World Health Organization

Introduction to Climate Resilient Sanitation Safety Planning

Step-by-step risk management for safely managed sanitation systems

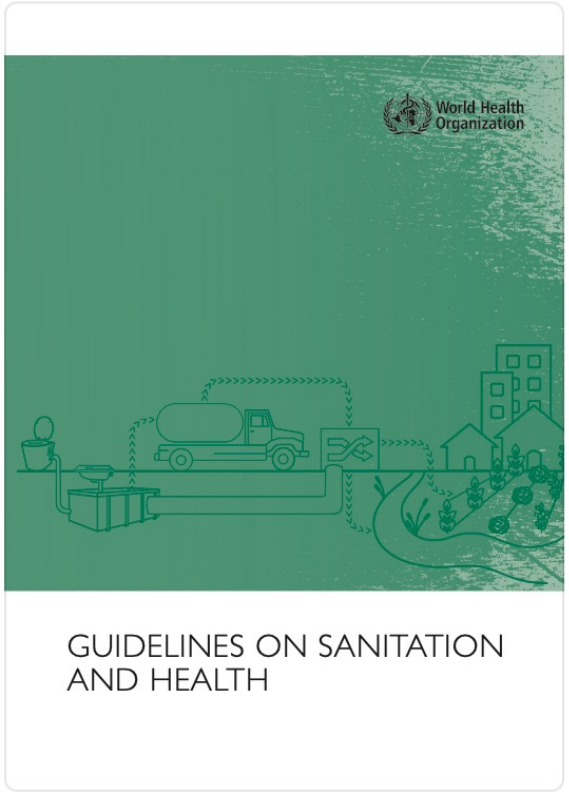
SANITATION
SAFETY
PLANNING

Why do we need Sanitation Safety Planning?

Sanitation

According to the WHO Guidelines on Sanitation and Health:

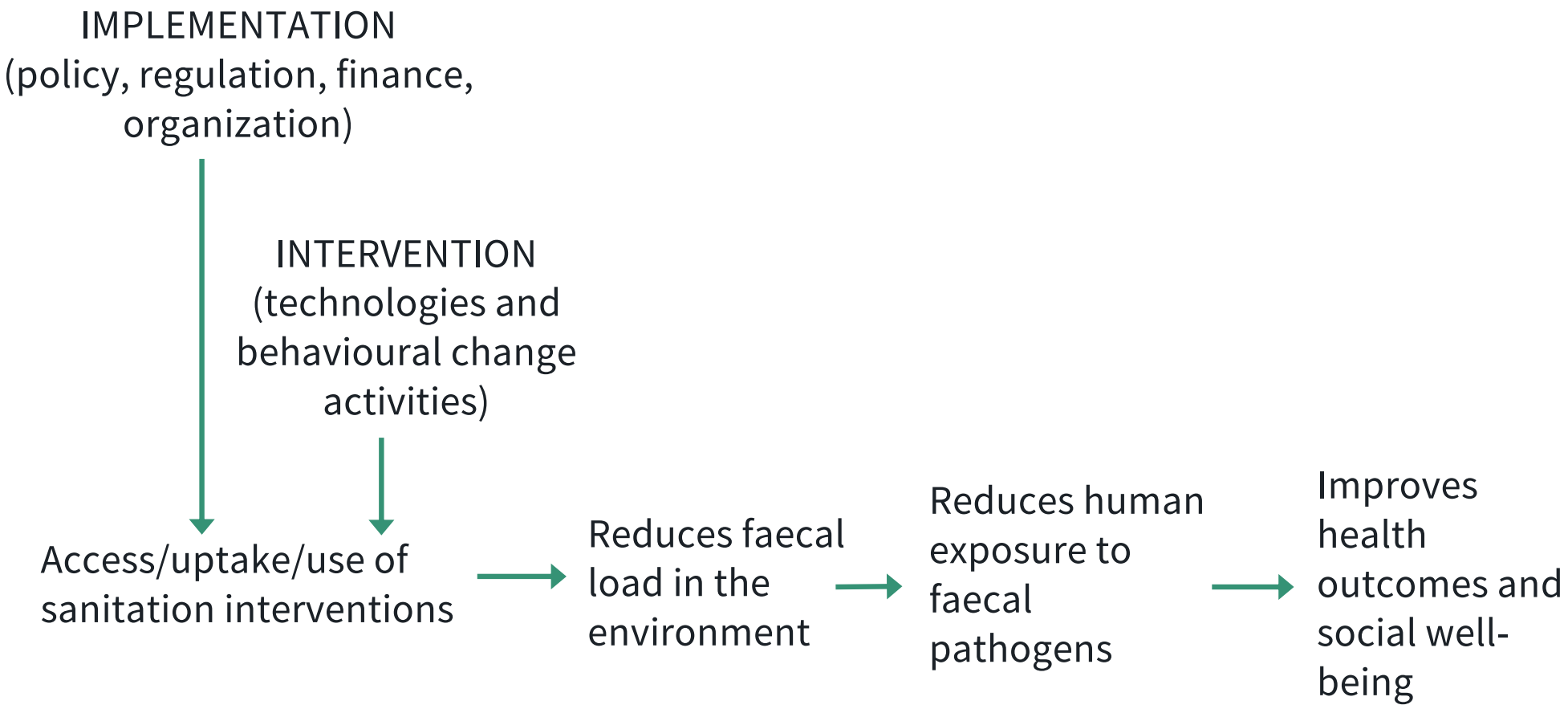
Sanitation is defined as **access to** and **use of** facilities and services for the **safe disposal** of human urine and faeces.



