



WORKSHOP

Sanitation safety planning for managing risks in wastewater reuse

Pan-European Symposium Water and Sanitation
Safety Planning and Extreme Weather Events

Bilthoven, The Netherlands
6-7 April 2017

SSP workshop

1. Introduction to SSP
2. Sanitation safety plans for managing risks in wastewater reuse
3. Buzz group discussions:

How SSPs may integrate with climate resilient WSP, and effectively manage climate-related risks?



Introduction to SSP

What is SSP?

SSP is a risk-based management tool for for improving, managing, and monitoring sanitation systems



Multiple barrier approach

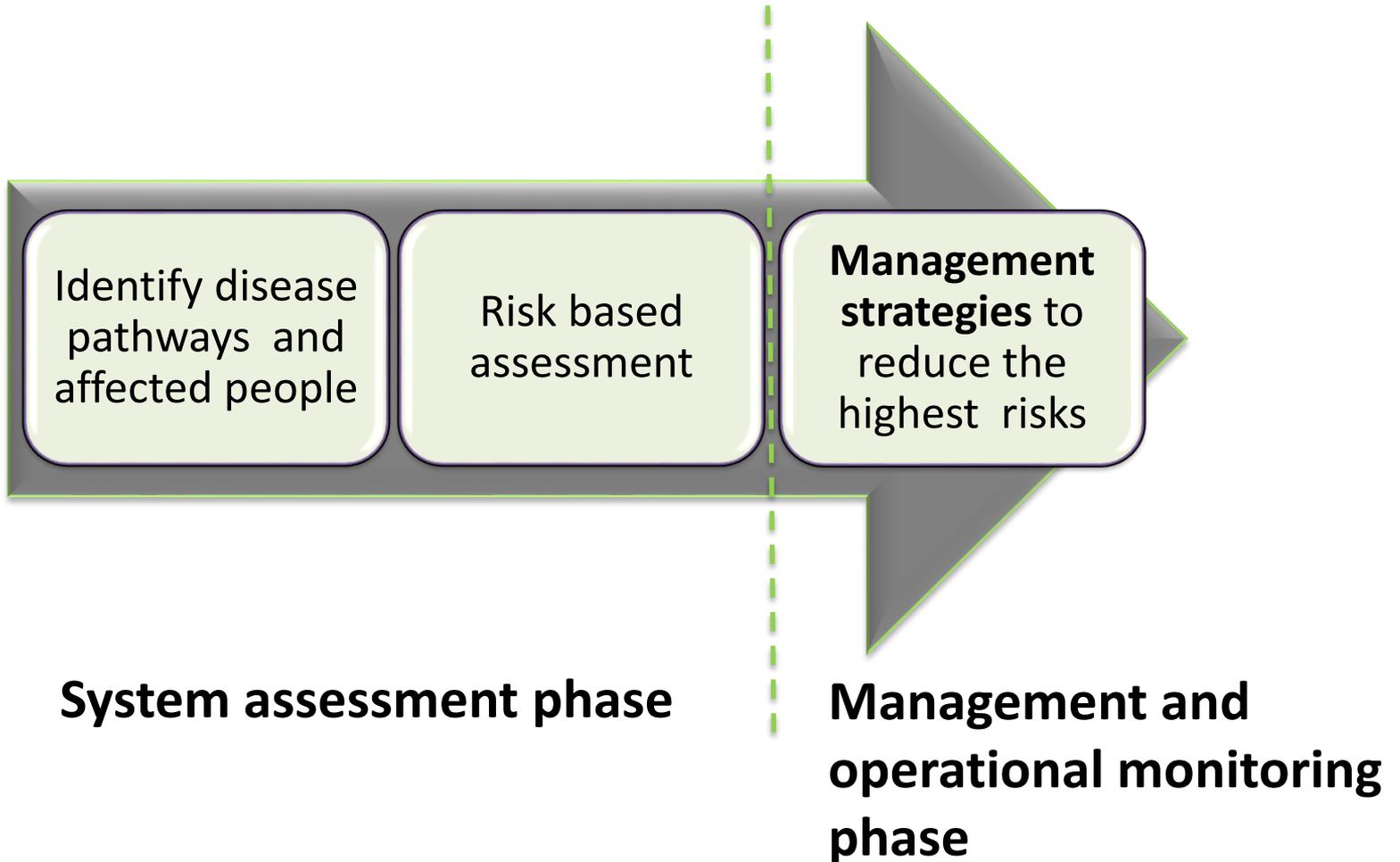


WHO 2006 *Guidelines for the safe use of wastewater, excreta and greywater*

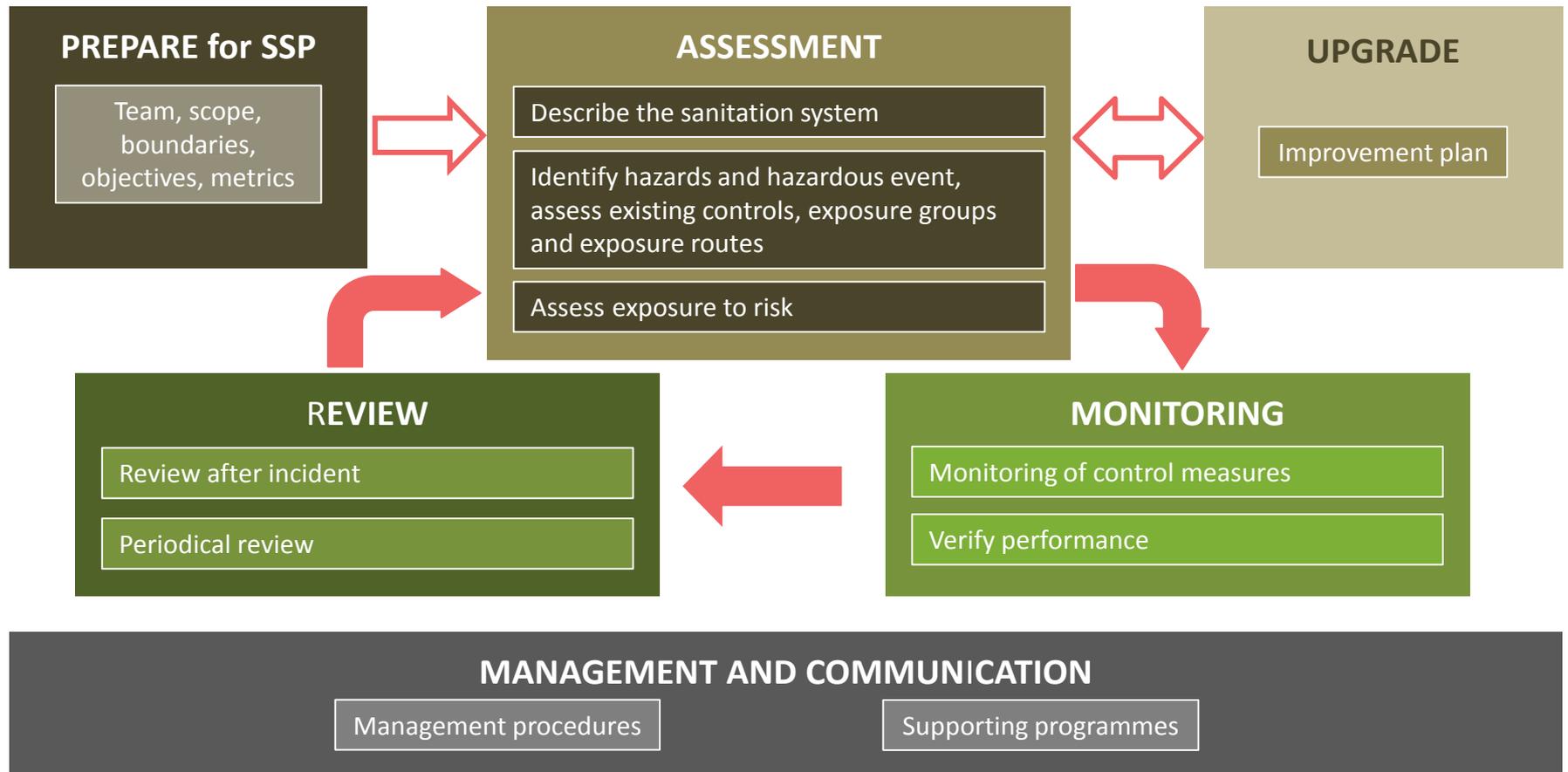
A code of good practice for the **safest possible use of wastes** in agriculture and aquaculture, so that **nutritional and household food security benefits** can be shared widely.



How does SSP work?



A step by step process:



How does SSP work?

ASSESSMENT - *What is the system and who's at risk?*

- Map and describe the sanitation system.
