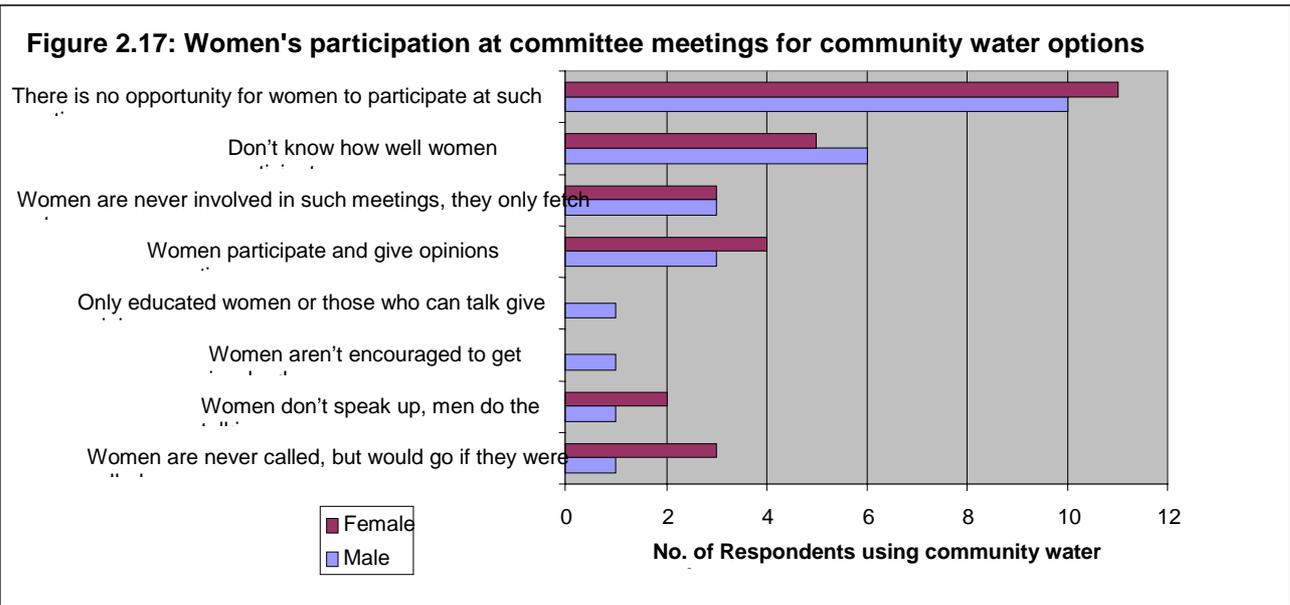
2.4.9.1 Participation and ownership in arsenic mitigation decision-making

A common theme emerged from questions regarding the management and operation of the community water projects – many people did not know about community options properly, especially about its management arrangements. Most had heard about the community arsenic mitigation projects in their area, especially if being implement by an NGO during early phases when information was disseminated. But many people did not know exactly how the community-based option operated and who was in charge. Often, the prevalent notion was that the person on whose land the option is was fully responsible for it. Many people were not aware of user committees or if they were aware, most were not members. Generally, the rural elite and powerful people were key decision-makers in user committees. In some instances, committee meetings were called and people told of the water issues and concerns, but this was more a rarity than a norm. As a result, few people knew about community meetings regarding mitigation projects and water management decision-making (see Figure 2.16).

Very few community projects actually had functioning user committees where people actively participated and felt communal ownership of the water option. Such findings concur with that of Ahmed *et al.* (2005:38), where many community water projects were found to be lacking: “In planning and implementation of the mitigation options broad-based participation appears to have been largely absent and some respondents interpreted contribution for the water point as participation. No respondent, except those who had given land to install the facilities were found to be directly involved in decision making on the water points.”



