

REPORT ON UNICEF K.A.P. SURVEY DATA

Malgosia Madajewicz & Alexander Pfaff

(with thanks to Hamid Rashid and Benjamin Harris
for ongoing and excellent research assistance)

Columbia University
January 28, 2004

INTRODUCTION – GOALS, SURVEYS, CHALLENGES & FINDINGS

UNICEF Bangladesh, with assistance from a number of non-governmental agencies (NGOs), conducted surveys to assess the impact of arsenic contamination in Bangladesh. The surveys aimed to measure the knowledge levels, attitudes and behavioral patterns of respondents living in arsenic-affected areas. The first survey, referred to hereafter as the baseline survey, or baseline, was conducted between July and September of 2001. The subsequent survey, referred to as the follow-up survey, or follow-up, took place in March-May, 2002. In the period between surveys, UNICEF and other governmental and non-governmental agencies carried out dissemination programs to make people aware of the problems associated with arsenic contamination. The primary objective of this report is to ascertain whether these dissemination programs increased the level of arsenic-related awareness and knowledge. We would also like to find out whether varying levels of knowledge and attitude among the respondents appear to explain the variance in their stated willingness to take action or to spend money to prevent arsenic-related problems.

Part I below presents socio-economic and demographic statistics for the respondents from the baseline and follow-up surveys. Descriptive statistics are compared across districts and between baseline and follow-up surveys within each district. Part II tries to assess whether responses to survey questions change in the aggregate between baseline and follow-up surveys. Part III tries to identify variables or attributes that are significant in explaining the variations in knowledge, attitude and behavior of the respondents. We also attempt to identify variables that explain respondents' stated willingness to pay for a particular measure. Part IV traces the characteristics of the group that had undertaken testing before the baseline survey occurred. We also try to see whether those who switched from a contaminated water source are any different from the rest of the sample.

Data

The surveys covered 10 administrative districts. This report uses 4,453 observations (2,909 observations from the baseline and 1,544 observations from the follow-up survey). The division by district and by the NGO collecting the data is reported in the appendix.

One of the NGOs conducting the survey slightly altered the format of the survey. In some cases, the degree of difference between the questions precluded us from using responses from the altered survey. In other cases, there was either no difference or the difference was minor, allowing us to use those responses along with the other survey responses. This occurred in four districts: Chandpur, Comilla, Jessor, and Faridpur. All of the responses from Jessor and Faridpur were from this NGO. For Chandpur and Comilla

there are responses from the altered and the standard surveys. We attempted to account for differences due to the altered survey by including a dummy variable in the regression analysis for those respondents asked questions from the altered survey, in addition to including two interaction terms multiplying the dummy variable for affected respondents times the dummy variables for the districts where responses existed from both surveys. The details of the differences between the surveys are documented within the appendix.

Methodology

In Part II, we focus upon the percentage of respondents who answer correctly any given knowledge or attitude question. It is considered positive if the percentage responding correctly increases between baseline and follow-up surveys. To see whether the increase is higher or lower for respondents with low education and income, we constructed two subsets of the data: those with monthly income less than or equal to Tk 4000 and no schooling or only non-formal education; and those with monthly income greater than Tk. 4000 and having primary education or higher. We have 1,147 observations in the former (“income=0, education=0”) and 1,293 in the latter (“income=1, education=1”) group.

To assess the impact of dissemination (i.e. investigate whether and to some extent why knowledge levels or attitudes vary between the baseline and follow-up surveys), we have created a dummy variable ‘id’ (with the value zero for baseline and one for follow-up) for inclusion in the regression analysis. If the coefficient of the ‘id’ variable is significant, then we will conclude that dissemination programs could have had a significant effect on the knowledge levels and attitudes. If the coefficient is both significant and positive, then dissemination may have increased the level of knowledge or a given attitude. When this effect of the dissemination is explored in regressions (as opposed to tables alone), we can statistically control for effects of variations in education and income across groups, since variations in knowledge and attitudes may be explained by those characteristics, in particular by differences in those characteristics between baseline and follow-up groups.

We are also interested to learn whether knowledge and attitudes vary across districts. For this purpose, we have created dummy variables for the districts. District dummy variables have been created for Brahmanbaria, Chandpur, Chaudanga, Comilla, Maridpur, Munshiganj, Narail, Jessor and Faridpur (in regressions, their coefficients can be interpreted as differences with respect to the district of Barisal). When a district dummy appears significant, we will conclude that the variation in the variable being analyzed can be explained by whatever unobserved differences exist between that district and Barisal.

Limitations

It is worth noting that we do not know whether the districts were randomly selected or whether there were some specific selection criteria for these choices. If the latter were so, for instance if districts were chosen because of their relatively high arsenic prevalence, then observed arsenic awareness here might not be representative of all of Bangladesh.

The primary difficulty with inferring the effectiveness of dissemination from the data is that, in each location, different groups were sampled before the dissemination and after. Therefore, we do not know whether, for each location, differences between the group sampled before dissemination and the group sampled after dissemination, rather than the dissemination itself, were responsible for documented changes in knowledge, attitudes, and behavior over time. Based on characteristics of respondents that we do observe, we see that the follow-up group is more educated and has slightly higher income and wealth. One would expect that follow-up respondents, those with higher education and slightly higher income, would have more knowledge even without dissemination. Thus to make more accurate inferences about how dissemination affected responses, we need to control for such observed characteristics in the baseline and follow-up groups' characteristics.

While in our regressions (unlike in the tables, which present differences without controls) we can try to control statistically for the observed differences in income and education, such that we can better estimate the actual effect of dissemination upon the responses, any unobserved differences between the baseline and follow-up groups remain an issue. For instance, the follow-up group may consist of individuals who have broader sets of social connections. They may be better informed even if not exposed to dissemination. We simply can not control for differences in characteristics that we do not observe at all. Only by interviewing the same individuals over time could this challenge be eliminated.

Another challenge is to control for changes that may have occurred through the country, for instance a change in the intensity of the national television campaign about arsenic. This survey did not include a control group, one not exposed to the dissemination efforts which could have indicated the background level of change over time in the country, allowing a comparison of that level of changes in responses with the one observed here. Thus, it is hard to say how much of the difference between the baseline and follow-up responses is due to dissemination and how much reflects changes occurring everywhere.

The surveys do not provide information on the level of arsenic in the tubewells that the respondents use. The absence of this information means that we cannot know whether the level of arsenic contamination is associated with willingness to take preventive action. Also, we have no data on the distances that respondents currently walk to obtain water or are likely to walk if they were to collect water from a prospective safe source of water. Such information could help to explain respondent willingness to take preventive action, although one final note is that these questionnaires contained few questions examining the actions actually taken by respondents that are of particular interest, such as continuing to use a contaminated water source or shifting to another source to lower health risks.

Summary

With these qualifications stated, in order to frame what is possible, below we present evidence that the dissemination campaign did increase knowledge and change attitudes. This is the case even controlling for observed characteristics, including district dummies. We find that characteristics also matter for responses. Finally, comparing characteristics of those with well tests before and after the campaign appears to explain what otherwise might appear to be a negative effect of dissemination on switching to a new water source.

PART I: BASIC CHARACTERISTICS OF THE RESPONDENTS

For all tables in Part I and II, numbers in the parentheses represent the total number of responses in that particular category or group. As it is evident in Table 1, the respondents in the baseline survey are significantly different than those in the follow-up. There are more females, fewer children, and the average age of the youngest child is almost two years younger in the follow-up survey. And perhaps more importantly in terms of the outcomes of interest here, the follow-up group is also more literate, in terms of both schooling and the ability to read. Among the baseline respondents, 37.85% never attended school at all, compared to 11.59% from among the follow-up who have not. While the respondents in the follow-up survey are slightly wealthier than those in the baseline survey, the discrepancies appear to be much greater for education than for income. In summary, the respondents from the two groups are significantly different in terms of gender, marital status, number and age of children, education, income and wealth. We need to keep these differences in mind in analyzing the differences in the stated responses of the two groups.

