Towards Participatory Sustainable Sanitation Planning

An Experiment in

"Learning By Doing"

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Introduction

- SuSanA (2008):economically viable, socially acceptable, technically and institutionally appropriate, and protects the environment

- Dominant Imagination- Centralized
- Paradigm Shift to Emergent Solutions: Decentralized with treatment as close to source; local material and expertise and lower costs

  ES remains “firm” level solutions- Strategy to scale up to a town level?

- An experiment of “learning by doing” for participatory sustainable sanitation planning to arrive at contextual solutions
- Challenges and Path Ahead

Five Sanitation "Stages"

1. Locally Managed Sanitation:
   a. Indifference to Cleanliness
   b. Reuse in Agriculture

2. Unmanaged Sanitation

3. Centralized Sanitation
4. Neo-Centralized Sanitation

5. Emergent Sanitation

(Source: University of Technology, Sydney)

Conventional Systems- Centralized and Resource intensive

Advantages

- Convenience-flush and forget
- Wastes transported long distance and has improved PH of cities
- Capital, energy and skill intensive – but all available by national & overseas funding with consultants at all levels and construction Co.
- Perceived as the ideal solution globally and hence attractive for politicians, contractors, engineers

Conventional

Disadvantages

- Technology choice & related decisions taken at national & state levels
- Costly and hence Indebtedness of state.
- De-institutionalisation of public utilities by SPV route of design & operation
- Leads to de-skilling of personnel & dependence
- Cater to big cities and endowed areas excluding small towns and marginal groups- Also last mile connectivity mising
- “End –of- the- pipe” treatment with no concerns of increasing waste production – linear flow of “waste”
- Technology “lock-in”. Eg. US needs $ 3.6 trillion

Emergent (Decentralized) Systems

Advantages

- Prioritize treatment close to where it is created
- Some systems use little or no water and keep different types (black and gray) wastewater separate to facilitate re-use of water and nutrients more efficiently
- More cost-effective and based on local skills and materials.
- Designed for small scale, flexible and contextually adapted systems
- Govt. has started promoting some of these technologies in policy documents
- Systems approach: a flow stream whereby sanitation is understood as a service achieved by linking together different combinations of technologies and actors in a sequence from waste generation to reuse

Decentralized Systems

Disadvantages

- Mostly individual units
- Scaling up needs institutional innovations to manage within a heterogeneous population.
- Few service providers
- How to start from being “septic smart” to treatment at cluster configurations?
- Financing Needs to be much more endogenous
- Success depends on: (a) local capacity building; (b) local institution building (c) behavioral changes and cooperation; (d) local regulation & compliance, especially to understand the cycles of emptying to quantify and design business models of resource capture

For Emergent Solutions to Succeed: A Fine-grained Understanding Needed

- Flow of waste water to be understood at micro level- Natural streams, constructed drains/storm water
- Waste water sheds
- Overlay socio-economic profile and make Sanitation Zones
- Waste water Disposal mechanisms, sanitation practices – spatial/social understanding
- Treatment locations and detailed studies
- Stakeholder consultations
- Participatory situational analysis: local colleges students for survey and local expertise
- Support and consultation with ULB members and local officials