The majority of the women did not know about the workings of the community projects, their rights and roles, or even membership in such projects. Often their names were only on paper, they attended no meetings, or were never informed of meetings nor asked for their opinions. In most cases, the water user committee consisted of only men, or mostly men with few token women; only four women claimed to have attended a committee meeting. Even if women were asked to attend meetings, they mostly listened in and rarely gave their opinions in public (often for socio-cultural reasons where men tend to speak for women or proper decorum is for women to not speak much in public). Figure 2.17 shows the range of opinions and perceptions regarding the participation of women in community water projects and committee meetings. Also, the meetings are often held at times and places that women can not go to given their domestic tasks and duties, and they are not given sufficient assistance or encouragement to attend such meetings (Box 2.10). For instance, when meetings take place in bazaars or market places, it is more difficult for women to attend meetings (as these are gendered spaces for men).



Thus it is seen that decision-making roles pertaining to drinking water often are gendered in that men participate in more formal/official settings in water management, where women are often marginalized (both in terms of actual attendance at such forums or being able to speak up and participate if they are there); there is a general sense that women's role is limited to deciding where to fetch the water from, and less so in terms of how to alleviate the access, control and managerial aspects of most water options. Despite increasing awareness of women's rights and greater mobility of women in rural areas, there remain entrenched divides in who can do what and how they can contribute opinions and participate in planning processes. Gender discrimination in decision-making capacities is thus observed.

However, when asked whether women should have more decision-making powers in arsenic mitigation, 92% of men and 94% of women agreed. In what ways and to what extent this was possible varied: some thought that women should only give their opinions to male members of their family to pass on, while others thought that women should actively and equally participate at public meetings. While most women feel that they should have more decision-making powers, and expressed interest in voicing their opinions and having more decision-making capacities, there were few who were willing to challenge the norms and authorities of their husbands, fathers, brothers, or elders in order to do so. Such constraints need to be viewed within the broader context of women's lives, and taken into account.

Such findings concur with research conducted by scholars on community-based and participatory projects elsewhere, where women are often marginalized or have token input in the project's formulation, management, and outcome (e.g. Agarwal 2001; Cooke and Kothari 2001; Mehta 1997; Cleaver and Elson 1995). Notions of 'community' also have to be critically assessed, as community does not necessarily imply homogenous and consensual units. While collective action in water management, especially during a time of crisis, is possible, it is also ridden with social hierarchies and unequal power relations. Rural power politics can turn into water politics. As such, it is often seen that poorer people or marginalized sections of the community do not necessarily benefit from projects/interventions as expected or claimed by project personnel. Such issues need greater attention in discourses and practices of community and participation in arsenic mitigation (Sultana, 2006b).

2.5 CONCLUSION

The arsenic crisis in Bangladesh poses a significant water management challenge in the country. Arsenic mitigation has to involve not only water provision and water management institutions, but also address interlinked health issues and social implications of the situation. Social impacts of the arsenic crisis need further attention, as thus far arsenic mitigation has been addressed largely as a technical problem, with emphasis on technocratic solutions. A

Box 2.10

"Men go to meetings to decide what to do about the Arsenic problem. We would go if we were asked, but we're never asked to go." – Woman in interview, December 2004

"There is no scope for women to participate at the meetings, they are generally not informed or asked to attend" – Man in interview, January 2005

"She is a woman, what does she know? Ask me and I'll tell you" – Man interrupting a focus group discussion with women, January 2005.

"My husband would never let me go to a meeting" – Woman in focus group discussion, January 2005

"Women should participate but they do not come to the meetings" – Man in interview, December 2004

"The committee is on paper only, not in reality. We do not know what is going on" – Woman in interview, November 2004

perspective that appreciates the dialectical relationship between environment and society would be more beneficial to this end. Gender issues in the implications of the arsenic situation clearly need greater attention from researchers, policy-makers, and project implementers. This study has attempted to provide information on the various and nuanced ways we can come to understand the realities of the arsenic crisis from a gender perspective. An explicit attention to gender issues is needed to notice and reveal such issues, which may not always be apparent or captured otherwise. While gender is often given lip-service in many policy and project documents, it is important to truly pay attention to such social differentiation as the arsenic crisis plays out in Bangladesh and recognize the multi-layered and interconnected social, economic, cultural and political dynamics involved.

There is a greater need for further research on why there are such gendered differences in awareness and responses, and how to ameliorate the situation. How to address the ostracization and stigmatization that women and men face as a result of arsenicosis needs greater impetus from those attempting arsenic mitigation. Better access to healthcare and health information is needed alongside improved patient identification. While monitoring of water and patients is critical, it is important to convey information accurately and clearly so as to reduce confusion or misperceptions. Taking into account the gendered realities on the ground is important in undertaking such tasks.