Statistics	Baseline (2909)	Follow-up (1544)
% of Female	29.09%	38.64%
% Married	18.87%	64.51%
Average Age	4350	38.07
Avg. Number of Children	3.63	3.06
Average Age of the Youngest Child	9.86	7.91
% Never Attended School	37.85%	11.59%
% Who Can Not Read At All	35.32%	17.57%
% of Farmer	24.95%	20.54%
% that Own a Radio	44.05%	65.65%
% that Own a Television	24.23%	34.35%
% that Own Agricultural Land	77.21%	80.70%
% that Have Electricity	32.00%	50.06%
% With Monthly Income of Less than Tk. 4000	66.07%	62.82%
% of People Who Never Listen to Radio	22.00%	15.74%
% of People Who Never Watch TV	39.94%	23.51%

Table 1: Basic Characteristics of the Respondents

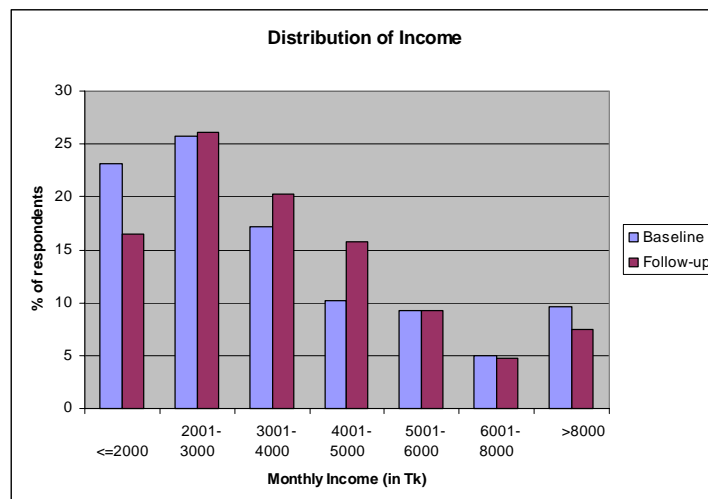


Chart 1: Distribution of Monthly Income

Table 2 shows how these indicators vary both across the districts and also within each district between baseline and follow-up surveys. For the districts, the same pattern holds over time as held for the complete baseline and follow-up surveys compared over time, i.e. the follow-up respondents within each district for which we have follow-up data are significantly different from their district counterparts in the baseline survey. The lack of education in the baseline survey, for instance, is most pronounced in Chaudanga, Narail, and Faridpur, but this difference disappears in the follow-up survey. Respondents from Chaudanga and Narail also seem to have less income compared to respondents in other districts, although this difference drops significantly for respondents from Narail in the follow-up survey. We would like to find out whether this inter-district variation in education and income could help to explain the inter-district variation in responses.

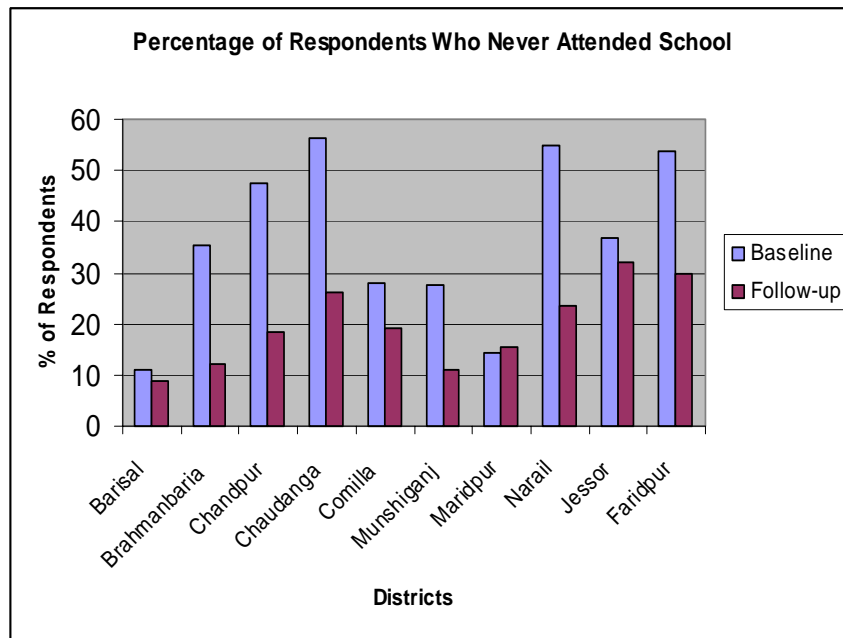


Chart 2: Percentage of People Who Never Attended School

Indicators		<u>Barisal</u>	<u>Brah.</u>	<u>Chand.</u>	<u>Chaud.</u>	<u>Comilla</u>	<u>Munshi</u>	<u>Madir.</u>	<u>Narail</u>	<u>Jessor</u>	<u>Farid.</u>
Number of Observations	B	100	206	549	101	648	102	200	102	468	433
	F	100	205	200	100	300	109	200	130	100	100
% of Female	B	24.00	27.67	14.03	49.50	13.89	42.16	24.00	97.06	2.99	10.85
	F	20.49	20.49	25.00	27.00	27.00	40.37	31.15	91.54	8.00	19.00
% Married	B	93.00	89.32	77.96	93.07	81.79	85.29	91.5	86.27	96.15	93.30
	F	88.00	86.34	88.50	86.00	90.33	77.98	82.5	97.69	88.00	95.00
Average Age	B	45.21	42.29	45.13	36.40	45.65	39.72	40.61	33.43	44.72	43.32
	F	39.84	39.84	42.03	34.19	40.64	35.88	39.17	35.88	45.93	49.40
Avg. Number of Children	B	3.95	3.86	4.04	3.13	4.07	3.33	3.21	3.79	NA	NA
	F	2.96	2.96	2.54	2.19	3.28	3.62	3.29	3.62	NA	NA
Average Age of the Youngest Child	B	10.18	10.10	10.68	10.31	10.17	11.37	9.45	7.06	NA	NA
	F	7.80	7.29	9.31	5.23	7.86	7.96	7.69	7.96	NA	NA
% Never Attended School	B	11.00	35.44	47.36	56.44	28.09	27.45	14.50	54.90	36.97	53.58
	F	9.00	12.20	18.50	26.00	19.00	11.01	15.50	23.38	32.00	30.00
% Who Can Not Read At All	B	5.00	35.92	24.00	62.38	47.74	32.35	21.00	54.90	NA	NA
	F	0.00	13.17	14.00	26.00	18.00	12.84	22.50	30.00	NA	NA
% of Farmer	B	35.00	29.13	16.00	37.62	32.66	27.45	22.00	NA	NA	34.41
	F	25.00	18.05	15.00	37.00	22.00	19.27	24.50	NA	NA	32.00
% that Own a Radio	B	41.00	51.46	18.00	31.68	44.22	41.18	64.00	33.33	NA	NA
	F	64.00	87.80	22.00	66.00	81.00	66.97	63.50	43.85	NA	NA
% that Own a television	B	23.00	26.70	7.00	15.84	16.58	45.10	16.58	16.67	NA	NA
	F	20.00	36.10	19.00	17.00	36.00	67.89	43.00	23.85	NA	NA
% that Own Agricultural Land	B	85.00	75.73	73.22	51.49	84.10	40.20	78.50	55.88	87.82	78.52
	F	99.00	86.83	78.00	91.00	84.67	70.64	86.50	75.38	50.00	71.00
% that Have Electricity	B	59.00	42.72	18.76	24.75	39.04	55.88	48.05	20.59	33.12	16.86
	F	60.00	57.56	43.50	62.00	53.33	59.63	57.50	33.08	19.00	45.00
% With Monthly Income of Less than Tk. 4000	B	76.00	72.82	71.58	92.08	53.86	72.55	46.50	92.16	69.44	58.89
	F	58.00	62.93	61.00	97.00	57.67	62.39	59.50	77.69	58.00	46.00
% of People Who Never Listen to Radio	B	29.00	25.73	20.95	53.47	19.14	30.39	13.50	46.08	17.89	18.48
	F	0.00	9.27	15.00	6.00	12.00	13.76	20.50	36.15	14.00	36.00
% of People Who Never Watch TV	B	46.00	51.94	48.63	62.38	31.33	20.59	27.00	59.80	33.12	42.73
	F	10.00	13.17	22.50	6.00	18.00	8.26	31.00	41.54	46.00	51.00

