

Climate Resilient WASH – Learning Platform

CR WASH Concept

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Outline

- Introduction
- Climate change and WASH
- WASH activities that drives Climate Change
- Impact of CC on WASH Sector
- Mitigation/Adaptation of/to climate related risks
- Ethiopian context



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Introduction

- Climate Change is associated to changes in **temperature** and **rainfall**
- **Climate variability**: the way climate elements (temperature & rainfall) depart from the average value in given months, seasons, years, decades or centuries in a given location
- **Climate change**: changes in climate elements that occur over a longer period (decades or longer) in a given location

Climate change and WASH

- Water is the primary medium through which CC influences the Earth's ecosystem. It affects
 - Water resources (quantity & quality)
 - WASH infrastructure and services
 - Public health
- Studies indicate
 - Warming by the end of the 21st century will be between **0.3** and **5°C**
 - **4°C** temperature rise can result in a **50%** decrease in water availability in East Africa (**2014, GWP and UNICEF**)
 - Incidence of diarrhea is expected to increase by **5%** for every **1°C** increase in temperature in developing countries (**2014. GWP and UNICEF**)



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Climate change and WASH...

- Climate change
 - Exacerbates existing vulnerabilities (drought, flooding, pollution, low WASH coverage, population growth, urbanization, inequalities, etc)
- Can result in decline of rainfall and run-off
 - Decline of water supply source
 - Water use conflict, migration, increased use of unimproved source
 - Lack of water for hygiene practices, increase in diarrheal diseases
 - Increases in concentration of pollutants in water sources
 - Non-functioning of sanitation systems (flush toilets, sewerage)



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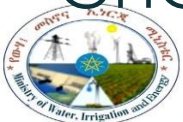


Climate change and WASH...

- Can result in increase of rainfall and flooding
 - Damage of WASH facilities (water supply system, collapse of latrines)
 - Contamination of water sources
- Can result in increase of temperature
 - Warmer temperature can lead to greater transmission of diseases
 - Outbreak of infectious diseases

WASH Activities that drive CC

- WASH services that produce GHG & contribute to global warming
 - Energy for pumping and treatment of water and wastewater
 - Pit latrines (human excreta)
 - Account to 1% of global anthropogenic methane emissions (significant source of GHG)
 - Wastewater treatment process
 - Biological wastewater treatment emits significant amount of GHG



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Impact of CC on WASH Sector

CC effect	Potential hazards	Example of Risk/benefit to WASH
<p>More intense rain or prolonged ppt</p>	<ul style="list-style-type: none"> • Increased flooding • Increased erosion, landslides • Contamination and damage of surface and GW supplies • Changes to groundwater recharge and levels 	<ul style="list-style-type: none"> • Increased availability of water • Damage to water & sanitation infrastructure • Pollution of wells • Inundation of water sources/inaccessibility of water sources • Landslides around water sources & latrines • Sedimentation and turbidity • Damage to infrastructure that support treatment process (electricity network, road) • Flooding of onsite systems causing spillage and contamination • Flooding and collapse of pit latrines • Overflow and /or obstruction sewage and septic systems • Floating of septic systems due to increased groundwater level • Excess flow to wastewater treatment system exceeding the design capacities • Challenges to sustainability of sanitation and hygiene behaviors • Waterborne diseases



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Impact of CC on WASH...

CC effect	Potential hazards	Example of Risk/benefit to WASH
More variable or declining rainfall or runoff	<ul style="list-style-type: none"> • Long dry seasons/periods • Droughts (seasonal and long term) • Reduced surface water flows • Reduced groundwater levels/resources 	<ul style="list-style-type: none"> • Lack/scarcity of water • Reduction in quantity and quality of water • Reduced groundwater recharge • Misfunctioning of water reliant sanitation systems (flush toilets, sewage, treatment) • Reduction in pollution of GW by pit latrines b/c of GW level drop • Increased corrosion of pipe sewers • Increased concentration of pollutants in wastewater and receiving waterbodies • Breaking of sewer pipes & joints due to soil compaction • Challenge to hygiene practices

Impact of CC on WASH...

CC effect	Potential hazards	Example of Risk/benefit to WASH
More variable or increasing temperatures	<ul style="list-style-type: none"> • High ambient air temperatures in homes or facilities • Higher freshwater temperatures • Hot and cold temperature extremes 	<ul style="list-style-type: none"> • Damage to infrastructure • Increase in pathogens in water in water leading to increased risk of diseases • Increase efficiency of biological wastewater treatment process ...if temperature stays within operational limit • Reduced efficiency of biological wastewater treatments (if temperature exceeds or fall below operational limits) • Growth of algae blooms or microbes carried by vectors in water • Increased corrosion of sewer lines • Quicker drying of facial sludge in dry pit
More frequent or intense storms	<ul style="list-style-type: none"> • Increased flooding • More extreme winds 	<ul style="list-style-type: none"> • Damage to WASH facility superstructures • Damage to other infrastructure/systems on which sanitation system relay (electricity, road)



