Faecal waste and its mysterious movement through urban ecosystems

Stockholm World Water Week
28th August 2018

EMORY UNIVERSITY
Center for Global Safe Water, Sanitation, and Hygiene

giz

sustainable sanitation alliance

UTS Institute for Sustainable Futures

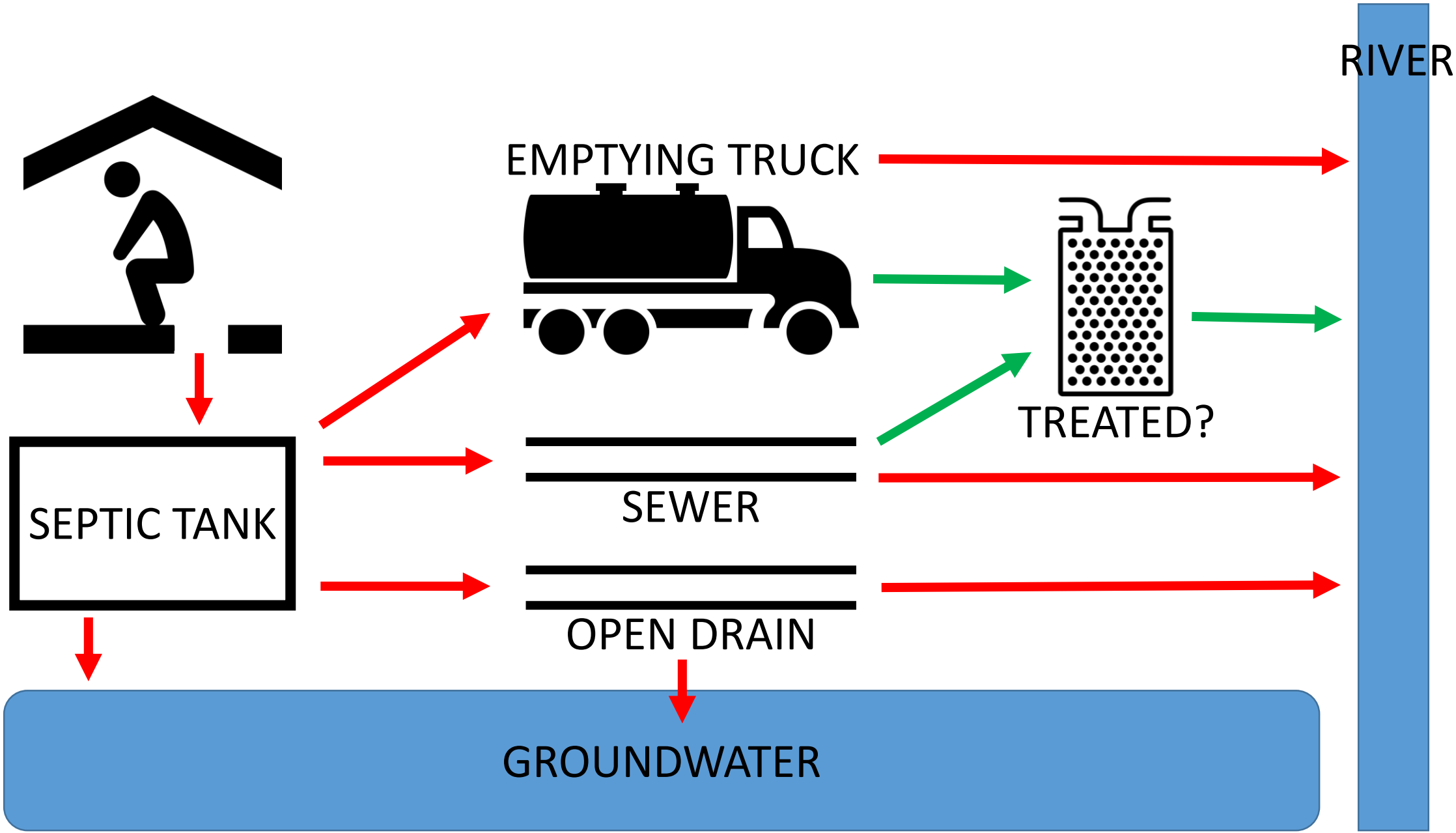
SANERGY
Building healthy, prosperous communities

World Health Organization

SNV

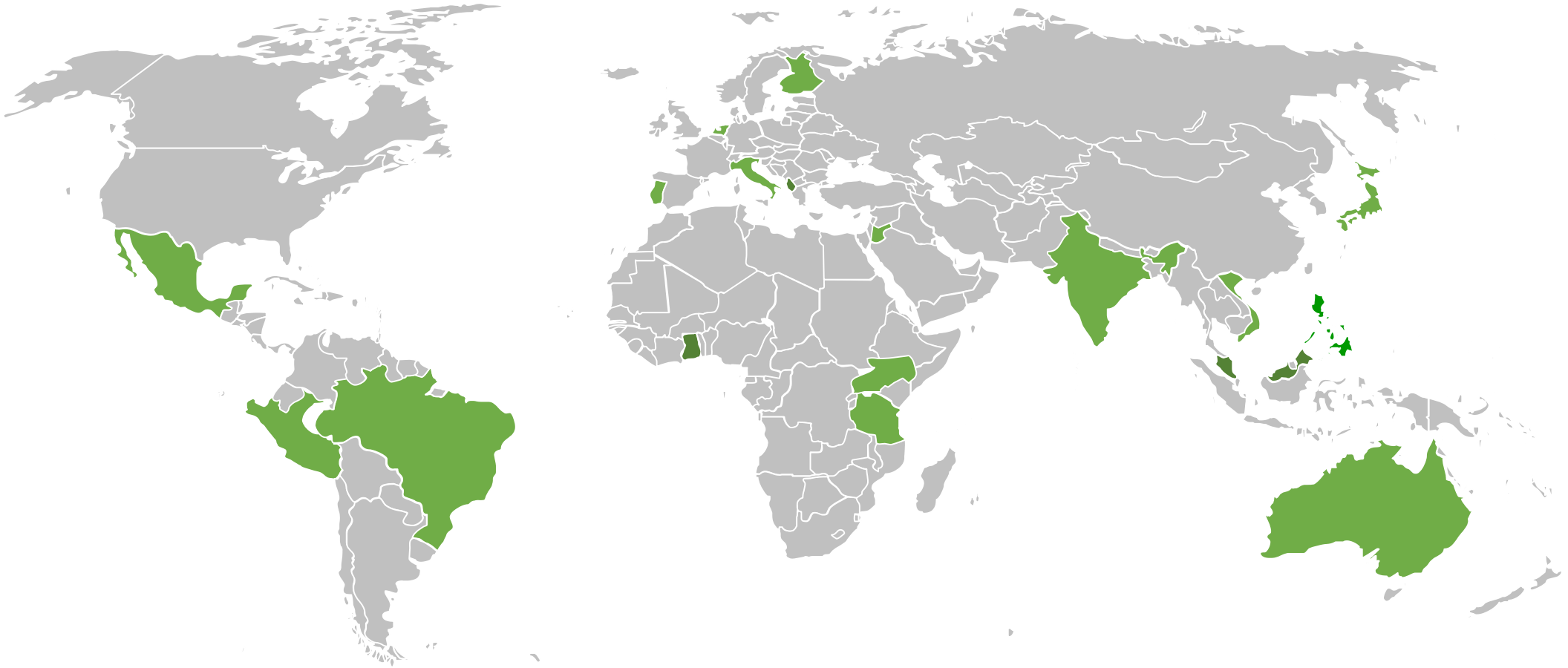
WSUP Water & Sanitation for the Urban Poor

WORLD BANK GROUP
Water


RIVER
EMPTYING TRUCK
TREATED?
SEPTIC TANK
SEWER
OPEN DRAIN
GROUNDWATER

Why Sanitation Safety Planning?