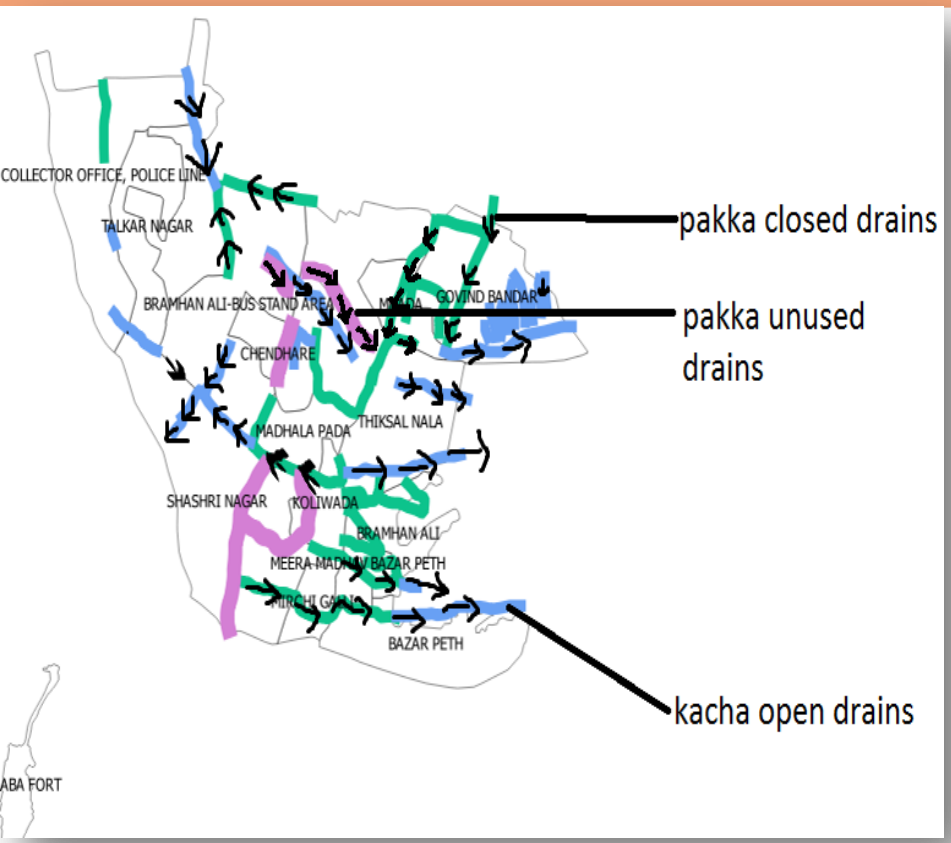
Beyond the Debate of Centralized & Decentralized

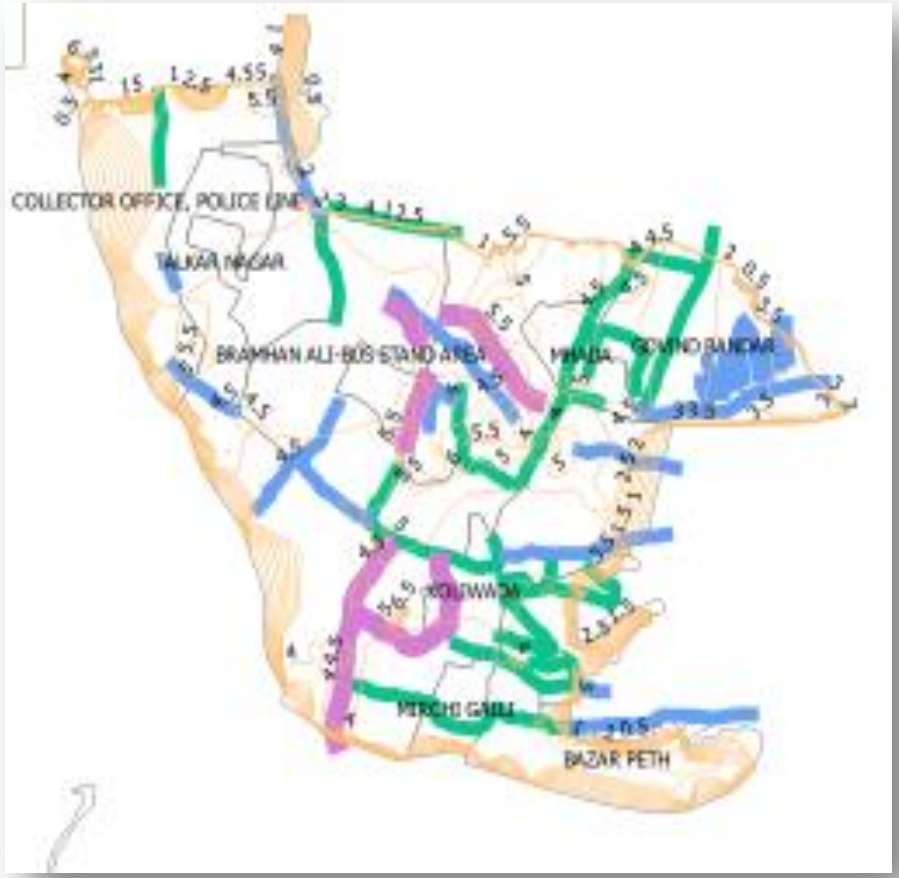
A Situational Analysis
for a Heterodox Understanding of Sanitation