Sanitation is a human right, and a public good and is meant to deliver cost-effective **benefits for public health, the economy and the environment**.

Sanitation impact on health

Pathways through which sanitation shall provide health and economic benefits



But evidence shows lower health impact than expected

Photos: L. Barreto Dillon

Sanitation systems are not interrupting pathogen transmission

Evidence on effectiveness

Overall, greater access to sanitation is associated with significant lower odds of diarrhoea and other infections.

-Absence of open defecation is associated with healthier populations.

-Evidence of a protective effect of sanitation on infectious diseases and nutrition.

-Evidence of association with wider health outcomes, including cognitive development, personal wellbeing, especially among women and girls.

However, the health impact is lower than expected

Reasons for low health impact

-Many interventions do not reach levels of toilet access and use in the community that are high enough to remove pathogens from the environment.

Disease reduction will not be detected unless the coverage of sanitation use at community level is high (>70%)

-Many sanitation systems do not effectively prevent contamination of the environment (failures in containment, transport, treatment, etc.) hence have limited impact on exposure.


The reality of poor sanitation


Health impact of unsafe sanitation
Faecal-oral infections: e.g., diarrhea (2016 killed 800 000 people)
Helminth infections
Vector-borne diseases
Sequelae (conditions caused by preceding infections): e.g., stunting.
Broader well-being: e.g., anxiety
Photo by fairplanet.org

Heath impact of unsafe sanitation

Direct impact (infections)*	Sequelae (conditions caused by preceding infection)	Broader well-being
Faecal-oral infections • Diarrhoeas (incl. cholera) • Dysenteries • Poliomyelitis • Typhoid **Helminth infections** • Ascariasis • Trichuriasis • Hookworm infection • Cysticercosis • Schistosomiasis • Foodborne tremetodes **Insect vector diseases** (vectors breed in faeces or water contaminated with faeces) • Lymphatic filariasis • West Nile Fever • Trachoma	• **Stunting/ growth faltering** - related to repeated diarrhoea, helminth infections, environmental enteric dysfunction • **Consequences of stunting** -obstructed labour, low birthweight • **Impaired cognitive function** • **Pneumonia** - related to repeated diarrhoea in undernourished children • **Anaemia** - related to hookworm infections	**Immediate:** • Anxiety (shame and embarrassment from open defecation and shared sanitation) and related consequences • Sexual assault (and related consequences) • Adverse birth outcomes (due to underuse of healthcare facilities with inadequate sanitation) **Long-term** • School absence • Poverty • Decreased economic productivity • Anti-microbial resistance

Sanitation as a development issue

Human right to sanitation

Entitles everyone to sanitation services that provide privacy and ensure dignity, and that are physically accessible and affordable, safe, hygienic, secure, socially and culturally acceptable.

