Gender Concerns in Arsenic Mitigation in Bangladesh: Trends and Challenges

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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).

Objectives

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.

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 Araihazar (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.

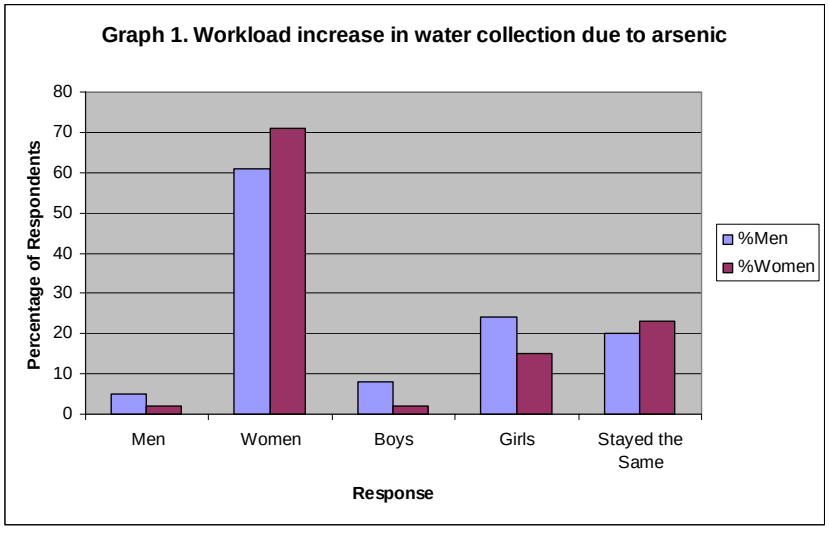
In the field, a semi-structured questionnaire survey was developed, piloted and finalized. Research Assistants were hired in each area to assist with implementation of the surveys. A total of six local RAs with basic educational background and experience were selected and trained for this purpose; they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

Research Findings and Discussion

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 (Graph 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.

Box 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

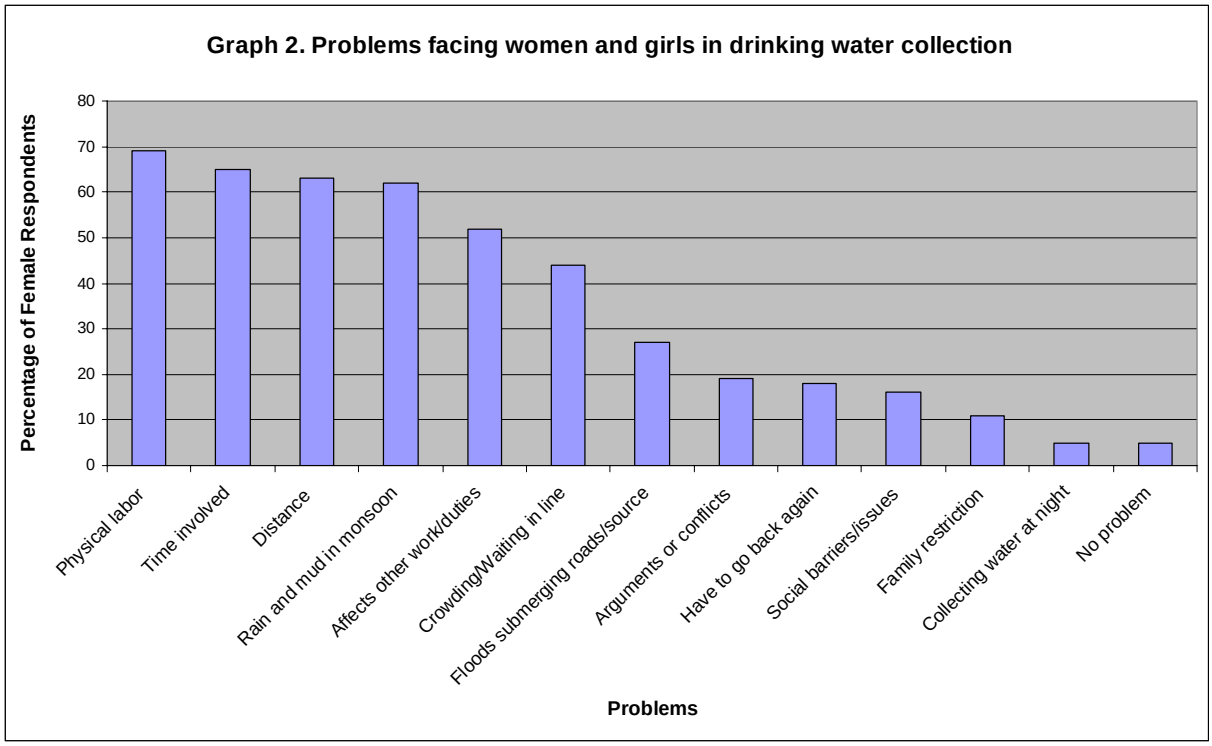
"Why should men fetch the water? That is a woman's job" – Woman in interview, January 2005

"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.

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 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.

Graph 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.

