CLIMATE RESILIENT SANITATION: COALITION FOR ACTION

Climate Resilient Sanitation: Green Climate Fund (GCF) Annex

Global Webinar

22nd January 2025

Agenda

CLIMATE RESILIENT SANITATION: COALITION FOR ACTION

Welcome by session moderator
- *Nat Paynter, UNICEF*

GCF Annex: Context and Overview
- Why discrete guidance is needed for climate-resilient sanitation: *Ann Thomas, UNICEF*
- GCF's approach to climate-resilient sanitation: *Bapon Fakhruddin, GCF*
- Overview of the new GCF Annex: *Sam Drabble, WSUP*
- Q&A

Panel Discussion: Climate-resilient sanitation experiences
- *Jolly Ann Maulit, UNICEF*
- *Yeasin Arafat, WaterAid*
- *Martin Gambrill, World Bank*
- *James Wallace, University of Leeds*
- Q&A

Proposal development
- Developing a sanitation proposal to GCF: *Bapon Fakhruddin, GCF*
- Audience Q&A

Next Steps and Closing
- *Kate Medlicott, WHO*

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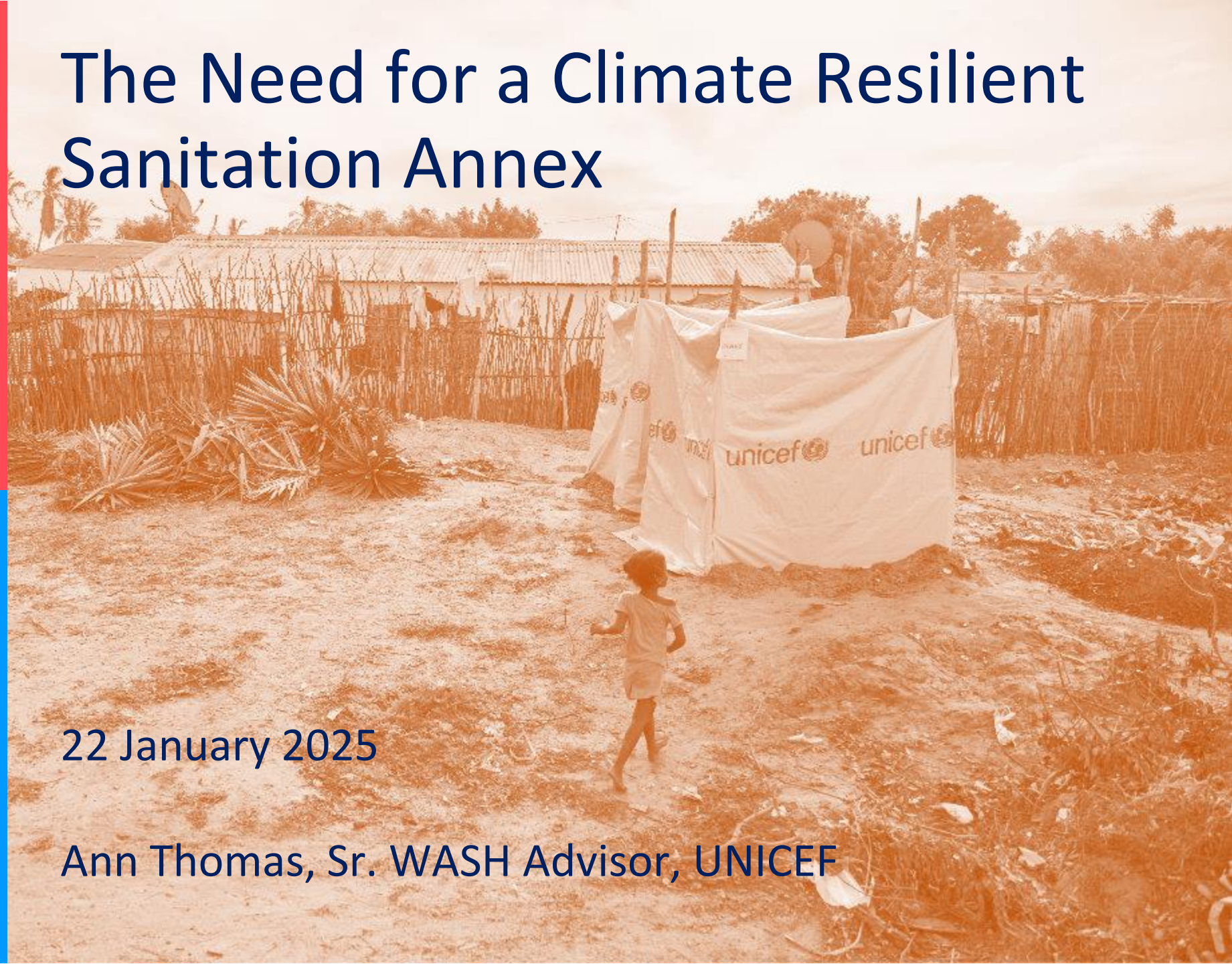
The Need for a Climate Resilient Sanitation Annex



22 January 2025

Ann Thomas, Sr. WASH Advisor, UNICEF

The Climate Resilient Sanitation Coalition

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VISION:
Integrating sanitation into global and national climate policy & practice; and integrating climate into global and national sanitation policy & practice.

Climate Hazards and Sanitation

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DROUGHT


Pour-flush toilets don't work

People return to open defecation


Sewers become blocked

STORMS, FLOODING & SEA LEVEL RISE


Pit latrines collapse


Rising seas inundate wastewater plants


People are displaced

Sanitation and Greenhouse Gas Emissions

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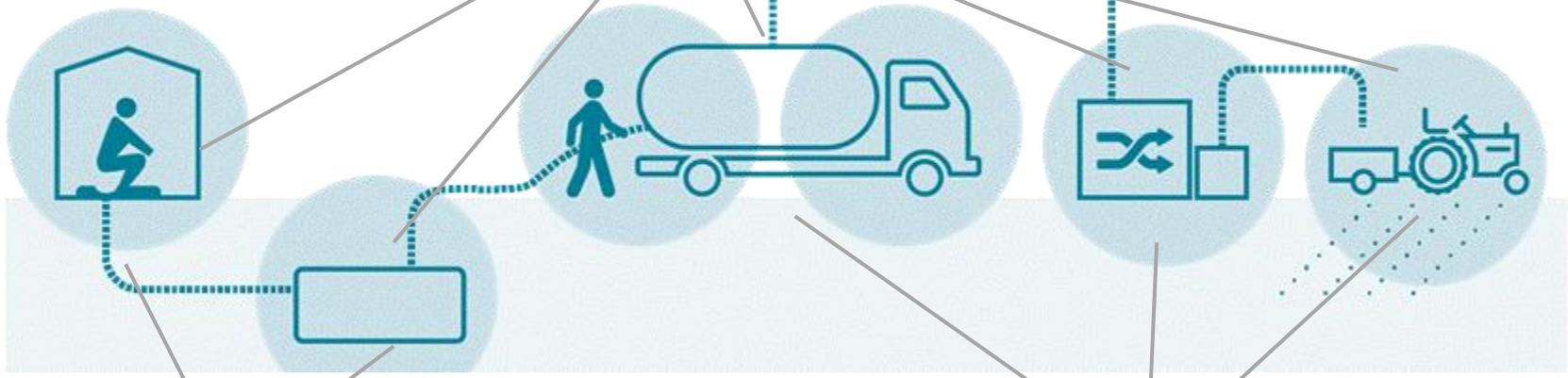
Embedded: Manufacturing of cement, steel, etc., produces CO_2