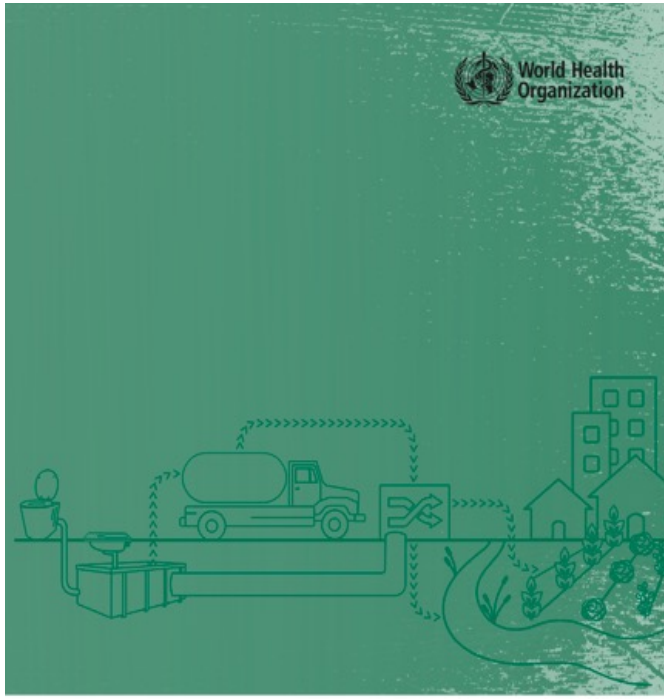
General Assembly Resolution 70/169: The human rights to safe drinking water and sanitation. United Nations, New York, USA.

Photo: L. Barreto Dillon

WHO 2018 Guidelines on Sanitation and Health

Authoritative health-based guidance on sanitation that results in better health

Evidence · Recommendations · Guidance · Tools · Resources



Objectives

- Ensure that sanitation systems are designed and managed safely to protect human health from microbial hazards contained in human excreta.
- Maximize the health impacts of sanitation interventions.
- Articulate the role of health sector in sanitation.

Recommendations

Derived from comprehensive evidence review and wide expert and end user input

1. Ensure universal access and use of toilets that safely contain excreta

2. Ensure universal access to safe systems along the entire sanitation service chain

3. Sanitation should be addressed as part of locally delivered services and broader development programmes and policies

4. The health sector should fulfil core functions to ensure safe sanitation to protect public health

Implementing recommendations

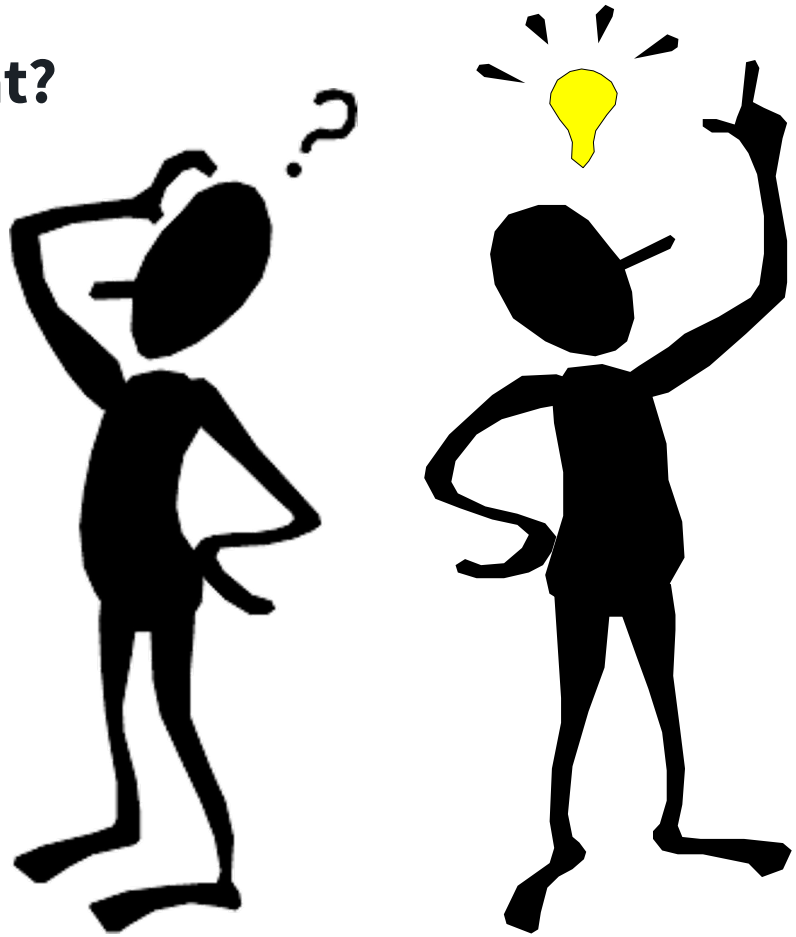
Ensuring that we maximize the health benefit of sanitation interventions

