

Climate Risk Assessments for WASH

Introduction

What is a risk?

Risk can be defined as the potential for consequences, where something of value is at stake and where the outcome is uncertain. In the context of climate change, risk result from dynamic interactions between climate-related hazards with the exposure and vulnerability of the affected human or ecological system to the hazards ([IPCC 2022](#)).

Risk is influenced by a combination of the probability of an event and its negative consequences and results from the interaction of hazard, vulnerability and exposure.

A dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage



The characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard

People, property, systems, or other elements present in hazard zones that are thereby subject to potential losses



Assessing Risks for WASH

From service delivery infrastructure to planning and institutional arrangements, risk assessments align with a systems strengthening approach by promoting a holistic, integrated, and adaptive strategies that build resilience, ensures sustainable resource use, and enhances the overall effectiveness of WASH services. In short, by assessing risks, you can identify:

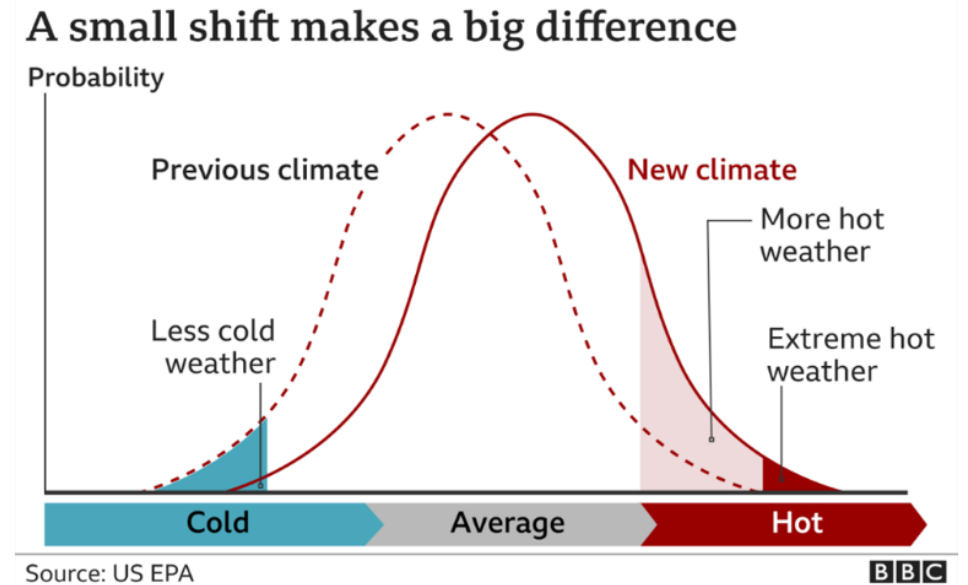
- Hazards that could have an impact
- Who and what is exposed to these hazards
- Vulnerabilities of those exposed and the projected damage of a hazard
- To what extent the risks can be reduced or mitigated

Climate Hazards vs. Climate Trends

It is important to understand the differences between these two concepts:

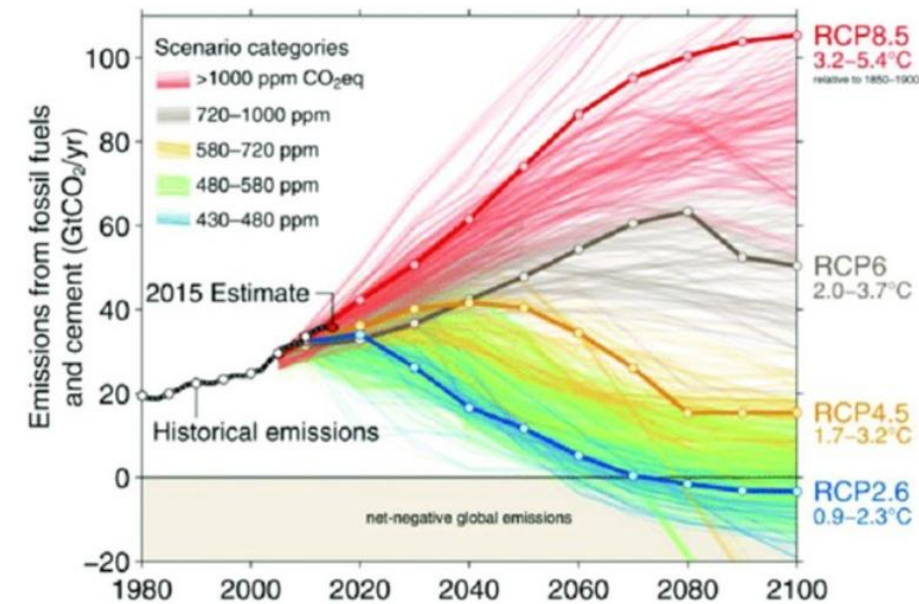
- **Climate trends** represent broader shifts in atmospheric conditions that unfold gradually over time.
- **Climate hazards** are immediate threats that can have immediate impacts on communities and ecosystems. This includes slow onset hazards such as drought.

The trend towards warmer climate, increases the likelihood of more extreme weather events and the occurrence of climate hazards.



Climate Models

- Climate is complex, it involves countless interconnected processes occurring across different spatial and temporal scales.
- → Predicting future climate hazards or trends involves a large degree of uncertainty. Therefore, models are often based on assumptions and provide predictions with results expressed as ranges.
- Historical climate data provide valuable insights into past climate variability and trends, aiding in the calibration and validation of climate models. **However, historical data is not perfect, with limitations, including sparse coverage, inconsistencies in data collection methods, and uncertainties in data quality.**
- One big assumption is the pathway of global warming, based on the increase of greenhouse gases (GHG).



Do you remember the key climate hazards for WASH?



Too Much Water

Extreme weather events such as floods and hurricanes can cause direct damage to water and sanitation infrastructure such as pipelines, wells, toilets, and treatment facilities.



Too Little Water

Rising temperatures results in droughts and less predictable water availability. The destruction of vegetation and tree cover from droughts, wildfires, or changes in agriculture intensifies runoff, reducing groundwater recharge.



Polluted Water

Flooding, especially in areas with limited safely managed sanitation services, can cause the spread of contaminants and disease. And with rising sea levels, salt water can more easily contaminate freshwater aquifers.

Climate Risk Assessment Tools

WASH Climate Resilient Development

Guidance Note

Risk assessments for WASH

Environmental events (climate-related, meteorological, and geophysical events and trends) and environmental degradation (pollution, industrial hazards)

■ Drought ■ Flooding ■ Heavy rainfall ■ Heatwave ■ Cold spell ■ Blizzard ■ Heavy snowfall ■ Melting of snow and ice	■ Storms – thunder, hail, dust, ice, wind ■ Tornado ■ Tropical cyclone ■ Salinisation (dryland) ■ Desertification ■ Wildfire ■ Landslide, mudslide	■ Avalanche ■ Rockfall ■ Subsidence ■ Soil erosion ■ River bank erosion ■ River siltation ■ Coastal erosion ■ Saline intrusion	■ Sea level rise (long-term) ■ Storm surge ■ Tsunami ■ Earthquake ■ Volcanic eruptions ■ Pollution ■ Other
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Violent/potential violent conflict (ongoing conflict, socio-political tensions and possible triggers)

- Violent conflict
- Riots
- Other

Current and potential political/social unrest and instability

- Social unrest and protests
- Political instability
- Other

Biological hazards

- Potential viruses/diseases
- Insect/animal infestation
- Plant or animal contagion
- Moulds and fungi
- Algal growth
- Other