Failures: Stagnant, uncollected sludge from latrines and/ or septic tanks emits methane

Operations: Transportation, treatment, and disposal emit CO_2

Sector Impacts

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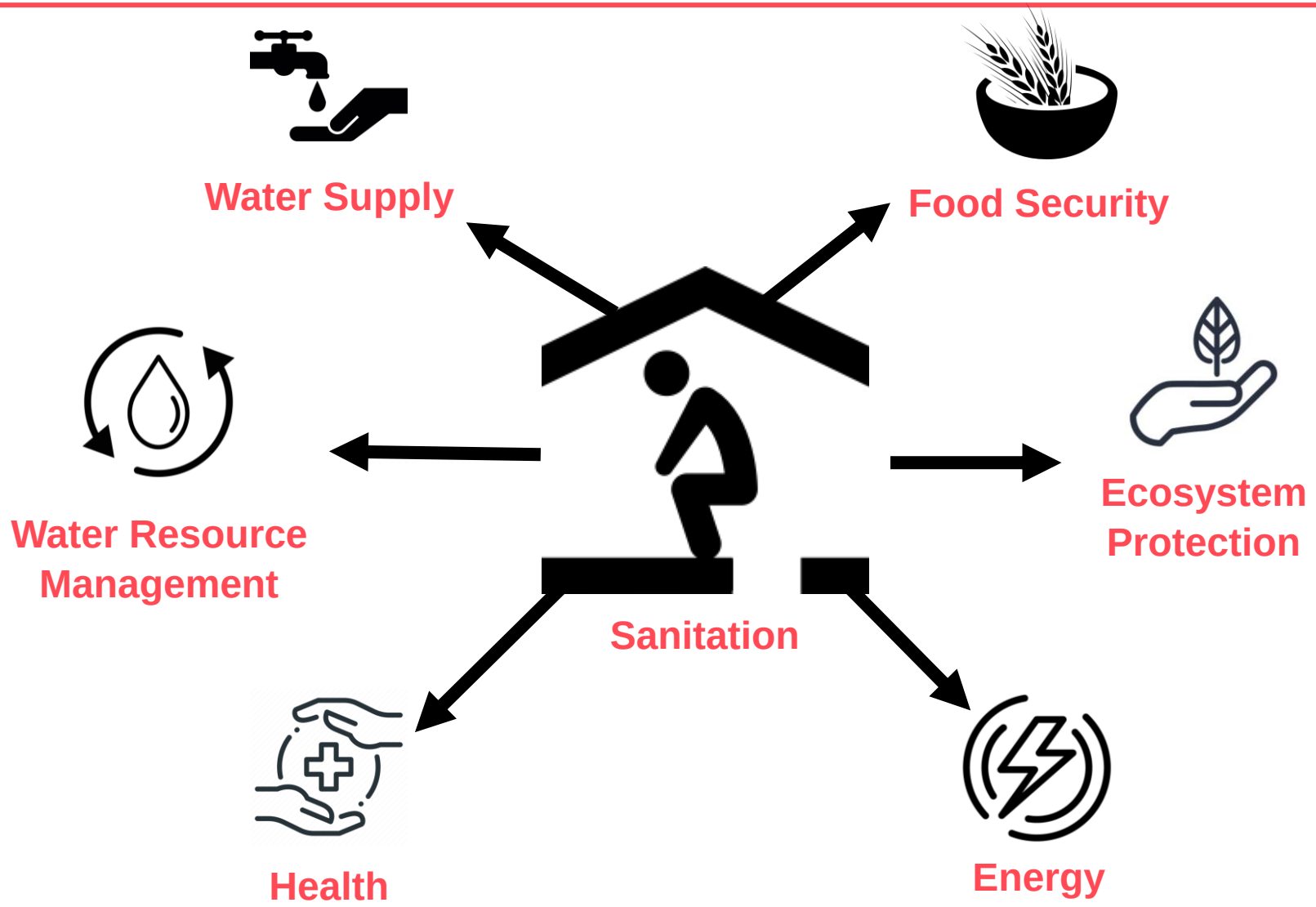

CRS Focus Populations

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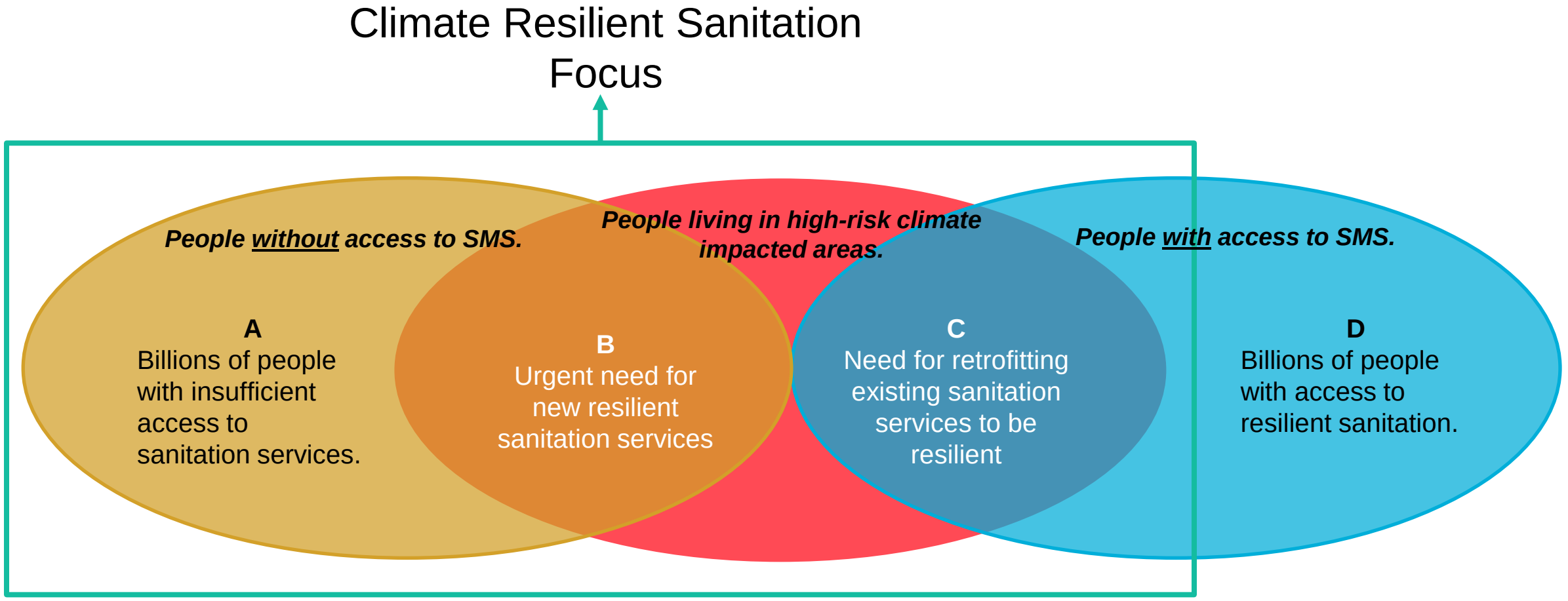