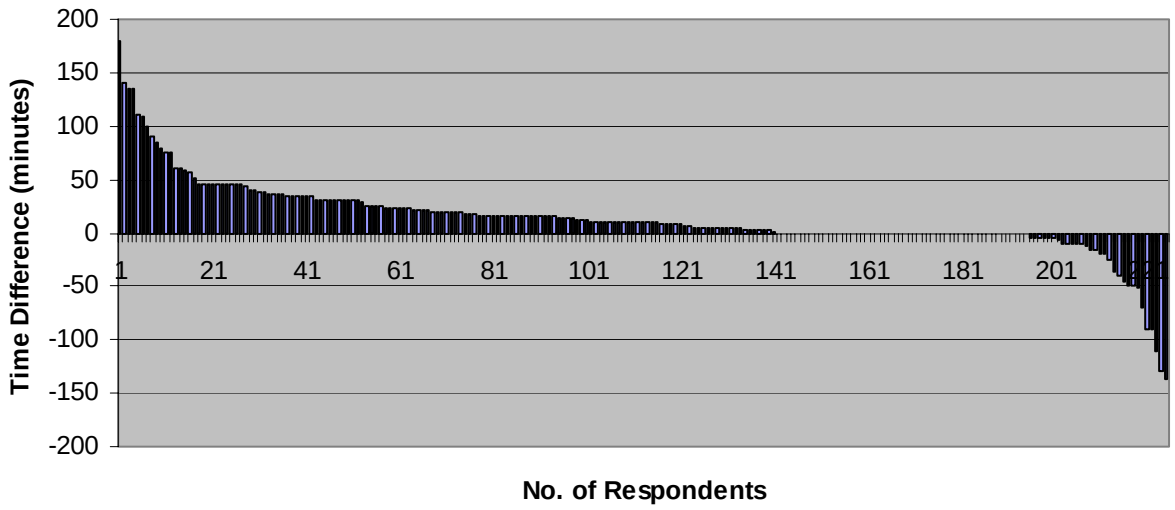


Approximately 84% of the respondents had to switch water sources due to arsenic. On average, respondents noted that time expended for water collection has gone up due to the arsenic situation. In general, average time to fetch water per trip was 7 minutes before arsenic; this has gone up to an average 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 1). However, there is great variation in how this compares with the time needed before arsenic was found. Graph 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 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)

Graph 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.

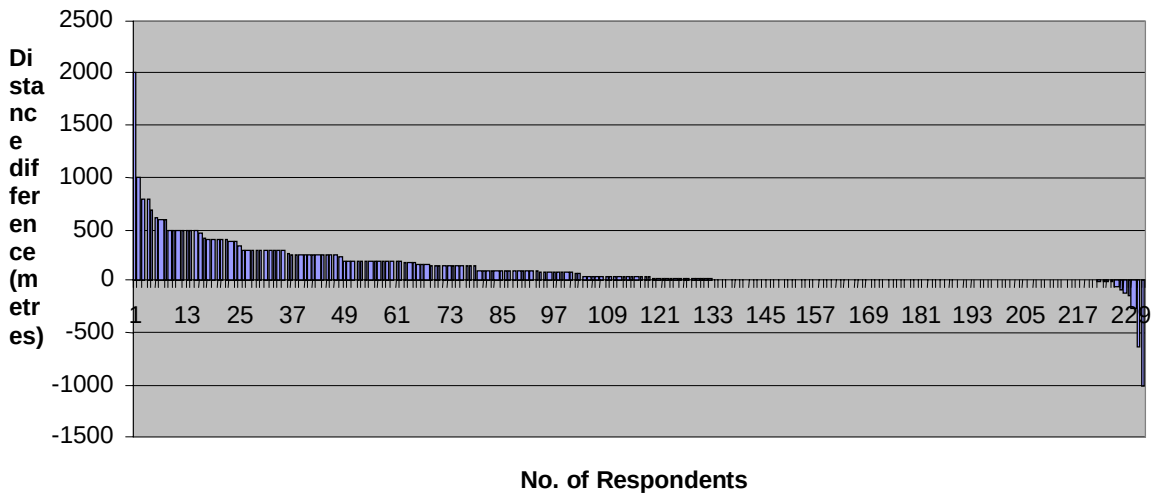
The average distance to water source before and after finding out about arsenic was also calculated per respondent. It is important to recognize that some people did not necessary switch to a safer source and were still drinking unsafe water, and that some people did not need to switch as their source 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). 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) (Graph 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. 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)

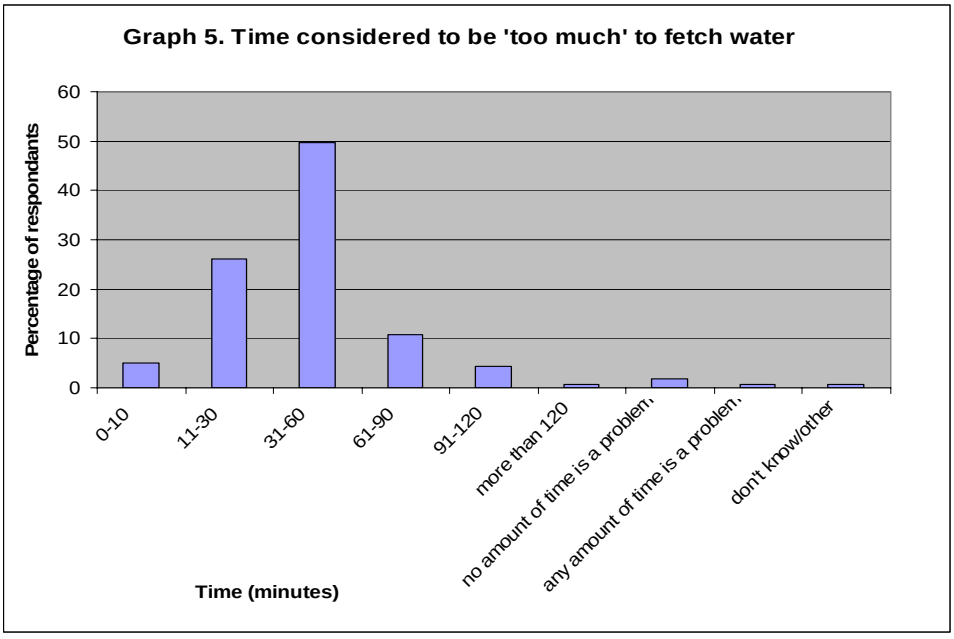
Graph 4. Distance difference in pre- and post-arsenic situation in fetching water per day