Without adequate safe alternative water sources being available, awareness campaigns will likely not have much impact as people continue to face acute water shortages in many areas. Similarly, assuming that people will naturally share water at few sources without problems is perhaps naïve. Overall, in arsenic mitigation, how to improve gendered hardship in drinking water provision needs to be addressed and be made contextually appropriate and acceptable. How to have affordable and acceptable options to improve access to safe water thus remains a big challenge. Recent promotion of piped water and privatization of water raise concerns of the ability of poorer households, particularly female-headed households, to pay for water and be members of such schemes (see also Rosenboom 2004; WSP 2002). Similarly, how community-based options are operating, who is benefiting, who is not, and why, are all issues that require much greater attention from funders and implementers. In terms of existing approaches and interventions, how and why certain approaches succeed while others fail after some time needs more investigation and success stories and lessons learnt shared more broadly.

Furthermore, how to have meaningful participation of women and men in water resources management and decision-making are issues that need to be addressed more broadly. Hanchett (2004) recommends greater involvement of women Union Parishad members in arsenic mitigation and fostering participation of women. Inclusive and effective participation, without excessively worsening the time and work burdens of the poor, are critical for democratic development in the long run. To this end, discourses of participation and community that are espoused in arsenic mitigation need to be critically assessed and re-evaluated. It appears that rhetoric such as participation, community, gender sensitivity, and empowerment are often used loosely and prolifically, without much critical analyses of what the realities on the ground are. Such issues need more attention in policy-making and projects in Bangladesh in general.

In order to address the gender concerns raised in this report, concerted efforts at all levels will be needed. Some issues can perhaps be addressed more directly during arsenic mitigation, while others will take time as part of broader societal change. It would be unrealistic to expect single projects or interventions to change social dynamics and gendered power relations, but it is possible to hope that moments of crisis in the country can provide opportunities for change for more gender equality and equity. The arsenic crisis can perhaps be the impetus that starts to bring about such social change.

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ANNEX 2.1: BASIC DEMOGRAPHIC INFORMATION

This study took place in the following sites:

Barisal district, Agailjhara Upazila, Bagdha union: Amboula, Chandtrishira/Chando, Nagirpar/Shomaipar, Khajuria villages

Jessore district, Chaugachha Upazila, Jagadishpur union: Marua village; with visits to Sharsha Upazila's Bagachara, Putkhali, Sharsa unions: Samta, Tengra, Bagachara, Khalshi, Shibnathpur and Shubornokhali villages

Narayanganj district, Araihasar Upazila, Araihasar and Brahmandi unions: Krishnapura, Boro Binayerchar, Chhoto Binayerchar, Jhaugara, Boilakandi villages

Manikganj district, Ghior Upazila, Baliakhora union: Phukhuria, Chhoto Bonna, Bonna Proshad villages

Demographical information by gender and class is shown in Table A:

Table A: Gender and class distribution of respondents (N=232; 98 male and 134 female)

Gender		Class					Total
		Hardcore Poor	Poor	Lower middle	Upper middle	Rich	
Male	Count	33	25	27	7	6	98
	% within gender	33.7%	25.5%	27.6%	7.1%	6.1%	100.0%
	% within class	48.5%	41.7%	36.5%	58.3%	33.3%	42.2%
Female	Count	35	35	47	5	12	134
	% within gender	26.1%	26.1%	35.1%	3.7%	9.0%	100.0%
	% within class	51.5%	58.3%	63.5%	41.7%	66.7%	57.8%
Total	Count	68	60	74	12	18	232
	% within gender	29.3%	25.9%	31.9%	5.2%	7.8%	100.0%
	% within class	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Class is estimated by total household income (including wages and earnings from different source per month, including remittances). The categorization is drawn from both the BBS (Bangladesh Bureau of Statistics) definition of hardcore poor and poor, as well as natural breaks in the survey sample's total household income distribution pattern. The following categories were thus generated and used as a proxy for socio-economic class:

Hardcore poor	0 - 2000 Taka/month
Poor	2001 - 3200 Taka/month
Lower middle	3201 - 6000 Taka/month
Upper middle	6001 - 8000 Taka/month
Rich	above 8001 Taka/month

CHAPTER 3:

THE ARSENIC CRISIS IN BANGLADESH AND HUMAN RIGHTS ISSUES

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3.1 BACKGROUND

Arsenic contamination in groundwater is a deadly devastation for safe water supply through pump technology in Bangladesh. It is estimated that 95% of the population relies on groundwater for drinking purposes and over a quarter of Bangladesh is affected by this new problem (DPHE/BGS/DFID, 2000). In 1993, Department of Public Health Engineering (DPHE) traced arsenic in tube well water in the north-eastern part of the country. Since then, the situation has aggravated. WHO declared arsenic contamination as a 'Major Public Health Issue' in 1996 and informed Bangladesh Government to deal the problem on emergency basis. The World Health Organization (WHO) revised its original guideline value for arsenic in drinking water 0.05 mg/L (WHO, 1984) to a provisional guideline value 0.01 mg/L (WHO, 1993). The level recommended by the Bangladesh government is 0.05 mg/L (DoE, 1991).

Department of Public Health Engineering (DPHE), British Geological Survey (BGS) and Mott MacDonald Ltd. survey throughout Bangladesh revealed that 27% of the shallow tube-wells are contaminated with arsenic above the level of 0.05 mg/l (50 ppb) and 46% of the shallow tube-wells tested are contaminated with arsenic above the WHO guideline 0.01 mg/l (10 ppb). It has also been found that, generally, not all tube wells in an area are affected by arsenic.

School of Environmental Studies (SOES), Jadavpur University, Calcutta and Dhaka Community Hospital Trust tested water from 64 districts of Bangladesh. Their finding up to February 2000 shows that in 47 districts arsenic in ground water is above 0.05 mg/l and in 54 districts above 0.01 mg/l. DPHE /BGS/ MML in phase 1 studies estimated that the population exposed to arsenic contamination more than 0.05 mg/l (>50 ppb) would vary in the range of 18.5-22.7 million. However, the BGS-DPHE studies finally gave an estimation of the number of population exposed to arsenic concentration above 0.05 mg/l (50 ppb) and 0.01 mg/l (10 ppb) to be 35.2 million and 56.7 million respectively. Based on Upazila statistics the exposure levels to arsenic exceeding 0.05 mg/l (50 ppb) and 0.01 mg/l (10 ppb) were estimated as 28.1 million and 46.4 million respectively.

However, an alarming number of people anticipated to be directly affected by this contamination. Water with high levels of arsenic leads to health problems including melanosis, leuko-melanosis, hyperkeratosis, black foot disease, cardiovascular disease, hepatomegaly, neuropathy and cancer. Arsenic accumulates in the liver, kidney, heart and

lungs. It is also deposited in bones, teeth and hair (Khan, 1997). Not only health effects a number of social and societal problems have also been reported from arsenic affected areas in Bangladesh.

Many national and international organizations have come forward to mitigate the problem. The government of Bangladesh also has undertaken a million dollar project 'Bangladesh Arsenic Mitigation Water Supply Project (BAMWSP)' to tackle the crisis. GoB /UNICEF has also given due emphasis for the mitigation of arsenic poisoning. However in spite of many of the initiatives what we are still far way from providing safe water supply to the arsenic affected population. Being a multi-dimensional and an enormous problem, the issue needs to be looked upon with a holistic approach and solution needs to be multisectoral. Furthermore the state parties are obligated to respect, prevent and fulfill the rights of its citizen and as the issues like water crisis, health problems, social problems are closely related to human rights issues, the arsenic problem should be addressed in the perspective of human rights issue.

3.2 WHAT ARE HUMAN RIGHTS?

Human rights are a set of universal entitlements that individuals enjoy irrespective of their sex, nationality, religion, culture or other status that are inherent to human beings and that are proclaimed and protected by international law.