What we can do as local practitioners?

We need to ensure that:

- Systems and services are selected to respond to the local context.
- Investments and system managements are based on local level risk assessments along the entire sanitation chain.
- Incremental improvements are based on local level risk assessment.
- Communities, sanitation workers, consumers and farmers are protected.

How do we do that?



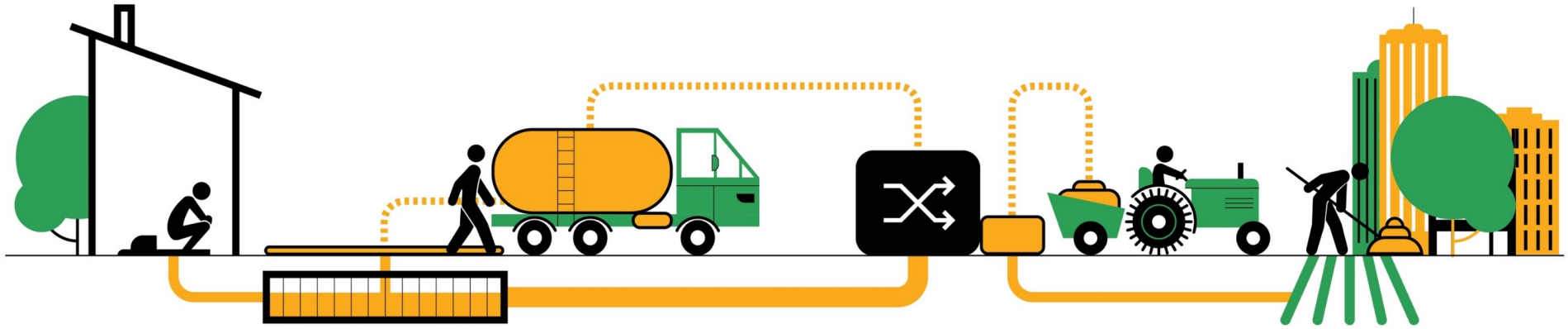
We need to ensure

safety

along the entire sanitation service chain.