Adapted from: 202305311322---UNICEF.pdf (unfccc.int)

Sanitation in Climate Finance and Policy

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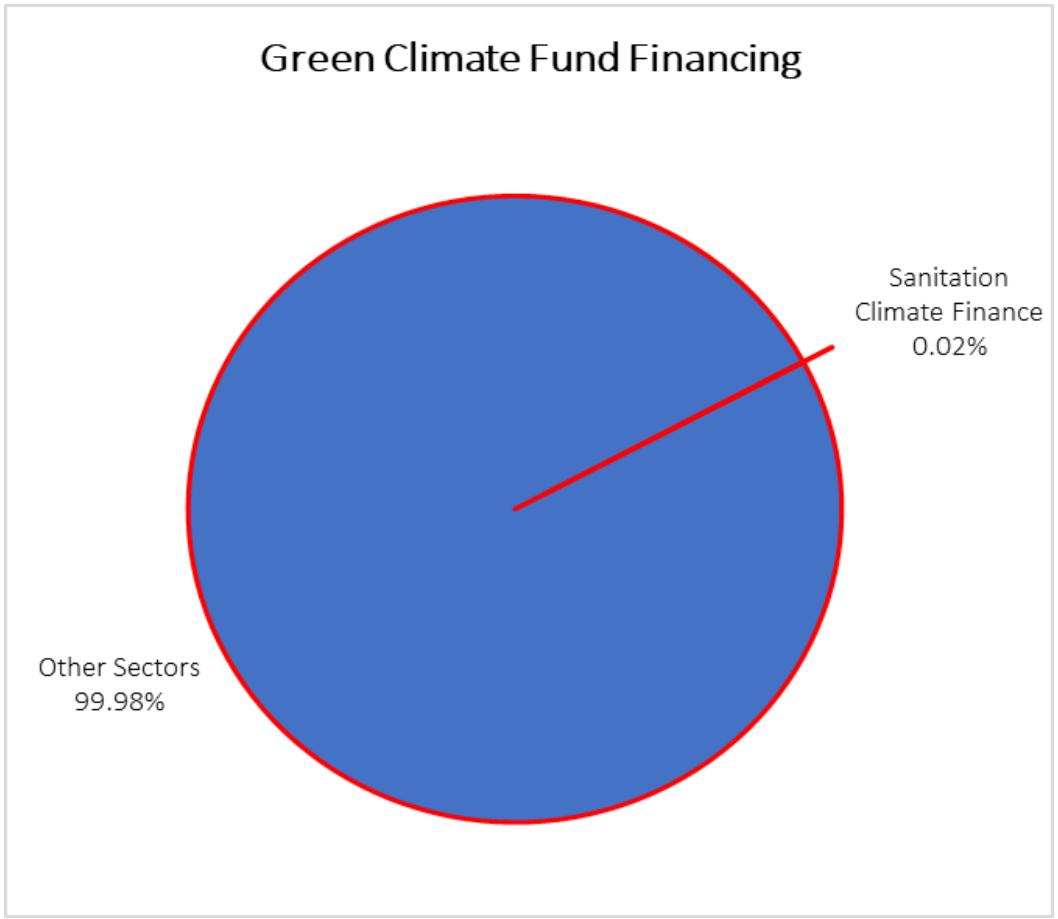
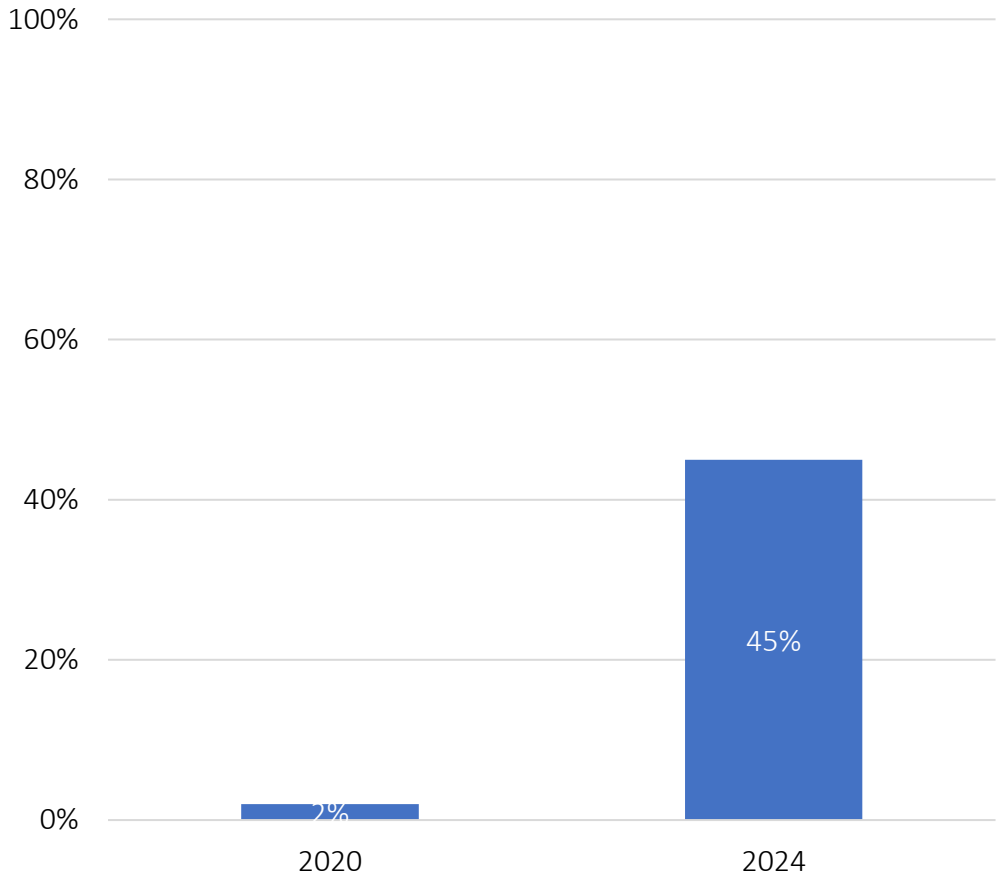
Sanitation and Finance



As of 2020, sanitation was just 0.02% of climate financing.