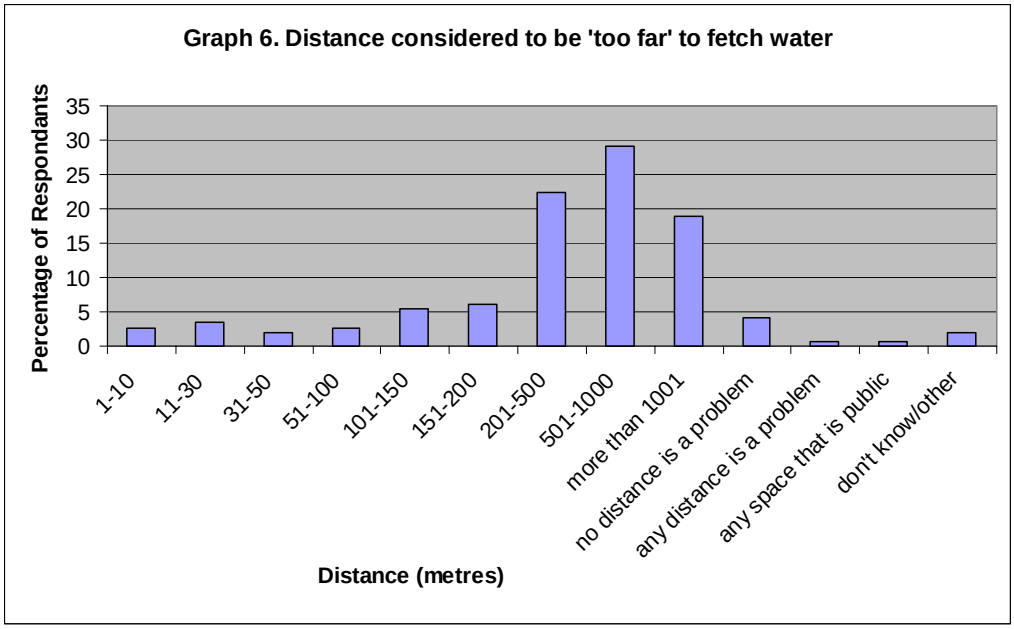


Government guidelines consider 250 users per well or source to be the practical maximum to reduce undue wait times. This is equivalent to 50 families, although the government long-term plans are to have one well per household (married couple) (Rosenboom 2004). In the present study, average number of 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.

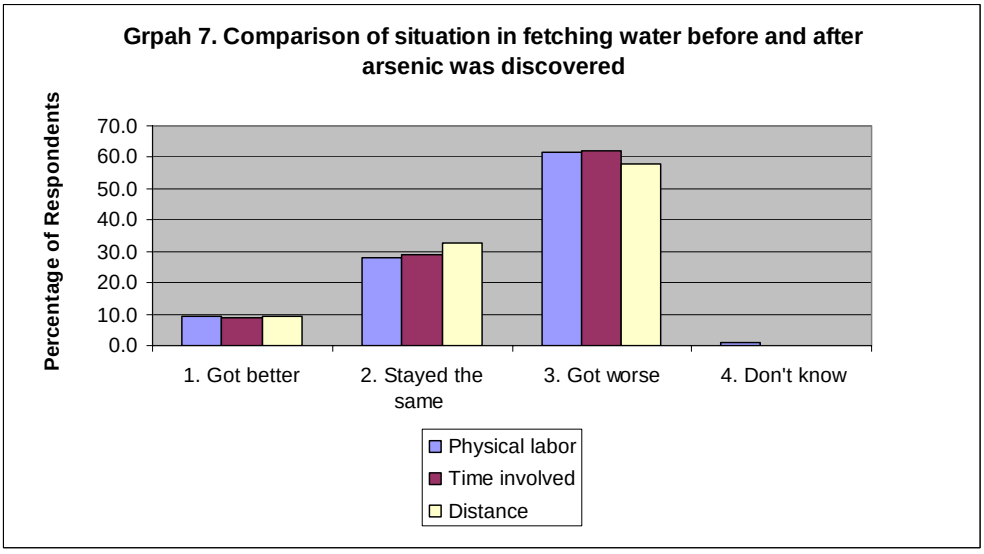
It is important to note that there is not necessarily a significant positive correlation between time and distance increase in getting water, as a variety of factors can influence the time needed when distance it held constant; such time factors can be from the route taken, pace of walking, amount of 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 (Graph 5 and Graph 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.





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 (Graph 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).

Box 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 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 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 4).

Box 4.

