

# **Wastewater and Health: Setting the scene**

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# Overview

- **What's the status of wastewater related disease?**
- **How much wastewater is being treated? And are we adequately planning and investing to meet the SDG?**
- **Outlook for 2030 – some reasons to be optimistic**

# Cholera outbreaks



Water distribution in Yemen

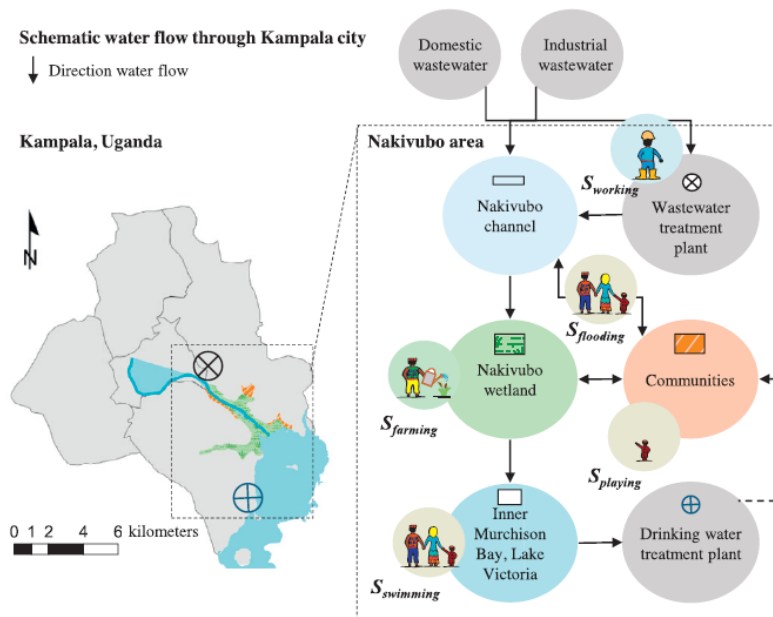
Photo: R

# Major wastewater related diseases

Disease	Mortality (deaths/year)	Burden of Disease (DALYs/year)	Comments
Diarrhoea	1 798 000	61 966 000	99.8% of deaths occur in developing countries; 90% of deaths occur in children
Typhoid	600 000	N/A	Estimated 16 million cases per year
Schistosomiasis	15 000	1 702 000	Found in 74 countries; 200 million people worldwide are estimated to be infected, 20 million with severe consequences
Ascariasis	3 000	1 817 000	Estimated 1.45 billion infections, of which 350 million suffer adverse health effects
Hookworm disease	3 000	59 000	Estimated 1.3 billion infections, of which 150 million suffer adverse health effects
Lymphatic filariasis	0	5 777 000	Mosquito vectors of filariasis breed in organically polluted water; does not cause death but leads to severe disability
Hepatitis A	N/A	N/A	Estimated 1.4 million cases per year worldwide; serological evidence of prior infection ranges from 15% to nearly 100%



# Estimated burden of disease from wastewater system in Kampala



Fuhrmann et al (2016). Disease burden due to gastrointestinal pathogens in a wastewater system in Kampala, Uganda