- **Characterize waste stream constituents and waste related health hazards.**

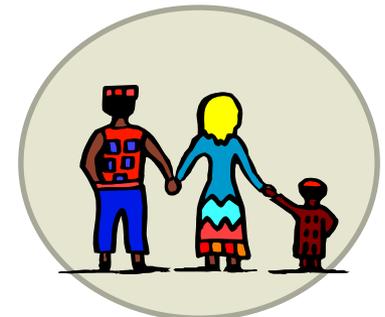
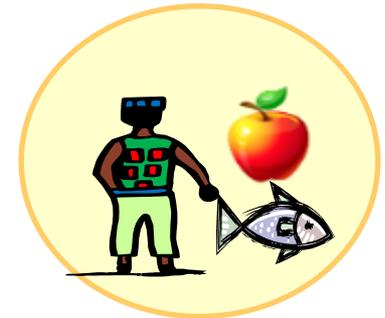
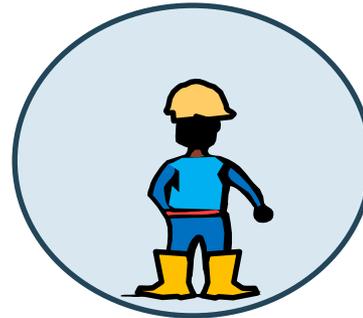
	POTENTIAL BIOLOGICAL HAZARDS					POTENTIAL CHEMICAL HAZARDS		POTENTIAL PHYSICAL HAZARDS		
	Viruses	Bacteria	Protozoa	Helminths	Vector-related diseases	Toxic chemicals	Heavy metals	Sharp objects	Inorganic material	Malodours
Liquid waste fractions										
Diluted excreta (human or animal)	×	×	×	×						×
Urine (human or animal)	×	×	×	×						×
Domestic waste water	×	×	×	×	×			×	×	×
Stormwater	×	×	×	×	×	×	×	×		
River water	×	×	×	×	×	×	×			
Industrial wastewater (Note 1)						×	×			
Solid waste fractions										
Faecal sludge	×	×	×	×	×			×	×	×
WWTP sludge	×	×	×	×	×	×	×	×	×	×
Organic domestic waste	×	×			×					
Inorganic domestic waste						×	×	×	×	
Agricultural waste (crop residuals)	×	×	×	×	×			×	×	
Gardening waste					×				×	
Animal manure/slurry	×	×	×	×	×				×	×
Medical waste	×	×	×	×		×	×	×	×	×
Industrial waste						×	×	×	×	×
Slaughter house waste	×	×	×	×	×		×			×
Construction and demolition waste								×	×	



How does SSP work?