Table 2 – Basic Characteristics of the Respondents Across the Districts

PART II: CHANGES BETWEEN BASELINE AND FOLLOW-UP SURVEYS

Here we look at seven knowledge questions to see whether the percentage responding correctly increases between surveys. An increase in correct response is considered an indication that dissemination could have improved levels of these types of knowledge. Then we see whether there are similar changes in attitudes. Finally, we would like to examine whether changes carry over to respondents' actual or potential practices, e.g. to willingness to spend a particular amount for prevention of an arsenic-related problem.

In the tables that contain percentages broken out by districts, illustrating district variation, certain cells below will contain the entry 'NA'. In some cases, this is due to a lack of response from respondents. In other cases, notably in responses from Jessor and Faridpur, the 'NA' entry is due to the aforementioned discrepancy between the surveys.

PART II. A. -- KNOWLEDGE QUESTIONS

Whether one can find arsenic in water: Here we are trying to ascertain whether a respondent is aware that arsenic can be detected in water. If respondents believe that arsenic cannot be detected, then they will have little incentive to test for arsenic and perhaps also less belief that measures can be taken to avoid drinking water with arsenic. Table 3 shows that between the baseline and follow-up, the percentage giving a correct answer increases from 59.07% to 89.55%. However, this increase is more pronounced for low-income, low education group – from 42.00% to 88.61% (a two-fold increase) compared to a 30 percent increase for the high-income, high education group.

1= Yes, 0= No + Don't Know	Baseline	Follow-up
% Correct	59.07(1452)	89.55(1379)
% Correct when income=0 & education=0	42.00(294)	88.61(179)
% Correct when income =1 & education=1	69.16(500)	89.90(472)

Table 3: Can One Find Arsenic in Water?

At the district-level, we see similar increase between baseline and follow-up surveys. But strikingly, in the follow-up, 89.06% of the respondents in Narail respond correctly compared to 66.34% of the respondents from Brahmanbaria (note: consider dropping, since discrepancy is less striking). We might expect that the respondents of Brahmanbaria, who have higher levels of education and income, would be more responsive to dissemination and hence would respond more correctly in the follow-up. We don't see that happening here.

1= Yes, 0= No + Don't Know		Barisal	Brah.	Chand.	Chaud.	Comilla	Munshi	Mar.	Narail	Jessor	Farid.
% Correct	Baseline (1419)	79.78	26.32	53.77	73.08	66.99	43.06	56.82	1.82	66.45	63.51
	Follow-up (982)	100.00	66.34	86.93	100.00	99.67	97.25	96.00	89.06	79.00	81.00
	Total (2401)	90.43	50.59	63.33	94.44	79.02	75.69	77.66	62.84	68.66	66.79

Table 4: Variation within and across the districts

Whether arsenic can be removed from water: Here, the correct answer is that arsenic can be removed from water. Surprisingly, the percentage giving the correct answer remains nearly constant, although there was a significant decrease for respondents in the low-income, low-education group. We need to ascertain whether ‘can be removed’ is indeed the intended correct answer (referring to arsenic filters, e.g., which we might not necessarily expect people to know about) before drawing any conclusion in this regard.

1= Yes, 0= No + Don't Know	Baseline	Follow-up
% Correct	43.78(1071)	41.33(634)
% Correct when income=0 & education=0	30.33(212)	19.90(40)
% Correct when income =1 & education=1	56.37(407)	50.96()

Table 5: Can arsenic be removed from water?

In Table 6, in Barisal, Brahmanbaria, Chaudanga, Comilla, and Maridpur the percentage of correct response decreases. For the other districts it increases between baseline and follow-up. This inconsistency is intriguing and raises the issue of how the question is interpreted or, put another way, what the correct response is depending on interpretation.

1= Yes, 0= No + Don't Know		Barisal	Brah.	Chand.	Chaud.	Comilla	Munshi	Maridpur	Narail	Jessor	Farid.
% Correct	Baseline (1074)	50.56	53.03	42.77	57.69	58.25	17.65	43.75	5.45	42.95	32.56
	Follow-up (634)	45.45	20.79	57.29	55.00	54.33	68.81	8.63	7.03	49.00	65.00
	Total (1708)	47.87	33.53	46.96	55.56	56.81	49.15	25.20	6.56	44.01	38.65

Table 6: Variation within and across the districts

Whether symptoms will go away if respondent stops using arsenic water: Here we ask if one thinks symptoms caused by use of arsenic contaminated water would go away if one stops drinking arsenic-laden water. In Table 7, we see a significant increase in the percentage of correct responses between baseline and follow-up. The increase is about 50 percent greater for low-income, low education than for high-income, high-education.

1= Yes, 0= No + Don't Know	Baseline	Follow-up
% Correct	32.24(210)	63.80(726)
% Correct when income=0 & education=0	23.85(31)	59.20(119)
% Correct when income =1 & education=1	36.73(72)	61.89(216)

Table-7: Whether symptoms will go away

In Table 8, we see the largest increases in the district of Chaudanga and Comilla, with a large increase in the districts of Brahmanbaria and Narail, as well. Munshiganj, interestingly, experienced a marked decline between the baseline and follow-up surveys .

1= Yes, 0= No + Don't Know		Barisal	Brah.	Chand.	Chaud.	Comilla	Munshi.	Maridpur	Narail	Jessor	Farid.
% Correct	Baseline (210)	25.84	35.38	26.19	15.38	15.87	30.99	49.43	12.73	NA	NA
	Follow-up (726)	39.39	77.07	43.43	99.00	95.98	6.42	57.75	57.81	NA	NA
	Total (936)	32.98	60.90	38.30	81.75	76.72	16.11	53.87	44.26	NA	NA

Table 8: Variation within and across the districts

Can people die if they continue to drink arsenic water? Here, we wish to find out whether respondents believed that people could die from continued use of arsenic-contaminated water. We notice, in Table 9, increase in the percentage of correct answer, however we don't see any significant difference along the education and income level.

1= Yes, 0= No + Don't Know	Baseline	Follow-up
% Correct	69.47(446)	92.97(952)
% Correct when income=0 & education=0	65.89(85)	89.73(166)
% Correct when income =1 & education=1	74.74(145)	95.74(292)

Table 9: Can people die?

We see a significant increase between baseline and follow-up in each district in the correct response, with the exception of Munshiganj, where follow-ups were not available. The increase in Comilla is more significant, however, than in the other districts.