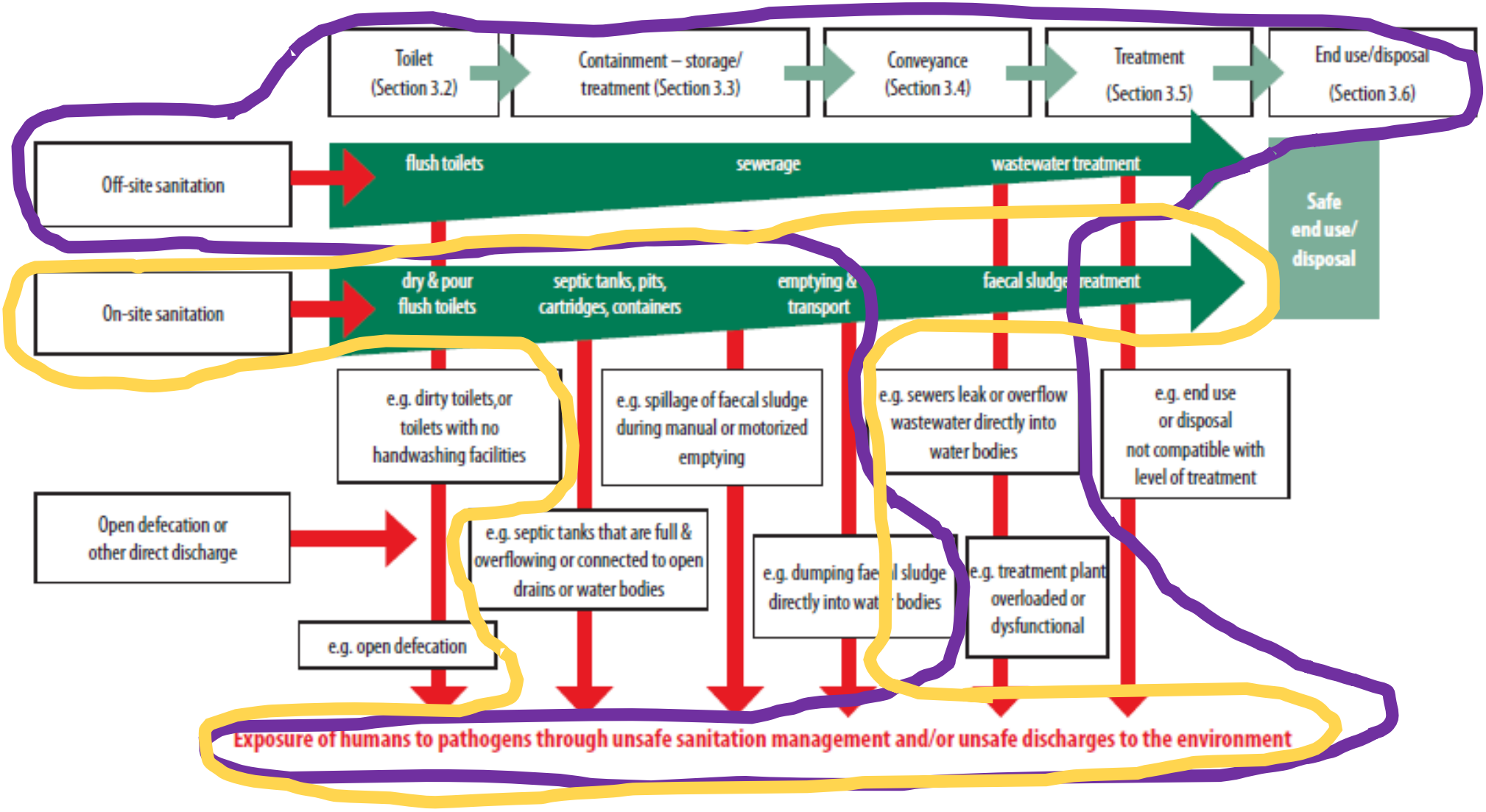
Safe sanitation systems

Arrangement of technologies and practices designed to separate human excreta from human contact **<u>at all steps</u>** of the **sanitation service chain**.



Failures at any step of the sanitation chain result in negative health outcomes

Typical failures



Risks should be managed along the entire sanitation service chain

Sanitation Safety Planning - SSP

WHO recommended approach

SSP is a risk-based management tool for sanitation systems that:

- helps with systematically identifying and prioritizing health risks along the sanitation chain;
- guides management and investments in sanitation systems according to risk;
- identifies operational monitoring priorities and regulatory oversight mechanisms that target the highest risks

SSP provides assurance on the safety of sanitation-related products and services

WHO 2006 Guidelines for the safe use of wastewater, excreta and greywater

SSP was first published to make the 2006 WHO Guidelines on reuse more widely adopted.

These guidelines are concerned with the health implications of reusing wastewater and aim to protect the farmers, local communities and consumers, maximizing the health benefits of safe reuse.