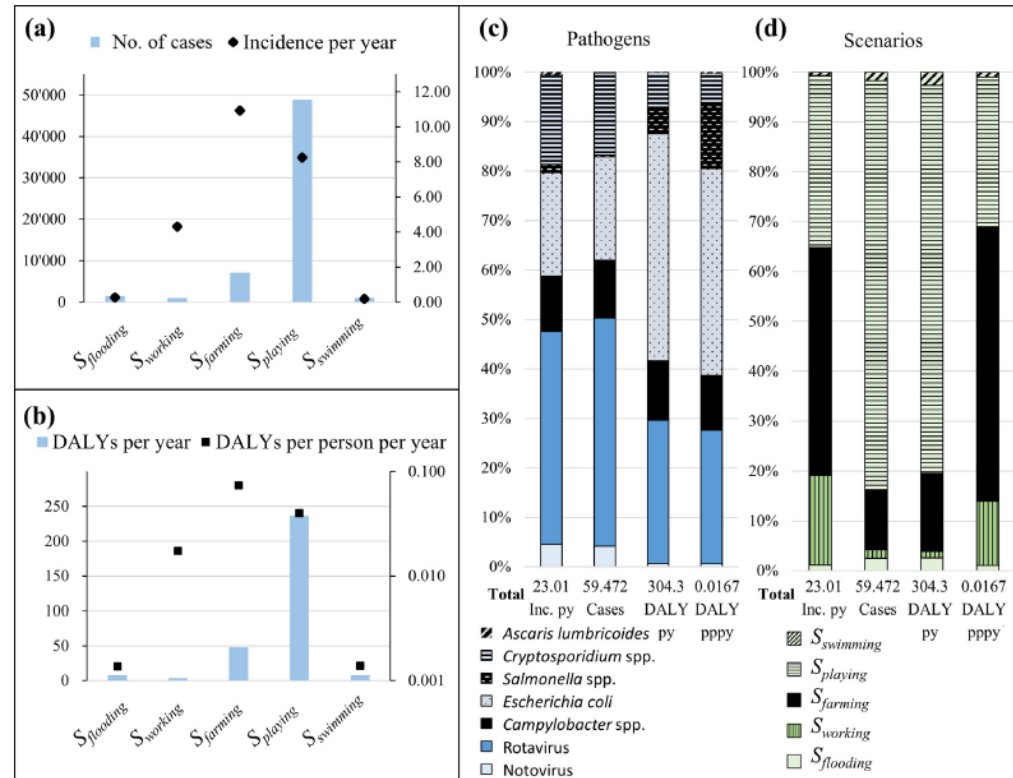
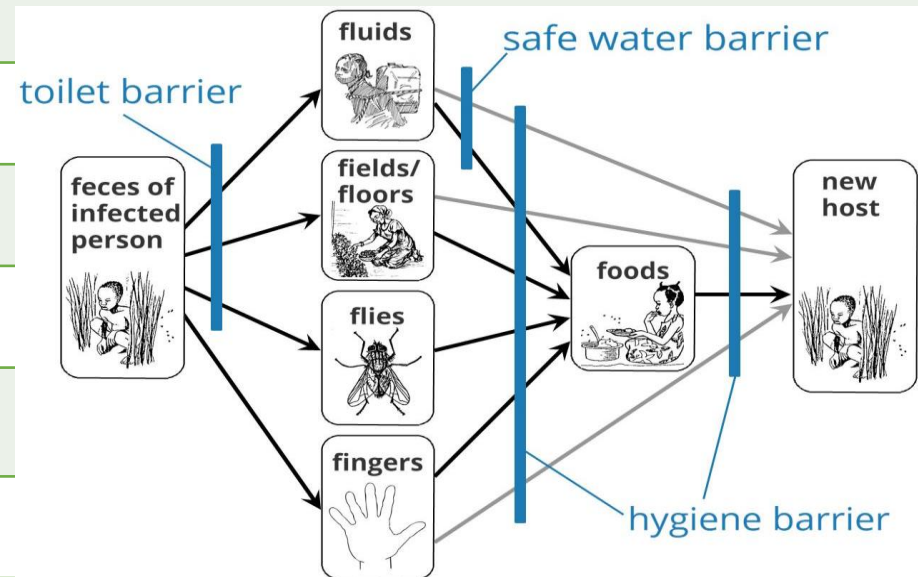


Fig. 3. Estimated gastroenteritis incidence per year (Inc. py), number of cases, disability-adjusted life years (DALYs) per year (py) and per person per year (pppy). (a) and (b) are showing estimates of the respective outcomes per  $S_{floodings}$ ,  $S_{working}$ ,  $S_{farming}$ ,  $S_{playing}$  and  $S_{swimming}$ . (c) and (d) are indicating the contribution of individual pathogens and scenarios, respectively, to the total estimated numbers per outcome along the major wastewater system in Kampala.

