



Water-Sanitation-Sewage connections in cities at risk of climate change

The agenda for SFD week: how to design and implement **affordable** and **sustainable** citywide sanitation **for all**



Excreta Matters I

- [file:///localhost/Users/sunitanarain/Desktop/Excreta matter vol.1 PDF/Final chapters for book/Master Excel Checked.xls](file:///localhost/Users/sunitanarain/Desktop/Excreta%20matter%20vol.1%20PDF/Final%20chapters%20for%20book/Master%20Excel%20Checked.xls)



71 city data analyzed
City water-waste profiles
Where does water come?
Where does waste go?
Simple questions
But not asked
Never answered



Water=**=**waste

More water supply and more waste

But everyone thinks of water, few of waste

80% water leaves homes as sewage

More water=**=**more waste

More waste less treatment = pollution

Cities in our world struggling to build infrastructure to keep pace with water and disposal/reuse of treated effluent



Excreta: **sums that don't add up**

Our common challenge

Cities get water from longer distance as local water is not available/contaminated

Cost of supply of water is increasing/distribution losses are increasing/ cannot recover costs

Costs of **taking back wastewater – intercepting it; conveying it; and then treating it to portable levels for discharge in rivers with low assimilative capacity – high – **unaffordable****

Cities treat waste of some/mixed with untreated waste of majority = **pollution**



Our Reality Today

- Cities exploding – imploding – without adequate sewage management
- Rivers dying because of pollution – increased cost of treatment and degradation of scarce resource

Combined with this 2 more factors

+ Climate change – more variable and more extreme rain leading to urban floods and droughts

+ Urban-Rural tensions over allocation of scarce water growing – cities have to become **water-waste-wise**



Our future tomorrow

- Re-invent sewage management
- Provide sanitation to all
- But affordable – so that cost of intercepting and treating wastewater possible
- Also design so that we reuse and recycle solids and liquids
- **Re-imagine; Re-work; Re-design** for sustainable and affordable futures



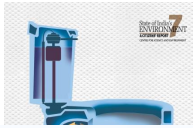
Recognise reality

- **We know now** that most in our city are **not** connected to sewage system
- They have 'on-site' treatment
- Septic tanks – connected to soak pits or connected to drains or with no underground lining
- This is opportunity for **new paradigm**