Chemical hazards

- Arsenic
- Fluoride
- Nitrate
- Phosphate
- Chemical spill
- Other

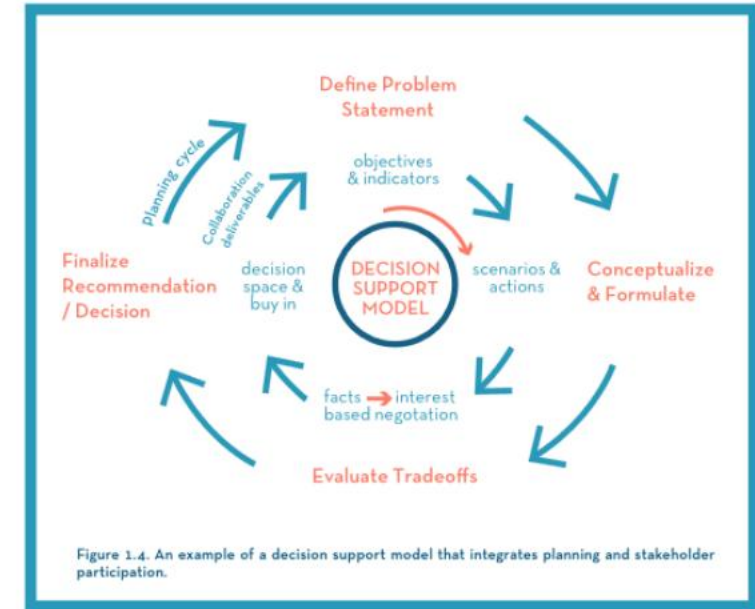
Cross-border dynamics (as a destabilising factor)

- Displacement
- Migration
- Cross-border violence
- Other

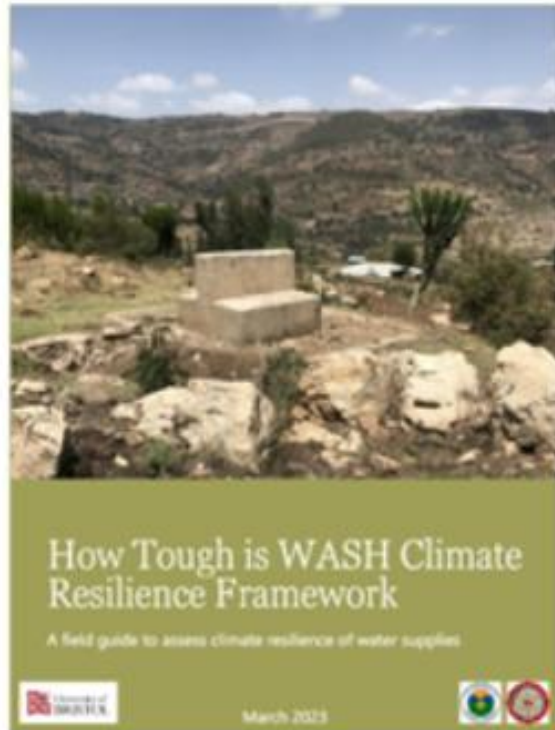
Economic downturn/shocks and market instability

- Economic downturn
- Economic shock
- Market instability for specific commodities
- Other

Climate Risk Informed Decision Analysis (CRIDA)
Collaborative Water Resources Planning for an Uncertain Future



Climate Risk Assessment Tools – How tough is WASH?



Indicator	Sub-indicators
Environment	Topography and land-use in the catchment
	Exposure to flooding
	Population density in the catchment and risk of fecal contamination
	Competition for water source
Infrastructure	Sanitary protection
	Yield
Service management	Strength of management
	Understanding of climate change and adaptive management
	Gender and social representation
Institutional support	Risk management program and support for adaptation
	Support after emergency
	Inter-sector coordination
Supply chains	Access to spare parts and consumables
	Robustness of supporting infrastructure
	Availability of spare parts locally
Community governance & engagement	Civic engagement and participatory behaviour (for community-managed supplies)
	Inclusivity (for community-managed supplies)
	Reporting mechanisms and engagement (for utility-managed supplies)