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Sanitation Safety Planning – a pragmatic approach for risk assessment in agricultural reuse systems

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The problem

• The “practice” of unsafe use of wastewater for farming/agricultural purposes
What do we mean by a pragmatic approach?

• approach to problem solving, by first identifying the problem
• secondly considering various options to solve the problem
• pragmatic is another word for sensible or more precisely "logical" therefore….whether when solving problems you have a certain method or structured way in dealing with that problem.

If this being the case........
• .........then would SSP qualify as a pragmatic approach to safe use of wastewater for farming/agricultural purposes?
• .....Yeas, SSP may be a solution to the “purported” problem
• ...because SSP acknowledges the need and utility of safe use of wastes for agricultural purposes.
• ....and SSP builds on the “science” of the existing practices by farmers...by improvisation of existing practices (wherever found).....by offering practical and locally feasible solutions.
• .......all along adopting an incremental approach for improvising the use wastewater/faecal sludge for agricultural/farming purposes.
Why this problem (unsafe use of wastewater) exists?

• Lack of knowledge and or awareness regarding hazards of the practice
• Lack of access to information regarding safe use of wastewater
• Lack of resources to implement safe guards for safe use of wastewater
• Myth of the “solutions” being expensive
• Is it because of convenience of not having to follow the sanitary-hygiene practices
• Or is it because of indifference or denial of probable hazards due to unsafe use of wastewater
• ?Accountability, Policy, Legislative measures
Sanitation Safety Planning (SSP) an approach

• SSP is a risk based management tool for sanitation systems. This manual focuses on safe use of human waste.

SSP assists users to:

✓ systematically identify and manage health risk along the sanitation chain;

✓ guide investment based on actual risks, to promote health benefits and minimize adverse health impacts;

✓ provide assurance to authorities and the public on the safety of sanitation-related products and services.
What we did at Devanahalli vis a vis SSP
What we did at Devanahalli

1. Sanitary inspection:
   ✓ an on-site inspection and evaluation of all conditions, devices, and practices in the sanitation system that pose an actual or potential danger to the health and well-being of the various exposure groups.
   ✓ a fact-finding activity that should identify system deficiencies including potential sources of hazardous events, but also inadequacies and lack of integrity in the system and/or that could lead to hazardous events.

2. SSP system assessment:
   ✓ assessment of the hazards and risks in the SSP system

   ✓ assessing risk from specific hazards through different exposure pathways.
   ✓ the components: hazard identification, exposure assessment, Likelihood (L) of an hazard and if it happens it’s Severity (S).
   ✓ the combination of L and S (the scores allotted therein) allows us to categorise risk(s) into High, Medium, Low and Unknown priority.
Exposure group categories identified

• **W** Workers- A person who is responsible for maintaining, cleaning, operating or emptying the sanitation technology.

• **F** Farmers- A person who is using the products (e.g. untreated, partially or fully treated wastewater, faecal sludge).

• **L** Local community- Anyone who is living near to, or downstream from, the sanitation technology or farm on which the material is used, and may be passively affected.

• **C** Consumers- Anyone who consumes or uses products (e.g. crops, fish or compost) that are produced using sanitation products.
Semi Quantitative Risk Assessment and Categorization (Hazard Risk Matrix)

<table>
<thead>
<tr>
<th>Risk Description</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>High priority</td>
<td>It is possible that the event results in injuries, acute and/or chronic illness or loss of life. Actions need to be taken to minimize the risk.</td>
</tr>
<tr>
<td>Medium priority</td>
<td>It is possible that the event results in moderate health effects (e.g. fever, headache, diarrhoea, small injuries) or unease (e.g. noise, malodours). Once the high priority risks are controlled, actions need to be taken to minimize the risk.</td>
</tr>
<tr>
<td>Low priority</td>
<td>No health effects anticipated. No action is needed at this time. The risk should be revisited in the future as part of the review process.</td>
</tr>
<tr>
<td>Unknown priority</td>
<td>Further data is needed to categorize the risk. Some action should be taken to reduce risk while more data is gathered.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Likelihood (L)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Very Unlikely</td>
<td>Has not happened in the past and it is highly improbable it will happen in the next 12 months (or another reasonable period).</td>
</tr>
<tr>
<td>2 Unlikely</td>
<td>Has not happened in the past but may occur in exceptional circumstances in the next 12 months (or another reasonable period).</td>
</tr>
<tr>
<td>3 Possible</td>
<td>May have happened in the past and/or may occur under regular circumstances in the next 12 months (or another reasonable period).</td>
</tr>
<tr>
<td>4 Likely</td>
<td>Has been observed in the past and/or is likely to occur in the next 12 months (or another reasonable period).</td>
</tr>
<tr>
<td>5 Almost Certain</td>
<td>Has often been observed in the past and/or will almost certainly occur in most circumstances in the next 12 months (or another reasonable period).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Severity (S)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Insignificant</td>
<td>Hazard or hazardous event resulting in no or negligible health effects compared to background levels.</td>
</tr>
<tr>
<td>2 Minor</td>
<td>Hazard or hazardous event potentially resulting in minor health effects (e.g. temporary symptoms like irritation, nausea, headache).</td>
</tr>
<tr>
<td>3 Moderate</td>
<td>Hazard or hazardous event potentially resulting in self-limiting health effects or minor illness (e.g. acute diarrhoea, vomiting, upper respiratory tract infection, minor trauma).</td>
</tr>
<tr>
<td>8 Major</td>
<td>Hazard or hazardous event potentially resulting in illness or injury (e.g. malaria, schistosomiasis, food-borne trematodiasis, chronic diarrhoea, chronic respiratory problems, neurological disorders, bone fracture); and/or may lead to legal complaints and concern; and/or major regulatory non-compliance.</td>
</tr>
<tr>
<td>16 Catastrophic</td>
<td>Hazard or hazardous event potentially resulting in serious illness or injury, or even loss of life (e.g. severe poisoning, loss of extremities, severe burns, drowning); and/or will lead to major investigation by regulator with prosecution likely.</td>
</tr>
</tbody>
</table>
# Semi-quantitative risk assessment matrix