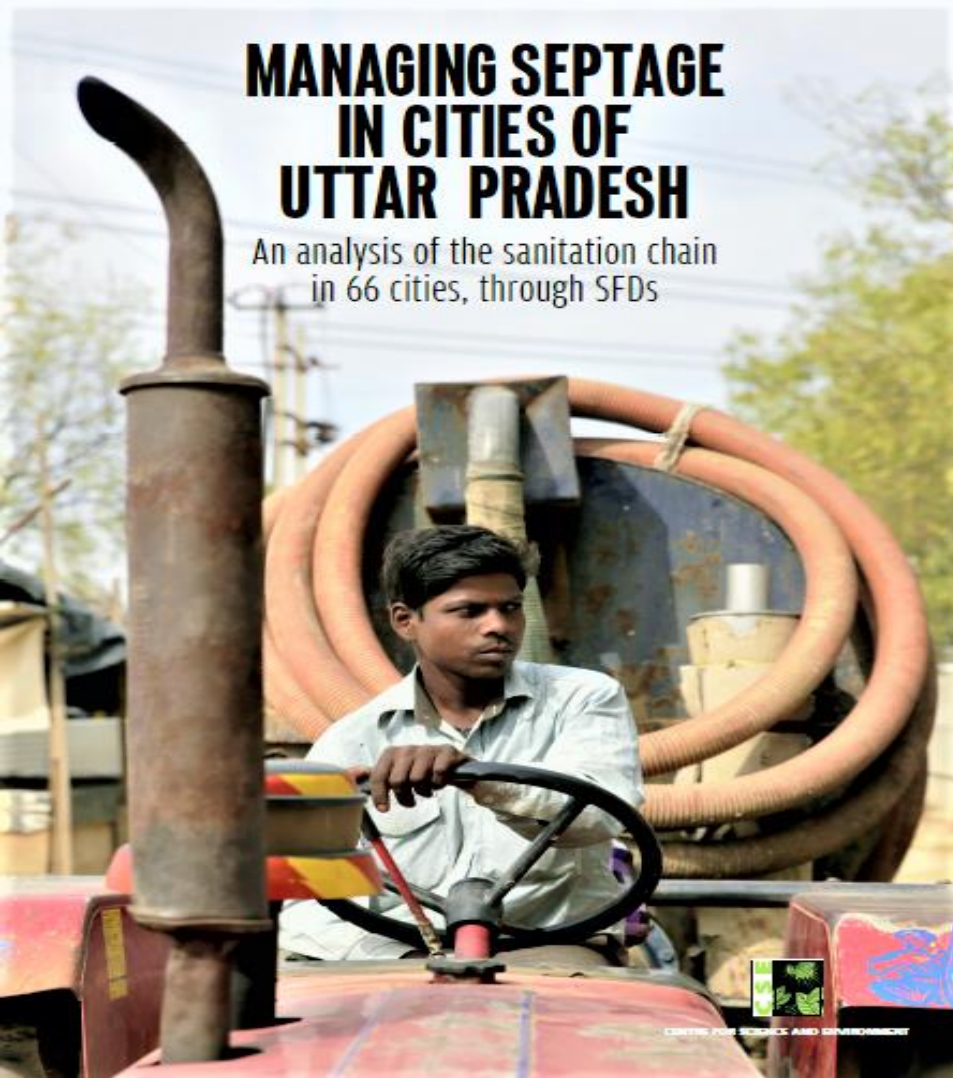
'Shit' Flow Diagrams

- Helped to map the flow to excreta in our cities and to understand policy/practice implications
- Determine systems in terms of on-site; off-site
- Determine if excreta is collected and how
- Determine if excreta is transported and how
- Determine if excreta is safely disposed off



