An integrated approach to arsenic mitigation in Bangladesh

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“Integrated Approach for Mitigation of Arsenic Contamination of Drinking Water in Bangladesh”

- Implemented by:
  Asia Arsenic Network (AAN)

- Supported by:
  Japan International Cooperation Agency (JICA)

- For the period of:
  2002-2004

- With the target area of:
  Sharsha Upazila, Jessore District, Bangladesh
Objectives of the project

1. To identify the dimensions arsenic contamination in terms of contaminated tubewells and arsenocosis patients
2. To create awareness among people on the risks of arsenic
3. To secure and supply safe water
4. To build up capacity of local government institutions and among community people for management of arsenic problem
Main approaches

- Surveillance of groundwater arsenic contamination
- Community awareness raising
- Community organization
- Provision of alternative drinking water supply with maintenance training
- Water quality testing
- Health care of patients
Options of alternative drinking water supply

- Community water supply alternatives with filtration and chlorination, if necessary
  - Modified dugwell filter (40)
  - Pond sand filter (13)
  - Deep tubewell (9)
  - Piped water supply system (1)
- Household water purifier (AAN filter) (99)
- Rainwater harvesting (33)
## Modified Dugwell Filter

<table>
<thead>
<tr>
<th>Type</th>
<th>As in raw water (mg/l)</th>
<th>Capacity</th>
<th>Construction cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type A</td>
<td>0 - &lt;0.05</td>
<td>40 households</td>
<td>45,000 Taka</td>
</tr>
<tr>
<td>Type B</td>
<td>&lt;0.05 - 0.20</td>
<td>40 households</td>
<td>60,000 Taka</td>
</tr>
</tbody>
</table>
# Pond Sand Filter (PSF)

<table>
<thead>
<tr>
<th>Type</th>
<th>Capacity</th>
<th>Cost of PSF construction</th>
<th>Cost of pond re-excavation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large</td>
<td>150 households</td>
<td>100,000 Taka</td>
<td>30,000 Taka</td>
</tr>
<tr>
<td>Medium</td>
<td>100 households</td>
<td>70,000 Taka</td>
<td>30,000 Taka</td>
</tr>
<tr>
<td>Small</td>
<td>80 households</td>
<td>50,000 Taka</td>
<td>25,000 Taka</td>
</tr>
</tbody>
</table>
Deep Tubewell

- Sealing by cement in clay layer
- Using a local technology

<table>
<thead>
<tr>
<th>Type</th>
<th>Depth(ft)</th>
<th>Construction cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTW with sealing</td>
<td>510</td>
<td>42,000 Taka</td>
</tr>
<tr>
<td>DTW without sealing</td>
<td>510</td>
<td>29,000 Taka</td>
</tr>
</tbody>
</table>

DTW without sealing ; 29,000Taka(510 ft)
Pipeline Water Supply System

- Surface water (Baor) as a source
- Filtration by an Ecological Filter
- Technology developed through the experience of dugwell and PSF filters
- Supplying water to 300 households

Construction cost: 1,400,000 Taka
Features of options

- Environment-friendly
- Available technology
- Dependable
- Durable
- Cost-effective
- User-friendly
## Roles and activities of Users Committee

<table>
<thead>
<tr>
<th>Community</th>
<th>Roles of Users Committee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formation of a Users Committee</td>
<td>➢ Meeting arrangement</td>
</tr>
<tr>
<td>Construction of a safe water option</td>
<td>➢ Bank account opening</td>
</tr>
<tr>
<td>Operation &amp; maintenance</td>
<td>➢ Users’ share collection</td>
</tr>
<tr>
<td></td>
<td>➢ Construction management</td>
</tr>
<tr>
<td></td>
<td>➢ Account keeping</td>
</tr>
<tr>
<td></td>
<td>➢ Option management</td>
</tr>
</tbody>
</table>
Consequences

1. Residents themselves collect water charges.
2. They operate and maintain their safe water supply systems.
3. They are in charge of keeping safe water quality through monitoring it by themselves or through having it tested at a laboratory.
Achievements

- Development of 63 safe and sustainable community drinking water supply systems
- Improvement of community awareness
- Improvement of patients’ health conditions
Improvement in arsenocosis (312 patients)

- Melanosis 49.7%
- Hyperkeratosis 39.1%
- Leukomelanosis 28.5%

Four patients died – One, liver cancer; one, bladder cancer; two, other diseases but arsenocosis may have been a predisposing factor in these cases.
Subjects to be pursued in the future

- Technology development
- Community participation
- Involvement of central and local government institutions
Acknowledgement

The presenter is very much grateful to Asia Arsenic Network (AAN) for offering information on its activities in an arsenic mitigation project in Bangladesh.
Thank you for your kind attention!