# Sanitation interventions as currently implemented: room for improvements !

Outcome	Total No. Studies	Effects from Sanitation
Observed feces	10	Slight reduction in levels of faeces (RD -0.03, 95% CI: -0.07 to 0.00)
Water quality	9	No effect
Hand contamination	5	No effect
Sentinel object (toys)	1	No effect
Surfaces and soil contamination	3	Mixed effects
Food contamination	1	No effect
Flies	7	Reduced fly counts where high levels of coverage and use
Contamination of water supply by distance to latrine	6	Inverse relationship between distance of water supply from a latrine and contamination of water supply



# Trachoma



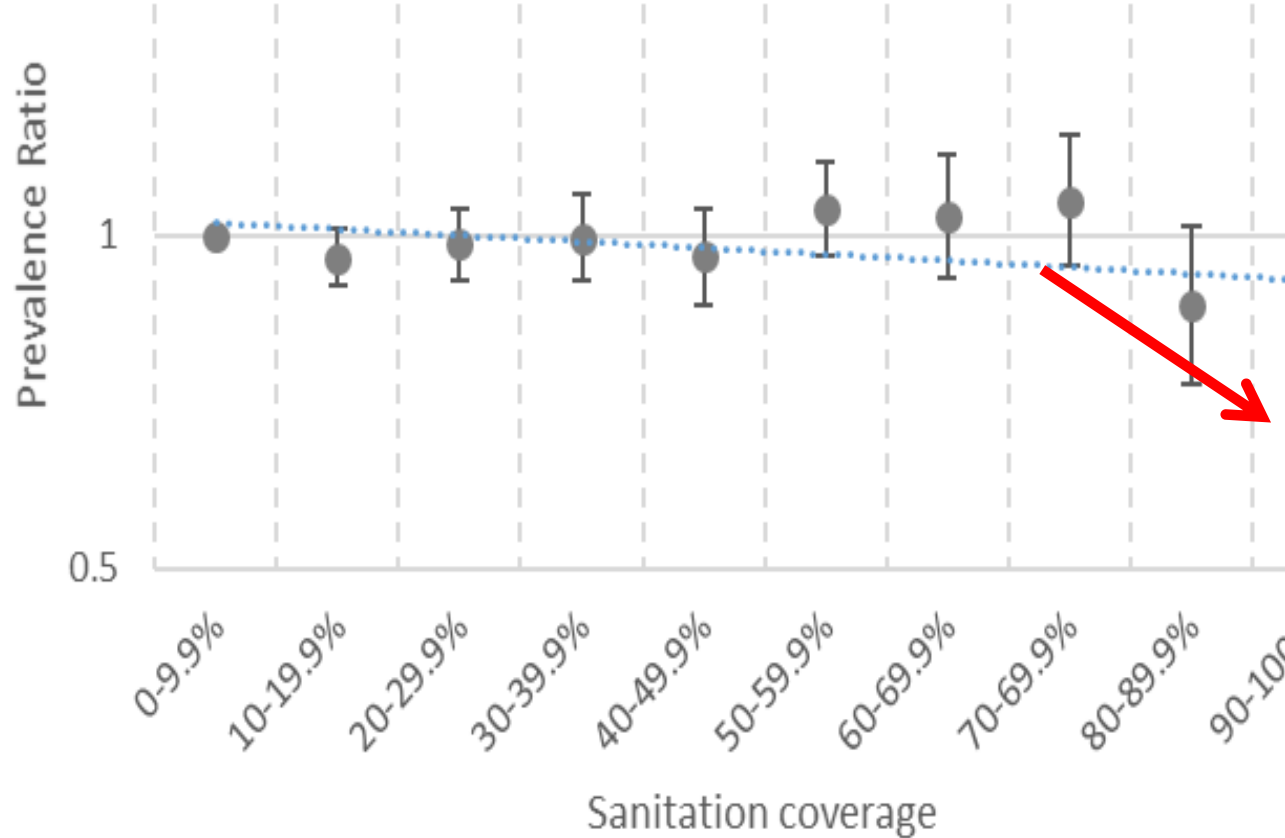
Polluted Lagoons in Kiribati

Photo: N

# Trachoma

Herd  
protection  
threshold  
at 80-90%  
coverage

Sanitation and water supply coverage thresholds associated with active trachoma: modeling cross-sectional data from 13 countries