1= Yes, 0= No + Don't Know		Barisal	Brah.	Chand.	Chaud.	Comilla	Munshi	Maridpur	Narail	Jessor	Farid.
% Correct	Baseline (446)	56.32	70.77	50.00	73.08	55.38	61.29	89.14	63.64	NA	NA
	Follow-up (952)	96.88	89.22	81.82	100.00	98.50	NA	98.48	82.03	NA	NA
	Total (1398)	77.60	82.04	72.34	94.44	87.92	61.29	94.09	76.50	NA	NA

Table 10: Variation within and across the districts

Whether respondent knew of any organization carrying out arsenic testing? This question asks whether the respondent is aware of any government or non-government organizations testing tubewells for arsenic. By the time the follow-up survey took place, a very high percentage of people were aware of arsenic testing (increased by about 50%). Increases in awareness are more significant for the low-income, low education group ().

1= Aware, 0= Not Aware	Baseline	Follow-up
% aware	63.29(1555)	96.80(1484)
% aware when income=0 & education=0	45.06(315)	95.02(191)
% aware when income =1 & education=1	78.84(570)	97.32(509)

Table 11: Aware of arsenic testing program

The correct response rates for this question were similar in the follow-up survey, although there was significant variation in the response rates in the baseline survey. Narail experienced the most dramatic increase, followed by Brahmanbaria. Compared to the other districts, the increase in the correct response rate in Jessor was relatively minor.

1= Aware, 0= Not Aware		Barisal	Brah.	Chand.	Chaud.	Comilla	Munshi.	Maridpur	Narail	Jessor	Farid.
% Aware	Baseline (1555)	40.45	24.06	47.66	50.00	76.85	76.39	72.16	9.09	81.41	63.97
	Follow-up (1484)	94.95	98.53	99.49	99.00	98.99	95.37	91.92	96.09	90.00	100.00
	Total (3039)	69.15	69.14	62.55	88.89	84.98	89.78	82.62	69.95	82.92	70.73

Table 12: Variation within and across the districts

What does the red mark mean? Tubewells that contain arsenic are marked ‘red’ and the safe tubewells are marked ‘green’. This question asks whether respondents know the meaning of ‘red’ marking. We see a significant increase over time in the percentage of correct answers, with a much greater increase in the low-education, low-income group.

1= Red means arsenic, 0= No + Don’t Know	Baseline	Follow-up
% Knows red denotes presence of arsenic	44.23(858)	87.54(1082)
% Knows red is arsenic when income=0 & education =0	23.17(136)	86.39(127)
% Knows red is arsenic when income =1 & education=1	67.01(386)	87.14(366)

Table 13: Meaning of red-mark

In certain districts, notably Narial and Chaudanga, very few respondents answered this question in the baseline survey (5 and 3, respectively), making analysis difficult. The response pattern for the district of Munshiganj was puzzling, as only one respondent out of 109 answered the question correctly in the follow-up survey. The districts unaffected by the low initial response rate, other than Munshiganj, experienced a similar increase in correct response rate.

1= Red Means Arsenic		Barisal	Brah.	Chand.	Chaud.	Comilla	Munshi	Maridpur	Narail	Jessor	Farid.
% Correct	Baseline (858)	71.43	62.50	29.63	100.00	51.55	14.29	88.57	100.00	54.70	33.26
	Follow-up (1082)	94.95	99.02	96.58	100.00	99.50	0.92	97.39	77.53	94.00	95.00
	Total (1940)	92.04	97.65	43.23	100.00	66.36	3.65	94.05	78.72	61.62	44.84

Table 14: Variation within and across the districts

Can Someone Spread Arsenicosis? In this question, respondents are asked if arsenicosis is contagious. The correct answer is ‘no’. We see that the percentage answering correctly increases from 31.39% in baseline to 77.10% in the follow-up survey. The increase is more pronounced (more than two-fold) for the low-income, low-education group.

1= No, 0= Yes + Don’t Know	Baseline	Follow-up
% Correct	31.39 (769)	77.10(1182)
% Correct when income=0 & education =0	33.33(101)	79.10(159)
% Correct when income =1 & education=1	48.54(348)	77.63(406)

Table 15: Can Someone Spread Arsenic?

Though there is significant increase in correct responses in each district, we notice greater increases in the Barisal and Chaudanga. Jessor increased only by about 1.5 percent..

1= No		Barisal	Brah.	Chand.	Chaud.	Comilla	Munshi	Maridpur	Narail	Jessor	Farid.
% No	Baseline (769)	32.58	50.78	18.33	23.08	37.74	42.25	48.00	43.64	35.68	18.48
	Follow-up (1182)	97.96	85.29	68.34	100.00	83.16	96.33	83.84	63.28	37.00	40.00
	Total (1951)	68.84	71.99	32.75	84.13	54.38	75.00	67.02	57.38	35.92	22.51

Table 16: Variation within and across the districts

PART II. B. -- ATTITUDE QUESTIONS

Should a person suffering from arsenicosis be allowed to share same water source?

Here, we try to learn attitudes towards sharing water source with a person who is suffering from arsenicosis. The ‘correct’ attitude is ‘yes’. The percentage saying ‘yes’ increases from 37.48% in the baseline to 88.30% in the follow-up survey. The increase in the ‘yes’ response among the low-income, low-education group is slightly higher.

1= Yes, 0= No + Don't Know	Baseline	Follow-up
% Yes	37.48(247)	88.30(1004)
% Yes when income=0 & education =0	24.43(32)	81.19(164)
% Yes when income =1 & education=1	46.23(92)	88.79(309)

Table 17: Should be allowed to share water source?

We see increases in the percentages saying ‘yes’ in each district. However, in Narail, significantly fewer people say ‘yes’ in the follow-up survey compared to the respondents in the other districts . Barisal, Chandpur, Chaudanga, Comilla, and Munshiganj all experienced increases in excess of 60 percentage points in the correct reponse rate.

1= Yes		Barisal	Brah.	Chand.	Chaud.	Comilla	Munshi	Maridpur	Narail	Jessor	Farid.
% Yes	Baseline (247)	31.48	46.62	28.57	26.92	9.09	23.61	60.80	14.55	NA	NA
	Follow-up (1004)	98.99	90.24	91.84	100.00	85.43	96.33	90.95	58.59	NA	NA
	Total (1251)	67.02	73.08	72.86	84.92	66.42	67.40	76.80	45.36	NA	NA

Table 18: Variation within and across the districts

Should the child be allowed to play with an arsenic-affected child? This question asks whether respondents would allow their children to play with a child suffering from arsenicosis. Again, we expect the respondents to say ‘yes’ to this attitude question. Here, we see a significant increase in the percentage saying ‘yes’ between baseline and follow-up surveys. The increase is again more pronounced for low-income, low education group.

1= Yes, 0 = No + Don't Know	Baseline	Follow-up
% Yes	35.51(234)	90.82(1029)
% Yes when income=0 & education =0	22.14(29)	47.74(95)
% Yes when income =1 & education=1	84.42(168)	9306(322)

Table 19: Should the child be allowed to play?

In the low-income, low-education district Narail, the percentage responding ‘yes’ is the lowest, for both the baseline and the follow-up surveys. We see the most significant increases over time in correct responses in Chaudanga, Chandpur, Comilla, and Munshiganj districts.

1= Yes		Barisal	Brah.	Chand.	Chaud.	Comilla	Munshi	Maridpur	Narail	Jessor	Farid.
% Yes	Baseline (234)	24.71	42.11	33.33	26.92	34.85	34.72	45.45	12.73	NA	NA
	Follow-up (1029)	92.93	96.57	98.99	100.00	97.49	97.25	89.74	52.34	NA	NA
	Total (1263)	60.64	78.07	79.43	84.92	81.89	72.38	68.73	40.44	NA	NA

Table 20: Variation within and across the districts

Should the arsenic-affected person leave the village? In this attitude question, we ask the respondents whether they would prefer that the arsenic-affected person leave the village. We expect respondents to say ‘no’ to this question, i.e. that is the ‘correct’ answer. The percentage saying ‘no’ increases from 65.24% to 92.86% between baseline and follow-up surveys. The increase is essentially the same for each group.