<table>
<thead>
<tr>
<th>LIKELIHOOD</th>
<th>Insignificant</th>
<th>Minor</th>
<th>Moderate</th>
<th>Major</th>
<th>Catastrophic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very unlikely</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Unlikely</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>Possible</td>
<td>3</td>
<td>3</td>
<td>6</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>Likely</td>
<td>4</td>
<td>4</td>
<td>8</td>
<td>16</td>
<td>32</td>
</tr>
<tr>
<td>Almost Certain</td>
<td>5</td>
<td>5</td>
<td>10</td>
<td>20</td>
<td>40</td>
</tr>
</tbody>
</table>

**Risk Score R = (L) x (S)**

- **<6** Low Risk
- **7–12** Medium Risk
- **13–32** High Risk
- **>32** Very High Risk
An example of existing practices

• Word document-Devanahalli and Honey suckers
Summary

• SSP approach ensures that control measures target the greatest health risks and emphasizes incremental improvement over time.
• It is applicable in high and low resource settings.
• It can be used both at the planning stage for new schemes, and to improve the performance of existing systems.
• SSP underscores the leadership role of the health sector in the use of wastewater, excreta and greywater, and helps to bring a human health perspective to traditional non-health sectors like sanitation engineering and the agricultural sector.
Thank you
Focus Group Discussion with the farmers utilising the waste water for irrigation

• Most of them felt that even though waste water may pose health hazards, they have not suffered from any major illness so far.
• They may have skin irritation especially over the hands and feet.

• According to Farmers, the common health risks associated with utilisation of waste water for irrigation are as follows
  • Fever
  • *Tuberculosis*
  • Cold cough
  • Allergies
Focus Group Discussion with the consumers of the vegetables grown with wastewater for irrigation

• They consume the vegetables often given by farmers in the harvesting seasons.
• They informed that, they are not aware whether the vegetables they buy in the market are grown using bore well water or wastewater
• According to them, the common vegetables that are grown using wastewater and consumed by them are
  ✓ Spinach
  ✓ Mint leaves
  ✓ Amaranth
  ✓ Cabbage
  ✓ Root vegetables like carrot and beet root
• The group informed that even though they consume the vegetables grown in wastewater and that they wash them thoroughly before cooking.
• Some women use salt and water for washing the vegetables which according to them will destroy the microorganisms.
• The respondents informed that according to them diseases that may spread if the vegetables are not washed properly were Tuberculosis, Typhoid, diarrhoea and vomiting.
• The local residents who buy vegetables from the weekly market (Wednesday) were interviewed. The Wednesday weekly market is a very popular and sought-after place for purchasing farm fresh vegetables produce.

• They informed that they cannot differentiate between vegetables grown utilizing waste water and clean water.

• Some were not even aware of the fact that the farmers use waste water. However, all of them said that the vegetables are very fresh and if washed and cooked properly most of the diseases can be avoided.

• The consumers opined that the common diseases that could be transmitted through consumption of vegetables grown in waste water can be
  ✓ Fever
  ✓ Loose stools
  ✓ Vomiting
  ✓ Food poisoning
  ✓ Worm infestation affecting the brain (Cysticercosis of the brain).

• They said the farmers/ vendors should be made aware of the possible mitigation methods for growing the vegetables safely using waste water.

• They also opined that the community should be made aware of the methods of preparation of food at household levels safely and hygienically.
The farmers informed that they face health risks only on the day of application of the faecal sludge manually to the crops especially in the second method mentioned above. The health risks reported by the farmers are as follows

✓ Fatigue
✓ Nausea
✓ Abdominal bloating.
✓ Excess heat in the body
✓ Intolerable malodour
✓ Itching all over the body
✓ Fever
✓ Mouth ulcers

• These symptoms last for 2-3 days and subside on rest and after taking medicines.
Key Informant Interview with the Private Practioner (PP)
Manasa Hospital in Devanahalli Town

A Private Practitioner practicing for more than 10 years in Devanahalli town was interviewed.

• According to the private practitioner, the common health risks in the community include
  • Typhoid,
  • Diarrhoea
  • Pneumonia
  • Generalised Itching
  • Fungal infections
  • Diseases due to scarcity of water
  • Disease due to use hardness of water

➢ With respect to diseases specific to farmers using faecal sludge as fertiliser, he was not able to report any specific diseases.
➢ However he opined that Typhoid and Diarrhoea may be common among them.
Interaction with Consumers

• Consumers opined that the common diseases that could be transmitted through consumption of vegetables grown in waste water or faecal sludge application can be
  - Fever
  - Loose stools
  - Vomiting
  - Food poisoning
  - Worm infestation affecting the brain (Cysticercosis of the brain).

• They said the farmers/ vendors should be made aware of the possible mitigation methods in growing the vegetables safely using waste.

• They also opined that the community should be made aware of the methods of preparation of food at household levels safely and hygienically.