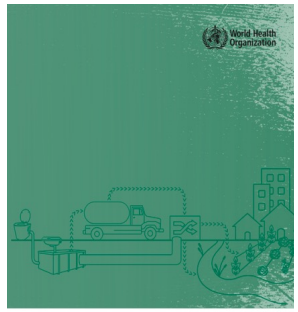
Today, SSP is used for the entire sanitation system.

World Health Organization

SSP manual – Second Edition, 2022

Key updates in this second edition of Sanitation safety planning include:

- simplification of the SSP process;
- reorientation to support recommendations on local-level risk assessment and management in the WHO Guidelines on sanitation and health, covering all steps of the sanitation chain, with or without safe end use; and
- inclusion of climate risks.



How does SSP works?

System assessment phase

Identify disease pathway and affected people.

Identify hazards and hazardous events.

Carry out a risk–based assessment.

Identify the highest risks.

Identification and prioritization of control measures.

Define monitoring and validation mechanisms.

Operational, monitoring and management phase

Implement control measures to reduce the highest risks.

SSP Modules

Where should SSP be done? Who should be involved and what are their roles?

How does the sanitation service chain work?

What could go wrong? What existing control measures are in place and how effective are they? How significant are the risks?

What needs to be improved and how?

Is the system operating as intended?

How should SSP be supported? How can we adapt to changes?

Results of Sanitation Safety Planning

Products

- Prioritized, incremental improvement plan.
- Operational monitoring plan for regular monitoring and periodic verification.

Outcomes

- Maximization of health impact of sanitation solutions.
- Progressive implementation towards sanitation targets.
- Built local capacities of stakeholders, so they initiate and maintain the risk-based sanitation management approach.

Benefits of Sanitation Safety Planning

- Maximizes health benefits of sanitation interventions
- Prioritizes efforts
- Sets a plan for incremental improvements
- Target limited resources to the highest health risks
- Coordinates efforts

"SSP brings back the sanitation focus to health"

Welcome to Coppentown, Sanitola

Municipality of 50,000 pp in the outskirts of a metropolitan city

Photo: L. Barreto Dillon

Coppentown case study

Water supply; surface water source upstream

Photo: L. Barreto Dillon

Coppentown case study

20% of the population is connected to a combined sewer system

Photo: 20 minutos

Photo: E. Terán

Coppentown case study

Mixed wastewater is transported by gravity to a conventional WWTP

Photo: L. Barreto Dillon

Coppentown case study

Treated wastewater is disposed in the river

Photo: L. Barreto Dillon

Coppentown case study

Irrigation for neighbouring farmers

Photo: L. Barreto Dillon

Coppentown case study

80% of the population uses on-site sanitation

Source: Urban Management Centre India (up), The Hindo (down)

Source: SuSanA Secretariat, Flickr

Coppentown case study

Reuse of faecal sludge

Source: www..fsmindia.org

Coppentown case study

Evidences

- 20% of Coppentown inhabitants are affected by gastro-intestinal disorders.
- Farmers report skin diseases.
- Incidence of infection diseases among sanitation workers.

Kick-off of SSP

- Steering Committee was created.
- SSP team has been working on it for the past months.
- SSP aims to ensure that the entire sanitation service chain is safely managed, diminishing the incidence and impact of sanitation-related diseases of communities, workers, farmers and consumers.

