

Behavioral Responses to Environmental Information: Evidence From a Household Survey in Bangladesh



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Camp Resources
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Health-Information Provision in Developing Countries

- Alternative to formal regulation
 - Reduce regulatory burden of state
- Motivate changes in behavior
 - Fecal Contamination: Jalan & Somanathan (JDE 2008)
 - Age specific relative HIV risk: Dupas (2009)
 - Arsenic: Madajewicz , Pfaff *et al* (JDE 2007)



Background

- UN/World Bank/Bangladesh Government encourage switching to groundwater to reduce bacterial disease from surface water in 1970s
- High levels of arsenic discovered in groundwater in early 1990s
- Bangladesh Arsenic Mitigation Water Supply Program (BAMWSP) conducts widespread testing. Wells are painted red if above 50 ppb and green if less 50 ppb



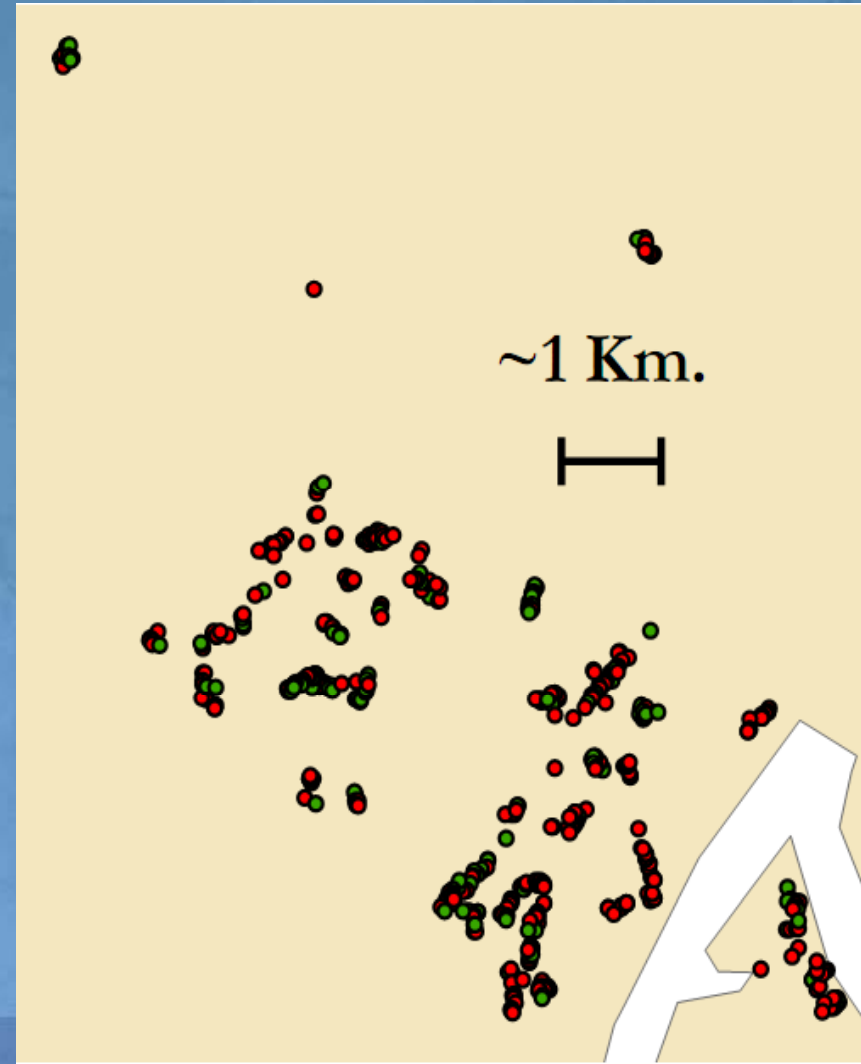
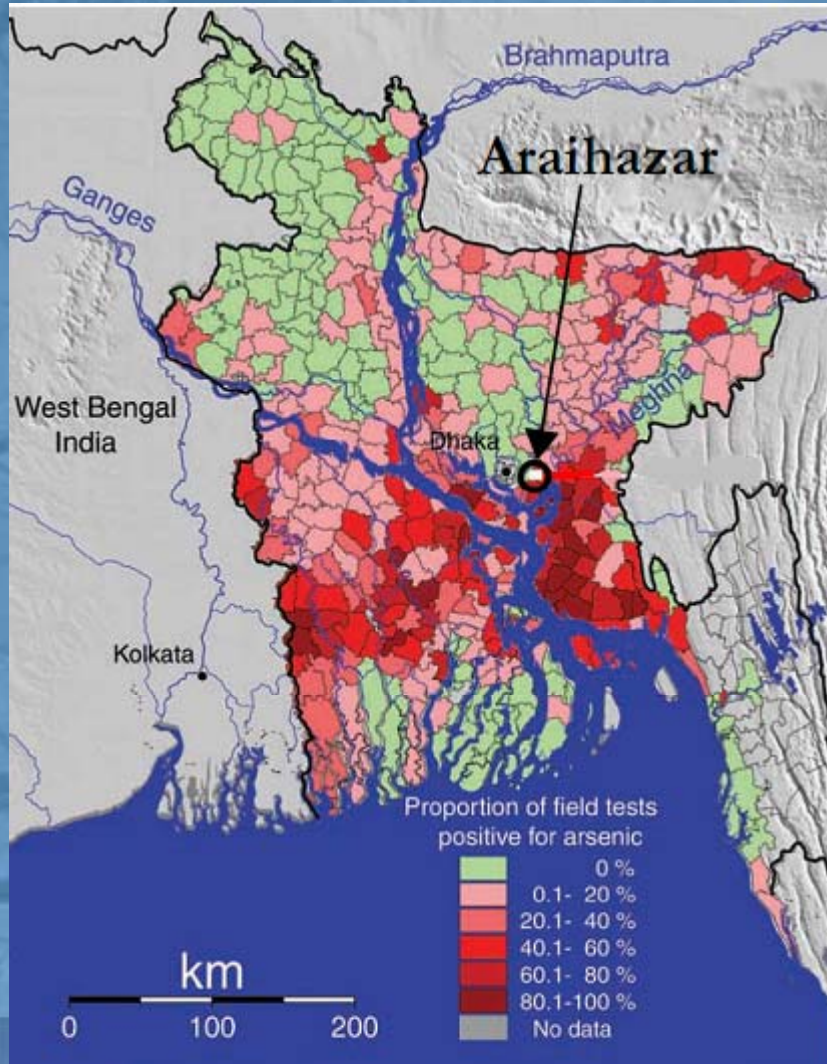