SSP around the World



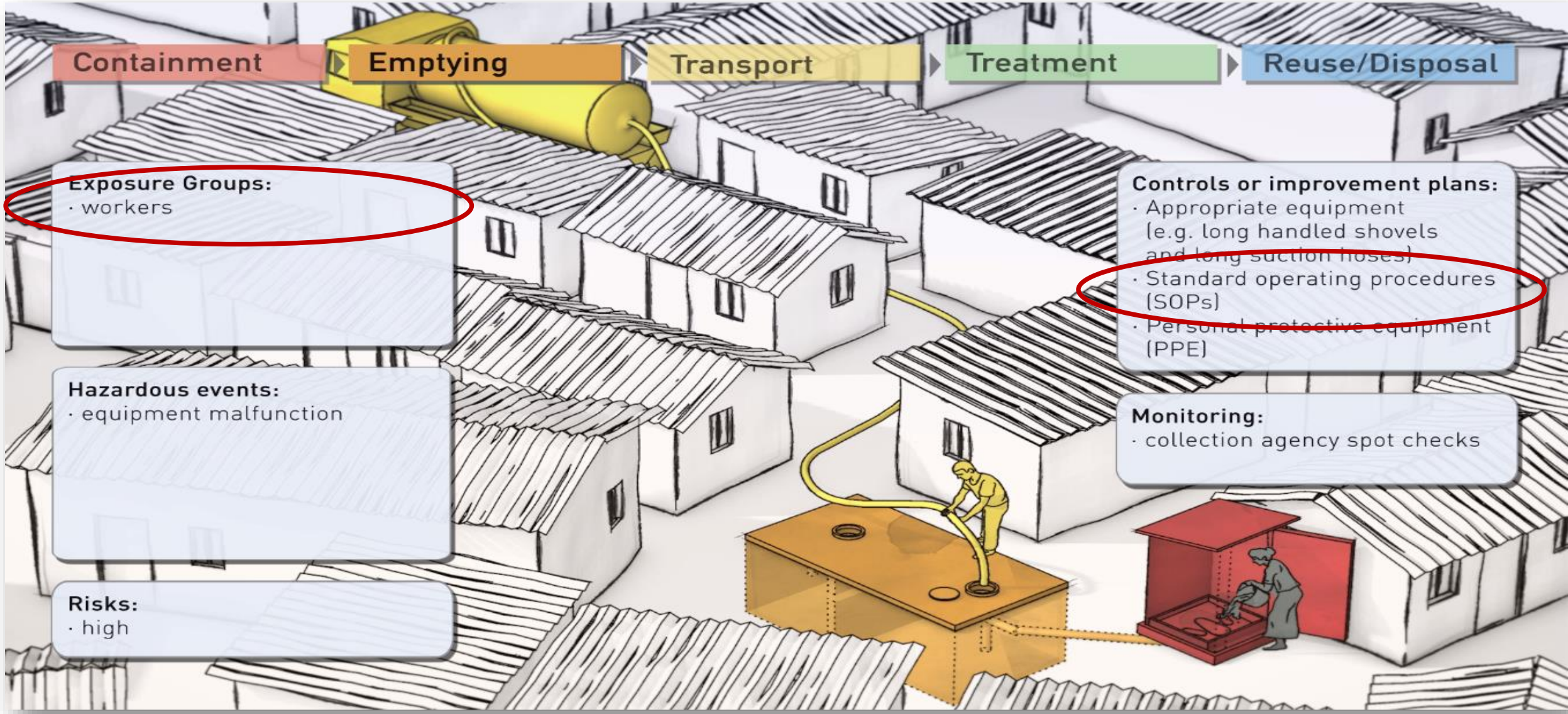
SSP Principles

- **Hazard identification and risk assessment**
- **Barriers to reduce risk – technical, management, behaviour**
- **Routine and verification monitoring – visual, process, sampling**
- **Supporting programmes and review**
- **Incremental improvement**