MANAGING SEPTAGE IN CITIES OF UTTAR PRADESH

An analysis of the sanitation chain
in 66 cities, through SFDs

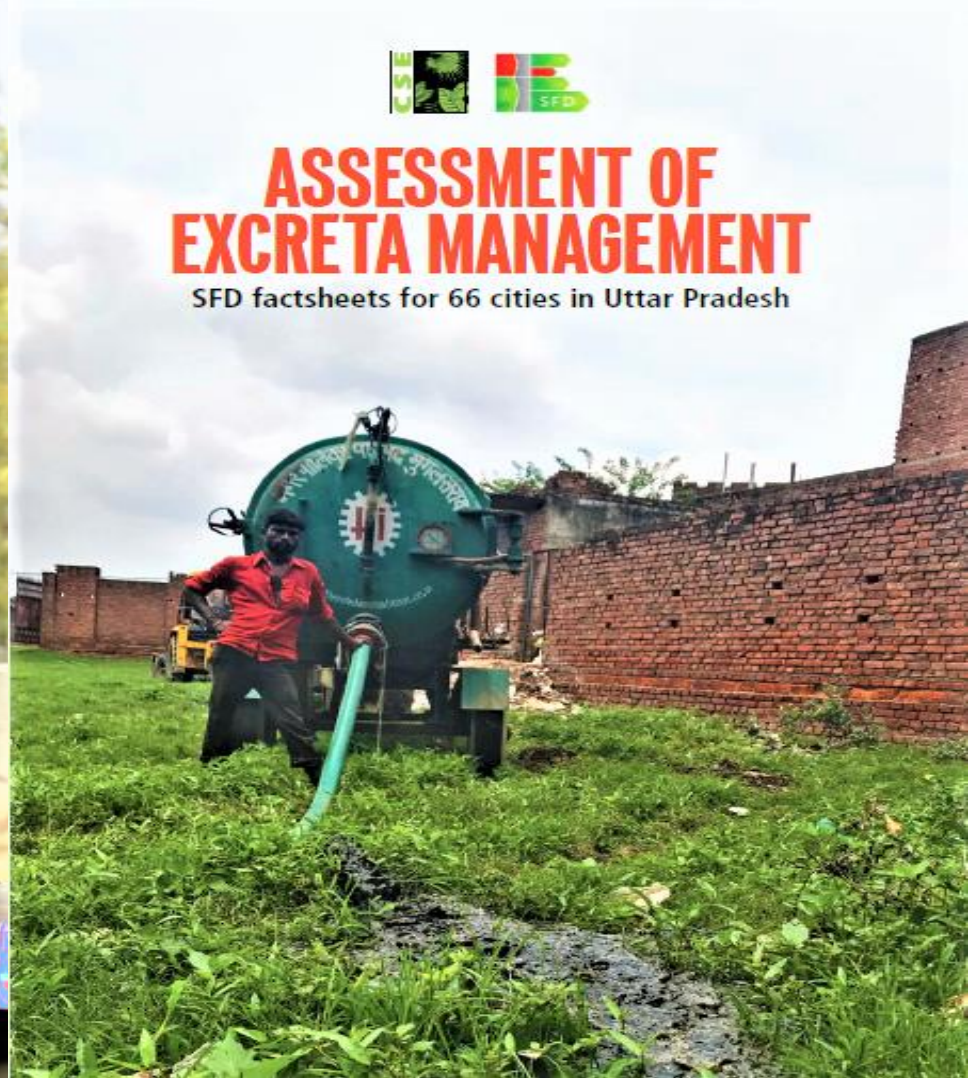


CENTRE FOR SUSTAINABLE AND ENVIRONMENT



ASSESSMENT OF EXCRETA MANAGEMENT

SFD factsheets for 66 cities in Uttar Pradesh





UP: Overview

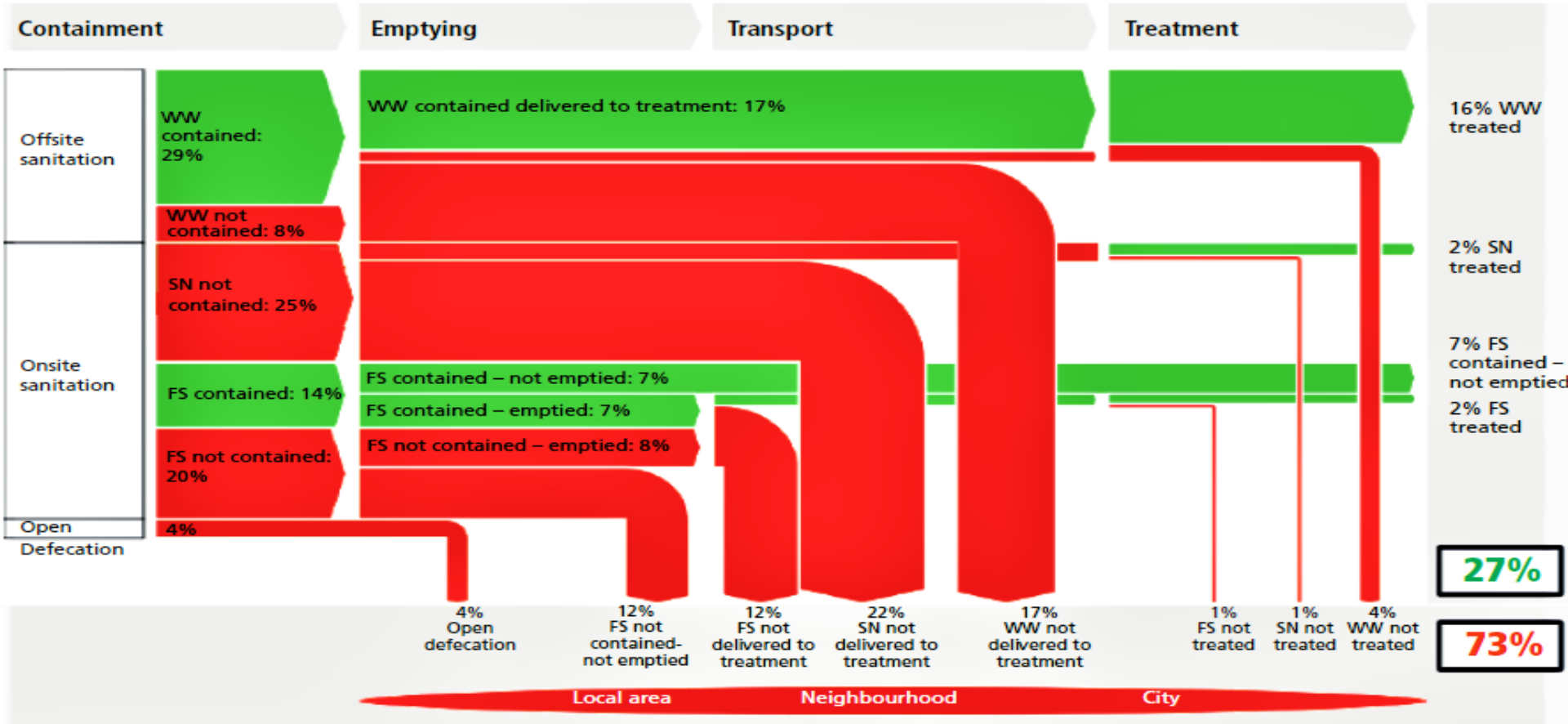
- Our analysis shows;
- Roughly 70% of state is 'on-site'
- 80% 'septic tanks' in state are connected to open drains where liquid is discharged
- 50% of the 'septic tanks' are mechanically cleaned – whenever there is need
- 90% of septic tank waste is not treated – disposed off in drains/rivers/land