1= No, 0 = Yes + Don’t Know	Baseline	Follow-up
% No	65.24(428)	92.86(1054)
% No when income=0 & education =0	60.47(78)	90.95(181)
% No when income =1 & education=1	64.32(128)	93.68(326)

Table 21: Should the arsenic-affected person leave the village?

The increase in correct response is somewhat higher in Narial and Maridpur, but fairly similar across districts. Overall, the increase is not as high as we observed in case of other knowledge and attitude questions due to the relatively high correct baseline response rate.

1= No		Barisal	Brah.	Chand.	Chaud.	Comilla	Munshi	Maridpur	Narail	Jessor	Farid.
% No	Baseline (428)	66.29	69.70	87.80	69.23	75.76	80.28	51.14	47.27	NA	NA
	Follow-up (1054)	91.92	84.88	98.99	99.00	98.99	98.17	91.84	84.38	NA	NA
	Total (1482)	79.79	78.93	95.71	92.86	93.21	91.11	72.58	73.22	NA	NA

Table 22: Variation within and across the districts

Will you allow your child to marry an arsenic-affected person? In this final attitude question, respondents are asked whether they would allow their children to marry a person with arsenicosis. We see a significant increase in the percentage saying ‘yes’ with a pronounced increase for the low-income, low education group. Overall, the percent responding correctly is much lower than in other knowledge/attitude questions.

1= Yes, 0 = No + Don’t Know	Baseline	Follow-up
% Yes	5.29(130)	27.05(415)
% Yes when income=0 & education =0	1.57(11)	27.50(55)
% Yes when income =1 & education=1	7.88(57)	27.72(145)

Table 23: Will you allow your child to marry an arsenic-affected person?

Fewer people in low-income, low-education district Narail will allow their child to marry an arsenic-affected person.. The most substantial increase was found in Chaudanga, the only district where respondents answered correctly more than half the time.

1= Yes		Barisal	Brah.	Chand.	Chaud.	Comilla	Munshi	Maridpur	Narail	Jessor	Farid.
% Yes	Baseline (119)	10.11	11.36	4.89	19.23	3.31	15.28	10.80	0.00	4.70	1.85
	Follow-up (302)	48.48	38.42	21.11	65.00	29.10	33.94	14.21	14.84	6.00	5.00
	Total (421)	30.32	27.68	9.57	55.56	12.79	26.52	12.60	10.38	4.93	2.44

Table 24: Variation within and across the districts

PART II. -- C. PRACTICE AND ACTIONS QUESTIONS

Did you ever take water from an arsenic contaminated source? The percentage of people who ever took arsenic contaminated water increases between baseline and follow-up surveys. However, the difference between income and education groups is small, and correct response rates were similar in the follow-up survey. An important perspective on these responses, though, is that very few respondents in the baseline survey answered, so it is difficult to come to clear conclusions concerning the change in this type of behavior.

1= Yes, 0 = No + Don't Know	Baseline	Follow-up
% Yes	40.70 (35)	78.09(588)
% Yes when income=0 & education =0	22.22 (2)	77.10 (101)
% Yes when income =1 & education=1	44.22 (16)	73.02 (157)

Table 25: Did you ever take water from an arsenic contaminated source?

Since there are few responses in the baseline survey, we cannot infer anything statistically in terms of changes between baseline and follow-up surveys.

1= Yes		Barisal	Brah.	Chand.	Chaud.	Comilla	Munshi	Maridpur	Narail	Jessor	Farid.
% Yes	Baseline (32)	60.00	40.00	0.00	0.00	NA	33.33	44.83	50.00	NA	NA
	Follow-up (443)	39.35	90.67	88.24	96.00	97.12	71.79	52.25	83.58	NA	NA
	Total (475)	38.64	89.39	65.22	95.05	97.12	67.82	49.70	82.61	NA	NA

Table 26: Variation within and across the districts

Do you still take water from that source? We see the percent of people using the same water source increases between baseline and follow-up surveys. However, we again have few respondents responding to this question in the baseline survey – a very small number given the large number of people who responded to knowledge questions in the baseline. Overall, the increase is greater for the low-income, low-education group.

1= Yes, 0 = No + Don't Know	Baseline	Follow-up
% Yes	48.57(17)	58.81(347)
% Yes when income=0 & education =0	0.00(0)	68.32(69)
% Yes when income =1 & education=1	53.33(8)	59.87(94)

Table 27: Do you still take water from that source?

We only have 35 responses in the baseline making it impossible for us to say anything conclusive about variations between baseline and follow-up surveys within each district.

1= Yes		Barisal	Brah.	Chand.	Chaud.	Comilla	Munshi	Maridpur	Narail	Jessor	Farid.
% Yes	Baseline (16)	66.67	50.00	NA	NA	NA	33.33	46.15	100.00	NA	NA
	Follow-up (270)	58.06	54.60	93.75	62.50	53.40	1.79	100.00	80.36	NA	NA
	Total (286)	58.82	54.55	93.75	62.50	53.40	3.39	83.33	80.70	NA	NA

Table 28: Variation within and across the districts

PART II. -- D. WILLINGNESS TO PAY QUESTIONS:

For each question we see an increase in the percent ‘yes’ between baseline and follow-up. It was significant for every category except ‘testing the tubewell’; this may be explained by the fact that by the follow-up survey almost all of the tubewells were already tested for arsenic. In addition, due to discrepancies between surveys, a subset of the respondents were asked if they were willing to perform labor in exchange for these services, in addition to being asked about willingness to spend. This could affect the results below.

1= Yes, for testing the tubewell	Baseline	Follow-up
% Yes	90.20(2458)	89.92(1468)
% Yes when income=0 & education =0	84.58 (700)	84.34 (198)
% Yes when income =1 & education=1	95.30(723)	93.18(484)
1= Yes, for maintaining the tubewell	Baseline	Follow-up
% Yes	82.21(652)	95.15(1073)
% Yes when income=0 & education =0	69.77(129)	92.82(195)
% Yes when income =1 & education=1	92.96(722)	97.76(313)
1= Yes, for installation of a new tubewell	Baseline	Follow-up
% Yes	92.43(2456)	95.43(1533)
% Yes when income=0 & education =0	88.70(699)	95.48 (199)
% Yes when income =1 & education=1	96.68(722)	97.51(523)
1= Yes, for maintaining the new tubewell	Baseline	Follow-up
% Yes	93.24(2457)	95.29(1530)
% Yes when income=0 & education =0	92.99(699)	93.97(199)
% Yes when income =1 & education=1	95.44 (723)	97.52(524)

Table 29: Willingness to pay

The response rate between districts is remarkably similar. In some cases, respondents in Narail were less willing to spend money on these measures. The lower level of income and wealth of the respondents from Narail is perhaps responsible for this difference.