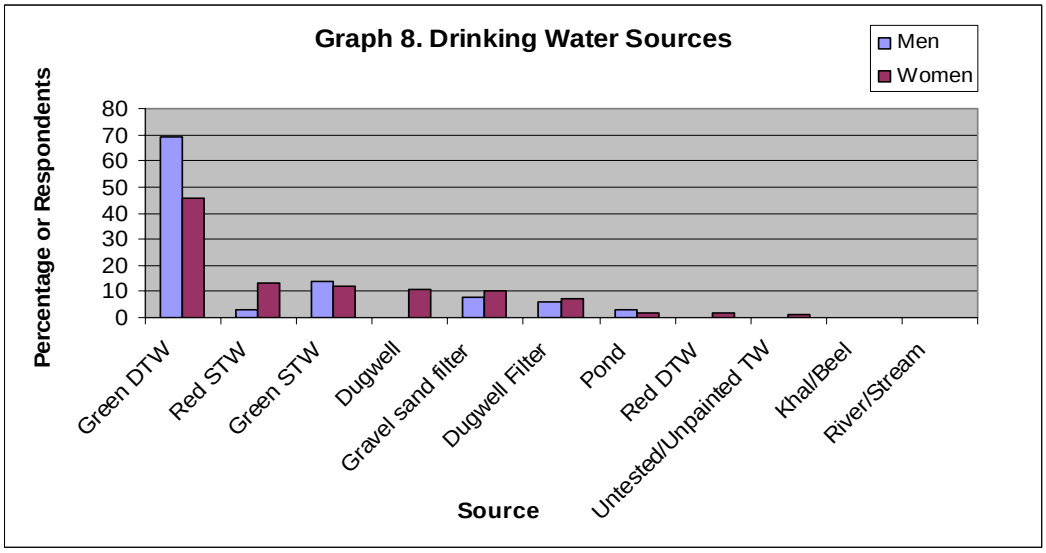
The women in the focus group discussion were worried about the fact that nearly 80% of the tubewells in their area were painted red. This placed a lot of pressure on the ones that were painted green or unpainted. One woman said that the waiting lines at the safe wells were sometimes long, and that everyone 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

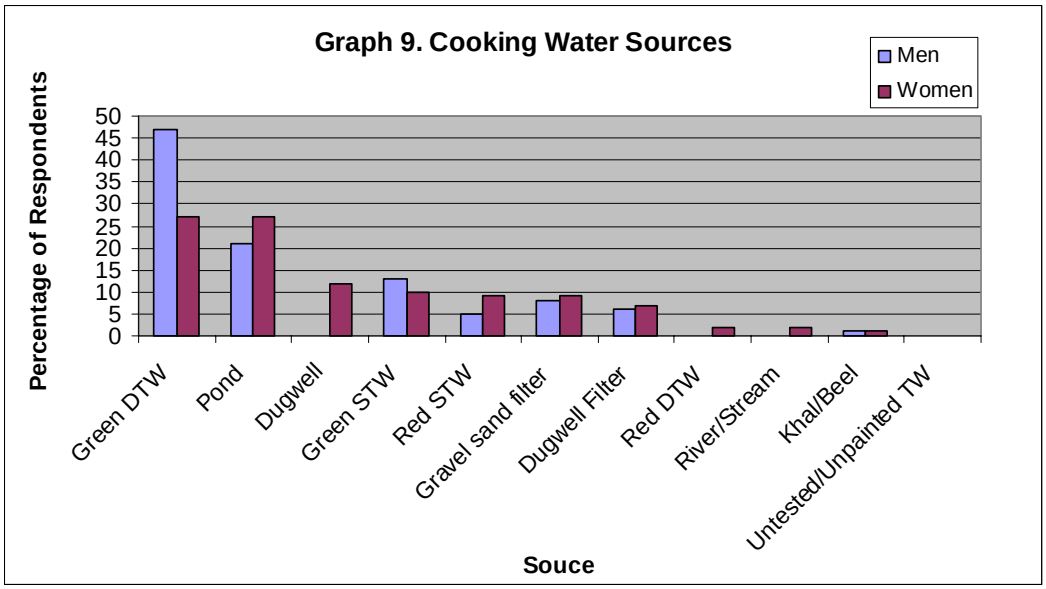
While women are facing increasing hardship to fetch water, many feel that it is their duty to bear the suffering and that they must continue at whatever cost. Nonetheless, some did lament that when it is too hard it is just easier to get whatever water they can for their family. Most women continued 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.”

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 (Graph 8 and Graph 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. 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 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 3. Do you drink or cook with water from a red tubewell?

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

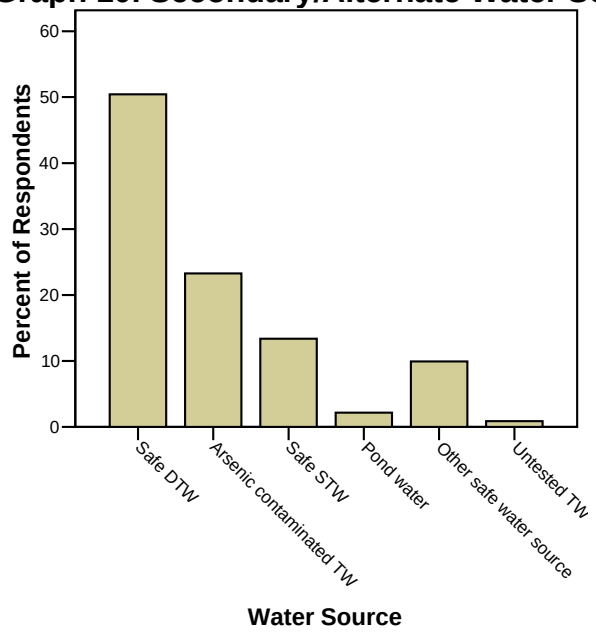
A substantial percentage of the respondents are exposed to consumption of arsenic from not only drinking and cooking but also from soaking rice (*panta bhat*) with contaminated water. Overall across all respondents, it is seen that nearly 10% drink, 8% cook, and 24% soak rice with arsenic contaminated 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).