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Mitigation of climate-related risks

- **CC Mitigation:** Human intervention to reduce the sources or enhance the sinks of GHGs
 - Reduce energy consumption
 - Gravity-based sewerage conveyance through increased use of decentralized systems
 - Promote composting toilets, regular emptying of septic tanks and manage wastewater
 - Use renewable energy sources for pumping water & wastewater



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Adaptation to climate-related risks

- **CC Adaptation:** Adjustment to actual or expected climate change and its effects to moderate or **avoid harm** or **exploit beneficial opportunities**
 - Manage physical risks
 - Build WASH infrastructures in carefully selected locations
 - Design, operate and manage technologies and services that are less vulnerable (deep ground water source, composting toilets, etc.)
 - Generate energy from faecal waste and wastewater



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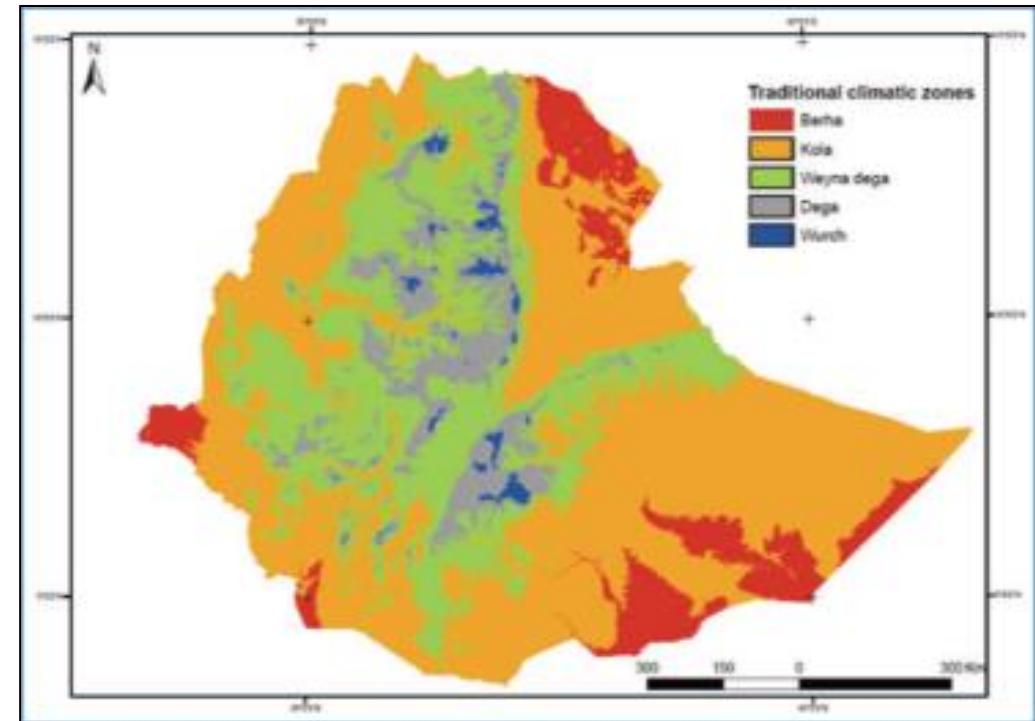
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Ethiopian Context

- Prone to extreme climate variability
- Major climate related hazards are flood and drought
- Seven major droughts since early 1980s,—five of which have led to severe life loss; dozens of local droughts as well
- Major floods occurred in different parts of the country in 1988, 1993, 1994, 1995, 1996, and 2006 (world Bank 2010)

Climatic/agro-climatic zone (MoWIE)



Climate trend

- 50 years (1951- 2006) meteorological data
 - Temperature increase by 0.37 °C
 - Rainfall nearly constant
- Projection over three periods 2030, 2050 and 2080 shows
 - Temperature increase of 0.9 - 1.1 °C , 1.7- 2.1 °C and 2.7- 3.4 °C
 - Small increase in annual precipitation

Adaptation/Mitigation strategies

- WS source focussed adaptation/mitigation strategy (Quantity & Quality)
 - Main WS source is GW
 - **Resilient** to climate change
 - GW management is the major adaptation way
 - Increase GW recharge (soil & water conservation, green legacy)
 - Increase retention
 - Discharge management (monitoring) and water quality management (water safety plan)
- Use of low energy demanding technologies and renewable energy sources
- Multi-village community water supply systems



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Adaptation strategies...

- **CC Resilience:** the ability of people and systems to anticipate, adapt to and recover from the negative effects of shocks and stresses in a manner that reduces **vulnerability**
- **CC Vulnerability:** Sensitivity or susceptibility to harm and lack of capacity to cope and adapt

Online Course IWRM for climate resilience: <https://cap-net.org/iwrm4climateresilience/>



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Thank You



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