International human rights law developed in the context of global revulsion at the horrors of second world war and the establishment of the United Nations (UN) in 1945. In accepting the Charter of the United Nations, its member states recognize that non-interference in their internal affairs is a principle that can be overridden where international peace and security are threatened (1). No doubt referring to the genocide and other war crimes, the drafters of the 1948 Universal Declaration of Human Rights were moved to refer to 'disregard and contempt for human rights [which] have resulted in barbarous acts [that] have outraged the conscience of man kind(2)'. Although the declaration is not itself a legally binding document, it reiterates that 'human rights should be protected by law'.

Today a growing body of international treaties and customary international law details the obligation of the states to respect, protect and fulfill human rights (3). States party to the two major covenants, for example, must not only avoid abuses of civil and political rights by their own agents, they must also prevent private sector discrimination and other abuses, while also taking steps individually and through international assistance and co-operation, especially economic and technical, to the maximum of available resources with a view to achieving progressively the full realization' of economic, social and cultural rights including the right to the health (4)

The key human rights document and the cornerstone of the modern human rights movement is the Universal Declaration of Human Rights (UDHR). A number of international human rights treaties exist that further elaborate the rights set out in the UDHR, including:

- the International Covenant on Civil and Political Rights
- the Covenant on Economic, Social, and Cultural Rights
- the Convention on the Elimination of All Forms of Racial Discrimination
- the Convention on the Elimination of All Forms of Discrimination Against Women
- the Convention on the Rights of the Child

Each of these documents lays out legally binding obligations for the governments that sign on to them. Countries that become party to international human rights treaties accept certain procedures and responsibilities, including periodic submission of reports on their compliance with the substantive provisions of the texts to international monitoring bodies.

3.2.1 Why is arsenic poisoning a human rights issue?

Groundwater arsenic poisoning has posed serious threats to public health in Bangladesh and it is considered as the worst mass poisoning in the world history. So far identified based on skin lesions, the number of Arsenicosis patients is more than 20,000 which is actually the tip of an iceberg as the number is much more if the other lesions resulting from arsenic poisoning would be considered.

Chronic arsenic poisoning causes numerous health problems on human body. The most common symptoms of chronic arsenic poisoning are visible skin lesions which are hyperpigmentation (melanosis), hyperkeratosis of palms and soles (keratosis), respiratory problems, eye problems, cardio-vascular disease like hypertension and black-foot disease, diabetes, peripheral neuropathy and adverse reproductive outcomes which include spontaneous abortion, still birth, neonatal death. The most fatal outcomes are gangrene, kidney and liver failure and internal organ cancer particularly urinary bladder and lung cancer. As arsenic interferes with the formation of energy in body, the arsenicosis patients invariably suffer from generalized weakness.

Along with the physical illness, the presence of visible skin lesions in arsenicosis patients has been throwing them into numerous social problems. The social problems inflicted by arsenicosis disease include dissolution of marriage or difficulty in marriage particularly in case of women, termination from schools, firing from jobs, segregation by the community people considering the disease as a contagious / familiar one or as a curse of God.