Water sanitation hygiene

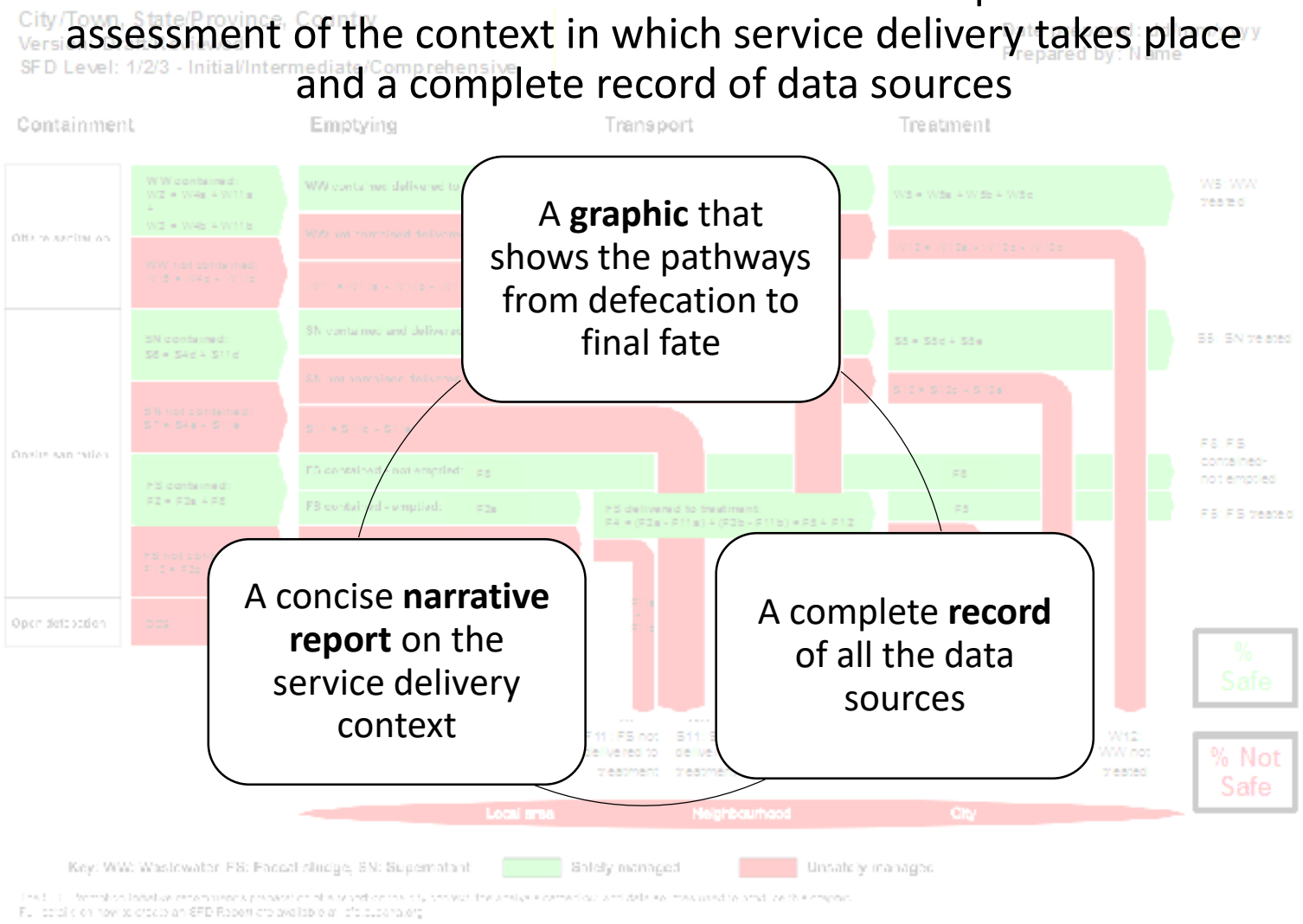
Sanitation safety planning

MOOC



What is an SFD?

An SFD summarises service outcomes in terms of the **flow and fate of excreta** in urban areas. It includes a qualitative assessment of the context in which service delivery takes place and a complete record of data sources

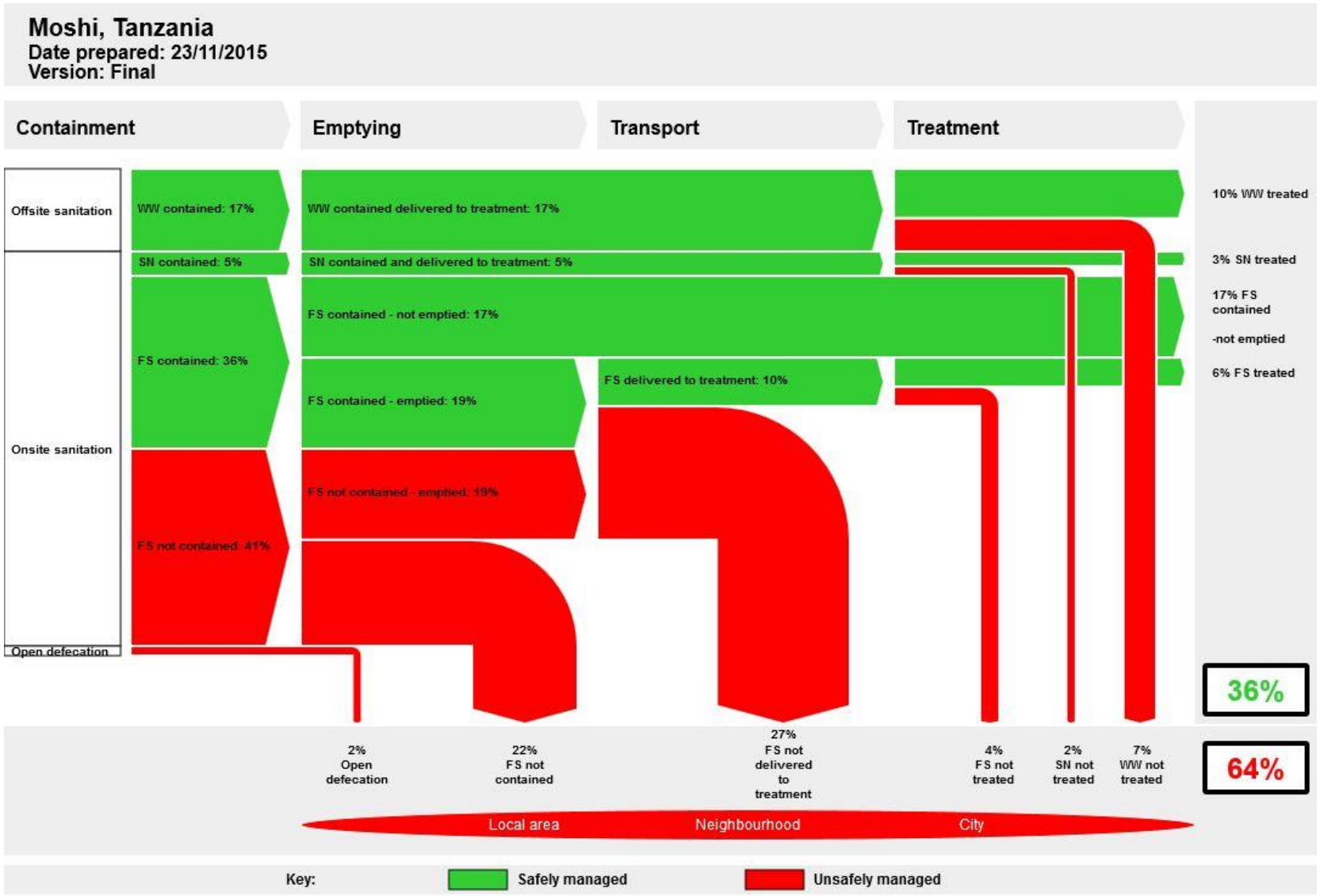


What is the aim of the SFD approach?

The SFD Graphic is a visual representation that enables stakeholders to **identify e communicate service outcomes** in terms of the flow and fate of excreta produced by the population; from which sanitation priorities can be identified and solutions developed

https://www.the-star.co.ke/news/2018/07/06/most-human-waste-untreated-posing-health-dangers-report_c1782597
https://www.the-star.co.ke/news/2018/07/05/where-does-your-shit-go-66-of-nairobi-human-waste-unaccounted-for_c1782731