		Barisal	Brah.	Chand.	Chaud.	Comilla	Munshi	Maridpur	Narail	Jessor	Farid.
% Yes, for testing the tubewell	Baseline (2458)	96.63	88.72	92.26	88.46	95.73	88.89	93.18	52.73	82.26	92.84
	Follow-up (1468)	95.96	97.08	74.87	100.00	98.66	93.58	81.50	71.09	94.90	100.00
	Total (3926)	96.21	92.96	87.25	97.62	96.81	91.71	86.97	65.57	84.45	94.17
% Yes, for maintaining the tubewell	Baseline (652)	95.91	88.55	23.81	88.46	87.88	92.65	89.14	45.45	NA	NA
	Follow-up (1073)	98.98	99.31	67.35	100.00	98.99	99.06	89.50	90.32	NA	NA
	Total (1725)	97.33	94.18	54.29	97.62	96.23	96.55	94.13	77.05	NA	NA
% Yes, for installation of a new tubewell	Baseline (2456)	98.86	89.47	90.43	80.77	97.67	88.73	83.52	74.55	97.86	89.38
	Follow-up (1533)	98.99	96.06	92.39	100.00	91.30	96.26	99.50	95.31	96.00	95.00
	Total (3989)	98.93	93.45	90.99	96.03	95.33	93.26	92.02	89.07	97.54	90.43
% Yes, for maintaining the new tubewell	Baseline (2457)	98.88	88.72	90.84	76.92	97.28	91.55	84.66	74.55	95.94	95.61
	Follow-up (1530)	97.98	95.52	94.42	100.00	91.25	95.37	98.50	94.53	96.00	95.00
	Total (3987)	98.40	92.81	91.86	95.24	95.07	93.85	92.02	88.52	95.95	95.50

Table 30: Variation within and across the districts

Amounts respondents are willing to spend: Table 31 shows less willingness to spend in the follow-up for ‘testing the tubewell’ but more for all other categories. Notice the high standard deviations for every mean. Also, in every category, the respondents with low income and low education are willing to spend less than those with high education and high income, with some pronounced differences. This is consistent with our expectation; willingness to spend should be influenced by levels of income and possibly education.

	Baseline		Follow-up	
	Mean	SD	Mean	SD
For testing the tubewell				
Amount	34.42	46.98	34.75	65.48
Amount when income=0 & education =0	25.48	28.61	19.99	39.81
Amount when income =1 & education=1	40.50	50.32	48.19	82.77
For maintaining the tubewell				
Amount	102.17	277.60	116.89	266.57
Amount when income=0 & education =0	74.89	160.81	69.74	98.21
Amount when income =1 & education=1	128.61	359.29	169.30	351.61
For installation of a new tubewell				
Amount	129.88	529.84	591.24	996.45
Amount when income=0 & education =0	34.04	148.36	522.51	636.30
Amount when income =1 & education=1	196.62	657.95	907.50	1237.48
For maintaining the new tubewell				
Amount	38.01	297.92	45.20	151.68
Amount when income=0 & education =0	14.96	129.69	27.66	33.79
Amount when income =1 & education=1	65.30	462.39	68.80	248.61

Table 31: Amounts respondents are willing to spend

For districts we see similar trends, e.g. less follow-up willingness to spend for ‘testing the tubewell’ and more for other categories. The variation across districts for ‘maintaining the tubewell’ is significant, as three districts experienced drops in this willingness. Respondents from Narail are willing to spend significantly less than other districts for all categories other than ‘testing the tubewell’. Differences in income and wealth between districts may explain this, though Chaudanga’s willingnesses are comparable to others’.

		Barisal	Brah.	Chand.	Chaud.	Comilla	Munshi	Maridpur	Narail	Jessor	Farid.
For testing the tubewell	Baseline	65.69	65.49	29.05	36.09	37.03	88.05	24.39	51.38	24.45	28.25
	Follow-up	55.87	11.75	25.59	15.24	31.81	136.42	18.79	16.32	34.02	27.06
	Total	65.54	36.47	28.20	19.14	35.10	177.77	21.58	24.79	26.13	28.03
For maintaining the tubewell	Baseline	108.36	71.96	95.50	94.78	145.86	314.60	28.78	38.00	NA	NA
	Follow-up	109.43	220.07	53.71	114.12	166.77	201.52	26.57	27.28	NA	NA
	Total	108.93	153.79	59.21	110.50	162.02	243.93	27.55	28.86	NA	NA
For installation of a new tubewell	Baseline	1183.66	140.30	10.93	106.19	37.36	302.50	852.93	52.90	19.53	3.94
	Follow-up	2098.72	519.36	242.43	263.90	490.70	292.78	1095.58	86.32	790.16	369.50
	Total	1168.11	375.07	79.09	236.53	196.03	213.22	992.49	79.51	155.28	72.53
For maintaining the new tubewell	Baseline	450.55	94.49	2.32	58.50	12.72	332.22	49.78	76.45	0.00	0.02
	Follow-up	118.25	59.57	28.51	21.46	45.20	92.93	43.01	15.78	14.38	17.14
	Total	475.37	72.75	9.94	27.63	24.04	183.20	45.92	22.24	2.76	3.18

Table 32: Variation within and across the districts

PART III: REGRESSION RESULTS (can provide regressions tables as desired)

Here we report on efforts to explain the observed variations in the responses to seven knowledge and four attitude questions in regressions with a set of explanatory variables. We also try to explain answers to four ‘willingness to pay’ and four ‘amount willing to spend’ variables or responses. Our explanatory variables include: marital status; years of schooling; monthly income; listening to radio; watching tv; baseline or followup dummy; the eight dummies for the districts, and the two interaction terms between the dummy for respondents asked questions from the altered survey and districts Chandur and Comilla. In the discussion below, if a variable is not noted as significant, then it was insignificant.

Is there any way in which you think you can find out if water contains arsenic? We find the id variable to be significant and positive, indicating that the dissemination program appears to have been successful in increasing the correct response rate. In addition, education was significant, districts varied, and listening to the radio, watching television, and marital status were significant. Lastly, the dummy variable for the altered survey and its interaction term with and the district Comilla were significant.

Can arsenic be removed from water through any means? We find id, income, and education to be significant, consistent with the tables. We find some significant district variation (seven of nine differ from Barisal), and that listening to the radio, watching tv, and marital status are significant. The dummy variable for the altered survey and its interaction with the district Comilla were found to be significant.

Will the skin problem go away if people stop drinking arsenic contaminated water? Here id and education were significant but income was not. This finding is expected given the similarity of response rates by respondents from different income and education levels. We find moderate district variation, and listening to radio to be significant.

Can people die if they drink arsenic contaminated water? Here, we find id to be significant. Income is significant only at the 10% confidence level. We find moderate district variation. The marriage variable is significant for this knowledge question.

Do you know of the government or any other organization carrying out arsenic testing program? We find id, education, and income to be significant, consistent with the tables. Two of nine districts differ from Barisal, and listening to the radio, watching television, marital status, and the altered survey are all significant. We also find the interaction term between the altered survey and the district of Chandpur to be significant.

What does a red mark on a tubewell mean? Here we find that id, income, and education are all positive and significant, consistent with the tables. We find little district variation. Watching television, listening to the radio, and marital status are significant.

Can someone spread arsenic disease? Like for the previous knowledge question, the id, income, and education are all positive and significant. Watching television, listening to the radio, marital status, and the altered survey are significant predictors.

Will you share your water source with an arsenic-affected person? The id and education are positive and significant (not income, all consistent with the tables). Also, we find listening to the radio to be significant.

Will you allow your child to play with an arsenic-affected child? Here we find both id and education to be positive and significant (again, not income). We find five of the seven district dummies to be significant, in addition to listening to the radio.

Will you want the arsenic-affected person to leave the village? Id and five district dummies were the only significant predictors, consistent with the tables.

Will you allow your child to marry an arsenic-affected person? The id, income, and education are all significant, as are three district dummies. In addition, watching television, listening to radio, and the altered survey are significant.

Willingness to pay for testing: The id, income, and education are all positive and significant. The id result differs from that from tables alone, and note that a regression not controlling for other factors finds id to be not significant. Listening to the radio and watching television are both negative and significant. Marriage, the altered survey, and the interaction term between the altered survey and Comilla also are all significant.

Willingness to pay for maintenance: As expected, we find id, education and income to be positive and significant. We also find three of the district variables to be significant.