3.2.1.1 Conceptual framework of arsenic poisoning and human rights

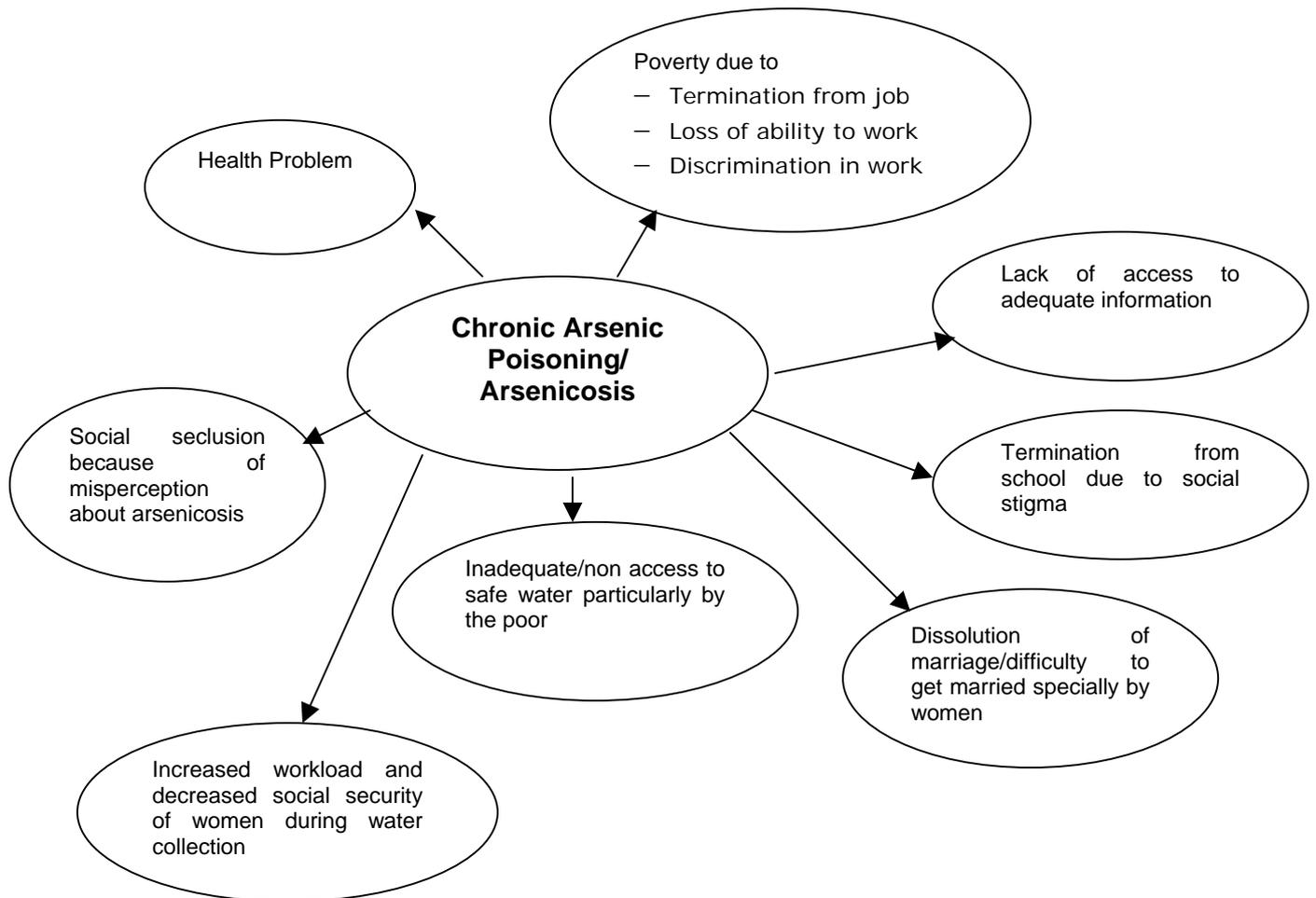
Anything that

- reduces quality of life,
- restricts life and
- prevent one's full realization of his / her potentiality

is automatically a human rights issue.

The issue of human rights in relation to chronic arsenic poisoning of mass people through ground water has not been discussed or yet established. The interaction between arsenic poisoning and human rights can be illustrated through the impact on the lives of individuals of neglect, denial and violation of their rights in the context of arsenic poisoning epidemic. This applies albeit in different ways to women, men and children who already developed arsenicosis symptoms and those who are vulnerable to develop the same.

The issues that has been emerged as a consequences of chronic arsenic poisoning / Arsenicosis can be illustrated as follows:



The most important human rights issue related to chronic arsenic poisoning are the following:

- Right to highest attainable standard of health
- Rights to non-discrimination including health care services and work
- Rights of all to equality in laws, policies and programmes in particular women and girls
- Rights of children to education and the services necessary for their health and life and Rights of all people to education and information
- Right to work
- Right to water

Given the current arsenic situation in Bangladesh the above mentioned human rights are being violated in some ways:

3.2.1.2 Right to highest attainable standard of health

In ICESCR (article 12) it has been stated that the state parties recognize ‘the right of everyone to the enjoyment of the highest standard of physical and mental health’. The state parties are obligated to make health facilities, goods and services available, accessible, acceptable and of good quality.

