Refining and contextualizing the Shit-Flow Diagram (SFD)

Paresh Chhajed-Picha
PhD Researcher, CTARA, IIT Bombay
August 12, 2021
Introduction to CANALPY – the larger initiative

The paper is available here: https://www.sciencedirect.com/science/article/pii/S0301479721010331
A collaboration between IIT Bombay and KILA since 2017

Aim:

- capacitate students to analyse concrete problems on the ground while working with local people, elected representatives and civil society organisations ensuring accountability at local government level and creating ‘student citizens’

Approach

- Training /capacitating students
- Inculcating analytical skills
- Academic institutions (students) working with local towns/panchayats for generating local solutions, plans on various issues
Winter and Summer Schools

- Exposure to various facets of water and waste management through expert lectures
- Training of OS applications
- Hands-on experience
- Data collection and analysis
Pilot project: Municipal Colony

- Serves sanitation workers of the Municipality

- Inclusions:
  - Toilet + Bathing and washing areas for each house
  - Conveyance and treatment of all the wastewater

- Funded by KMML under its CSR head

- Awarded the Best Small city in Innovation and Best Practices during Swachh Survekshan 2020 for the project

Refining and contextualising the SFD

The paper is available here: https://www.sciencedirect.com/science/article/pii/S0301479721010331
Introduction

• Safely managed sanitation remains a challenge
  • 80% wastewater disposed without treatment (WWAP 2017)

• Conventional solution is expensive, water intensive and time consuming (Öberg et al., 2020; Van Drecht et al., 2009)

• Alternate systems are needed to achieve SDG targets (Andersson et al., 2016; Larsen et al., 2016)

• FSM is gaining traction, wider acceptance and faster implementation is required (Berendes et al., 2017)

• Planning FSM is different
  • New tool to support planning process

• Challenges
  • Lack of data (Devaraj et al., 2021; Luthra, 2020)
  • Lack of local capacity (NIUA, 2017)
Study site – Alleppey

- Coastal town in Kerala
  - Part of Kuttanadu eco-system
  - Very high ground water table
- Port – no more significant
- Tourist attraction – proximity to Vembanad lake, backwaters, houseboats, beaches
- Eutrophication of canals hampers tourism
- Nutrient load in canals due to unmanaged wastewater
- Model of decentralised SWM

Related twitter thread: [https://twitter.com/Sparsh85/status/1148465373672402944?s=20](https://twitter.com/Sparsh85/status/1148465373672402944?s=20)
Methods

• Household survey
  • 2100+ households approached
  • Use of ~1700 responses

• Students as enumerators
  • Basic training in research ethics and use of applications (ODK Collect, Maps)
  • Questionnaire in Malayalam
  • Mock surveys by volunteers
  • Teams of 2, at least one Malayalam speaker
  • Telephonic support by team leads

Results: Status of the FSM Service Chain in Alleppey

- All households have access to toilets
- Majority (2 in 3) of OSS are pits, inappropriate for the town
  - Census information wrt OSS is inaccurate
- Manual emptying is reported
  - Emptying by unregulated private service providers only
  - 43% OSS never emptied, >30% 10 years or older
  - Avg. emptying cycle of 3.5 years for emptied OSS
- No treatment facility
  - 3 plants in vicinity, arrangement to treat FS did not last
- Dumping of untreated FS
  - Reuse possibilities not assessed

• Gives an impression OSS safely contain FS
  • Threat of groundwater pollution considered low as >75% households have piped water supply

• 2 Other issues
  • Containment of FS and disposal of SN needs is coupled (in some combinations)
  • Emptying frequency is not considered

Revisiting the Assumptions

- Septic tanks that are emptied once in less than 5 years are considered to safely contain the FS. Disposal of the supernatant of such systems through soak pits is also considered safe. Disposal of supernatant in other ways, including into open-drain or stormwater sewer, open ground, and 'don't know where' is considered unsafe.

- Septic tanks not emptied once in less than 5 years are considered unsafe containment, disposal of the supernatant of such septic tanks through any mechanism is also considered unsafe.

- All types of pits, whether regularly emptied or not, are considered unsafe.