Experiment in Two Small Towns

- Town level: Meso-level decision making on technology & institutional aspects of Sanitation
- Alibag in Maharashtra & Nedumanagad in Kerala
- Secondary Data: Demography, Urban Finance, MSNA data
- P**articipatory Appraisal**- involvement of local college students for primary data collection and continued conversation with ULB personnel.
- **Questionnaire Survey: D**omestic water sources and usage details, access to toilets, grey water generation and disposal, black water generation and disposal methods.
- Discussions/interviews with ULB officials, women's groups, septic tank makers and cleaners
- Drain Mapping using available maps and on ground verification

Drain Mapping





Introducing ‘Wastewater sheds’

Topography & Natural Drainage

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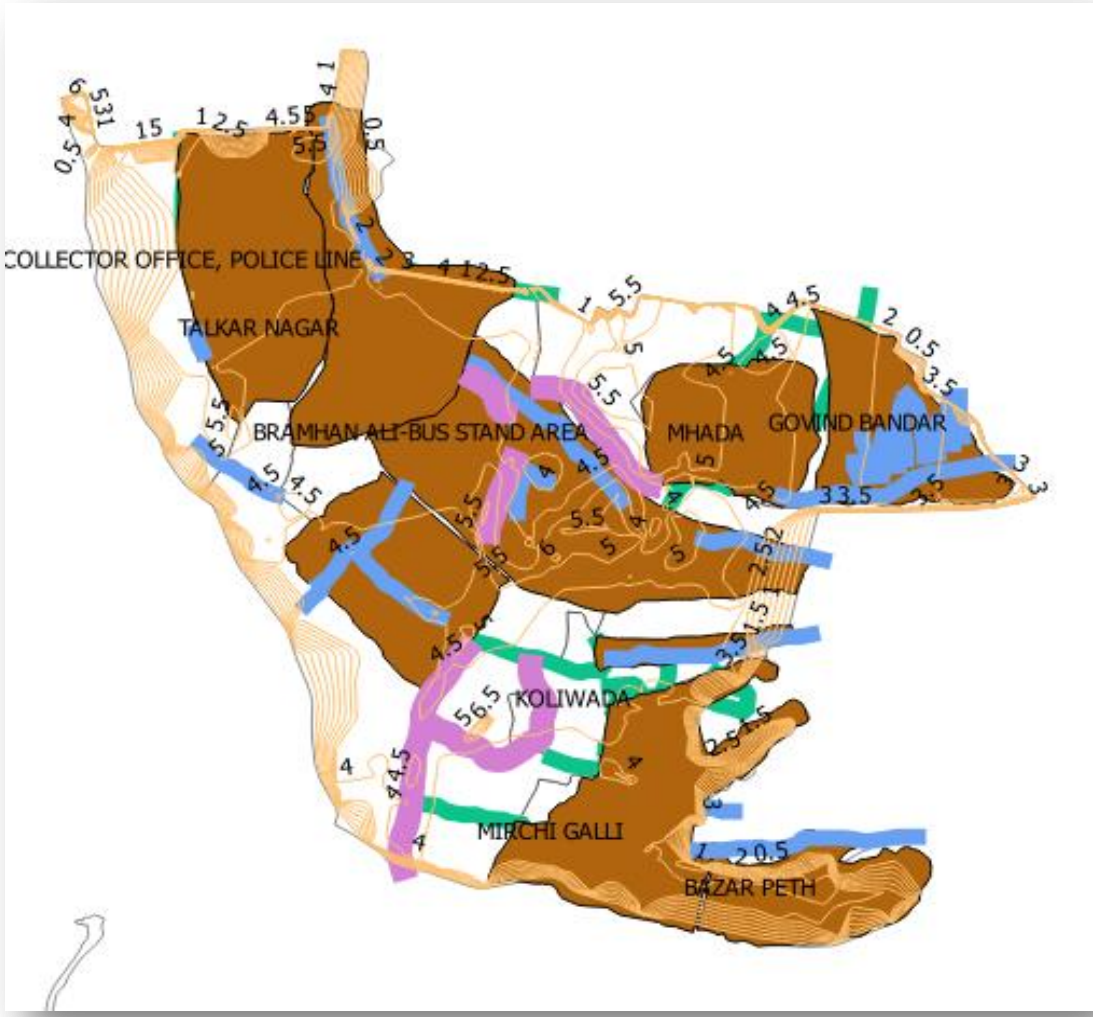
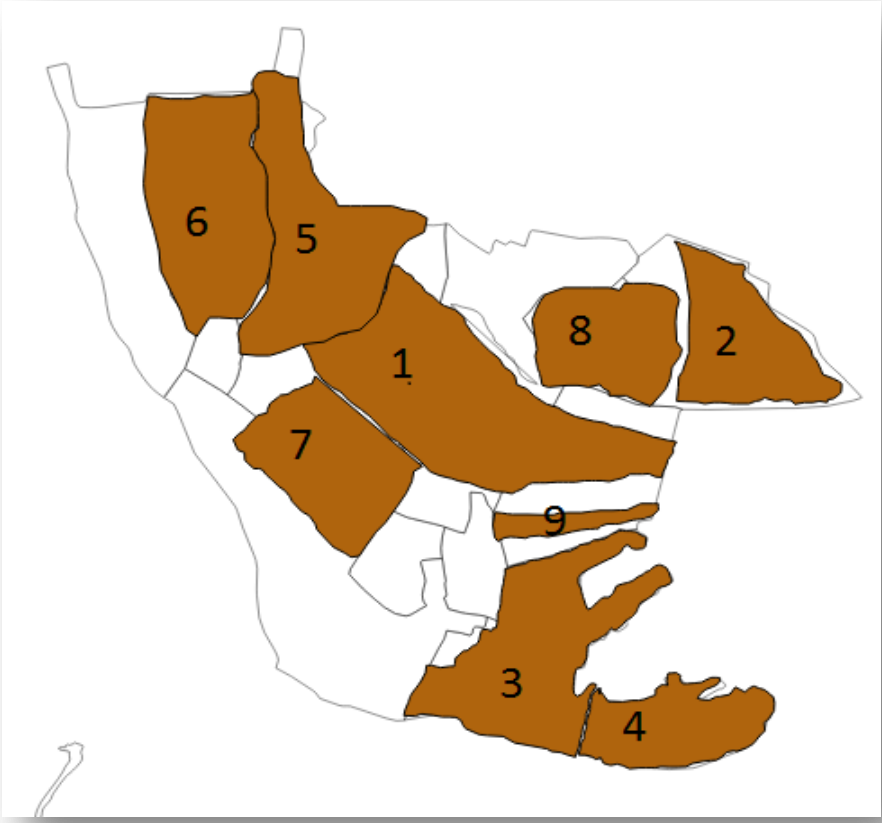
Constructed Drainage



(Field Observations – wastewater flows in city)