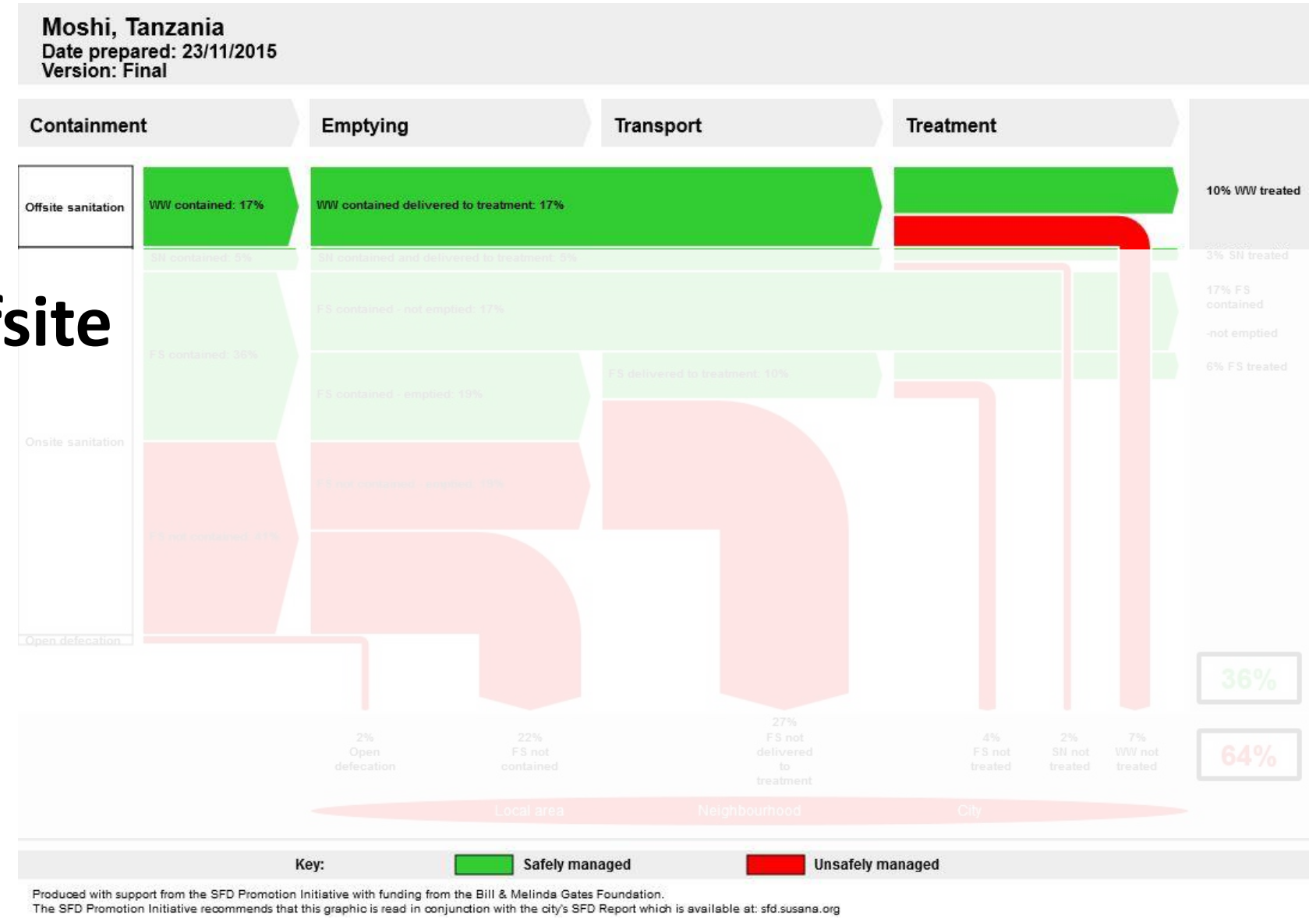
How do SFDs work?



Produced with support from the SFD Promotion Initiative with funding from the Bill & Melinda Gates Foundation.
The SFD Promotion Initiative recommends that this graphic is read in conjunction with the city's SFD Report which is available at: sfd.susana.org

How do SFDs work?

Offsite



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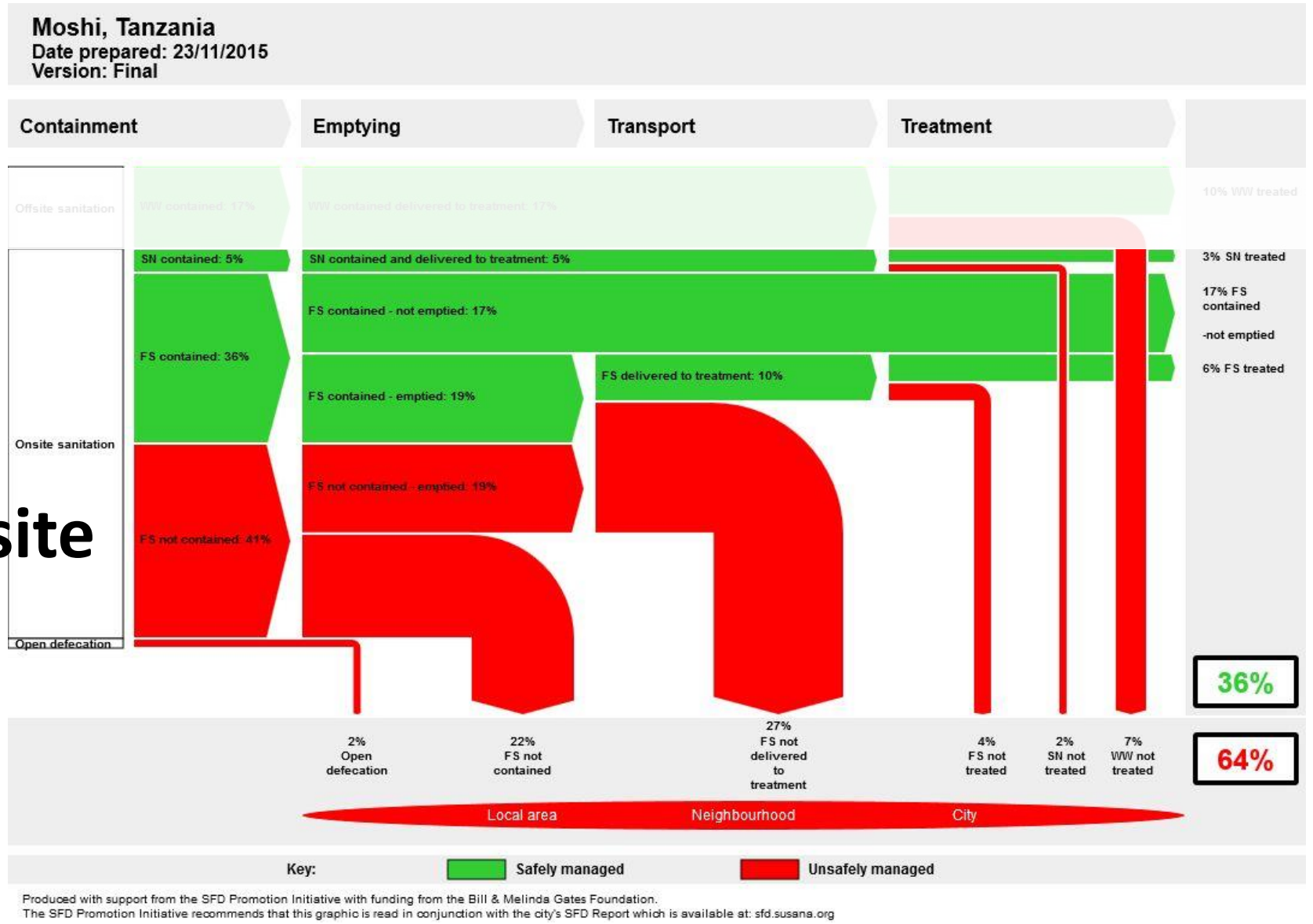
How do SFDs work?