Willingness to pay for installing a new tubewell: We find id and income significant, but not education. Eight of nine districts differ from Barisal. Marital status, watching television, and the altered survey are significant predictors as well.

Willingness to pay for maintaining the new tubewell: Id, income, and most of the dummy variables are significant, in addition to 'married', consistent with the tables.

Amount to pay for testing: As above, we find id, income, and education significant here. Most district dummy variables, watching television and the altered survey are too.

Amount to pay for maintenance: Other than moderate district variation, we find income and watching television to be the only significant predictors for this variable. Consistent with the tables, we found little change between the baseline and follow-up surveys.

Amount to pay for installing a new tubewell: Here, in addition to id and income, we find all districts to be significant. The marital status and altered survey variables are also significant, as is the interaction term between survey type and the district Comilla.

Amount to pay for maintaining the new tubewell: Id is negative and significant, as in the tables (six districts dropped in mean willingness to spend, while four increased). Income is positive and significant, and the districts differ significantly from each other. Marital status, watching television, and the altered survey are significant.

In a final regression effort, we are also interested to find out whether the variation in the level of knowledge and attitude (variables which were dependent variables in the above regressions) can serve as explanatory variables for respondents' willingness to pay for a preventive measure (also a dependent variable above, but without these new predictors). We have four 'willingness to pay' variables to explain, i.e. willingness to pay for testing, willingness to pay for maintenance, willingness to pay for installing a new tubewell and finally, willingness to pay for maintaining the new tubewell. On the right hand side of the regression, we have now included 11 (eleven) knowledge and attitude variables.

These new explanatory variables for willingness to pay are:

1. Can one find arsenic in water?
2. Can arsenic be removed from water?
3. Will the skin problem go away if one stops drinking arsenic-water?
4. Can one die if he/she drinks arsenic contaminated water?
5. Can someone, affected by arsenic, spread it to others?
6. Will you share your water source with an arsenic-affected person?
7. Will you allow your child to play with an arsenic-affected child?
8. Will you want the arsenic-affected person to leave the village?
9. Will you allow your child to marry an arsenic-affected person?
10. Are you aware of any government or NGO carrying out arsenic testing?
11. Meaning of the red marking

In the first regression for the dichotomous 'willingness to pay' variable as dependent variable, only explanatory variable #6 from the list above is significant. Interestingly, only variable #11 is significant in the second, third, and fourth regressions, indicating that understanding the meaning of the red marking may be an important predictor for willingness to pay. It is possible this variable acts as a proxy for income more than the other variables, since we know income is an important predictor for willingness to pay.

We ran the same regressions for the four dependent variables where respondents indicate the amounts they are willing to spend. In the first regression, variables #6, #7 and #8 are significant. In the second regression, none are significant. On the question of how much money they would like to spend for installing a new tubewell, variables #1, #2, and #8 are significant. Finally, in the last regression, only variables #1 and #2 are significant.

PART IV: TUBEWELL OWNERSHIP, TESTING AND USE

Here we examine tubewell ownership as well as testing and usage in the baseline and in the follow-up survey. We are interested to find out whether arsenic in the tubewell has influenced preventive well switching. We should control for who tested their tubewells. We also want to know if those who switched wells differ from others with well arsenic.

Tubewell ownership, testing, and arsenic contamination & tubewell switching:

We see almost no difference between baseline and follow-up in the percentage who own a tubewell. However, the percentage of tubewells that has been tested for arsenic increases enormously, from 8.87% to 98.47%. This is not surprising, as only a few people would have been expected to test on their own, before the campaign, which then tested all the wells involved in the survey. Less clear is why we also see a significant increase in the percentage of positive arsenic tests. It could be due simply to random variation, or perhaps due to follow-up-survey targeting based on arsenic that we are not yet aware of.

The percentage of people who are still using the same tubewell dropped from 92.37% to 86.08% between baseline and follow-up surveys. This could be evidence of a beneficial effect of the dissemination. However, we must recall that the follow-up respondents are more educated and slightly richer. Also, we just saw that arsenic is more prevalent in the follow-up group's wells, which could be another reason for not staying at the wells.

The percentage of people using the same tubewell when arsenic has been found there, though, increased from 77.27% in the baseline survey to 85.71% in the follow-up survey. This might appear to indicate a negative effect of the dissemination on well switching. However, we just saw that the populations who have had a well test shifted radically. Those who had tested their wells on their own, i.e. before the NGO arsenic intervention, may well be a group that is more likely to switch wells upon learning they have arsenic (e.g., a more educated, richer, more socially connected group). Thus different behaviors conditional on a positive test may result not from dissemination but from characteristics. Even though the follow-up group is, on the whole, more educated and slightly richer, the select few driven to test their wells on their own could be an even more active group. This speculation leads to our comparing the groups with tested wells, in Table 35 below, which does find that those who had tested their wells in the baseline differ significantly.

	Baseline	Follow-up
% of respondents that own their tubewell	85.89 ^a	85.29
% of tubewell that has been tested	8.87 ^b	98.47
% of tubewell where arsenic has been found	52.31 ^c	73.78 ^d
% of respondents still using the same tubewell	92.37 ^d	86.08 ^e
% still using when arsenic is found in the tubewell	77.27 ^e	85.71 ^h

Table 33: Tubewell Usage

^a: 659 answered; 566 said there was a tubewell in their home.

^b: 2,357 answered; 209 said their tubewell had been tested for arsenic (106 of whom had not responded on ownership).

^c: 195 said their tubewell was tested and they knew the outcome of the test; 102 said the test for arsenic was positive.

^d: 511 answered; 472 said they were using the same tubewell (415 respondents had reported no test of their tubewell).

^e: Of the 102 above who reported positive arsenic tests, 44 answered here; 34 said they were using the same tubewell.

^f: 1,327 said their tubewell was tested and they knew the outcome of the test; 979 said the test for arsenic was positive.

^g: 783 answered; 674 said they were using the same tubewell.

^h: Of the 979 above who reported positive arsenic tests, 742 answered here; 636 said they were using the same well.

From Table 34 below, we see that compared to respondents from the other districts, fewer people own a tubewell in Barisal, Jessor, and Narail, but the percentage of tubewells in the baseline that have been tested for arsenic is higher in Barisal, Munshiganj, Maridpur, and Narail than in most of the other districts. We notice the lowest percentage of well testing positive for arsenic in Chaudanga and Comilla. The percentage of respondents still using the same tubewell is relatively constant across districts, except in Barisal and Brahmanbaria, where a lesser percentage are using the same tubewell. This is also true for the percentage of people who still using the same tubewell after arsenic was found.

		Barisal	Brah.	Chand.	Chaud.	Comilla	Munshi.	Maridpur	Narail	Jessor	Farid.
% own a tubewell	baseline	80.90	91.73	78.57	88.46	87.88	84.72	95.45	52.73	NA	NA
	follow-up	72.16	93.17	88.38	100.00	88.96	94.50	95.00	73.44	39.00	82.00
% of tubewell that has been tested	baseline	19.44	6.14	9.13	4.35	3.55	34.43	28.57	17.24	5.56	5.77
	follow-up	100.00	99.48	99.49	100.00	98.63	99.01	99.48	94.51	87.80	97.00
% of tubewell where arsenic has been found	baseline	76.92	75.00	55.26	0.00	11.76	38.10	40.43	75.00	68.00	76.00
	follow-up	67.14	91.76	96.86	51.00	67.82	55.00	65.08	81.18	86.11	68.04
% of respondents still using the same tubewell	baseline	78.26	96.67	81.82	100.00	98.18	97.73	93.57	89.29	NA	NA
	follow-up	59.57	65.91	93.62	94.23	93.33	87.88	100.00	96.00	NA	NA
% still using when arsenic is found in the tubewell	baseline	60.00	100.00	0.00	NA	100.00	100.00	78.95	100.00	NA	NA
	follow-up	59.57	61.94	93.62	94.12	93.29	85.45	100.00	98.55	NA	NA

Table 34: Variation within and across the districts

Group that tested their tubewell before the baseline survey:

In Table 35, we report the characteristics of the respondents who tested their tubewell before the baseline survey took place in order to examine whether this group differs (on average) from tubewell owners in the baseline as well as from the entire baseline sample.