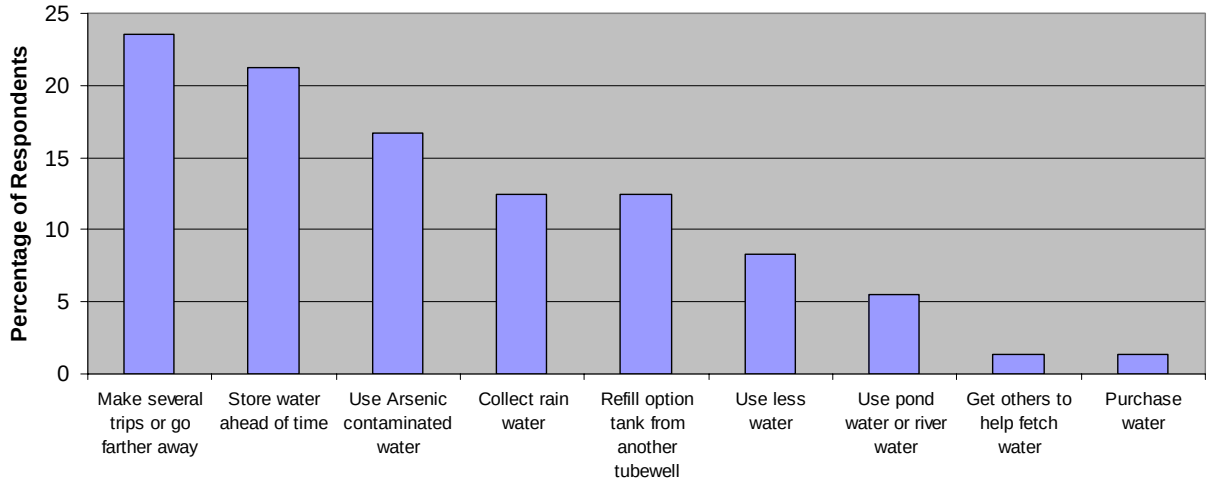
In general, when the primary safe water source is unavailable, broken, under operation and maintenance, or inaccessible, the secondary/alternate water sources become important. It is observed that the secondary/alternate drinking water source is usually another safe source for most people that they can access (Graph 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.

Graph 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 (Graph 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.

Graph 11. Actions taken when facing water shortage



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 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 6).

Box 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 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.

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").

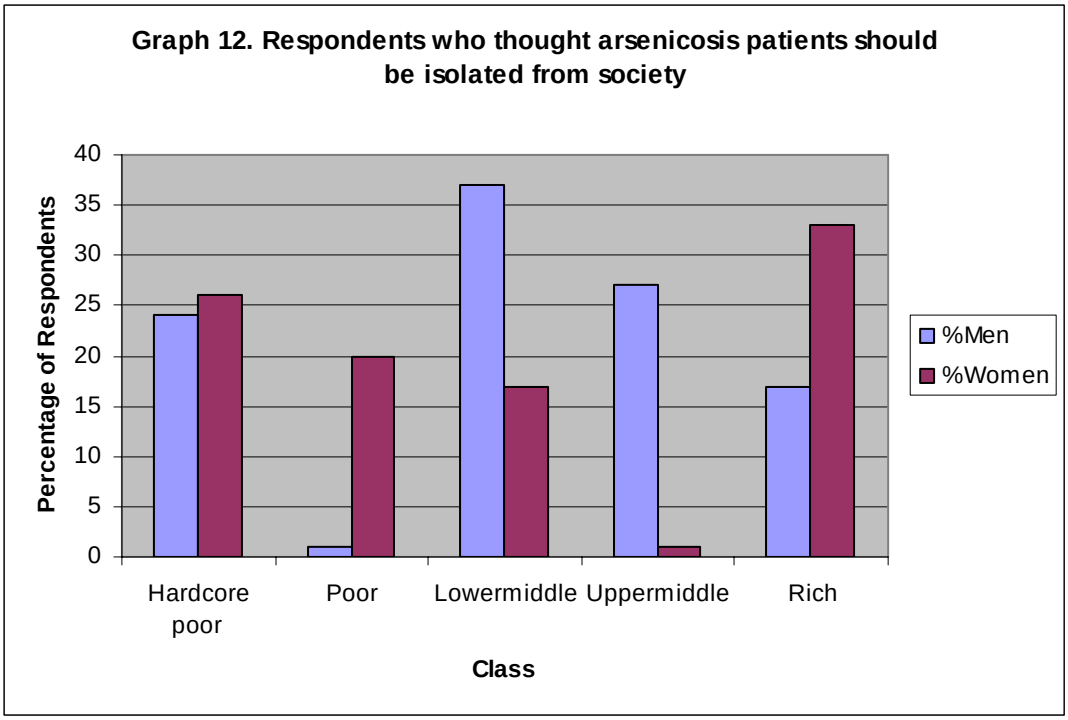
When directly asked if arsenicosis was contagious or not, overall 91% men and 85% of women said it was not contagious; 9% men and 15% women thought it was contagious. This varied with class, as poorer groups thought arsenicosis was contagious more than wealthier groups (Table 4). Such differences could 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 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 (Graph 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.