Onsite



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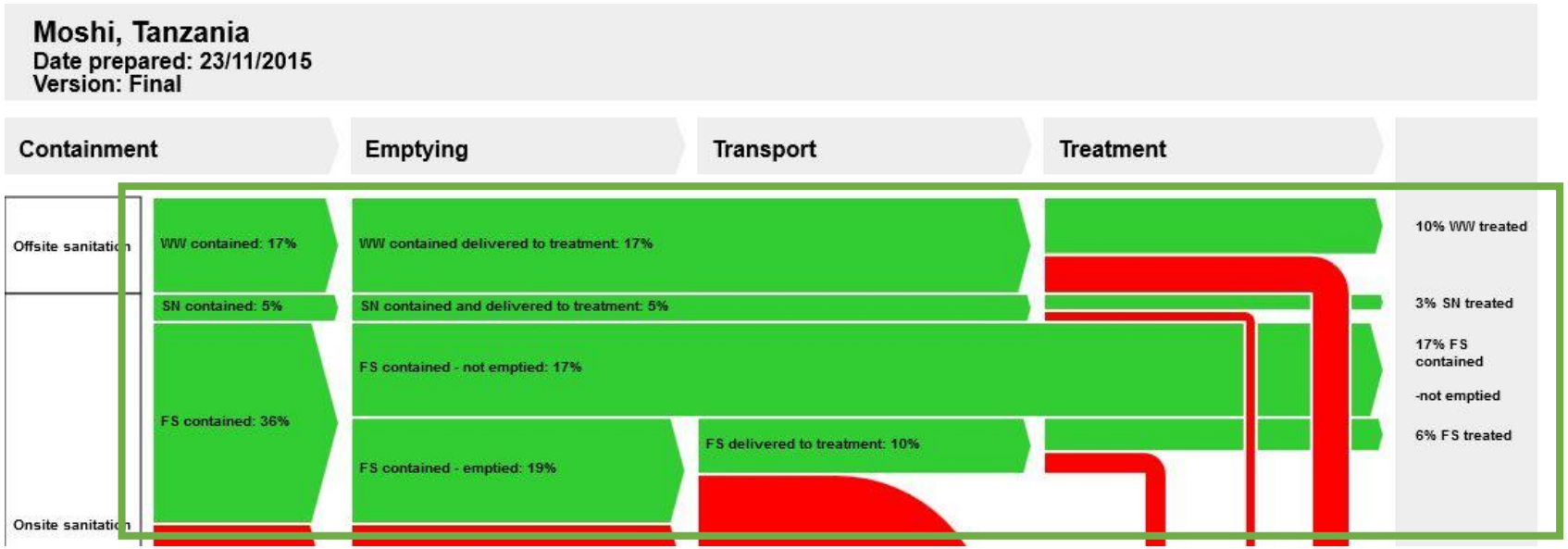

Excreta which are safely managed and move along the sanitation service chain are represented **by green