Exposure groups:

- Who are they?
 - Workers (W)
 - Farmers (F)
 - Local community (L)
 - Consumer (C)
- How many are they?
- Where are they?
- What are they exposed to?
- What is the route of contamination?
- How often are they exposed?



How does SSP work?

Exposure and transmission routes:



Ingestion (unintentional)
after contact with
wastewater/excreta



Ingestion of
contaminated water



Consumption of
contaminated
produce



Dermal (skin) contact
with excreta and
wastewater



Vector-borne with
flies/mosquitoes



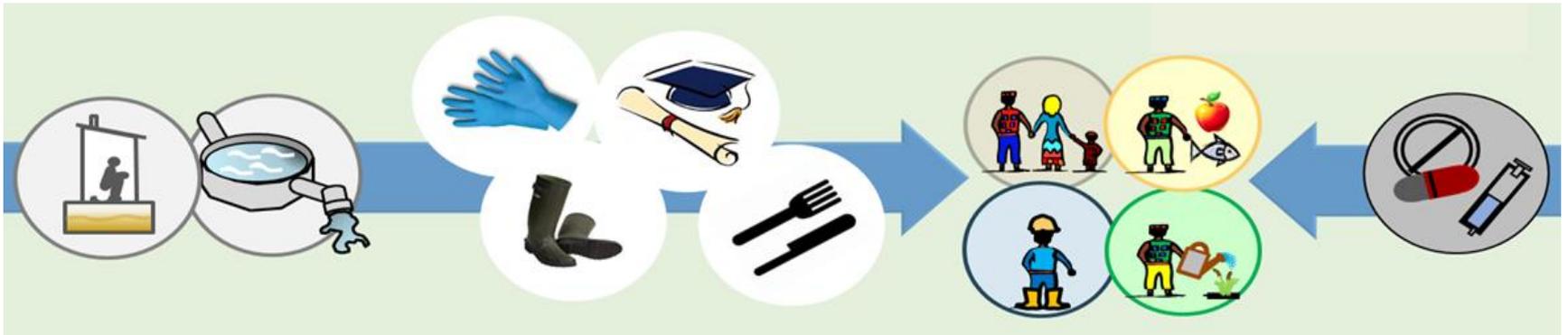
Inhalation of
aerosols and
particles



How does SSP work?

The 2 key SSP outputs:

1. Prioritized, incremental improvement plan which **protects all exposure groups** along the sanitation chain.
2. Operational monitoring plan for regular monitoring and periodic verification



Key Points on SSP

- **Health** risk based planning and management approach
(based on WHO Guidelines and Stockholm framework)
- For improving existing sanitation system
- **Multi-stakeholder, multi-barriers**
(technology, management and behaviours)
- SSP emphasizes incremental improvements
(towards health based targets)
- **SSP ensures safety in the sanitation value chain**



WSP and SSP

Many similarities, but some differences...

WSPs	SSPs
What could affect the drinking-water quality ?	What is the effect on people using or exposed ?
Considers single exposure group (drinking-water consumer).	Considers multiple exposure groups.
Implementing agency – water utility or a community association for small supplies	Implementing agency – varies depending on objectives, skills and resources

WSP and SSP

WSPs

SSPs

What could affect drinking-water supply (drinking-water consumer).

What is the effect on people using or exposed?

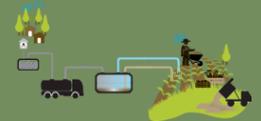
Implementing agency – water utility or a community association for small supplies

Implementing agency – varies depending on objectives, skills and resources

Always asking “what could affect the drinking-water supply system?”

Always asking “What is the effect on people using or exposed to the wastewater/products?”

Why focus on wastewater reuse?





- **Most wastewater and sludge is untreated**
- **Demand for reuse will grow**
- **Public health risks need to be managed**

How does SSP work?

Sanitation system:

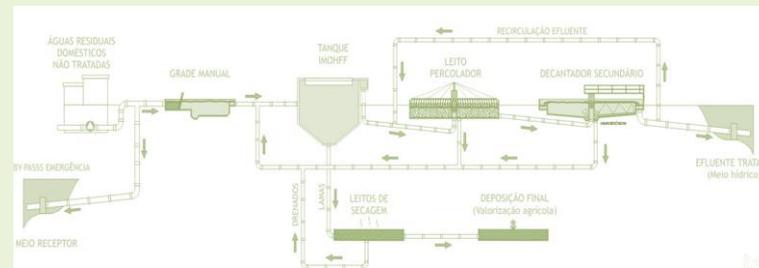
If irrigating with wastewater, SSP could encompass all steps from:

- waste generation,
- treatment and use, to
- **product use and consumption**

Waste generation



Treatment and use

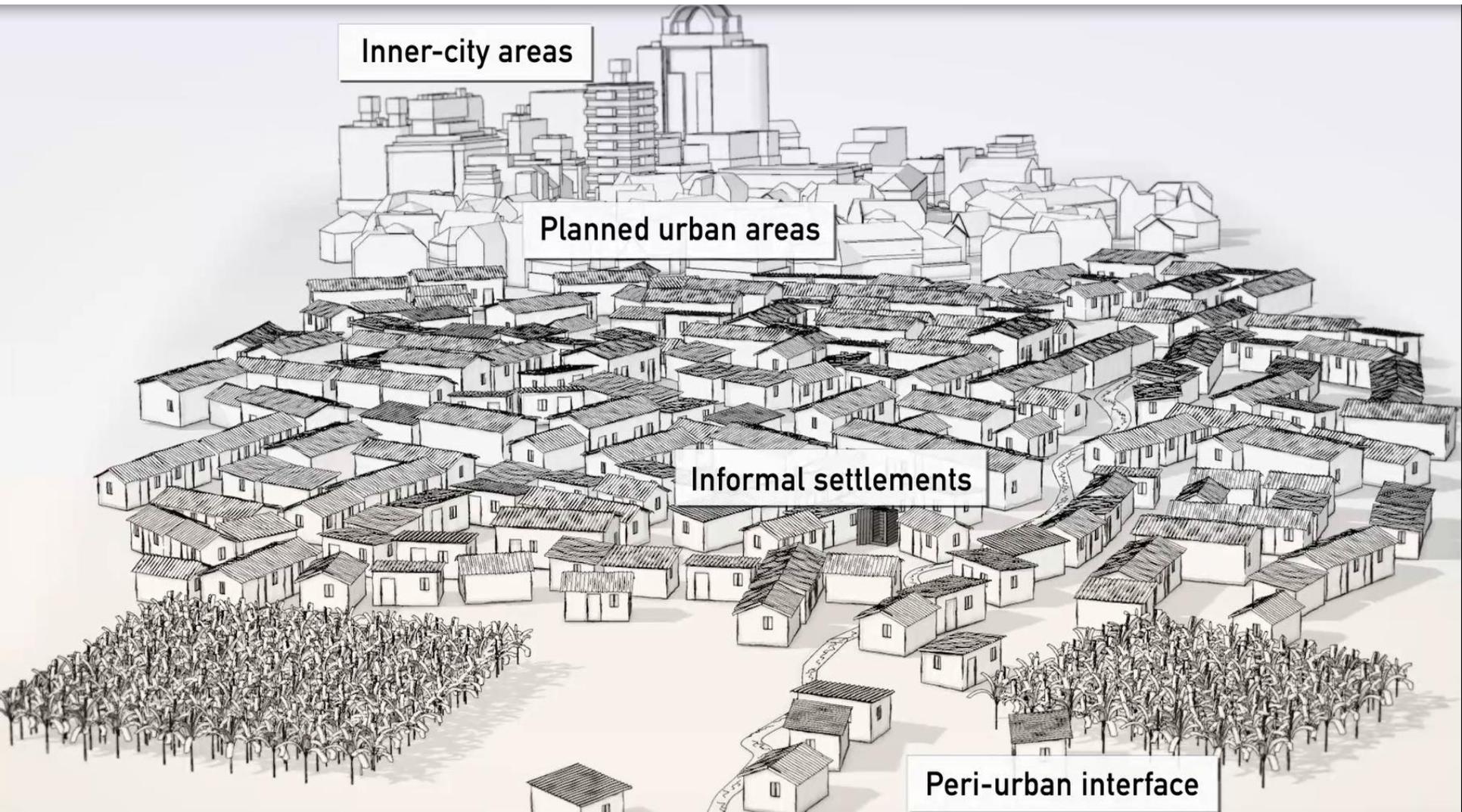


Product use and consumption



How does SSP work?

Example



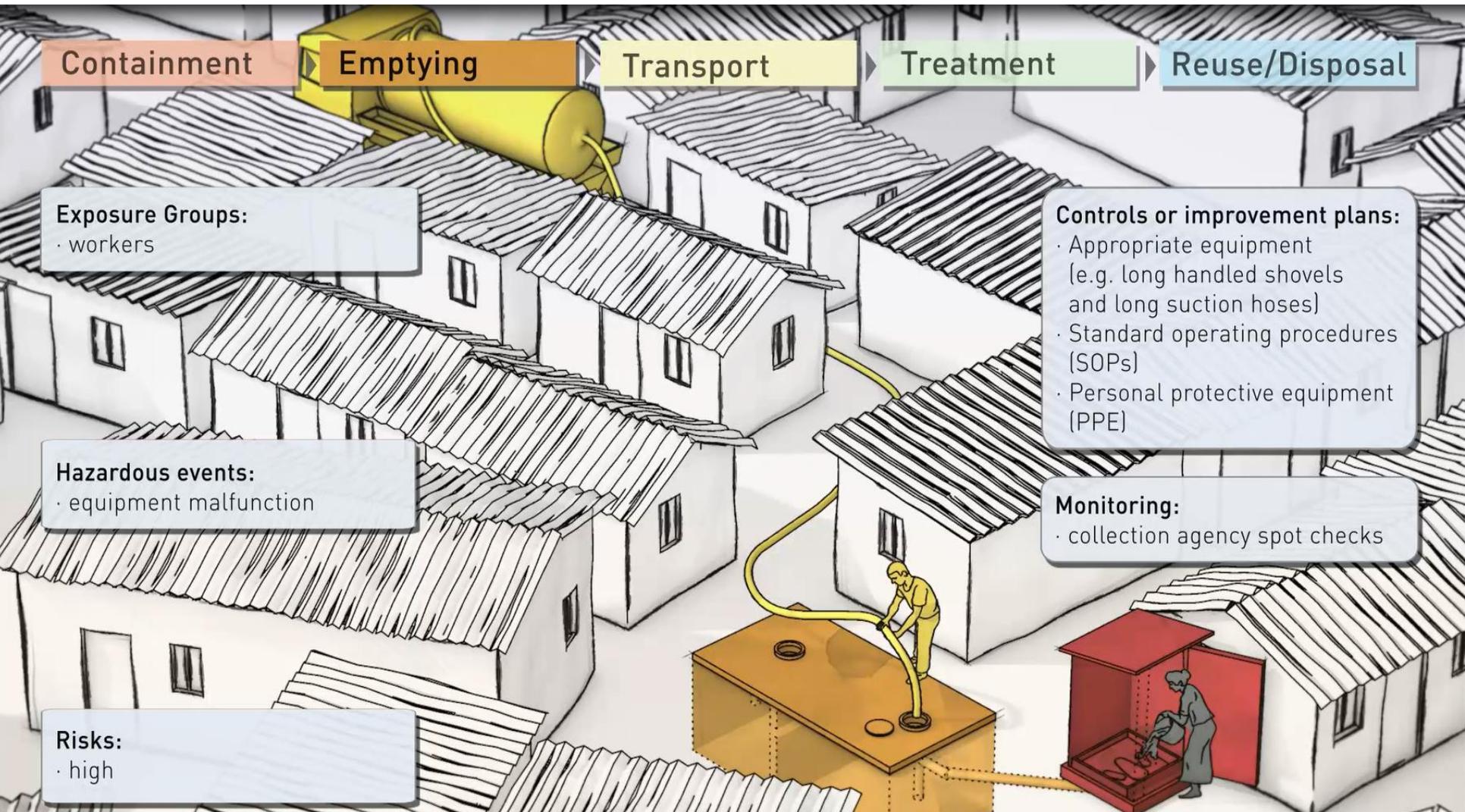
How does SSP work?