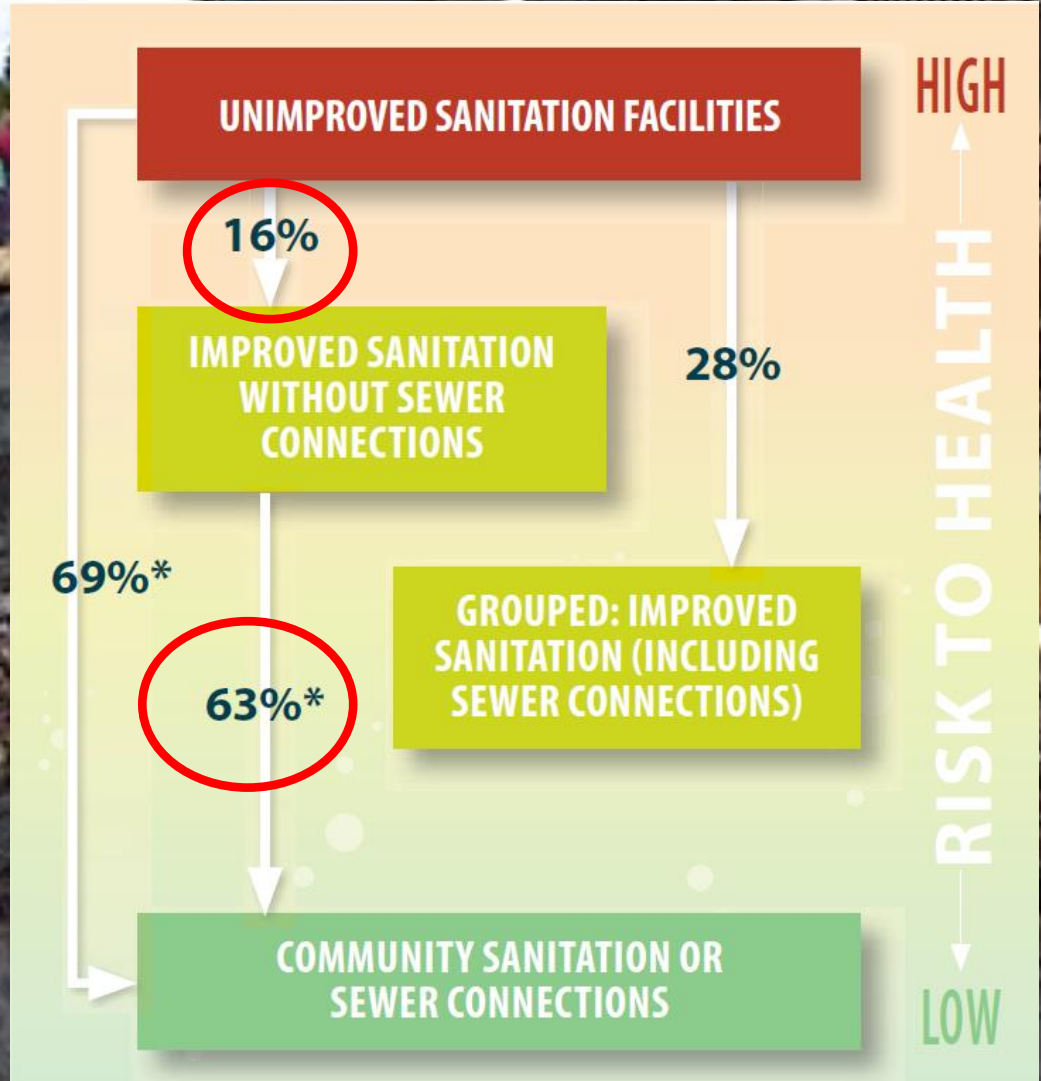


Polluted Lagoons in Kiribati

Photo: M



# Diarrhoea



# ANTIBIOTIC RESISTANCE

## HOW IT SPREADS



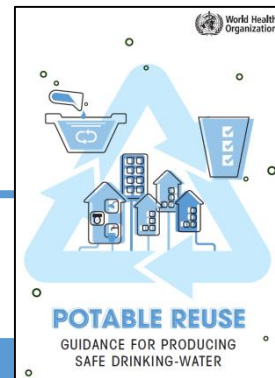
Wastewater irrigated food



Wastewater contributes to AMR



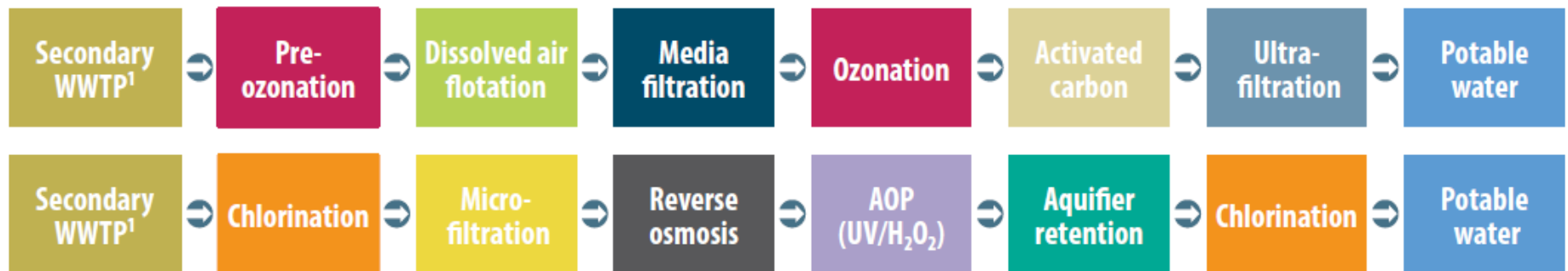