Sanitation in NDCs



Sanitation representation in NDCs has grown from 2% to 45% in four years.

Why Now?

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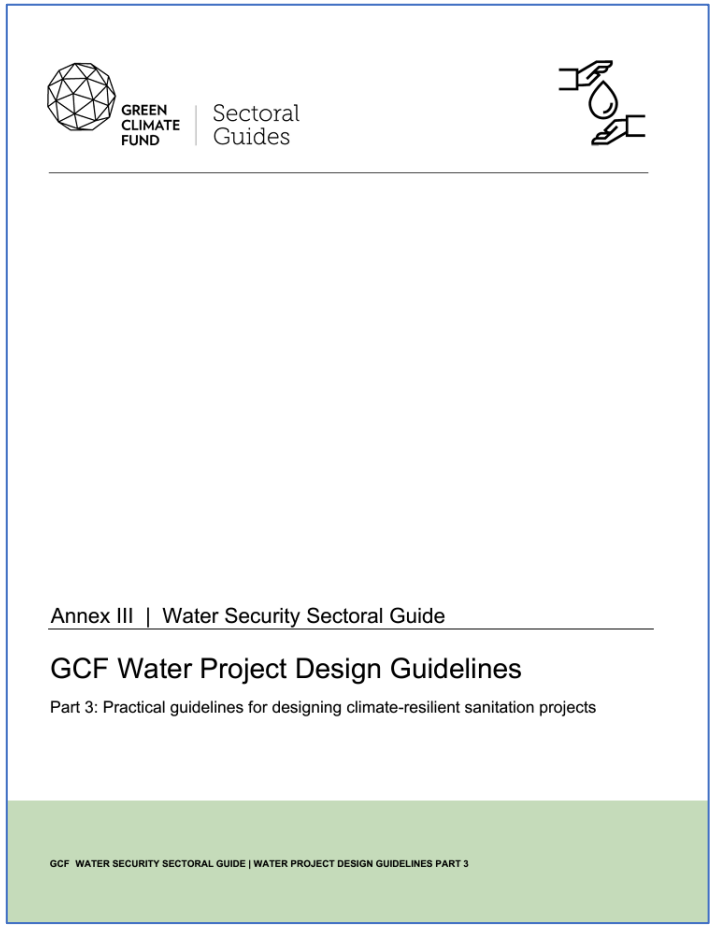
1. **Accreditation:** Increasing numbers of organizations are receiving accreditation (including UNICEF)
2. **Increased opportunities:** Climate funds (not just GCF) are increasingly available
3. **NDCs:** NDCs are currently being updated through February
4. **Climate – Sanitation Links:** Better articulation of links among sanitation, climate, health, and environment than ever before.

How the CRS Annex to GCF Guidelines Addresses Previous Gaps



1. Provides **guidance** on accessing financing for climate resilient sanitation.

2. **Addresses** topics not well covered in other guidelines, such as mitigation and policy.

3. **Links** to related sectors including environment.

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Green Climate Fund And Climate Resilient Sanitation

Bapon Fakhruddin, GCF
22nd January 2025

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Overview of the Green Climate Fund (GCF) Sanitation Annex

Sam Drabble, WSUP
22nd January 2025

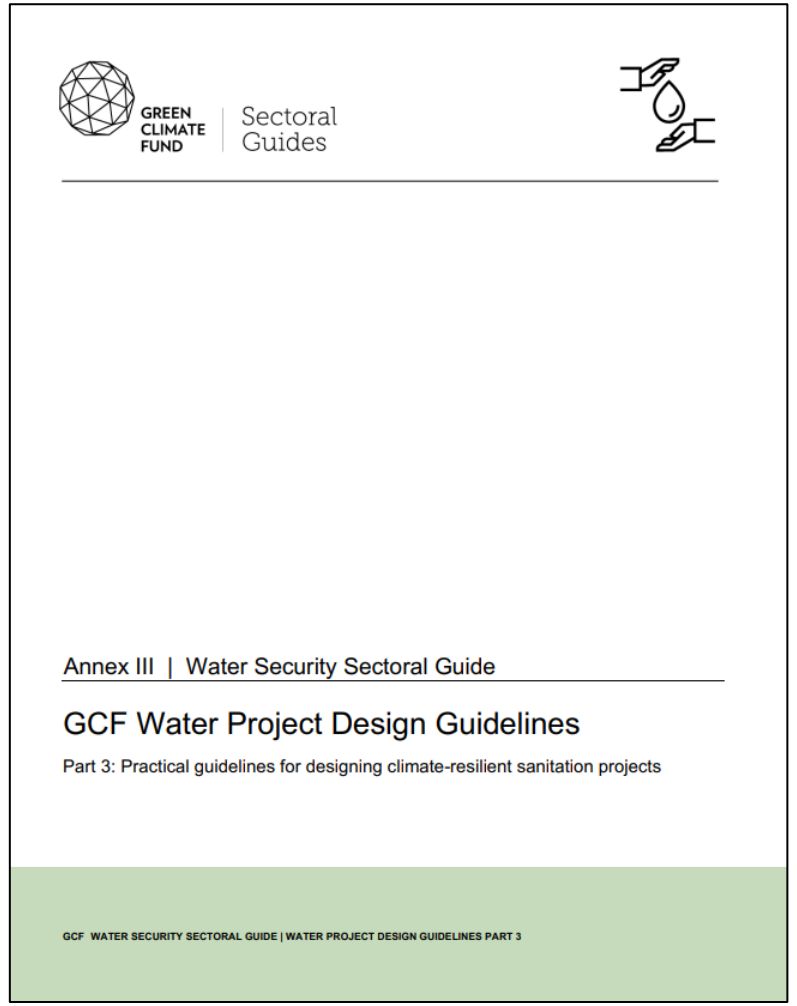
Recap: Purpose of the GCF Annex

Annex provides **practical guidelines** for developing CRS projects and programmes

Complements the **GCF Water Security Sectoral Guide** which has 3 parts:

- **Annex 1** - *Practical guidelines for designing water-climate-resilient projects*
- **Annex 2** - *Applications of the Practical guidelines for designing water-climate-resilient projects in IWRM, CR-WASH, and Drought and Flood management*
- **Annex 3** - ***Practical guidelines for designing climate-resilient sanitation projects***

Target audience includes Direct Access Entities at the national levels, International Access Entities and Accredited Entities



Structure of the Annex

CLIMATE RESILIENT SANITATION: COALITION FOR ACTION

1- Introduction

- *How the Annex relates to the GCF Water Security Sectoral Guide*
- *Status of sanitation globally*
- *Sanitation, the climate crisis, and health*
- *GCF approach to climate-resilient sanitation (CRS)*