Uttar Pradesh (Urban), India

SFD Level: 2 - Intermediate SFD

Date prepared: 23 December 2018
Prepared by: CSE



Key: WW: Wastewater, FS: Faecal sludge, SN: Supernatant ■ Safely managed ■ Unsafely managed

Note: This SFD is done based on study of 66 towns and cities, representing 60% of urban population in UP



Reality is opportunity

- Majority of households are connected to on-site systems (quality indifferent)
- These systems are cost-effective
- Governments do not have to build underground sewerage
- People are managers
- If septic tank is overflowing then people will have backflow – will call and get cleaned
- **NIMBY**
- **Already exist – do not have to re-engineer entire cities for sewerage networks**



Reality: Landline or mobile?

- 20 years ago, India was building landlines to connect people with phones
- Today, we go through satellites – mobile phones
- 10 years ago, world was building energy grids to connect people with electricity
- Today, people are installing solar systems on rooftops
- If we can jump-skip-leapfrog the landline-grid route in connectivity in telephones and energy access then sanitation?



Agenda: SFD week

Citywide regulation for action?

1. What is the best way to provide recognition/legislative framework for on-site sanitation systems?

- **Step 1: Bring policy guidelines/bylaws for enforcement and implementation**

What have cities done? How is this working?

We need framework and then we need compliance/enforcement



Agenda: SFD week

Best practices and business models in transport/conveyance

- **Step 2:** Focus on regulating transport and not construction of septic tanks to begin with
- States are working with GPS to regulate this ‘business’
- What kind of incentives are given so that each transporter is registered and collection is monitored
- What do cities charge? Do they provide rates? Or leave it to business to decide
- Do they charge tipping fee – how should payments for treatment and disposal be designed



Agenda: SFD week

Treatment

- **Step 3: Treatment for reuse**
- **Most important step**
- Co-processing where treatment plant exists
- Otherwise
- New treatment plant to be built but designed for **recycling and reuse**
- **Currently many questions on what is best treatment and what it will cost**



What is FS?

- Questions on treatment because there are also questions on the characteristics of FS or sewage?
- Septic systems are mixed bag – some well designed so that there is separation; but most only tanks, with no outlets for liquid
- Question also what is the sludge/discharged effluent to be used for? That will determine design of treatment



Agenda: SFD week

Re-use and re-invent for land

- Today's sewage system is water-based – water for flush and water to convey sewage and then after treatment disposal into water
- This destroys the nitrogen-cycle of world
- Nutrients lost
- Food security lost
- Water polluted
- **Land-based** sewage systems can repair this



Land-based: agenda

- Nutrients-Food-Excreta-Nutrients-Food
- Excreta can be used as nutrients for soil – reused in agriculture or compost
- If we design to remove pathogens and deliberately design for re-use
- Option to combine compost; make pellets for energy...
- Need to scale up; otherwise we will collect, even treat; but have vast amounts of sludge to handle



City's sanitation; Rivers quality

- But most important is that we must measure/monitor what we are are doing is working for the entire city
- Affordable sanitation **to all**
- Sewage interception of all – all types of sewage/excreta collected; on-site; off-site
- **Cleans the river; improves quality of life**
- Makes waste into a resource



Possible. **Very Much**

- This is our agenda for this SFD week
- We deliberate on what is possible – how we can make it work
- We will work to find solutions – in different backyards and learn and learn to make this work



Because We all live downstream Your waste is my water