Example: Informal urban setting



How does SSP work?

Example: Improved containment and emptying



How does SSP work?

Example: Treatment

Containment

Emptying

Transport

Treatment

Reuse/Disposal

Exposure groups:

- users of the biosolids
- surrounding community members
- consumers of the farm produce
- communities downstream of the treatment plant

Hazardous events:

- overloading of the plant,
- breakdowns
- the processing (temperature and time)
- flies or mosquitoes
- seasonal factors

Risks:

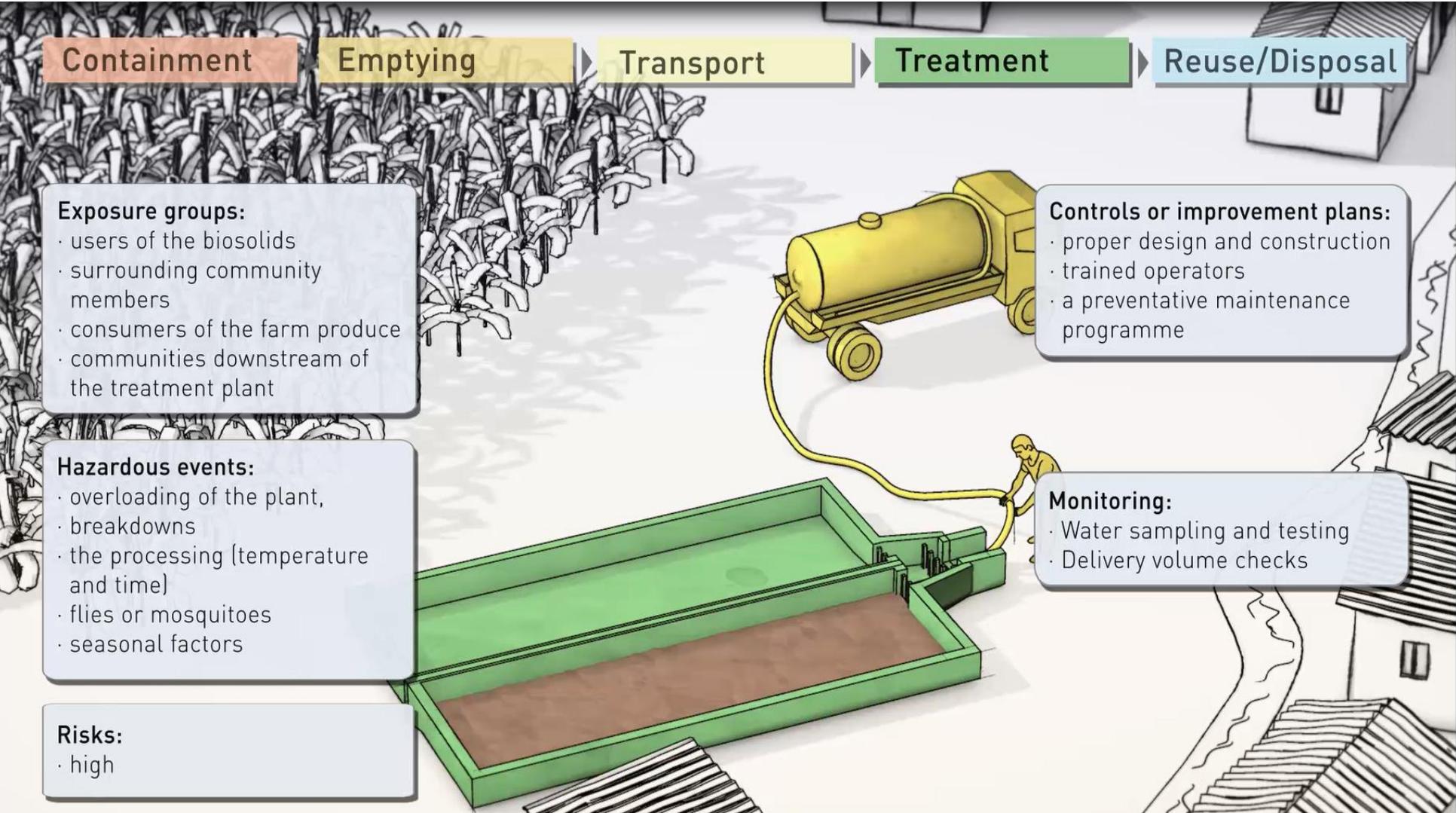
- high

Controls or improvement plans:

- proper design and construction
- trained operators
- a preventative maintenance programme