In case of arsenic poisoning in Bangladesh, the arsenicosis patients are lacking sufficient medical facilities in terms of adequate medical set up and skilled medical professionals, and

also the medicines for this disease are not affordable by all particularly the poor who are mostly affected with arsenicosis. Also the appropriate medical treatment for arsenicosis is yet to be developed. The arsenicosis patients have also been lacking sufficient information on prevention and treatment of arsenicosis as well as the way to find out the solution to arsenic contamination.

3.2.1.3 Right to education

Article 26 of the Universal Declaration of Human Rights states in part that ‘everyone has the right to education Education shall be directed to the full development of the human personality and to the strengthening of respect for human rights and fundamental freedoms. It shall promote understanding, tolerance and friendship’ This rights includes three broad components which apply in the context of arsenic poisoning. Firstly, both children and adults have the right to receive arsenic related education, particularly prevention and care. Access to education concerning arsenic poisoning is an essential component of effective prevention and care programmes. The arsenic affected people are lacking valid and sufficient information regarding the mitigation of arsenic poisoning. Secondly, state should ensure that both children and adults living with arsenicosis are not discriminatorily denied access to education at all levels. Termination of school children affected with also been reported in many places in Bangladesh because of considering the disease as contagious There is no public health rationale for such measures since there is no risk of transmitting arsenic poisoning in educational settings. Thirdly states should, through education, promote understanding, respect, tolerance and non-discrimination in relation to persons having arsenicosis.

3.2.1.4 Right to work

Everyone has the right to work ... [and] to just and favorable conditions of work (5). The right to work entails the right of every person to access to employment without any precondition except the necessary occupational qualification. This right is violated when a person having arsenical skin symptoms is terminated from his or her existing job or refused employment particularly in private job considering the disease as an infectious disease. This is state’s obligation to prevent all forms of discrimination in the work place on the grounds of arsenic poisoning.

3.2.1.5 Right to an adequate standard of living and social security services

Article 25 of the Universal Declaration of Human rights states that ‘ Everyone has the right to a standard of living adequate for the health and well-being of himself and his or her family, including food, clothing, housing and medical care and necessary social services, and the rights to security in the event of un-employment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control. This issue is particularly relevant to meeting the needs of people living with arsenicosis and/or their families, who have become impoverished by arsenic poisoning as a result of increased morbidity and mortality due to arsenic poisoning and / or discrimination which can result in un-employment and poverty.

States should take steps to ensure that people living with arsenicosis have the minimum social security in terms of standard of living.

3.2.1.6 Right to water

The human right to water entitles everyone to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic uses (6). Article 11 of

International Covenant on Economic, Social and Cultural Rights specifies a number of rights including right to water for the realization of the right to an adequate standard of living' including adequate food, clothing and housing'. The right to water has been recognized in a wide range of international documents, including treaties, declarations and other standards (7, 8, 9, 10). The obligation of the states parties to guarantee that the right to water is enjoyed without discrimination and equally between men and women irrespective of sex, color, age, language, religion, economic condition etc. and even in times of severe resource constraints, the vulnerable members of the society must be protected by the adoption of relatively low cost targeted programmes.

Because of extensive arsenic contamination of shallow tube wells a large sect of rural population including the children has been in serious crisis in accessing arsenic free safe drinking water. Again lot of educational institutes in rural Bangladesh has also been lacking safe drinking water because of arsenic contamination of the existing water sources. Water is considered as a womanly issue in Bangladesh as the women do collect water principally in our country. In spite of that women are not in a position to make any decision regarding water management. Furthermore the arsenic free safe water source has been shifted from doorstep to far away which is not only increasing the workload on women but also making the women vulnerable to insecurity. It is the states parties obligation to ensure safe drinking water to all including the children and bring the women in decision making process along with alleviating the disproportionate burden.

3.3 Strategic directions for addressing the human rights issues in relation to arsenic poisoning in Bangladesh

1. Institutional Responsibilities and Process:

A. Developing Institutional Framework

- a. National Framework: States should establish an effective national framework for their response to Arsenic poisoning / arsenicosis which ensures a coordinated, participatory, transparent and accountable approach, integrating arsenic mitigation policy and programme responsibilities across all branches of Government.
- b. Supporting community partnership: States should ensure through political and financial support, that community consultation occurs in all phases of arsenic mitigation policy design, programme implementation and evaluation and that community organizations are enable to carry out their activities including in the fields of ethics, law and human rights effectively.