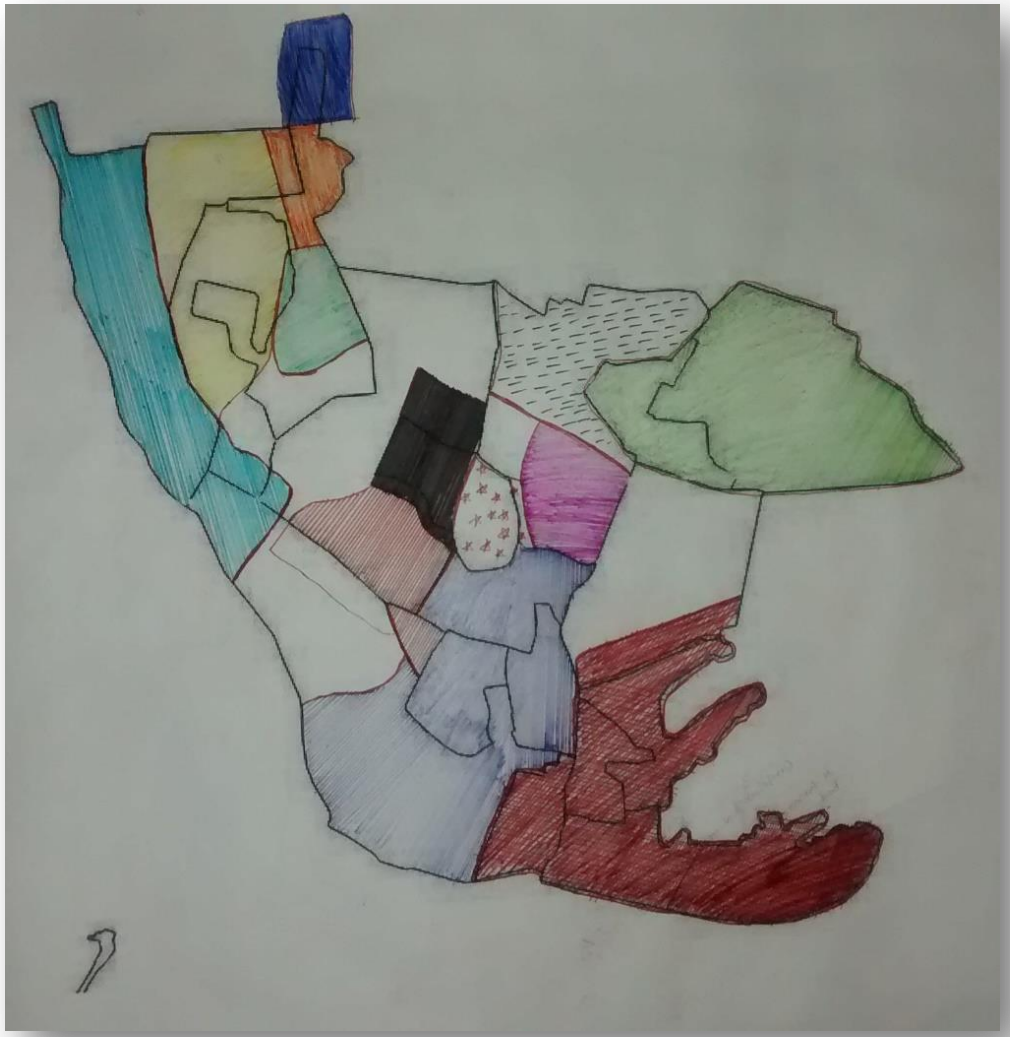
‘Wastewater-sheds’

- Wastewater shed is the area over which all wastewater or flowing water flows through a single given outlet point
- This is similar to watershed; in waste water sheds, waste water flow is through artificial constructed drainage along natural slopes
- Watershed in an urban context– wastewater flows