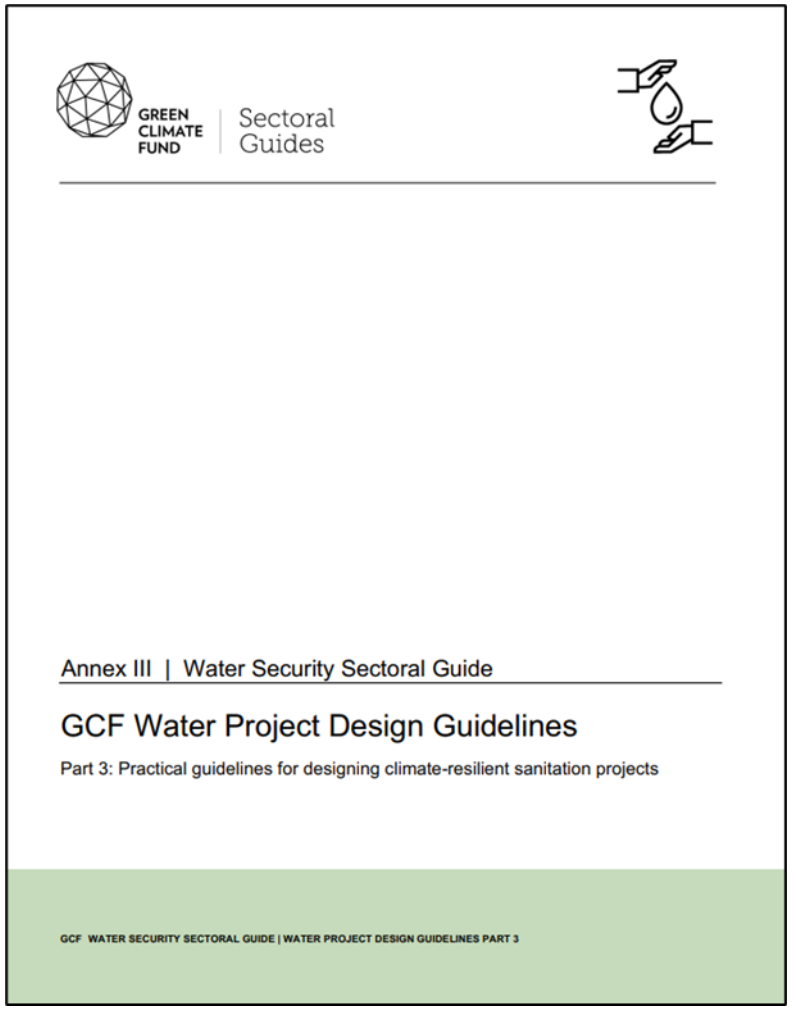
2 - Building the Climate Rationale for Sanitation Projects: Adaptation

3 - Building the Climate Rationale for Sanitation Projects: Mitigation

4 - Potential interventions to support CRS across the Sanitation Service Chain

- *Adaptation*
- *Mitigation*
- *Strengthening systems to enable CRS*

5 - Developing a GCF proposal



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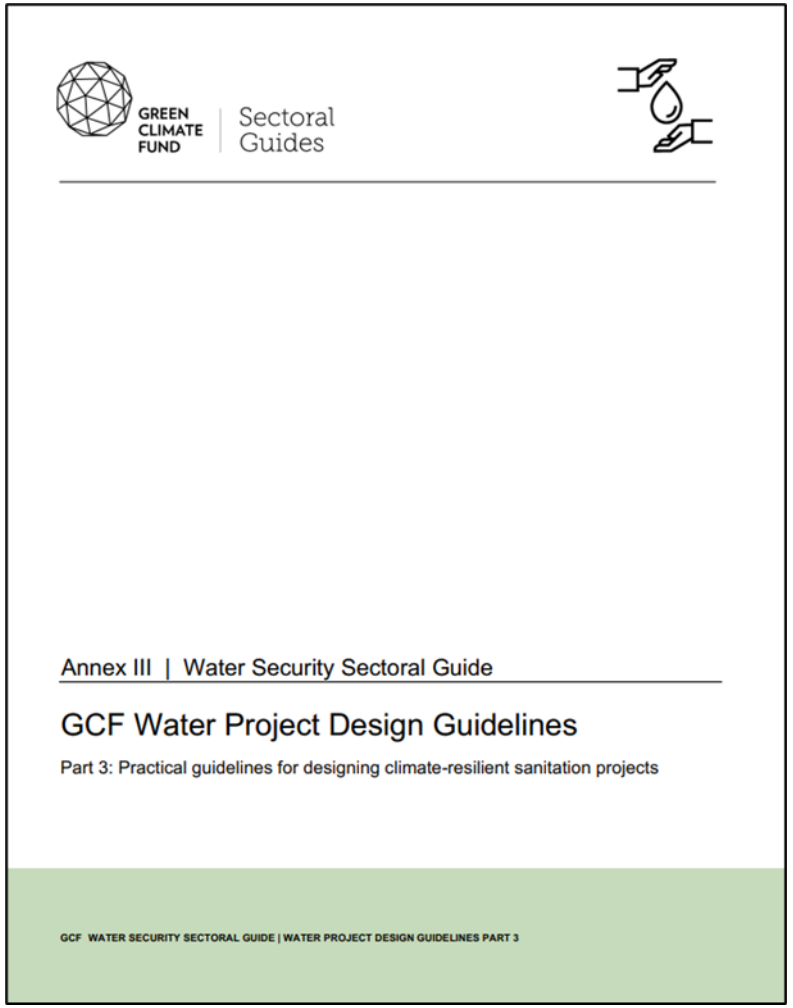

1 - Introduction: GCF approach to CRS

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Sanitation proposals to GCF must have a **clear climate rationale** and display a **level of ambition consistent with GCF's envisioned paradigm shift** for CRS. Successful proposals must achieve:

- Effective articulation of the **climate science basis and rationale** for the project
- Alignment with overall **GCF investment criteria**
- Alignment with GCF **key strategies for climate-resilient sanitation**

GCF investment criteria

- ✓ Impact potential
- ✓ Paradigm shift potential
- ✓ Sustainable development potential
- ✓ Needs of the recipient
- ✓ Country ownership
- ✓ Efficiency and effectiveness

GCF key strategies for CRS

- ✓ Climate-resilient infrastructure and services
- ✓ Circular economy and integrated management
- ✓ Community engagement and capacity building
- ✓ Policy, regulatory and governance support
- ✓ Monitoring and evaluation