arrows** moving from left to right in the graphic

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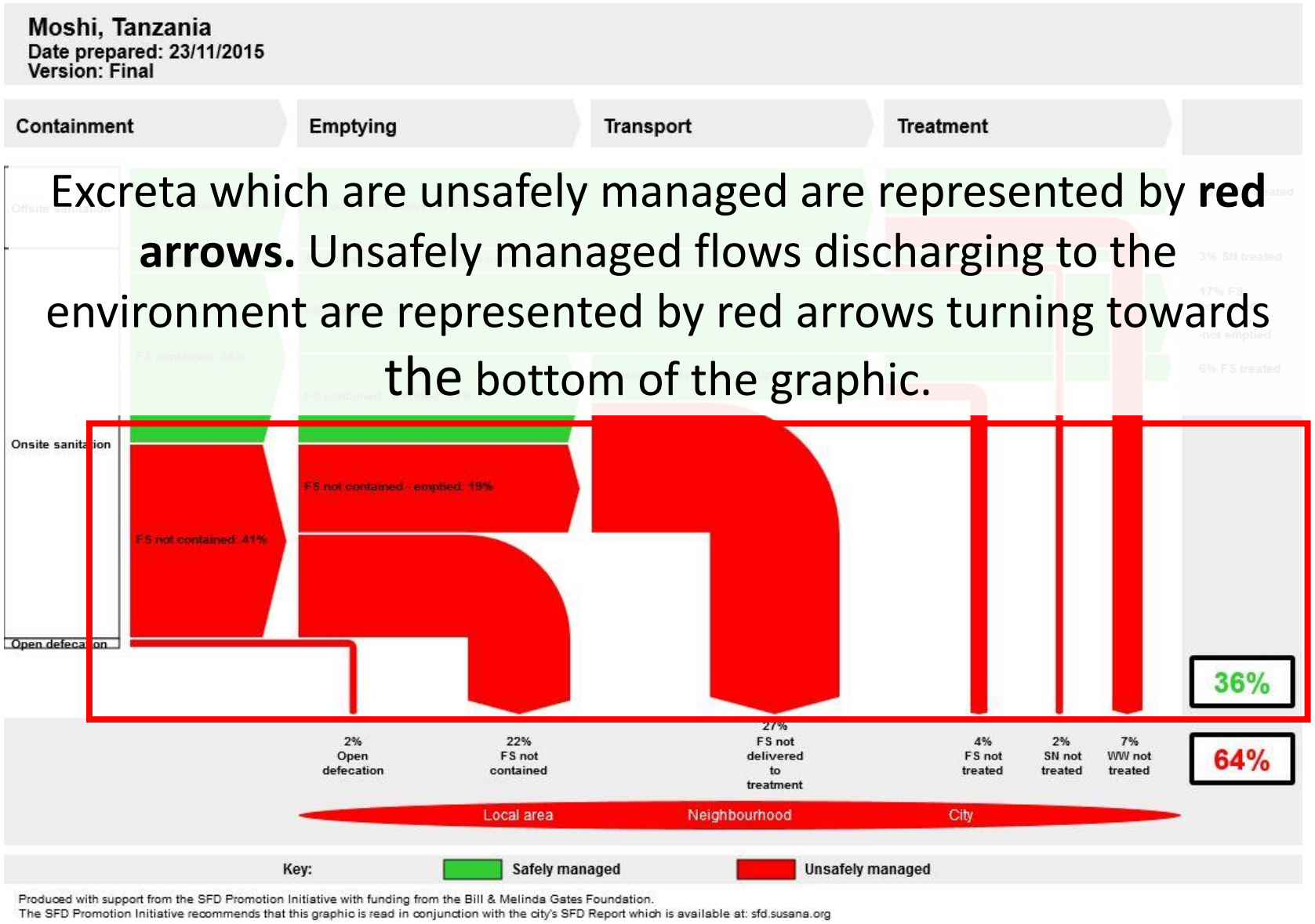
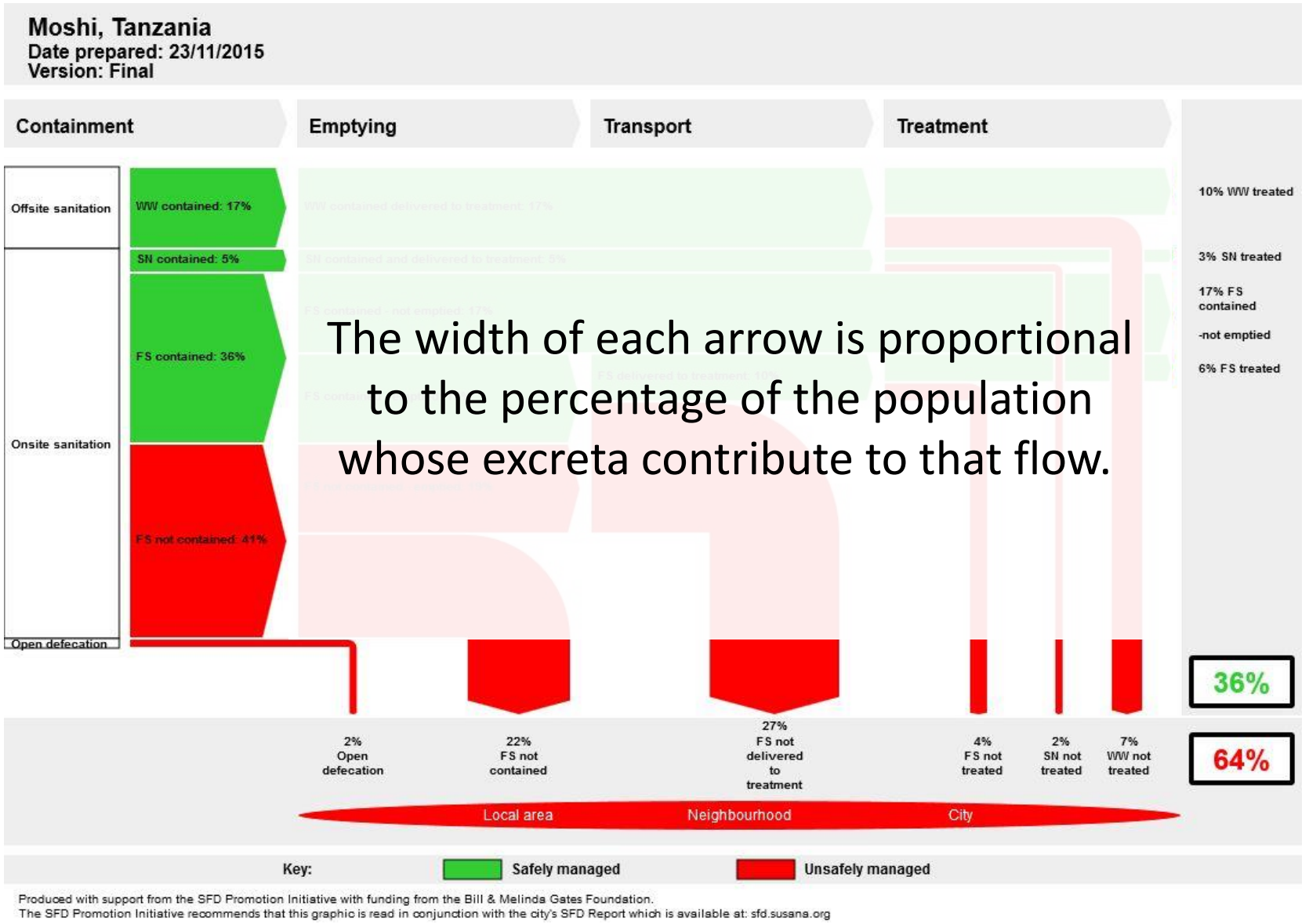
How do SFDs work?