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.

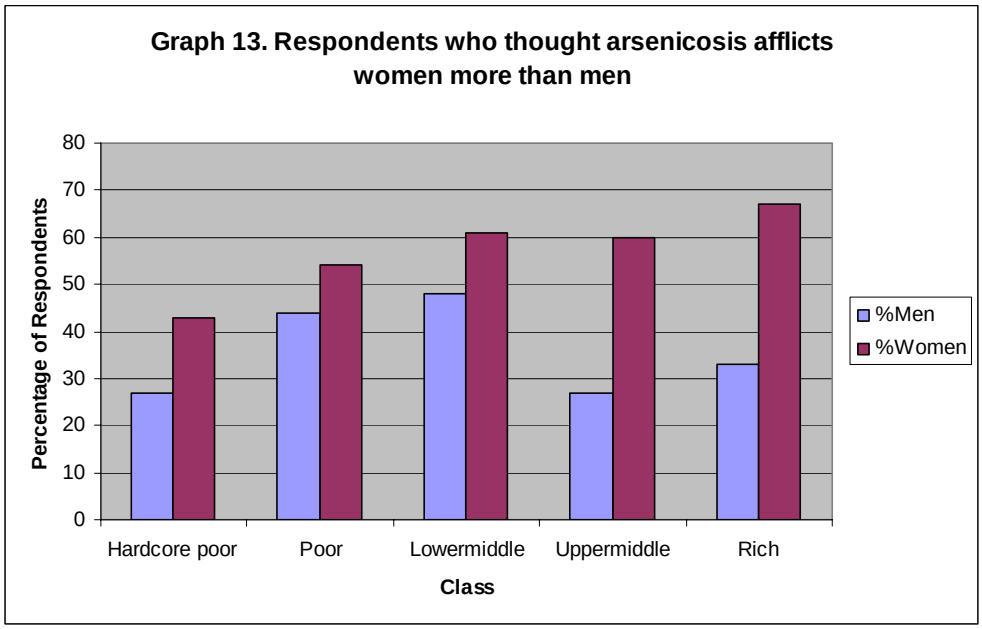
To what extent people know exactly in what ways they can help themselves in dealing with the health impacts of arsenic are still debatable. While some projects claim that through awareness and mobilization campaigns they have sensitized rural people of the causes and cures of early stages of arsenicosis, 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.

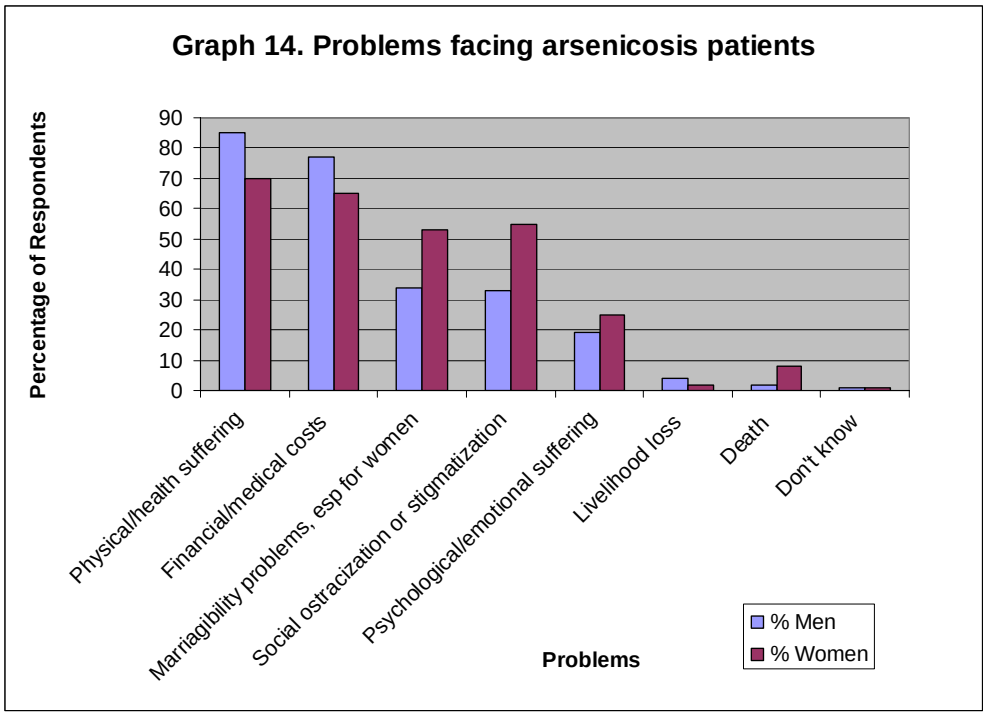
Women are also less likely to afford and get medical attention for health manifestations of arsenic poisoning; they are also less willing to share symptoms and be socially marked. Women's access to adequate healthcare is a problem throughout rural areas, not only in terms of actually being able to go 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 out 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 (Graph 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 (Graph 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 7)

Box 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 8).