We can see that the group that tested their tubewell before the baseline survey is significantly different from tubewell owners in the baseline and the entire baseline population. Those tubewell owners who tested pre-baseline are somewhat richer than the other two groups, and are less educated tubewell owners overall, but more educated than the entire sample.

Indicator	Those who tested pre-baseline (209)	Tubewell owners in baseline (566)	The entire baseline sample (2909)
% of people with education =1 (education>2)	77.99	79.33	59.99
% of people with income =1 (income >Tk 4000)	48.50	39.05	33.93
% of people who can read easily	82.52	70.14	50.27
% of people who listen to radio daily	50.72	47.00	36.51
% of people who watch tv daily	45.93	38.34	21.59
% owning a radio	56.31	56.54	44.05
% owning a tv	45.63	37.99	24.23
% having agricultural land	84.21	78.98	77.21
% having electric supply	60.29	55.30	32.00
% having pucca household	4.85	5.30	3.33
% of people who know that arsenic can be detected	66.51	47.00	59.07
% of people who know that arsenic can be removed	46.86	43.67	43.78
% of people who think skin problem will go away	50.49	34.29	32.24
% of people who think people can die from arsenic	77.78	71.51	69.47
% of people who think arsenic is a contagious disease	49.04	35.60	31.39
% of people who will share water source	49.51	39.22	37.48
% of people who will allow the child to play	41.75	37.28	35.51
% of people who will want arsenic patient to stay	51.46	66.25	65.24
% of people who will allow their child to marry	10.53	10.97	5.29
% of people who are aware of testing programs	84.69	49.38	63.29
% of people who know the meaning of 'red' mark	78.02	69.60	44.23

Table 35: Group that tested their tubewell before the baseline survey

Group that switched to safer tubewell: Out of 1,876 tubewell owners, 1390 (74.65%) responded about whether their tubewell had been tested for arsenic. Of these, 990 (72.58%) responded that the test was positive. Finally, of those who reported that their tubewell contained arsenic, only 116 (14.78%) reported that they were no longer using the contaminated water source. Those who switched represent only 2.61% of the sample. We want to see whether they are significantly different from those who did not switch.

From Table 36, differences between those who switched water source and those who tested but did not switch are ability to read, how frequently they listen to the radio, and watching tv. The average age of the youngest child is much lower for the switchers. We think that respondents may perceive younger children to be more vulnerable to arsenic. One important result is that compared to the group that tested and did not switch, the test-and-switch group had significantly higher levels of education and listened to the radio and watched tv more frequently. Moreover, the group that tested and switched had higher correct responses rates for every behavior and knowledge question examined. But it is clear that finding arsenic in the tubewell or having higher levels of education and income does not necessarily mean switching away from the contaminated source.

Indicator	Tested tubewell, switched	Tested tubewell, still using	Untested tubewell, switched	Untested tubewell, still using	All tubewell owners
Average Age of the Youngest Child (years)	6.60	8.36	10.96	9.88	8.72
% of people with education =1 (education>2)	86.32	80.20	76.67	77.54	82.14
% of people with income =1 (income >Tk 4000)	29.06	39.75	20.00	86.88	39.66
% of people who can read easily	72.65	66.01	80.00	66.43	66.96
% of people who listen to radio daily	72.65	47.19	40.00	44.44	48.08
% of people who watch tv daily	53.33	37.50	33.33	32.62	35.71
% of people who know that arsenic can be detected	93.16	86.38	46.67	47.52	77.87
% of people who know that arsenic can be removed	46.15	32.11	40.00	46.19	42.27
% of people who think skin problem will go away	79.49	61.55	26.67	31.74	54.61
% of people who think people can die from arsenic	93.58	90.77	68.97	70.46	85.26
% of people who think arsenic is a contagious disease	91.38	87.84	53.33	43.78	70.95
% of people who will share water source	94.87	83.94	43.33	36.64	71.52
% of people who will allow the child to play	91.45	88.70	40.00	35.70	72.78
% of people who will want arsenic patient to stay	91.45	90.25	66.67	69.76	83.90
% of people who will allow their child to marry	40.17	31.36	20.00	9.72	23.85
% of people who are aware of testing programs	97.44	94.77	43.33	44.08	82.93
% of people who know the meaning of 'red' mark	92.08	83.16	60.00	57.78	85.10

Table 36: Tubewell owners who tested their tubewell and switched sources

APPENDIX

SUMMARY OF OBSERVATIONS BY DISTRICT AND NGO

District	NGO	Observations	Baseline	Follow-up
Barisal	NGO Forum	199	99	100
	ISDCM	1	1	0
Brahmanbaria	CDIP	211	106	105
	ISPCM	200	100	100
Chandpur	Grameen	200	100	100
	BRAC	549	449	100
Chaudanga	ISDCM	201	101	100
Comilla	Grameen	200	100	100
	ISDCM	198	99	99
	BRAC	549	449	100
	CDIP	1	0	1
Maridpur	GUP	400	200	200
Munshiganj	DCH	211	102	109
Narail	EPRC	232	102	130
Jessor	BRAC	568	468	100
Faridpur	BRAC	533	433	100
		4453	2909	1544

It appears that 3 observations may have been miscoded. They can be checked or not used.

SUMMARY OF BRAC AND NON-BRAC SURVEYS

Q#	Question Description	In BRAC Survey?
---	Surveytype (ID)	Yes
---	District	Yes
1	Sex	Yes
2a	Age	Yes
2b	Married	No
2c	Number of children	No
2d	Age of youngest child	No

2e	Occupation	Yes
2f	Education	Yes
2g	Can read or write	No
3a	Items owned by household	Yes
3c	Agricultural land	Yes
3d	Electricity	Yes
3e	Total household income	Yes
4a	Listen to radio	Yes
4b	Watch tv	Yes
6	Household structure	No
12c	Can you determine if water contains arsenic	Yes
12e	Can arsenic be removed from water	Yes
13c	Will problems caused by arsenic go away	No
13e	Can people die from drinking water w/arsenic	No
14a	Can people spread aresenic-related illness	Yes
14c	Should someone w/arsenicosis share water sources	No
14d	Should a child w/arsenicosis be allowed to play w/others	No
14e	Should a person w/arsenicosis leave the village	No
14f	Would you allow your child to marry a person w/arsenicosis	Yes
15a	Aware of organization testing for arsenic	Yes
15f	What does a red mark on a tubewell mean	Yes
16a	Do you ever take water from wells where arsenic was found	No
16b	Do you still take water from the well where arsenic was found	No
17a	Do you have a tubewell in your home	Yes
17b	Has this tubewell been tested	Yes
17c	What did the test show	Yes
17d	Are you currently using this tubewell	No
20b	Would you be willing to pay for tubewell testing	Yes
20c	How much	Yes
20d	Would you be willing to pay for maintaining tubewells	No
20e	How much	No
20f	Would you be willing to pay for installation of new water supply	Yes
20g	How much	Yes
20h	Would you be willing to pay for maintaining new tubewells	Yes
20i	How much	Yes

Q#	Notes
2e	Categories don't overlap, can still determine farmer/no
2f	Categories don't overlap, assume literate = educated
20b - c	Respondents are given option of providing labor or \$
20f - i	Respondents are given option of providing labor or \$