Excreta which are unsafely managed are represented by **red arrows.** Unsafely managed flows discharging to the environment are represented by red arrows turning towards the bottom of the graphic.

How do SFDs work?



The width of each arrow is proportional to the percentage of the population whose excreta contribute to that flow.

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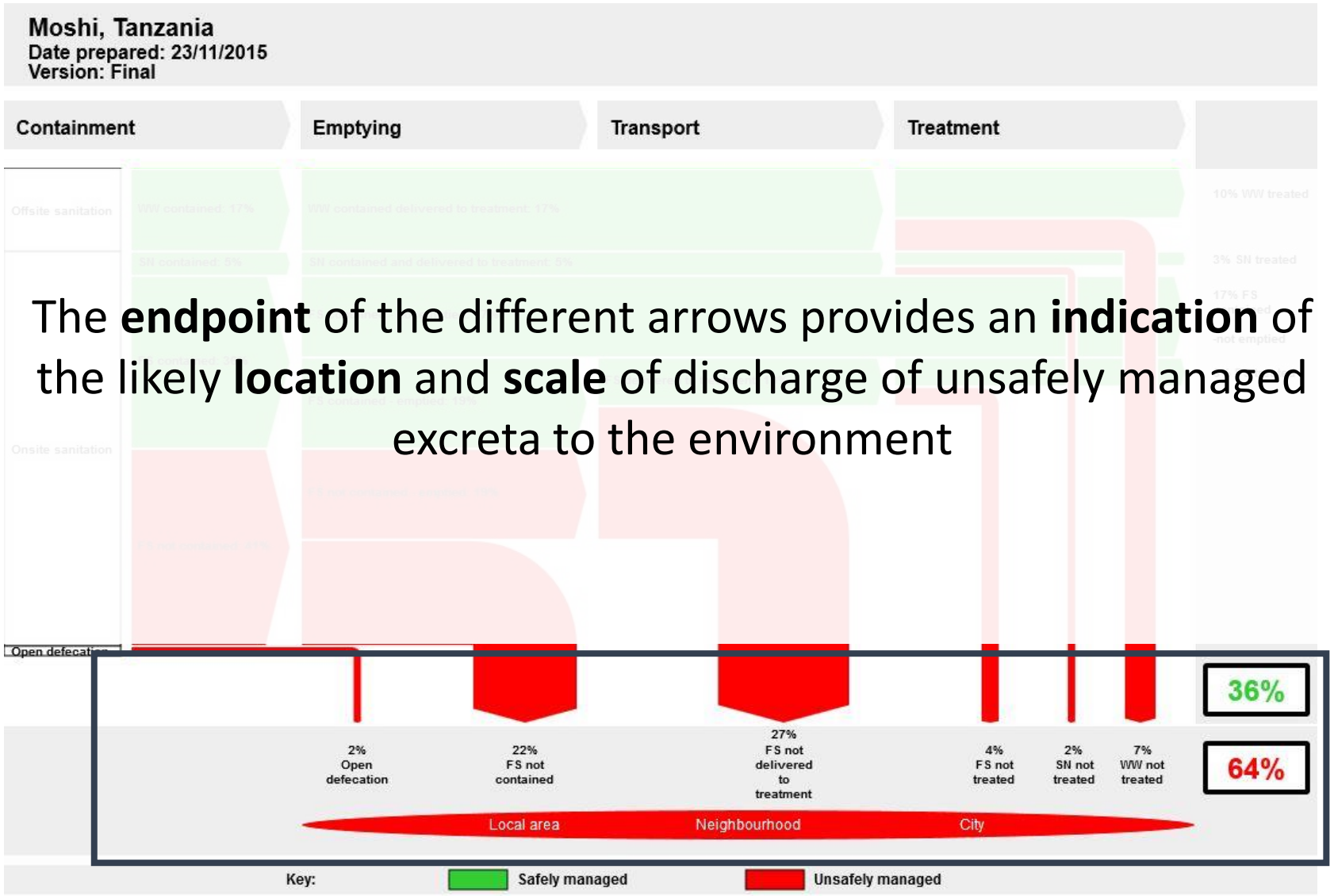
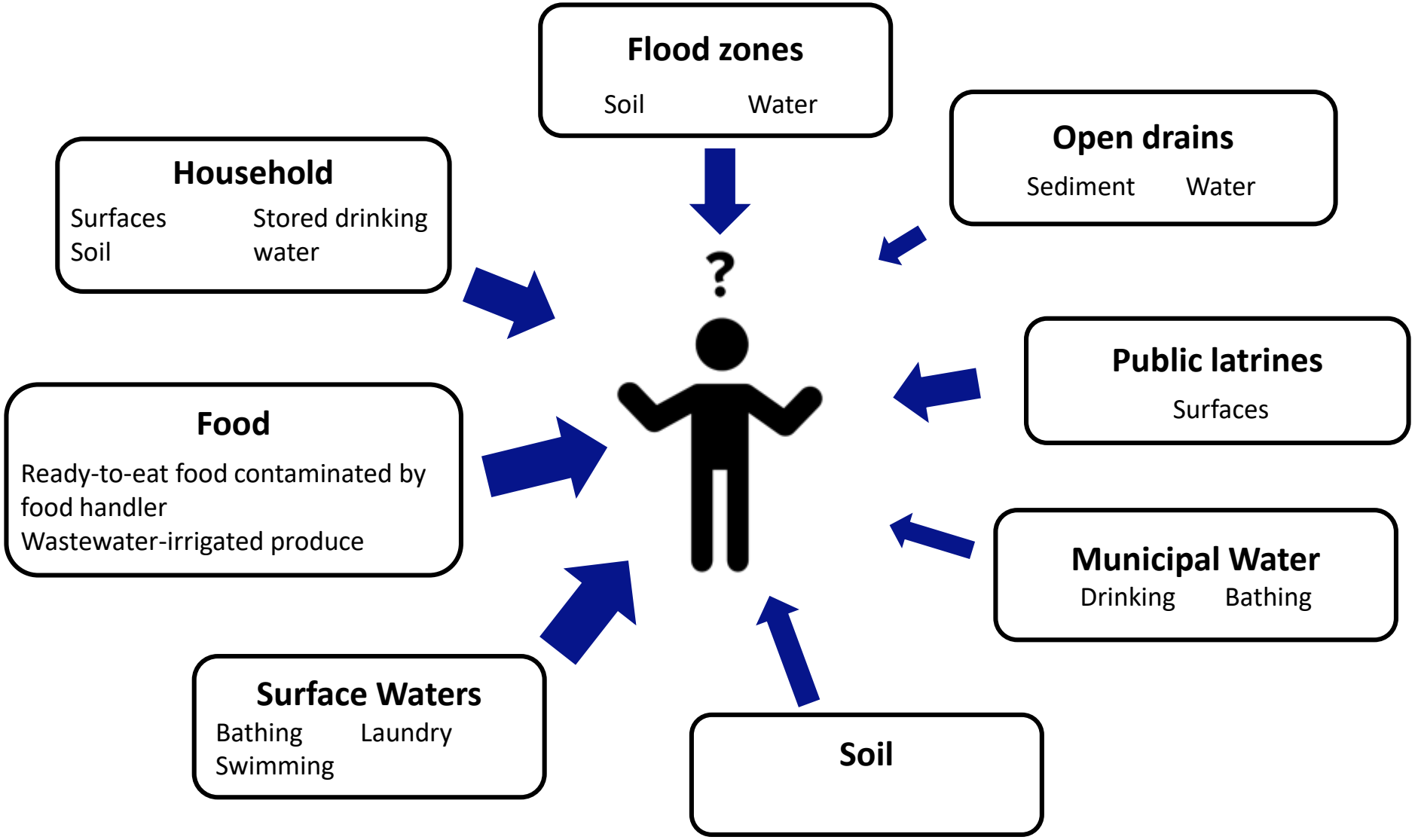
How do SFDs work?



The **endpoint** of the different arrows provides an **indication** of the likely **location** and **scale** of discharge of unsafely managed excreta to the environment

What is the risk of exposure to fecal contamination in the urban environment?
Which pathways pose the greatest risk?



Confused designed by Jessica Look for The Noun Project

The SaniPath Tool Assesses Risk of Exposure to Fecal Contamination in the Urban Environment

Primary Data Collection

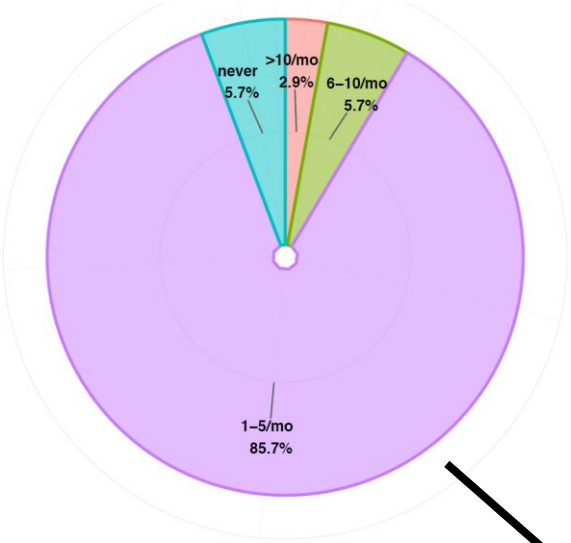
- **Exposure Behavior**
  - Reported frequency of behavior of adults and children that may lead to exposure to fecal contamination

- **Fecal Contamination**
  - Collect environmental samples from relevant exposure pathways
  - Analyze for *E. coli* as an indicator of fecal contamination

SaniPath Approach for Estimating Exposure to Fecal Contamination

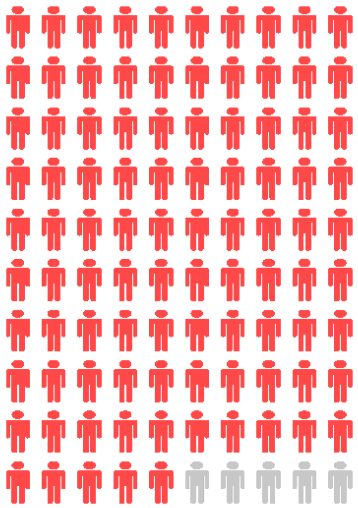
Behavior Frequency

Frequency of produce ingestion (Children)