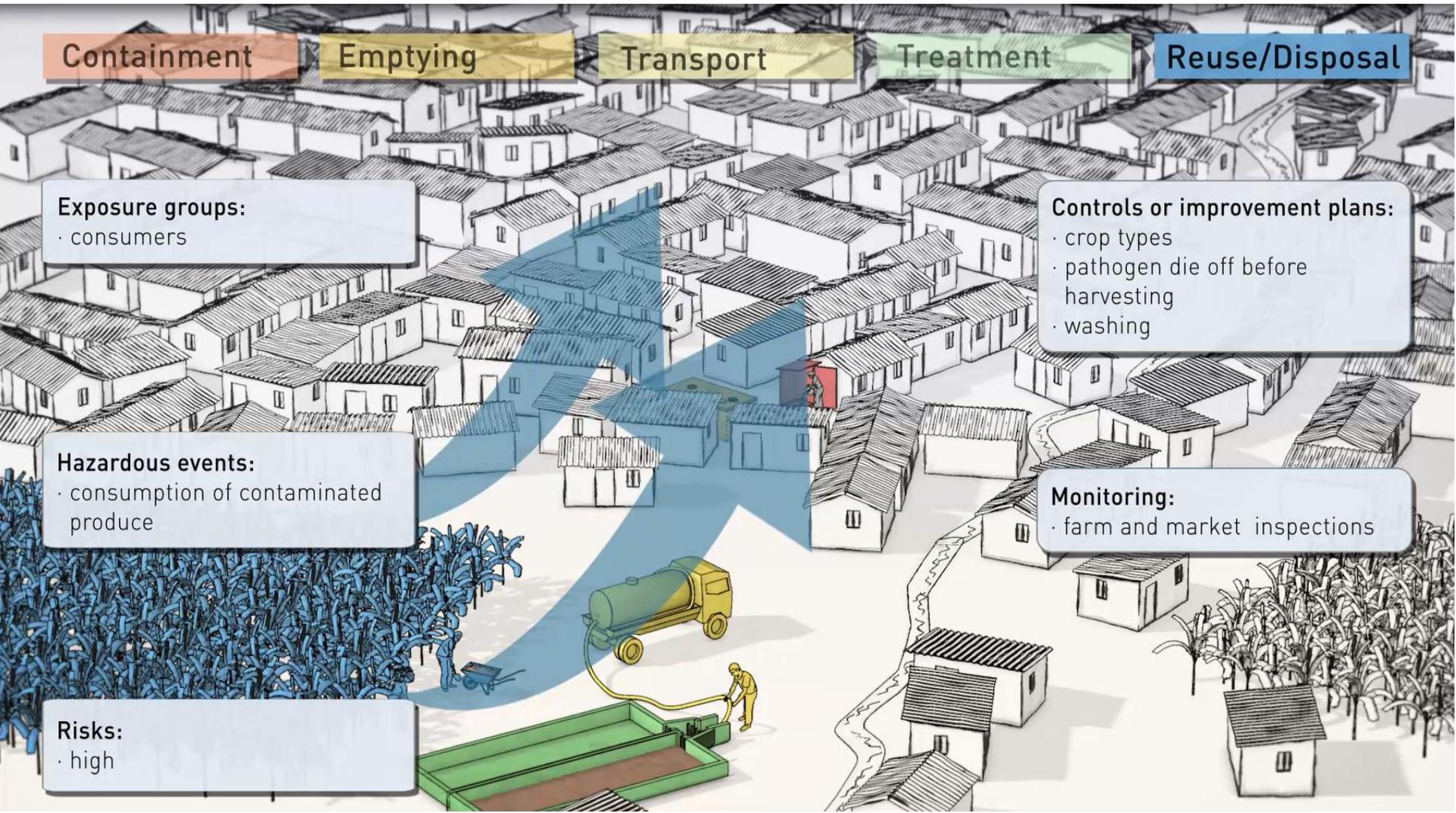
Monitoring:

- Water sampling and testing
- Delivery volume checks



How does SSP work?

Example: Reuse/Disposal



Benefits of SSPs

- Provides a **risk based framework to develop a coordinated approach across the whole sanitation system.**
- **Promotes cooperation across sectors.** Brings together several stakeholders with the common goal to understand and manage sanitation risks and reduce health risks.
- **Targets resources at the highest risk areas** – incremental improvement.
- **Provides confidence** that in all parts of the sanitation system risks have been identified and managed.