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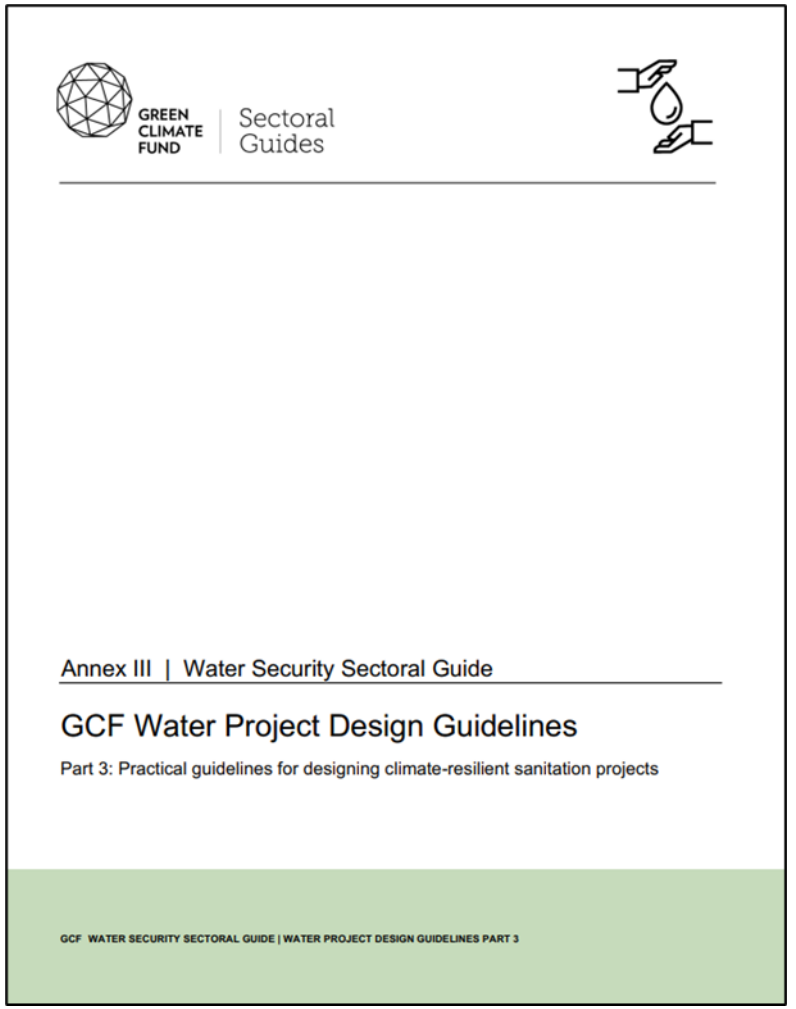

2 - Building the climate rationale: Adaptation

- **Climate risk assessments** are a critical step in **developing the climate rationale** for any GCF project

- Annex provides guidance for conducting **sanitation-focused** climate risk assessments

Assessments should follow the structure described in the GCF Water Sector Guidelines Annex 1:

Risk = Hazard X Exposure X Vulnerability

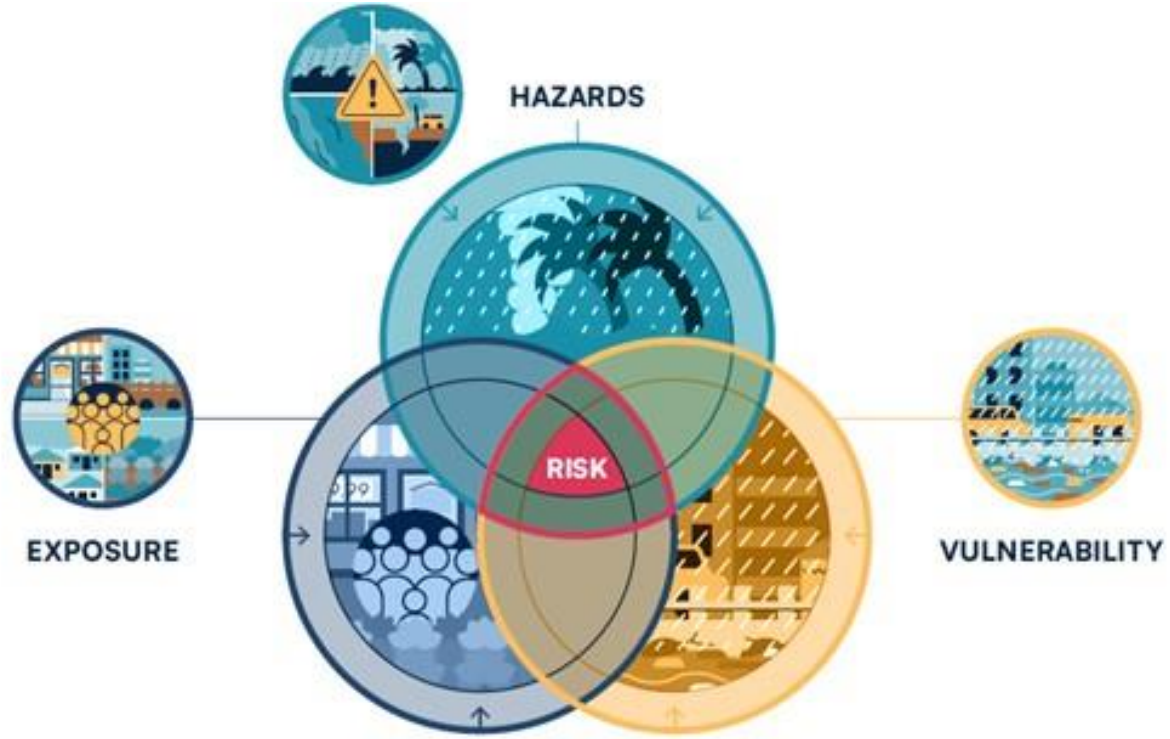

Figure 2.1, Page 26

Climate hazards and their impacts

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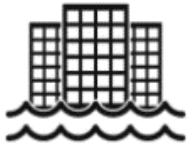
- Climate risk assessments must outline **hazards to be accounted for** and their impacts on sanitation systems

Extreme storms

Sea level rise

Droughts and water scarcity



Flooding

Extreme temperatures

Evidence of Climate Change Impacts on Urban Sanitation System (relevant to flooding and storms) (Hyde-Smith et al, 2022)