<table>
<thead>
<tr>
<th>System Code</th>
<th>System Description</th>
<th>SFD-PI method</th>
<th>Context adapted SFD</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1A2C5</td>
<td>Septic tank connected to soak pit</td>
<td>Safe</td>
<td>Safe</td>
</tr>
<tr>
<td>T1A2C6</td>
<td>Septic tank connected to open drain or storm sewer</td>
<td>Unsafe</td>
<td>Unsafe</td>
</tr>
<tr>
<td>T1A2C8</td>
<td>Septic tank connected to open ground</td>
<td>Unsafe</td>
<td>Safe</td>
</tr>
<tr>
<td>T1A2C9</td>
<td>Septic tank connected to 'don't know where'</td>
<td>Unsafe</td>
<td>Safe</td>
</tr>
<tr>
<td>T1A4C5</td>
<td>Lined tank with impermeable walls and open bottom, connected to a soak pit</td>
<td>Safe</td>
<td>Safe</td>
</tr>
<tr>
<td>T1A4C6</td>
<td>Lined tank with impermeable walls and open bottom, connected to an open drain or storm sewer</td>
<td>Unsafe</td>
<td>Unsafe</td>
</tr>
<tr>
<td>T1A4C8</td>
<td>Lined tank with impermeable walls and open bottom, connected to open ground</td>
<td>Unsafe</td>
<td>Safe</td>
</tr>
<tr>
<td>T1A4C9</td>
<td>Lined tank with impermeable walls and open bottom, connected to 'don't know where'</td>
<td>Unsafe</td>
<td>Safe</td>
</tr>
<tr>
<td>T1A4C10</td>
<td>Lined tank with impermeable walls and open bottom, no outlet or overflow</td>
<td>Safe</td>
<td>Unsafe</td>
</tr>
<tr>
<td>T1A5C10</td>
<td>Lined pit with semi-permeable walls and open bottom, no outlet or overflow</td>
<td>Safe</td>
<td>NA</td>
</tr>
<tr>
<td>T1A6C10</td>
<td>Unlined pit, no outlet or overflow</td>
<td>Safe</td>
<td>NA</td>
</tr>
</tbody>
</table>

Note: A vertical line between FS (faecal sludge) and SN (supernatant) indicates that their safety is separately considered. An absence of vertical line indicates that the two are not delinked.

Discussion

• SFD needs refinement and adapted to the context
  • Containment of FS and disposal of SN needs to be decoupled
  • Regular emptying of OSS is necessary
  • Environmental consequences of unmanaged wastewater need attention

• Household surveys are necessary
  • OSS related information not available
  • Deeper probe regarding type of OSS is needed
  • Could otherwise lead to over or under estimation of treatment capacity
Discussion

• Extending the Capacity-building Approach*

  • Capacity = the ability of individuals, institutions and societies to perform functions, solve problems and set and achieve objectives in a sustainable manner (UNDP, 2010)
    • Public agencies, private sector, civil society actors, individuals
  • Capacity building is a long term process (Edelmen and Mengers, 1997)
  • The approach builds capacity of future professionals and citizens
  • Need to be accompanied by other measures

Conclusion

• First independent feedback to SFD tool
• However good a tool be, local capacity is needed for its effective use
• Demonstration of method to refine SFD
  • Each OSS type needs to assessed for its impact on the issue of concern
  • Consider potential solutions to make the outcome useful for planning
• Capacity building approach can overcome the two challenges of data and lack of local capacity
• Long term collaborations between colleges and local governments
  • Can build layers of data that can be used for integrated planning
  • Build local capacity to analyse local problems

Role of CSE’s training
CSE’s training

- Attended the Online Course on Preparation of Shit Flow Diagram conducted by the CSE in July 2018
  - Had been working in WASH for 6 years then
  - Had already decided that FSM will be the focus of the PhD research
- Exposure to the most popular tool
- Used the tool for the first time
- Invoked interest and allowed time to understand the nitty-gritties

- Play a vital role by exposing practitioners (and researchers) to evolving sector understanding and knowledge
- Encourages practitioners to apply the new knowledge in their day to day work
- Important element of building capacity of various actors
  - Government agencies
  - Civil society
  - Students
Thank you

ar.pareshchhajed@gmail.com
Twitter: @Sparsh85