# WHO Potable Reuse Guidance



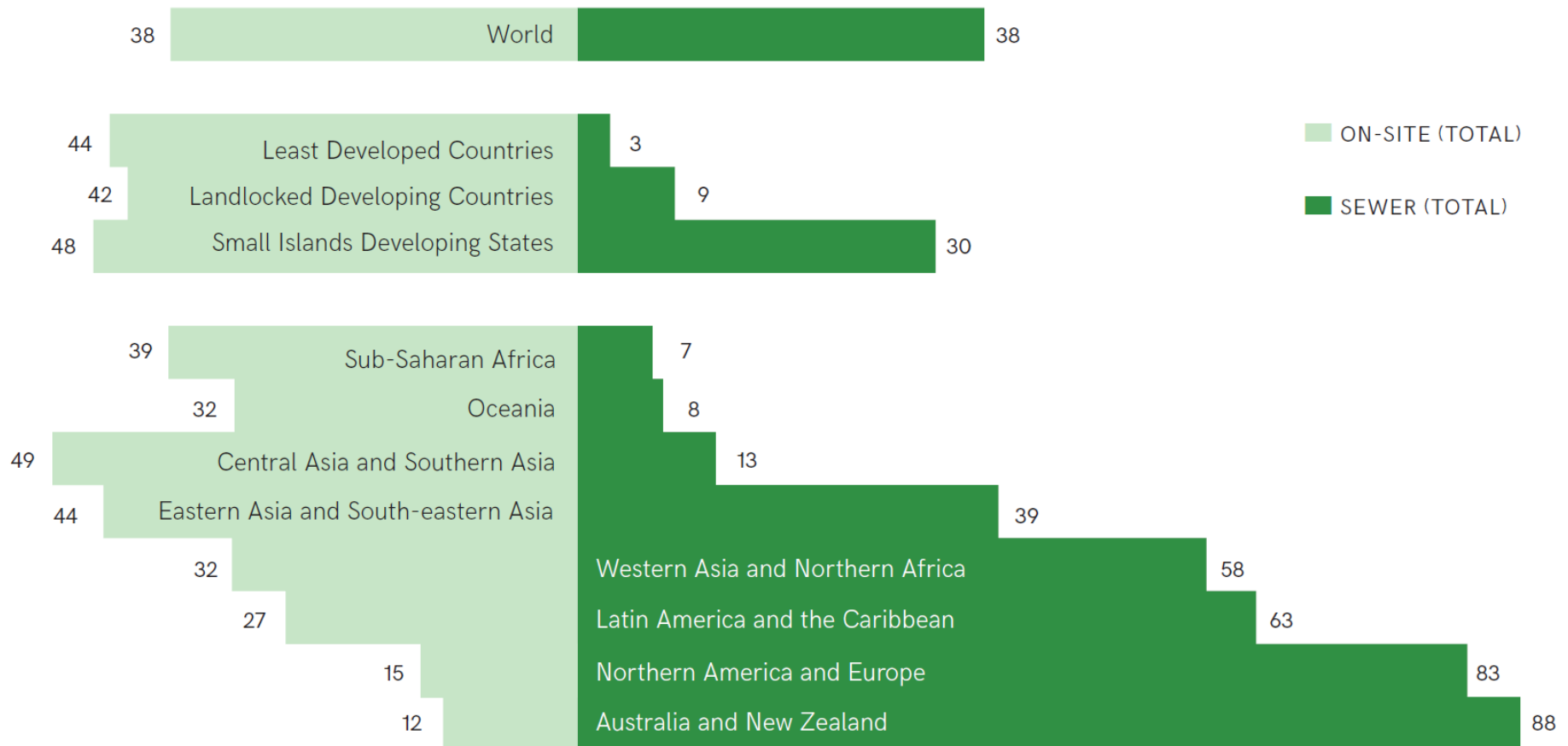
## Default performance targets

	Pathogens		
	Enteric viruses (Noroviruses)	Enteric protozoa (Cryptosporidium)	Enteric bacteria (Campylobacter)
Log reductions (LRVs)	9.5	8.5	8.5