Hazard	Impacts (using Peal et al, 2020 failure mode classification)				
	Fecal sludge not contained, not	**Fecal sludge and supernatant not delivered**	**Fecal sludge and supernatant not treated**	**Wastewater not delivered to treatment**	**Wastewater not treated**
High-intensity rainfall, increased flooding, erosion and landslides	Damage to pits or superstructures making latrines unusable	People 'drain' toilets into the environment using floodwater during flood	Flooding and damage to wetland flora	Increased frequency or spill volume of combined sewer overflows	Flooding and damage to wastewater treatment plant structure and equipment
	Pits overflow/collapse leading to fecal contamination	Structural damage to pavements		Increased risk of urban flooding (overflow of inspection chambers, flooding of basements)	Flooding of wastewater treatment plant leading to temporary system failure and discharge of raw sewage
	Toilets become inundated/inaccessbile (causing people to abandon toilets and revert to open defecation)	Road collapse or development of sinkholes due to destabilization of soil caused by damages sewers		Increase risk of pipe damage due to changed soil moisture and subsidence	Electricity failure leading to failure of pumps and aeration
				Changes to inflow and infiltration rates into the sewer system	Road interruptions leading to disruption of site access for wastewater treatment plant staff and supplies
	Electricity failure resulting in lack of water supply and non-functioning of toilets	Damage to roads infastructure elements other than pavements (eg bridges)		Sewer blockages after an event because of sand, debris or solid waste entering sewers and pump stations	Pollutant load exceeding biological treatment capacity of wastewater treatment plants
	Inundation of drainfields	Road capacity decreases/increases in congestions/travel time increases		Electricity failure leading to failure of pumps	Discharge of untreated/partially treated effluent due to overloading or bypassing of treatment
	Backflow/overflow of sewage from septic tanks	Roads become inaccessible		Damage to sewer pumps and mains	Increased dilution of influent
	Damage to pits, septic, tanks and absorption fields	Electricity failure leading to traffic light failure		Overload of sewer system resulting in overflow to the drainage system	Reduced nutrient removal cpacity during high-intensity rainfall events (eg due to reduced retention time and high
Contamination of and damage to surface water and groundwater supplies				Higher pollutant concentration in receiving waters due to increase in combined sewer overflow spill volumes/frequency	Contamination of receiving water bodies due to wastewater treatment plant failure
Changes to groundwater recharge and groundwater levels	Floatation and damage of septic tanks due to high groundwater levels	Structural damage to pavement (destabilisation of the substrate)			Inflow and infiltration into seprate systems causes higher inflow into wastewater treatment plants that stretch their design capacity
	Flodding and famage of septic tanks due to high groundwater levels				
	Higher groundwater pollution				
More extreme winds				Uprooting of trees and replacement of dmaged electricity poles leading to damage of sewer pipes	Damage to wastewater treatment plant infrastructure/buildings

Table 2.1, Page 29

Characteristics of exposure and vulnerability

Exposure = the presence of people, livelihoods, ecosystems, etc, that **could be adversely affected by climate hazards**

Exposure assessments essential to identify different **elements at risk** and calculate loss estimates

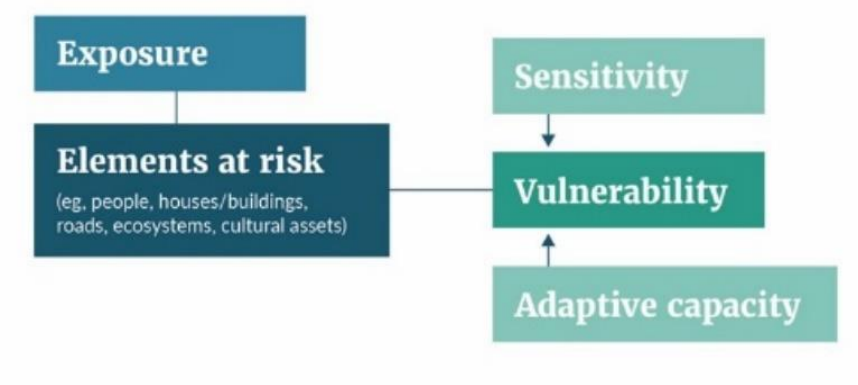


Figure 2.2, Page 36

Vulnerability = sensitivity or susceptibility to harm and capacity to cope and adapt

Vulnerability assessments essential to understand susceptibilities of systems and populations **when exposed** to climate hazards

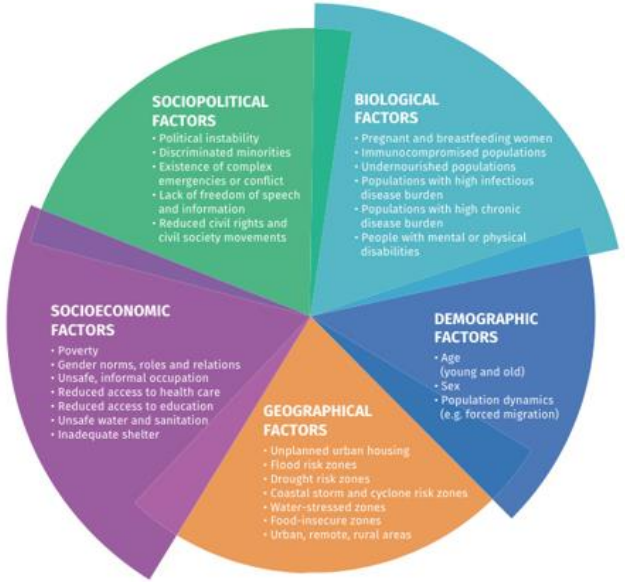


Figure 2.3, Page 38

3 - Building the climate rationale: Mitigation

Annex sets out the evidence for the nature and scale of emissions arising from:

- **As-designed operation** of sanitation infrastructure and services

- Disposal of unstable faecal matter into the aquatic environment or on to land

- Use of products which **could be substituted** by well-managed use of **sanitation by-products**

	Containment	Emptying and transport	Treatment	Managed or unmanaged disposal in aquatic environments or on land	Substitution of sanitation by-products for other products
Scope 1					
Direct and fugitive emissions	CO_2, CH_4 and N_2O from pits, tanks and containers	n/a	CO_2, CH_4 and N_2O from treatment plants	CO_2, CH_4 and N_2O from land and water bodies	n/a
Transport	n/a	CO_2 from truck fuel combustion	n/a	CO_2 from truck fuel combustion removing sludge for land disposal	n/a
Scope 2					
Imported energy use	n/a	n/a	CO_2 from imported energy used in treatment processes	n/a	n/a
Scope 3					
Embedded carbon	Materials in construction of pits, tanks and containers	n/a	Materials in construction treatment plants	n/a	n/a
Other indirect emissions	n/a	n/a	n/a	n/a	Reduction in manufacturing and transportation

Table 3.1, Page 41: Principal sources of greenhouse gas emissions from whole-chain sanitation systems which store waste onsite before using road-based transport to move to treatment.

Current evidence base on emissions from sanitation systems

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- Rate and scale of emissions from any sanitation system dependent on the technology deployed, its operation and local contextual factors

- To date, **only limited empirical data exist** with which to estimate sanitation emissions. Emerging conclusions:

  - **The primary source of emissions in most sanitation systems are direct emissions** caused by the stabilisation of faecal sludges in storage pits and tanks or at treatment plants, or by discharges of untreated faecal waste
  - These emissions are significant and are likely to have been underestimated historically
  - Limited evidence that either sewered or non-sewered sanitation 'better' than the other in terms of emissions
  - The primary issue is that **most faecal waste never reaches treatment**

Photo: Olivia Reddy, University of Bristol

Guidance for measuring and monitoring emissions from sanitation systems

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- Annex highlights **Intergovernmental Panel on Climate Change (IPCC) guidelines and methodologies** for estimating GHG emissions
- Estimation of Scope 1 emissions covered in Vol. 5, Chapter 6 of 2019 refinement of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories
- **Measurement and estimation are both highly context-specific and specialised -** recommended to work with qualified scientists with a track record in measuring emissions across the entire sanitation value chain
- Significant additional data will be generated in coming years which can be used to **prepare estimates with increasing levels of confidence** as the empirical evidence base grows