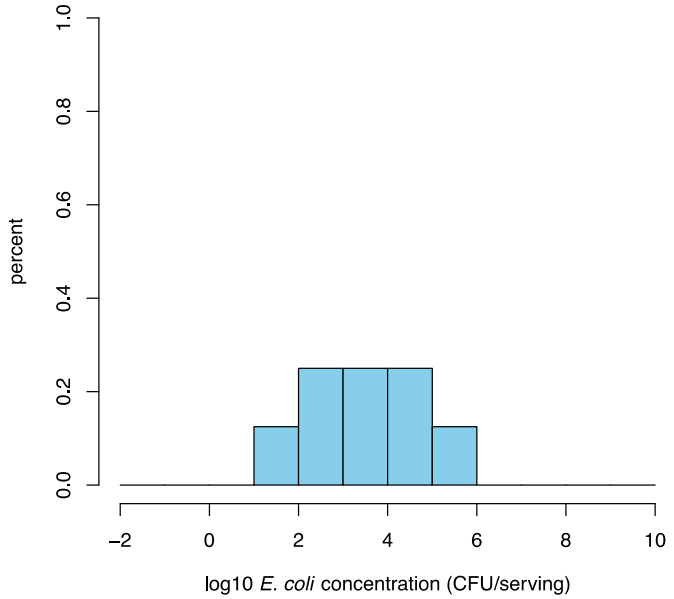
Other parameters: intake volumes, duration of exposure, etc.

Produce (Children)
Percent Exposed = 95%
Log10 Dose 7.1



Environmental Contamination

Produce samples



Tool uses Bayesian analysis to estimate the distribution of environmental contamination and frequency of exposure.

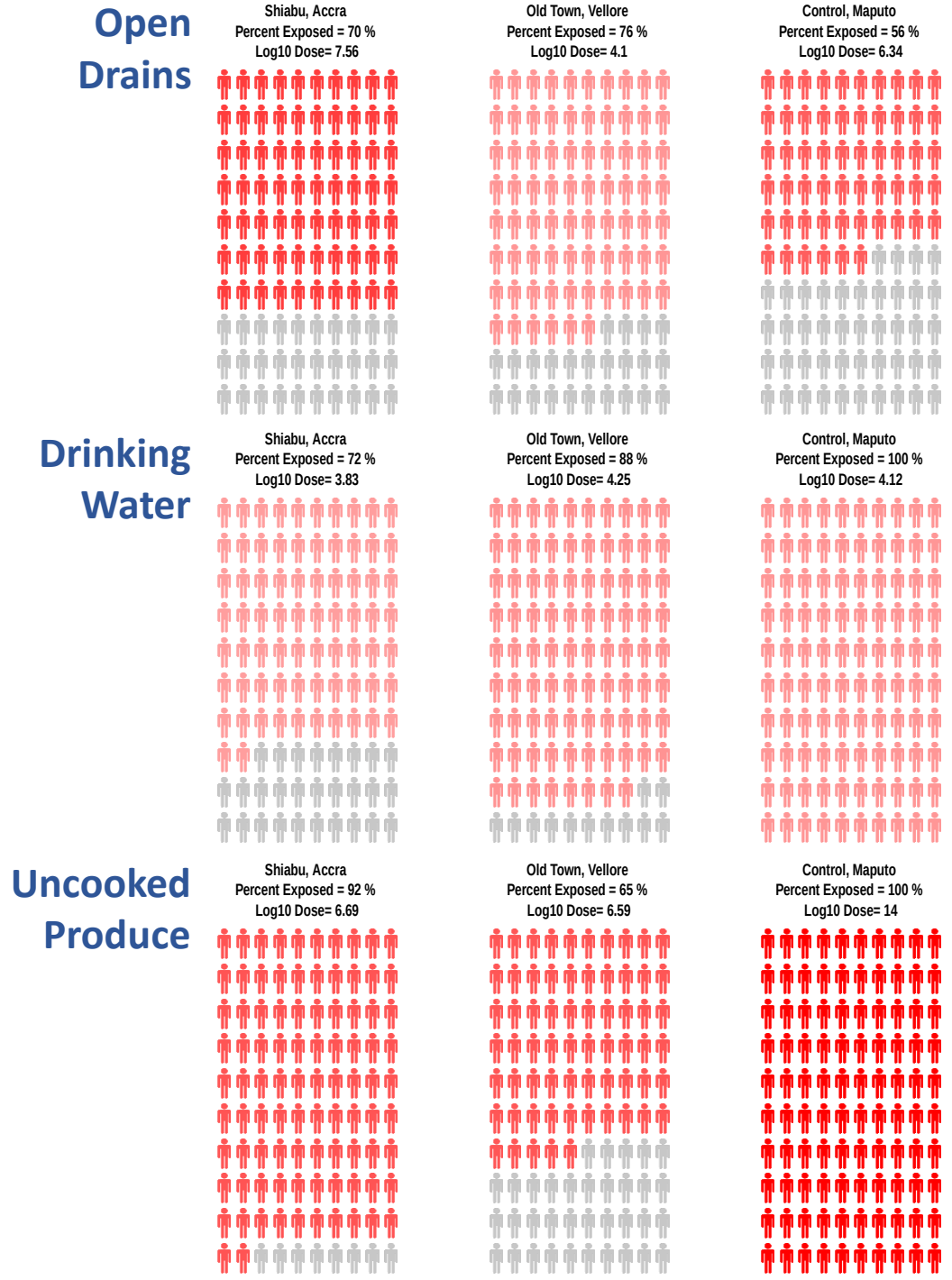
The mean dose and proportion of the population exposed are summarized from simulated distributions and displayed in risk profiles

SaniPath Risk Profiles: Results for 3 pathways in 3 cities

- Greatest differences between the 3 cities in the magnitude of fecal contamination and exposure to open drains

- Moderate fecal contamination of drinking water, but high proportion of population exposed

- Produce was highly contaminated in all 3 cities, but proportion of the exposed population varies by city due to cultural differences in diet



7 Cities
32 Neighborhoods

SaniPath Field Sites 2013-2018

Partners

TREND Group Ghana, Christian Medical College Vellore, Noguchi Memorial Institute, University of Brighton, Georgia Tech, LSHTM, WaterAid Australia, icddr,b, IWMI, WRI, Kumasi and Accra Metropolitan Assembly, GiZ, Lusaka City Council, Improve Int

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SaniPath

Thank You

For more information visit
SaniPath.org

View the NEW Tool at

tool.sanipath.org

Christine L. Moe
clmoe@emory.edu

View Tool tutorials on YouTube!

YouTube SaniPath Exposure Assessment Tool

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Are implementers currently paying sufficient attention to pathogen flows?

Are there pathogen pathways that we’re not taking sufficiently into account?

What do we need to do/know in order to do it better?