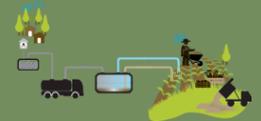
Natural Wastewater Treatment & Reuse

WASTEWATER REUSE 2 Health Aspects

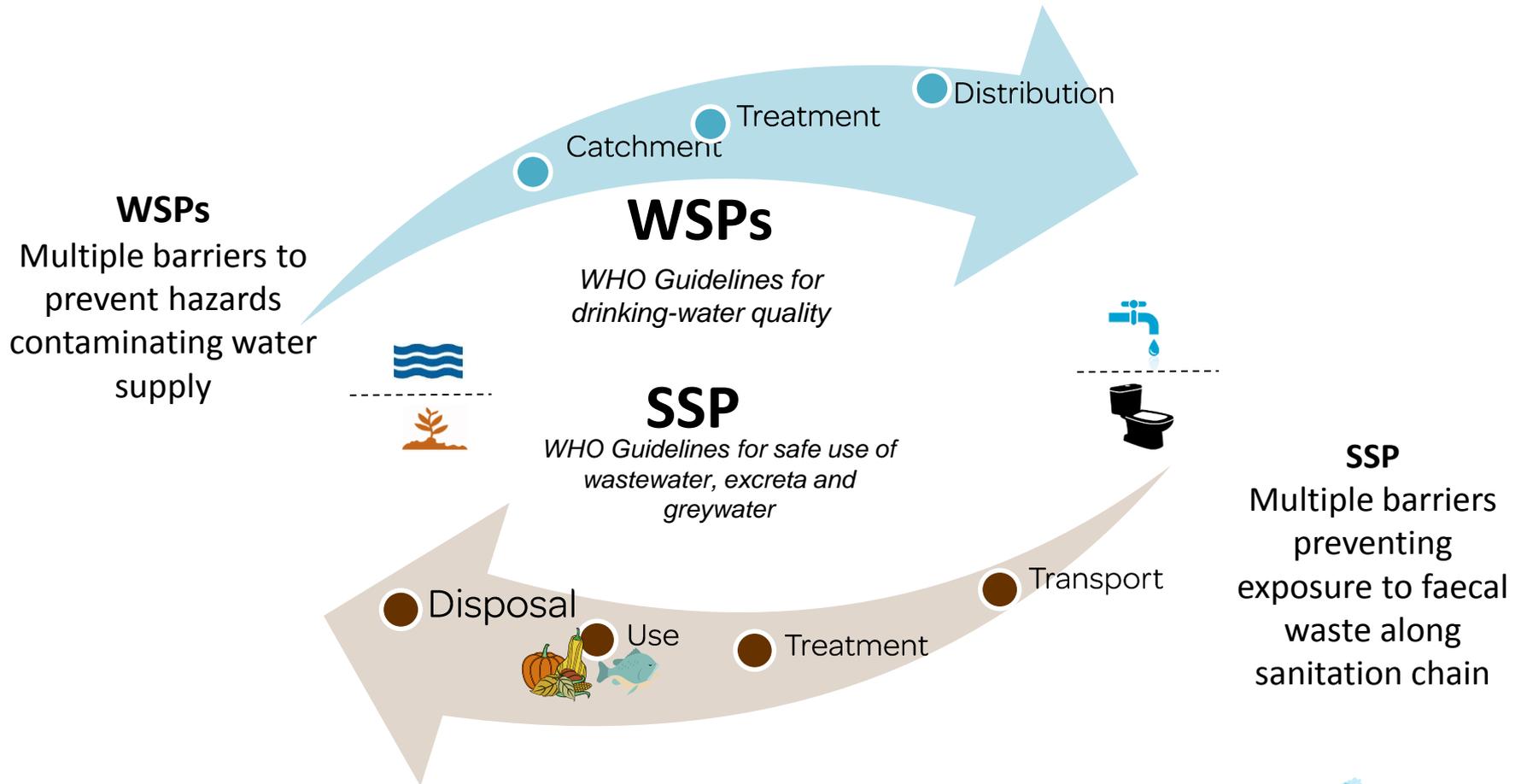
Professor Mara

Used with kind permission of Prof Mara © Prof. Duncan Mara

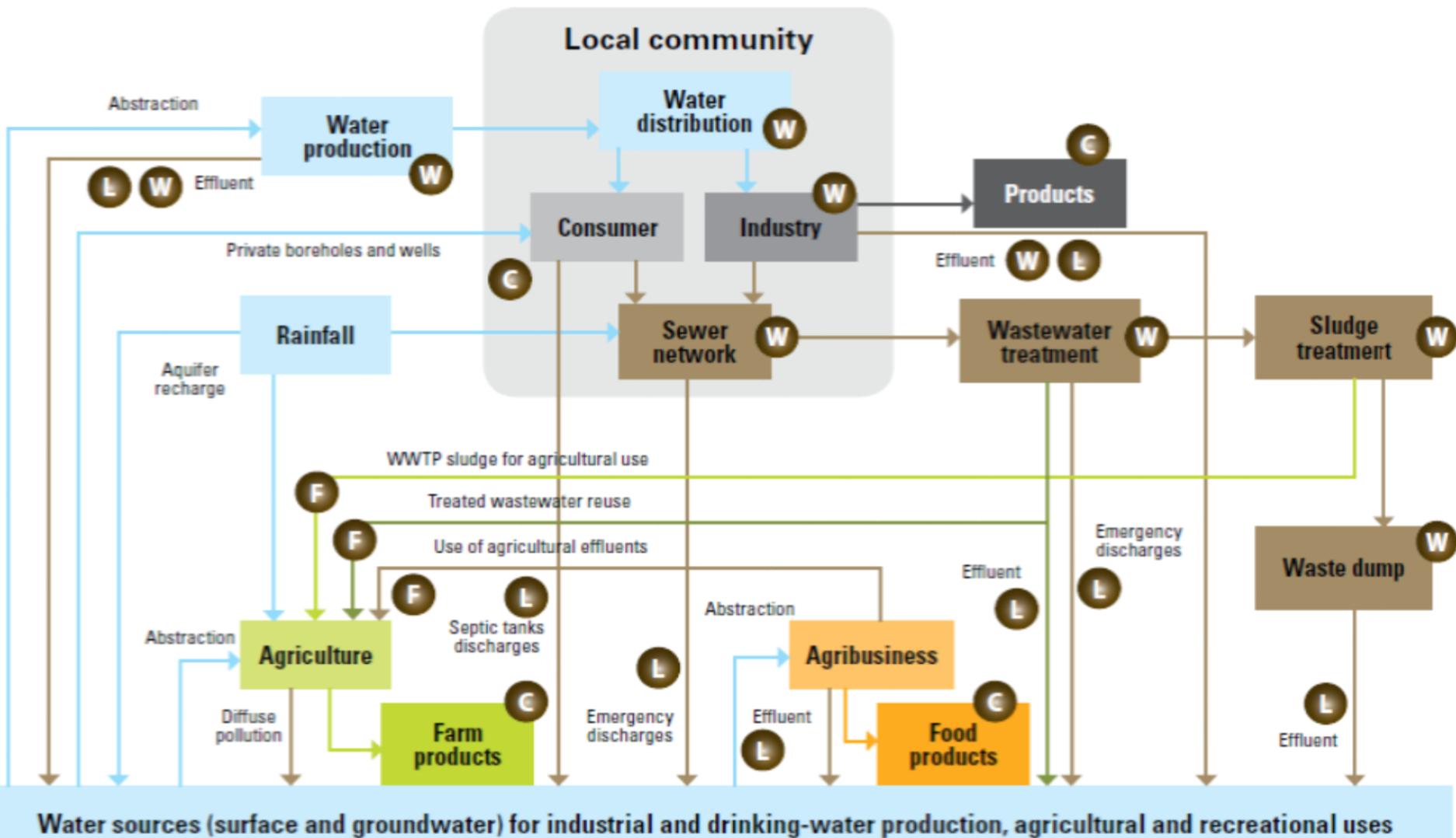
How SSPs may integrate with climate resilient WSP, and effectively manage climate-related risks?