Photo: Olivia Reddy, University of Bristol

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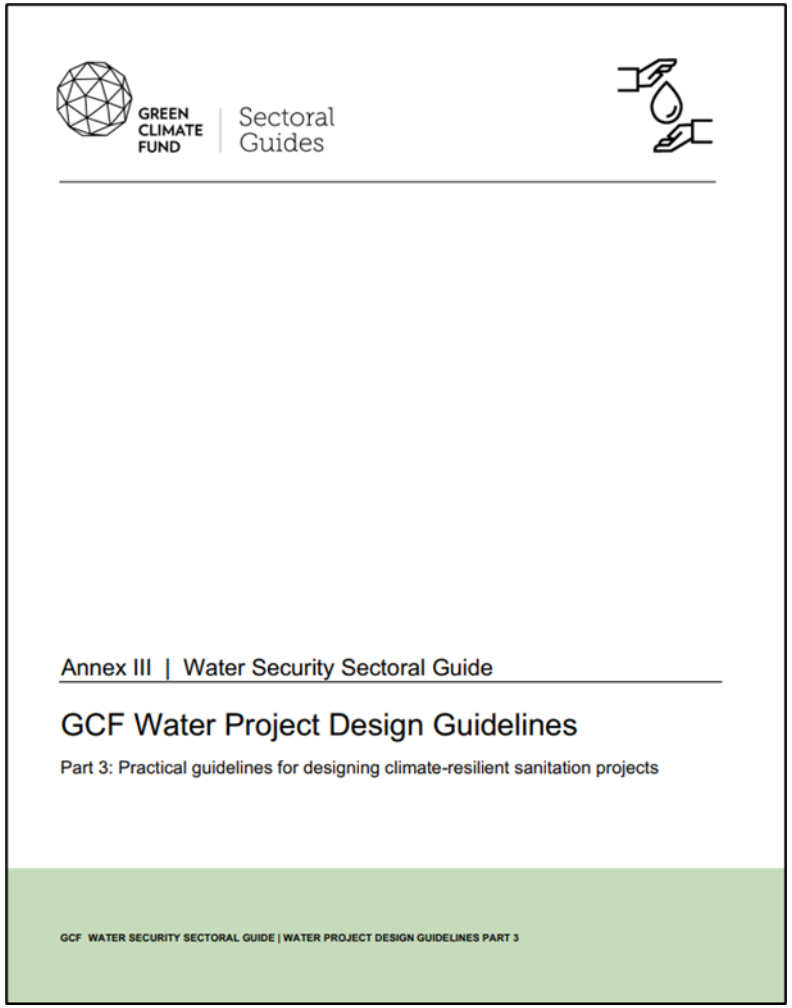

4 - Responses and interventions

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Annex highlights the potential for sanitation to act as an **entry point for wider systems change** across sectors and to contribute to **transformative adaptation** to climate change

Guidance is provided on potential **interventions to support climate change adaptation** across the sanitation service chain

Type of Response	Containment	Emptying and Conveyance	Treatment, Reuse and Disposal
Technical modifications to new or existing infrastructure	Raised latrines/ containment **CRIS** Robust and resilient latrines/ containment **CRIS** Low or no water latrines **CRIS** Sealable and removable containment CRIS	Simplified sewers **CRIS** Vacuum sewer systems **CRIS** Treatment of sewer overflows **CRIS/IM** Sustainable Drainage Systems **CRIS/IM**	Site selection and flood prevention **CRIS** Corrosion resistant design **CRIS** Modular FSTP/WWTP design **CRIS** Decentralised/ distributed FSTP/WWTPs **CRIS**
Active management of the infrastructure or service		Scheduled or more frequent emptying for OSS **CRIS** Preventative O&M of sewer systems **CRIS**	Application of treated wastewater and faecal sludge **CRIS/IM**
Preparing sanitation systems for cascading impacts of failures in other systems	Alternative water sources for flush toilets **CRIS/IM**	Alternative emptying vehicles and equipment for OSS **CRIS**	Alternative power sources for FSTPs and WWTPs **CRIS**

Elements of GCF projects: CRIS – Climate Resistant Infrastructure and Services, IM – Integrated Management

Table 4.1, Page 53

Responses and interventions (2)

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Potential **interventions to support climate change mitigation**

Intervention type	Effect category	Category
Infrastructure modifications	*Anaerobic digestion at treatment (with or without co-treatment of MSW)*	*CRIS/IM*
	Addition of methane/biogas capture on aerobic treatment plants	*CRIS/IM*
	Enhanced composting of faecal wastes to produce agricultural products (including black soldier-fly lava)	*CRIS/ IM*
	Water recovery from wastewater or faecal sludge treatment for use in agriculture	*CRIS/IM*
	Additional tertiary treatment and enhanced nutrient removal	*CRIS/IM*
Scale and management operations	*Regular emptying of household pits and tanks particularly prior to rainfall*	*CRIS*
	Optimisation of scale and design of sewerage	*CRIS*
	Optimisation of scale of operations for road-based sanitation	*CRIS*
Governance and regulatory modifications	*Improved regulation of emptying including incentives for planned emptying and disposal at treatment*	*CRIS*
	Results-based contracts for treatment operators	*CRIS*

Elements of GCF projects: CRIS – Climate Resistant Infrastructure and Services, IM – Integrated Management

Table 4.3, Page 66

Potential **system strengthening interventions** to enable CRS

Box 4.1: Summary of potential PIRF interventions to enable climate-resilient sanitation.

- Ensure projects align with and strengthen relevant climate policies and plans, particularly NDCs and NAPs
- Ensure policy frameworks promote circular economy approaches
- Ensure service providers are prepared for a future of multiple revenue streams and equipped with climate-specific knowledge and skills
- Mainstream climate-resilient sanitation into regulations, guidelines, standards, and codes of practice at every step of the sanitation service chain
- Leverage a menu of financing options to support the sustainability and scalability of project interventions
- Create targeted financial incentives to support private sector engagement and resource recovery
- Strengthen policy, institutional and regulatory frameworks to support the integration of sanitation with wider basic services and urban development processes
- Build flexibility into planning, financing, and regulatory frameworks to support service providers in adapting to emerging or unexpected conditions

Box 4.1, Page 75

Applying the Annex: Key messages

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- Sanitation is first and foremost a **public health intervention**
- CRS proposals need to **articulate the anticipated mitigation and/or adaptation impact**
- While GHG reductions from CRS interventions are likely, **do not promise specific reductions**
- CRS projects should **promote links with other sectors** (e.g., environment, health, agriculture)
- CRS infrastructure is not effective on its own – **projects should include systems strengthening**

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Part Two

Climate-resilient Sanitation Experiences

Panel Discussion:
Climate-Resilient Sanitation Experiences

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- Jolly Ann Maulit: UNICEF
- Yeasin Arafat: WaterAid
- Martin Gambrill: World Bank
- James Wallace: University of Leeds

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Proposal Development

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Next Steps & Close

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