Research Questions

- Persistence of Switching
- Differences between households exhibiting different source-switching behavior over time
- Social Networks
- Risk Communication
 - Continuous/Discrete Risk Message
- Belief Updating
 - Changes in beliefs over time
 - Do beliefs predict behavior



Area of Study





Timeline of Interventions

BAMWSP tests
all existing wells

Columbia team
gathers samples
from tube-wells
installed post
switching behavior on
BAMWSP

Duke University
“baseline” survey
for hh receiving
results from 2005
Duke University survey of
switching behavior of hh from 2005
study

Duke University follow-up
survey for hh receiving results
in spring 2008

2003

2005

Spring
2008

Fall 2008

Response Persistence
Group

Result Provision
Group



Result-Provision Group

- 45 villages with at least one “new” well in 2005
 - 507 wells sampled
 - 75 wells moved/ deepened before results provided
 - Not different from those that had not deepened
 - Resulting sample is 434 wells and 668 hh



Well Labeling





Result Provision: Baseline Survey Data

- Family
 - Roster
 - Illness
- Income Proxies
- Belief about a generic unsafe well (before results provided)
 - Separately for children and adults
 - Separately for skin lesions and serious health problems
 - 1 month, 1 year, 5 years, 10 years, 20 years
- Belief about their well (after results provided)
- Neighbors
 - Who they talk with about arsenic
 - Who has gotten sick from arsenic
 - Details about neighbors whose well was previously tested
 - Switching decision
 - Health improvement



Result Provision: Follow-up Survey

- Source switching choices
- Social networks
 - Pair-wise questions of random subset of households in same village who are also in our study
- Knowledge/awareness/ beliefs
 - Recall standard & own-well status
 - Knowledge questions
 - Elicit beliefs about tested well



Result Provision: Follow-up Survey

- Interview 605 households across 44 villages
 - 519 consuming water from tested well at baseline
 - Not different from hhs that stopped drinking water from tested well before result provision
 - 126 switch sources
 - 87% switch from red wells
 - Main reason: safety concerns
 - 393 stay at tested well
 - 51%: red wells
 - Main reason: alternatives far/ unwillingness to use well not owned



Persistence Survey

- 62 villages surveyed in 2005, we returned to 58 of them in Spring 2008
- 1,938 are re-interviewed in Spring 2008
- 1,705 households able to recall water source decisions in both periods



Persistence Survey: Data

- Family
 - Roster
 - Illness
- Income Proxies
- Belief about a generic unsafe well
 - Same as results provision survey
- Neighbors
 - Same as results provision survey
- Detailed well switching history
 - 2003 to 2005
 - 2005 to 2008
 - reasons why/why not
 - recalled well status
- Social networks



Different Behaviors

Source-switching behavior	Tested <50 in 2003 (n=580)	Tested >50 in 2003 (n=945)	Don't know/ do not recall test result (n=180)	Total (n=1705)
Never changed source	88%	56%	45%	1,117
Changed source b/w 2003-05	2%	19%	22%	232
Changed source b/w 2005-08	8%	21%	14%	269
Change sources in 2003-05 & 2005-08	2%	4%	19%	87



Persistence

- 27% of households that switch early on switch sources again
- Only 0.01% switch back to their previous source
- For the 42 hhs tested unsafe in 2003:
 - First switch: safety (59%)
 - Of the ones who mentioned safety:
 - Second switch: safety (56%)
 - Second switch: distance (32%)



Factors influencing behavior: Results from linear probability model

		Switch/Never switch (n=943)	Switch early/Switch late (n=378)	Switch more than once/ Switch once (n=420)
Income proxies	Latrine is for household's exclusive use	0.10 (0.05)**	0.24 (0.08)***	
	Brick walls	0.18 (0.05)***		0.11 (0.04)***
Labor supply	Number of adult women			0.02 (0.009)**
Education	Years of schooling of most educated member			0.02 (0.01)*
Gender discrimin- ation	Number male children			
Social Networks	Number of hhs recalled that were tested previously		0.04 (0.03)	0.05(0.01)***



Social Interactions

- Are late-switchers influenced by neighbors who are early switchers
- Actions of neighbors are endogenous
 - Households intrinsically similar in time-invariant ways
 - Households share similar characteristics
 - Households share similar institutional arrangements
- Use arsenic as an instrument: not chosen by households, variability in levels
 - Action of near-neighbors matters most
 - But arsenic nearby also influences set of alternatives
 - Arsenic of far-neighbors satisfies exclusion restrictions
 - But far-neighbors' actions show no influence