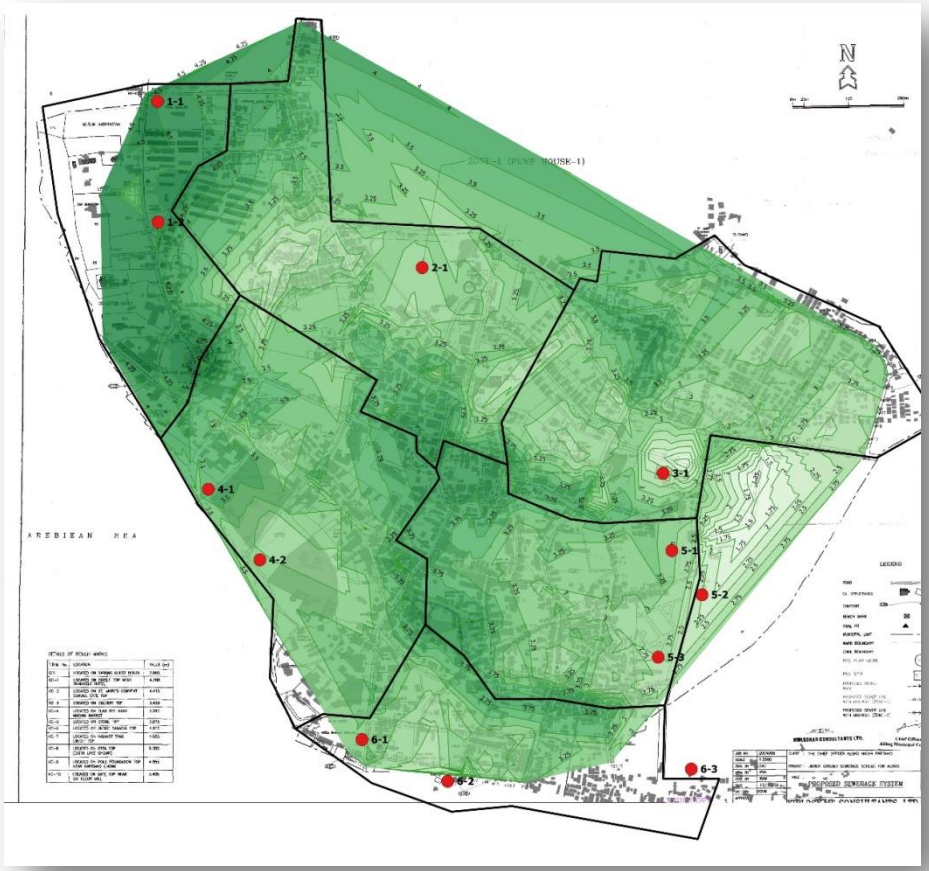
‘Sanitation Zones’ - a socio spatial unit

- Sanitation shed/zone is an area which overlays the wastewater flows or wastewater sheds on socio economic parameters
- In a sanitation zone, sanitation and wastewater practices are likely to be similar and thus, issues faced are similar
- It can be considered as a fairly homogenous unit for technology and governance intervention



A decentralized plan- Proposed sites

(In collaboration with CDD)



Challenges: Technical

- Integrating spatial and socio-economic data: Mismatch between sanitation zones and prevailing administrative boundaries
- Estimating exact volume of water use is tough in India; a variety of sources (groundwater, rainwater, piped water, surface water etc; usually a combination of these for different uses)
- In towns with negligible slope/gradient, using contour maps to ascertain flow direction might not be feasible
- De-mystifying mapping with accuracy
- Capacitation of academic institutions: Incorporation of heterodox technology models into curriculum (imaginations at work with environmental engineers?)
- Local expertise and local service providers for construction & maintenance

Challenges: Institutional

- Regulation of decentralized units – Institutions for cluster management with social regulation
- Septage Management: Town level governance interventions to make resource retrieval attractive
- Participation in a campaign mode is easier – How to sustain post situational analysis activities?
- Incentives for participation- green technicians who can integrate SWM/LWM/RWH/Urban to make it viable
- Network of practitioners to identify the gaps and make robust technical & institutional emergent sanitation models
- Advocacy for making macro policies of financing and governance compatible to these.
- "BUY-IN" OF POLITICAL CLASS (Courtesy: Mrs. Shantha Sheela Nair)