B. Law review, reform and support services

- a. Public health legislation: states should review and reform public health legislation to ensure that they adequately address the public health issues raised by arsenic poisoning.
- b. Anti-discriminatory and protective laws: states should enact or strengthen anti-discrimination and other protective laws that protect vulnerable groups.
- c. Regulation of goods, services and information: states should enact legislation to provide for the regulation of arsenicosis – related goods, services and information, so as to ensure widespread availability of qualitative prevention measures and services, adequate arsenicosis prevention and care information and safe and effective medication at an affordable price.

C. Promotion of a supportive and enabling environment

states should, in collaboration with and through the community, promote a supportive and enabling environment for women, children and other vulnerable groups by addressing underlying prejudices and in-equalities in relation to arsenic poisoning through community dialogue, specially designed social and health services and support to community groups.

2. Realization of the human rights related to arsenic poisoning / arsenicosis.

A. Right to highest attainable standard of health

Strategic issues:

- a. To adopt and implement a national public health strategy and plan of action in the ground of arsenic poisoning of mass people.
- b. To ensure the right of the access to health facilities and services on a non-discriminatory basis and special measures needs to be taken to ensure the access of the poorest of the poor to arsenic mitigation facilities including arsenic free safe water, care and treatment services
- c. Appropriate arsenic poisoning / arsenicosis related information, education and support including access to services for mitigation of arsenic poisoning needs to be ensured.
- d. Access to adequate treatment and drugs should be made available with the overall context of the state's public health policies.
- e. Conduction of adequate research for developing specific treatment for arsenicosis. **B.**

B. Right to education

Strategic issues:

- a. Ensuring adequate and valid information dissemination related to arsenic mitigation and arsenicosis at within and outside of the institutions.
- b. Ensuring no discrimination regarding access to educational institutes because of symptoms of arsenicosis through appropriate educational and awareness campaign.
- c. Sufficient awareness among the people to respect, tolerate and non-discriminatory approach towards arsenicosis patients.

C. Right to work

Strategic issues:

- a. Ensuring the non-discrimination of the arsenicosis patients in the workplace including the private sector
- b. Appropriate legislative measures to ensure the rights of the arsenicosis patients to work.

D. Right to an adequate standard of living and social security services

Strategic issues:

- a. Rehabilitation of the socially and economically marginalized people affected with arsenic poisoning.

- b. Re-allocation / re-channeling of resources for vulnerable people affected with arsenic poisoning on priority basis.

E. Right to water

Strategic issues:

- a. Appropriate resource allocation and investments in water to facilitate access to water for all and necessary needs to be taken to ensure the preservation of water bodies.
- b. Special attention and necessary steps should be taken to include the women in decision making process and alleviation of disproportionate burden of women during collection of water.
- c. Adequate supply of arsenic free safe drinking water to educational institutions for ensuring right of the children to water on urgent basis.
- d. State should have a national arsenic mitigation policy and ensure that the policy is maintained during implementation of arsenic mitigation projects by the states or non-state actors.
- e. Arsenic free safe water should be made affordable to all by taking appropriate measures like use of a range of low cost water technologies, appropriate pricing policies such as free or low cost water and income supplements.
- f. International assistance may be taken to ensure the state's obligation in respecting, protecting and fulfilling the human rights to water if necessary.

3.3 CONCLUSION

The arsenic crisis in Bangladesh has a number of human rights dimension. It is essential to examine public health policies and practices affecting arsenic poisoning sufferers to ensure that these policies and practices do not violate right to health provisions. In particular it is important to consider the potential discriminatory treatment such individuals may suffer. Although there is no international covenant imposing specific obligations on states in relation to arsenic poisoning in Bangladesh, the human rights issue emerging from arsenic poisoning can be explained with the rights discussed in many international documents. Arsenic calamity needs to be mitigated in a holistic approach and with a right-based approach. Though it is the states parties' obligations to maintain and ensure the human rights of the people affected with arsenic poisoning, the NGOs and other non-state actors should also come forward to complement the government of Bangladesh in establishing the human rights of the arsenic affected people in Bangladesh.

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