Closing the loop



Interlinkages...





Displacement caused by disasters

26.4 million displaced
on **average per year**
over the last **7 years**



That's **1 person** forced
to flee every **second**



1.7 million people were displaced by
disasters related to **geophysical**
hazards in 2014



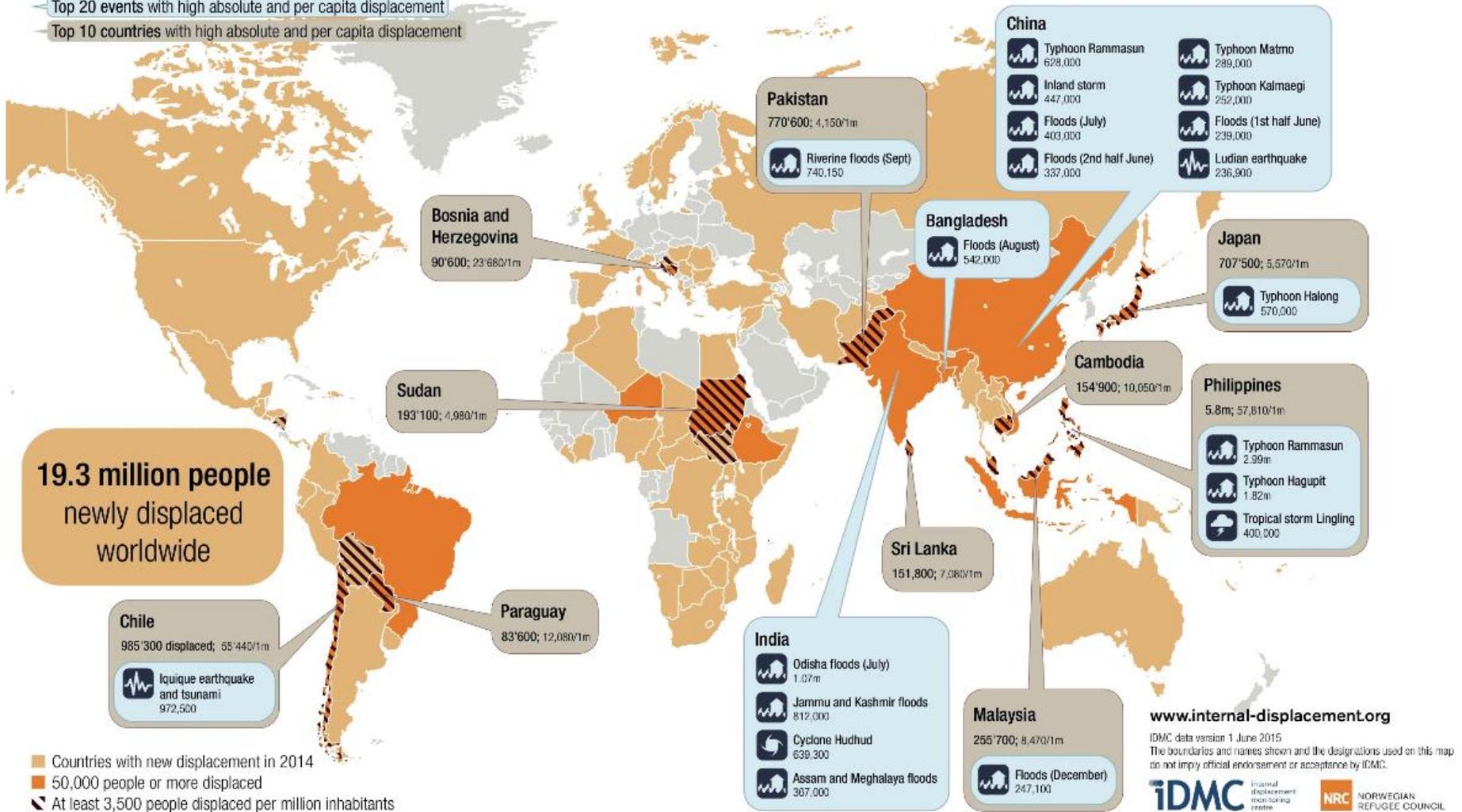
17.5 million people were displaced
by disasters related to **weather**
hazards in 2014

Source <http://www.internal-displacement.org/global-estimates/>, accessed March 2017



Displacement related to disasters worldwide in 2014

- Top 20 events with high absolute and per capita displacement
- Top 10 countries with high absolute and per capita displacement



Source <http://www.internal-displacement.org/global-estimates/>, accessed March 2017



The poorest and most vulnerable communities are the most affected

Buzz group discussion

How SSPs may integrate with climate resilient WSP, and effectively manage climate-related risks?



Buzz group discussion instructions:

- Divide in not more than 5 groups (5 min).
- Each group will answer 2 questions (15 min):

1. *What opportunities do you see in integrating the SSP approach with climate resilient WSP, and effectively manage climate-related risks?*

2. *If you would to take this approach forward, what challenges do you foresee?*

- Plenary discussion based on the answers (20 min).





Thank you!
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