Thank you

Appendix Slides

FSM Observations- Nedumangad, Kerala

FSM in Kerala
(Observations from Nedumanagad)

Observations of FSM- Kerala

- Kerala has a very high dependence on on-site systems; as per census 2011, more than 83 percent urban households in Kerala depend on either safe or unsafe on-site sanitation systems.
- In Nedumangad, solid waste from commercial and public places is collected by the municipality, drinking water is supplied by Kerala Water Authority and on-site sanitary installations are emptied by private service providers. More than 80 percent households depend on on-site systems. Almost every household uses well water.
- Building plans for ULB approval- mandatory requirements of on-site installation and its plan and cross section to ascertain its size conforms with the norms. However, what gets constructed on-ground is not monitored
- Though most households claim to have a septic tank as per the census, our sample survey suggests that most of them are either lined or unlined pits; almost all of them without a bottom. They are generally bigger and deeper than the norm suggested by CPHEEO.

Observations of FSM- Kerala

- Since many pits/septic tanks are bigger than suggested norms, the cleaning frequency is much longer than 2-3 years suggested by CPHEEO. Only 5 of the 62 households surveyed reported to have ever emptied their pits. Still fewer reported to having built another pit after the first was full. Remaining households have never emptied their pits/tanks (a few years to a few decades)
- The private emptiers generally empty on-site installation during the night to avoid confrontation with the state.
- The emptiers are not provided with a treatment facility or a regulated dumping area. Where they dump emptied septage is not yet understood by us. Some service providers in the area were identified through their advertisements and contacted. They refused to discuss the issue of emptying fearing state action.

Regulations & Imminent Danger

- A minimum distance of 10m be maintained between a pit and well where the water table is less than 2 m below the bottom of the pit at any time of the year (CPHEEO manual, 2013: 9, 14-15)
- No on-site installation is allowed within 7.5 m from a well whose water is consumed (The Kerala Municipality Building Rules,1999)
- In our survey of 800 households, nearly 30 percent wells were reported to be less than 7.5m away and another 17 percent between 7.5m and 10m from the on-site installation.

Challenges faced during Kerala study

- The distance between septic tank of one property and well of adjacent or vice versa also needs to be assessed. This is difficult due to topography and presence of boundary walls.
- As the surveys are carried out in working hours, getting response from person who probably oversaw construction and is likely to know the details is almost not possible. Self-reporting with some technical guidance may be a better idea.
- A detailed assessment of on-site installations needs technical expertise, know-how of the community, local practices and know local language.
- Getting any information from the emptying service providers seems to be a long process. It will need trust building before they divulge what the dumping process is
- Knowing the local language is essential to communicate with the operators/drivers.

Questions for Future

- Why are norms related to size, material of septic tanks/ on-site installations not enforced? How could it be improved?
- Almost all households in Kerala have toilet (open defecation reported by 1.7% households in census 2011, which would have reduced as SBM is being implemented). If we assume that what our survey brings out may be true all over the state, the on-site installations need to be altered or replaced to conform to the norm in the long run. Is there a way to upgrade the on-site installation? When could it be done? How can it be enforced?
- Everybody including people in the municipality are aware of presence of private emptier. Then why has providing them treatment facilities not received attention? Will the emptier be willing to dump FS at treatment facilities if provided? How do we ensure all FS reaches the treatment facilities?
- What to do with the liquid after taking off the setage?

Questions for Future

- What will be maximum financially viable haulage distance for deciding the location of such treatment facilities?
- The quantity of FS likely to be expected at treatment facilities and their characteristics need to be known before designing such facilities. Literature suggests that this could be one of the biggest challenges. Could these facilities be modular so that some modules could be added in future when needed? Could such facilities cater to surrounding rural areas also?
- Is land available for such facilities in the respective development/regional plans? What other reservations could be used for such facilities?