Box 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

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).

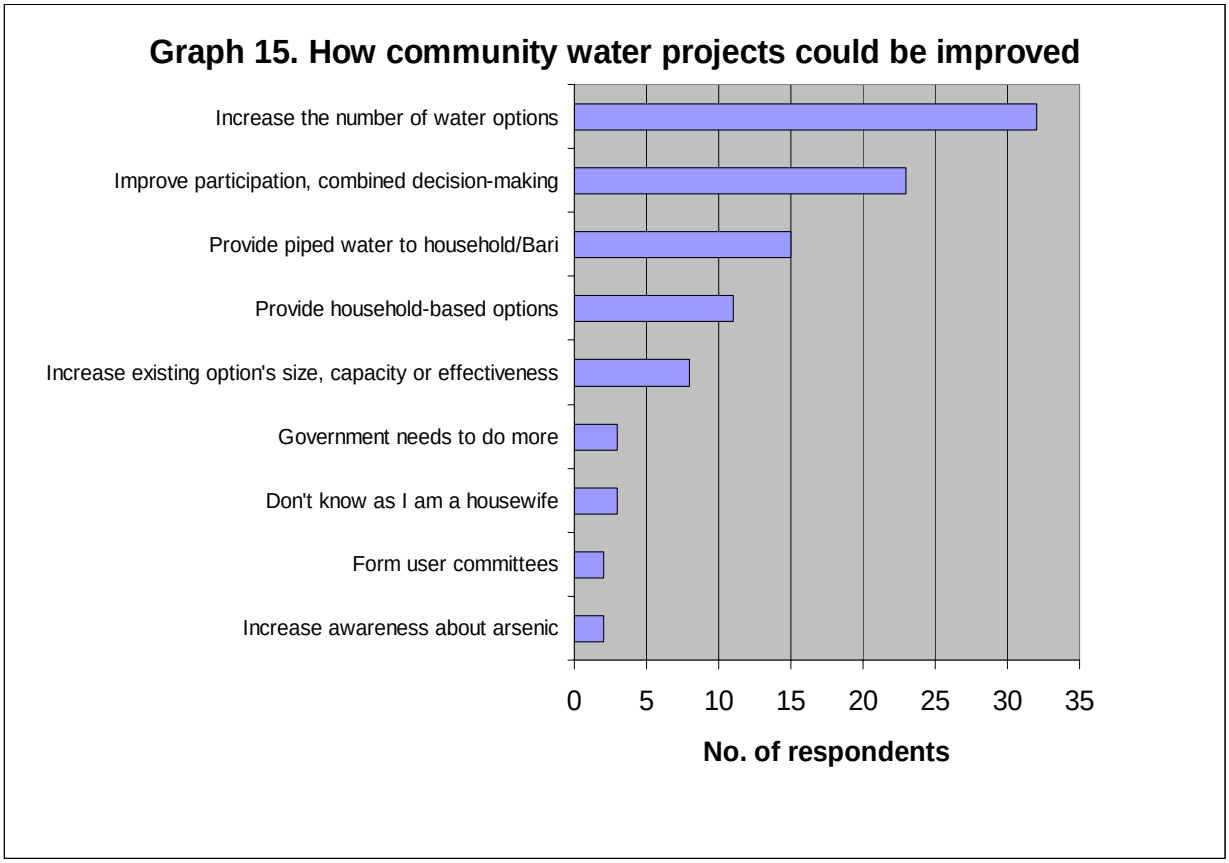
In places where community options were operating, general opinions regarding the projects were the need to increase the number of options available, reduce the number of households dependent on each option, reduce costs involved, and configure better ways to share the water. However, among most water 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 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 9.

Ali had come home for a quick lunch before heading out to the fields to work, but he took some time out 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 *para*s, 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

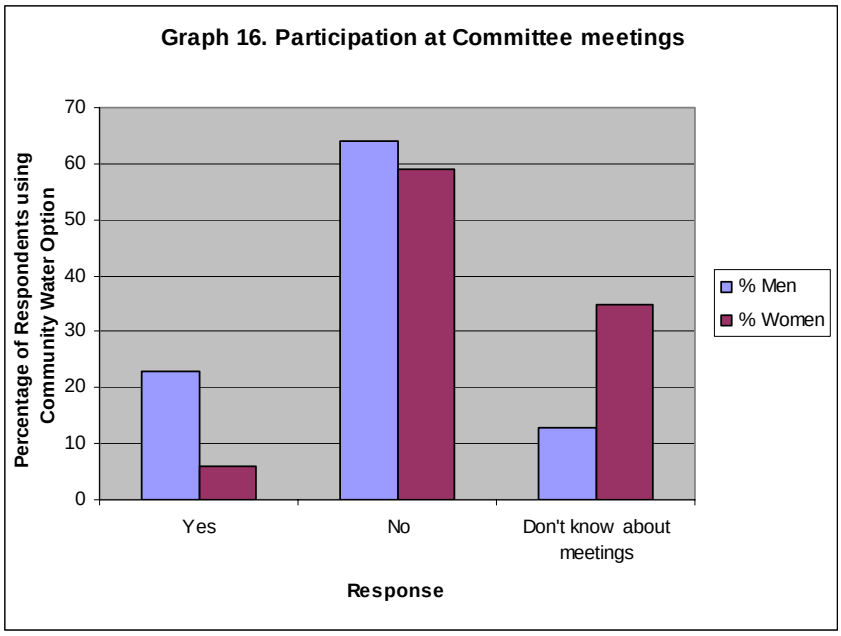
For non-members, some of whom are still able to get water from community options they are not formally a part of, the experiences vary: some have little difficulty in getting water, many did not know whether they were using a privately-owned or community-owned water source, while others are told to leave 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.