Coppentown case study

Sanitation step	Hazardous event	Exposure groups	Existing control measures	Under current climate scenario		Control measures	Resources required [In money units]	Indicate with an "x" if it should be prioritized
				Risk assessment (L x S = R)	Risk			
Collection/ Storage/ Treatment	Ingestion of pathogens in wastewater from overflowing toilet or septic tank. This intensifies due to damaged or blockage following heavy rainfall.	40,000 individuals using on-site systems	None	L=1 Very unlikely S=2 Minor 1x2= 2	Low	Installation of sealed covers for septic tanks and non-return valves on pipes to prevent back flows.	5	
						Community education on tank maintenance, and on hygiene and safe behaviors during/after extreme events.	1	
						Monitoring system to control state of household tanks.	2	
Disposal	Ingestion of pathogens while in contact with illegal dumped fecal sludge in open drains and open fields adjacent to residential areas.	100,000 individual living around the illegal dumping areas	None	L= 5 Almost certain S= 8 Major 5x8= 40	Very high	Issuing a municipal decree/by-law for fecal sludge mgmt.	1	
						Designation of an off-site dumping area for fecal sludge	1	
						Monitoring and controlling sludge private operators (for instance, through GPS systems).	3	
						Strengthening enforcement authorities	3	
						Implement sludge transfer stations for private operators, with intermediate transport to a Fecal Sludge Treatment Plant (dewatering, drying and composting)	5	
Treatment (Wastewater treatment plant)	Ingestion of pathogens while using river water contaminated with discharged untreated wastewater. This intensifies during extreme rainfall events causing discharge of excess, untreated wastewater into environment.	500 individuals living adjacent to treatment plant 10,000 individuals living in village downstream	Wastewater treatment plant working ok with minor incidents	L= 3 possible S=4 Moderate 3x4= 12	Medium	Install flood, inundation, and run-off defenses (e.g., dikes) and undertake sound catchment management	8	
						Invest in early warning systems and emergency response equipment (e.g., mobile pumps stored off-site, non-electricity-based treatment systems)	5	
						Additional holding pond to buffer high flows and reduce overflow or bypass to river	6	

Coppentown case study

Semi-quantitative Risk Assessment Method

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TOOL 3.5. Suggested risk definitions for semi-quantitative risk assessment

	DESCRIPTOR	DESCRIPTION
Likelihood (L)		
1	Very unlikely	Has not happened in the past and it is **highly improbable** it will happen in the next 12 months (or another reasonable period).
2	Unlikely	Has not happened in the past but **may occur in exceptional circumstances** in the next 12 months (or another reasonable period).
3	Possible	May have happened in the past and/or **may occur under regular circumstances** in the next 12 months (or another reasonable period).
4	Likely	Has been observed in the past and/or is **likely** to occur in the next 12 months (or another reasonable period).
5	Almost certain	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).
Severity (S)		
1	Insignificant	Hazard or hazardous event resulting in **no or negligible health effects** compared with background levels.
2	Minor	Hazard or hazardous event potentially resulting in **minor health effects** (e.g. temporary symptoms of irritation, nausea, headache).
4	Moderate	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).
8	Major	Hazard or hazardous event potentially resulting in **illness or injury** (e.g. malaria, schistosomiasis, food-borne trematodiases, chronic diarrhoea, chronic respiratory problems, neurological disorders, bone fracture), and/or may lead to **legal complaints** and concern, and/or major **regulatory noncompliance**.
16	Catastrophic	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.

TOOL 3.6. Semi-quantitative risk assessment matrix

			SEVERITY (S)				
			Insignificant 1	Minor 2	Moderate 4	Major 8	Catastrophic 16
LIKELIHOOD (L)	Very unlikely	1	1	2	4	8	16
	Unlikely	2	2	4	8	16	32
	Possible	3	3	6	12	24	48
	Likely	4	4	8	16	32	64
	Almost certain	5	5	10	20	40	80
Risk score R = L × S			<6	6–12	13–32	>32	
Risk level			Low risk	Medium risk	High risk	Very high risk	

Discussions in groups of 2

You have received the risk assessment table prepared by the SSP local team

- You and your teammate are part of an Expert Consultation Group.
- You are going to provide recommendations to the SSP Steering Committee.

Knowing that the Steering Committee only has 10 Money Units, which improvement options should be prioritized? Why?

15 min

Back to plenary

Let's us discuss

- How can the local risk assessment help to prioritize sanitation interventions?
- How would you describe the value of Sanitation Safety Planning?

SSP in a nutshell

- is the WHO recommended approach for local risk assessment and management for sanitation systems;
- helps to maximize health benefits and minimize health risks;
- guides efforts to where it will have the most impact;
- helps to coordinate efforts of the many stakeholders along the sanitation chain, and stimulates policy dialogue.

World Health Organization

THANK YOU

SANITATION
SAFETY
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