## Examples of treatment schemes

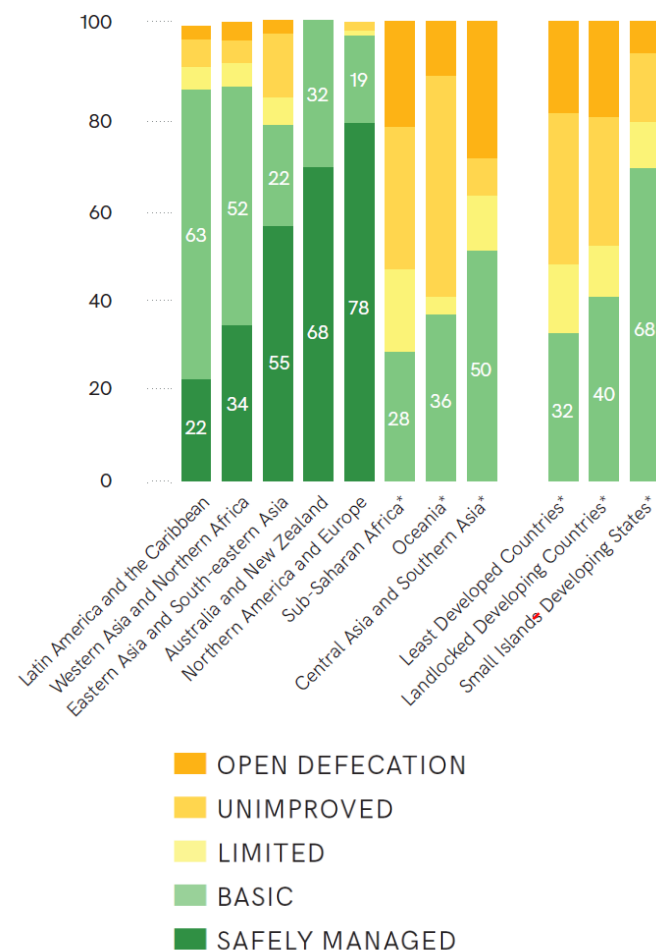
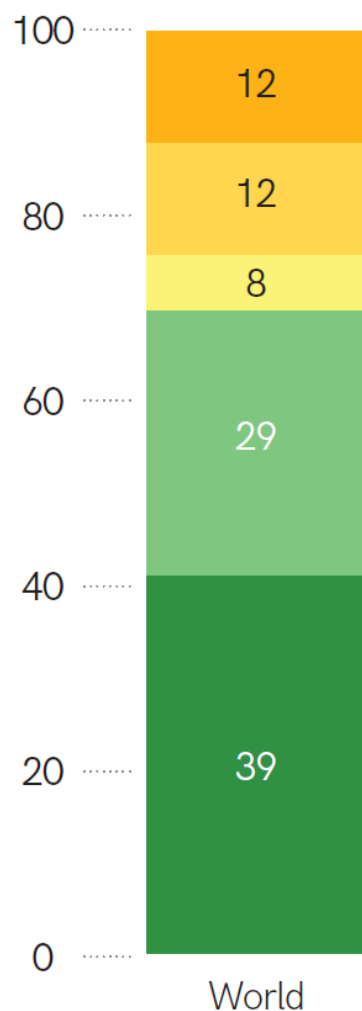