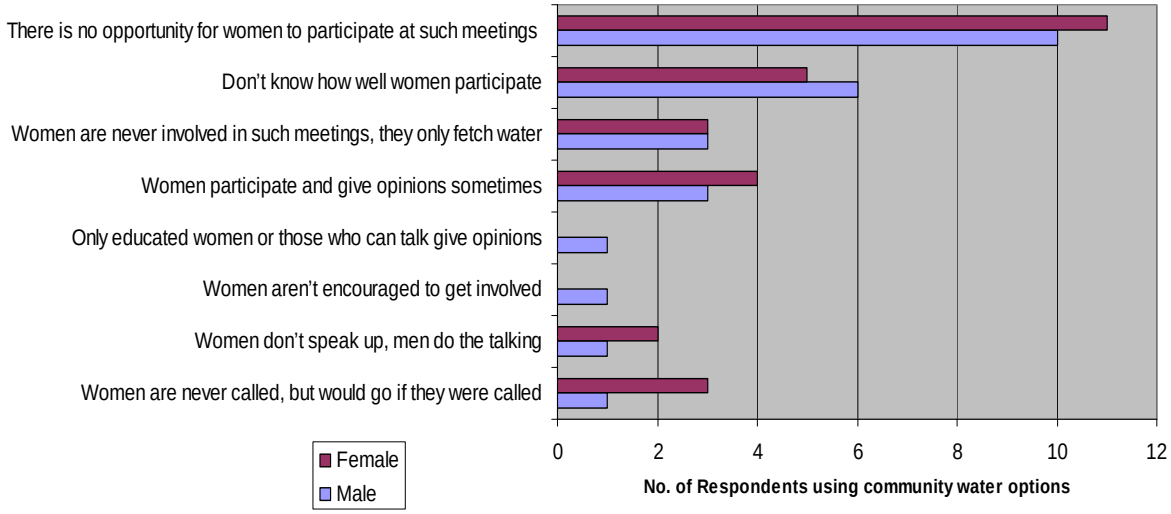
A common theme emerged from questions regarding the management and operation of the community water projects – many people did not know about community options properly, especially about its management arrangements. Most had heard about the community arsenic mitigation projects in their area, especially 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 Graph 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 consistent 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). Graph 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 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).

Graph 17. Women's participation at committee meetings for community water options



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 fora 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.

Box 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

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).

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 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 1: Basic Demographical 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, Araihazar Upazila, Araihazar 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)

		Class					Total
Gender		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

Annex 2: Terms of Reference

Research into Gender Concerns in Arsenic Mitigation in Bangladesh

1 Objective

1.1 The objective of the Research is to produce a report on the gender aspects of arsenic in South-western Bangladesh based on field research.

2 Recipient

2.1 The recipient of the services will be the Arsenic Policy Support Unit (APSU), Local Government Division, Ministry of Local Government, Rural Development and Cooperatives.

3 Scope

3.1 The researcher (Ms Farhana Sultana) will manage a team who will undertake field research into gender aspects of arsenic in South-western Bangladesh and produce a report of key findings.

4 Methodology

4.1 The research team will undertake the following activities to meet the objectives of this study:

i undertake field research in two arsenic-affected Districts in Bangladesh to collect data on gender aspects of arsenic including coping mechanisms, community management and health impacts;

ii undertake a detailed disaggregated gender analysis of the field data; and

iii prepare a report on the findings of the research.

5 Background

5.1 Few studies have looked at the social implications of the arsenic problem in Bangladesh, particularly from a gender perspective, as a majority of the research has focused on epidemiological, medical, geological or technical issues pertaining to this situation. There are almost no in-depth gender analyses of the crisis, yet there are clear gendered differences in perceptions of, responses to and coping with arsenic. Gendered locations influence access to, control over, and knowledge of water resources. Gender interacts in complex ways with multiple axes of difference, such as class, caste, age, and geographical location, in determining the position and power that individuals have in accessing and using scarce resources, such as safe potable water. As such, access to safe water – deemed as a basic need and even a basic human right – is a gendered question.

5.2 An APSU report by Suzanne 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 thorough gender analysis has been undertaken to date, and such a gender study is critical at this stage to better inform policy-makers and programs.

5.3 This research will focus on community-based drinking water options. While such options are being promoted throughout the country, various gender issues challenge the true success of such options. Detailing how certain community water options work, and why some do not, can shed light on the social dynamics that are important in sustainable solutions to the arsenic crisis. It is important to assess such concerns in order to better inform policy-making and program implementation.

5.4 The study will be undertaken in arsenic-acute areas where community-based options have been implemented and do a comparison with an arsenic area where such external interventions have not been undertaken. Areas will also be selected in these places that have high occurrence of patients and those with low prevalence of patients for comparison. Such a comparative study will provide insights into the gender dynamics of water management, responses to and coping strategies vis-à-vis the arsenic situation.

DFIDB
March 2005