# New disaggregations of on-site sanitation and sewer connections

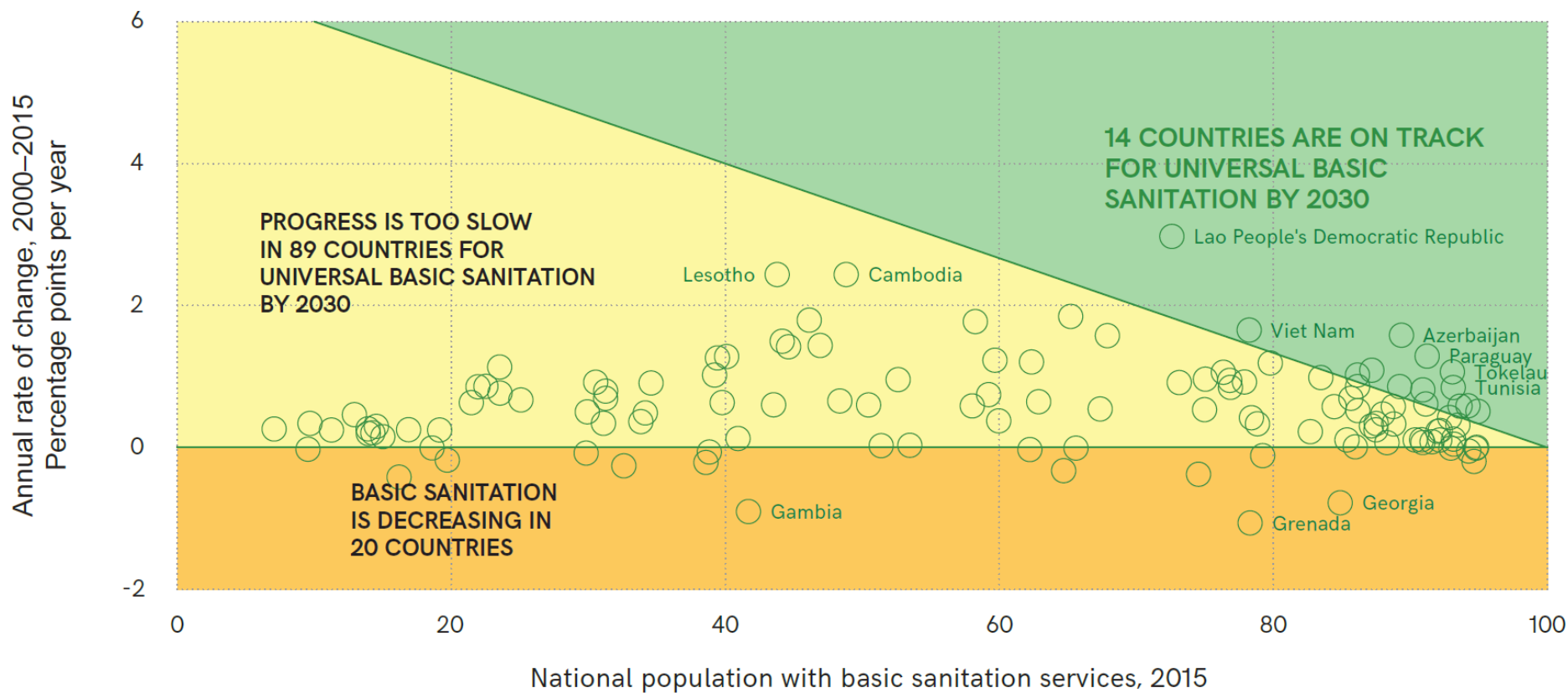


# New SDG estimates

- estimates for 84 countries
- 2.9 billion used a safely managed sanitation service
- 1.9 billion with sewers with at least secondary treatment
- 2.3 billion still lacked basic services



# Just 1 in 10 countries below 95% coverage is on track to achieve universal basic sanitation by 2030



# Political Commitment



# Health Sector Engagement

## Regulators



## GLOBAL ACTION PLAN ON ANTIMICROBIAL RESISTANCE



## WASH HEALTH CARE FACILITIES



## Water Sanitation & Hygiene

for accelerating and  
sustaining progress on  
Neglected Tropical Diseases

A GLOBAL STRATEGY  
2015–2020





# Innovation

- **Call to action on Urban Sanitation**
  - embracing context, complexity and multiple types of intervention
- **Cost recovery and environmental sustainability through safe RRR**
  - energy, water, nutrient recovery
- **Financing beyond traditional WWTPs**
  - A few examples: Apps for FSM, and FSTPs, Container based sanitation, reinvent the toilet....
- **Sanitation Safety Planning; WHO Guidelines**
  - We can reduce exposure and risk with a combination of measures.

**Thank you**

**[www.who.int/](http://www.who.int/)**

