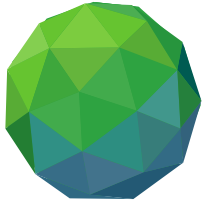


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Climate Rationale for GCF Water Projects

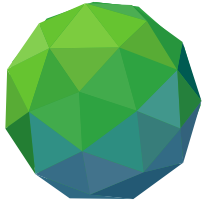
Alastair Morrison
Water Sector Senior Specialist
Green Climate Fund

Technical Workshop on Project Preparation
Centurion, South Africa
19th September 2018



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Background and Context



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Water and Climate Change

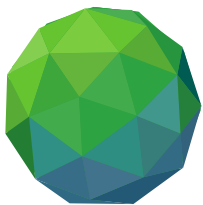
“it is through the water sector that most of the impacts of climate change will be felt....”

Runoff Flood Flows Erosion Drought

Sea levels Wave heights Storm frequency

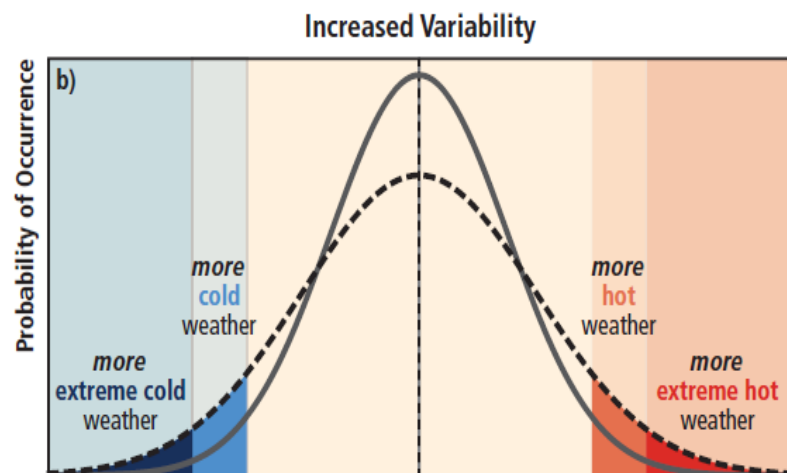
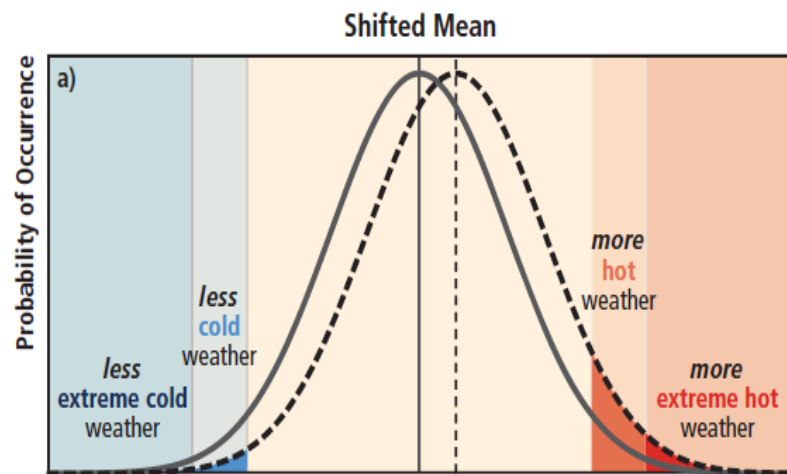
Rainfall Landslides Water-related diseases

Evapotranspiration Glaciation



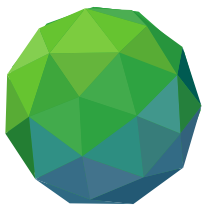
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Climate Change is causing changes in Distribution of Extreme Climates



A changing climate leads:

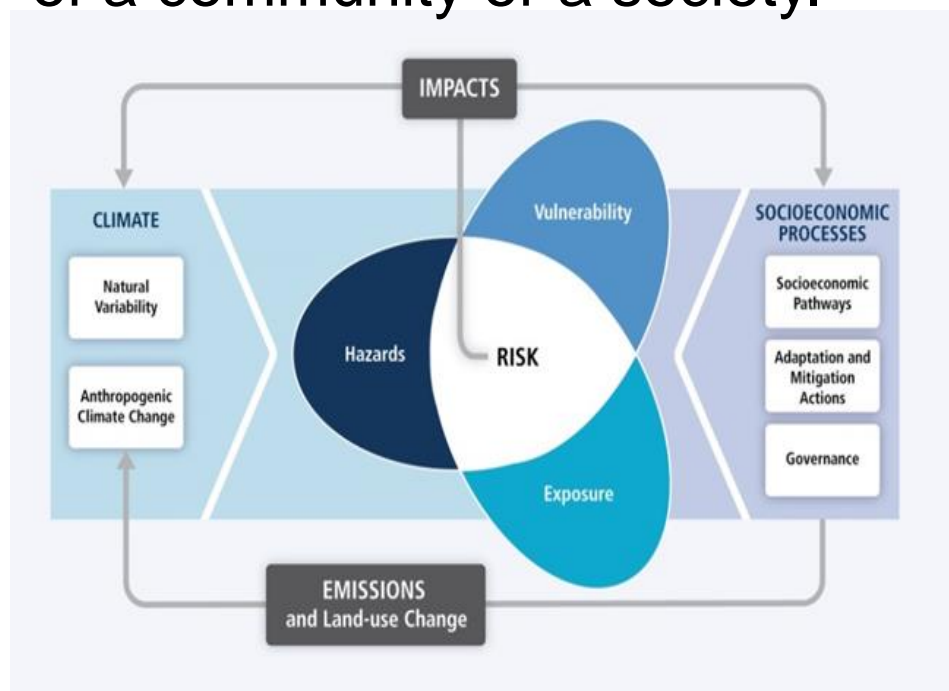
- Threshold changes in mean, variability and extremes
- Changes in frequency, intensity, spatial extent, duration of extreme climates
- Timing of extreme events can result in unprecedented extreme climate events.



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Disaster Risk, Climate Change and Low-Emission Climate-Resilient Development.

Climate disasters occur when **extreme climatic events** interact with **vulnerable social, economic and environmental conditions** leading to **severe alterations** in normal functioning of a community or a society.

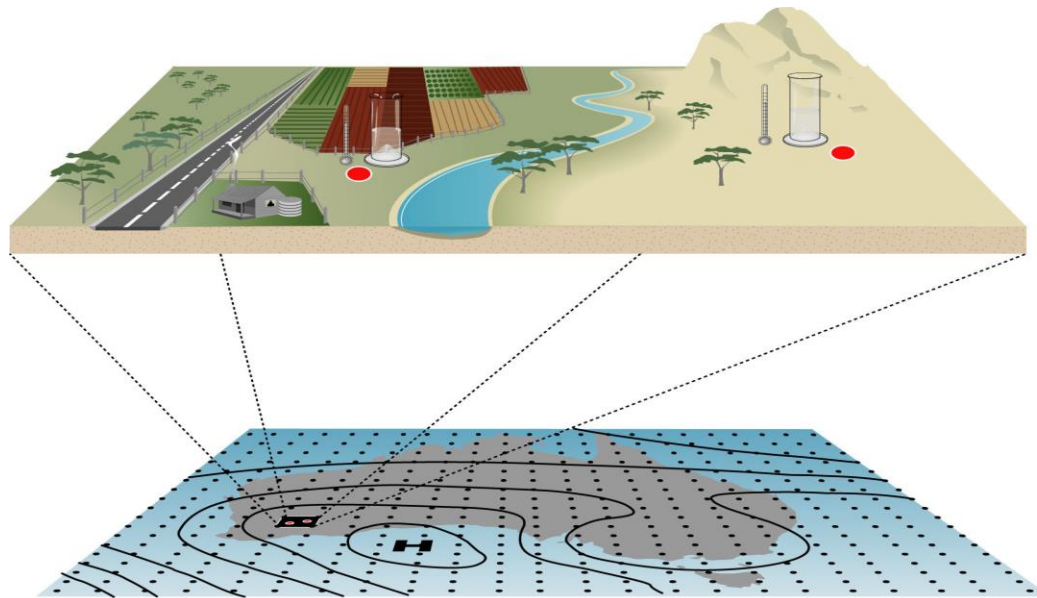


- **Disaster risk** – intersection of exposure, vulnerability and hazard/extreme events
- Climate events affect vulnerability to future extreme events by modifying resilience, coping capacity, and adaptive capacity

Source: IPCC, SREX 2013



Countries Face Challenges Accessing Robust Information at Project Scale



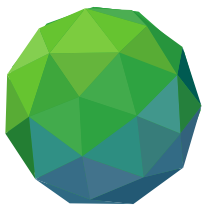
... from a global climate model (GCM) grid to the point of interest.

information is required at project scale for establishing GCF climate rationale



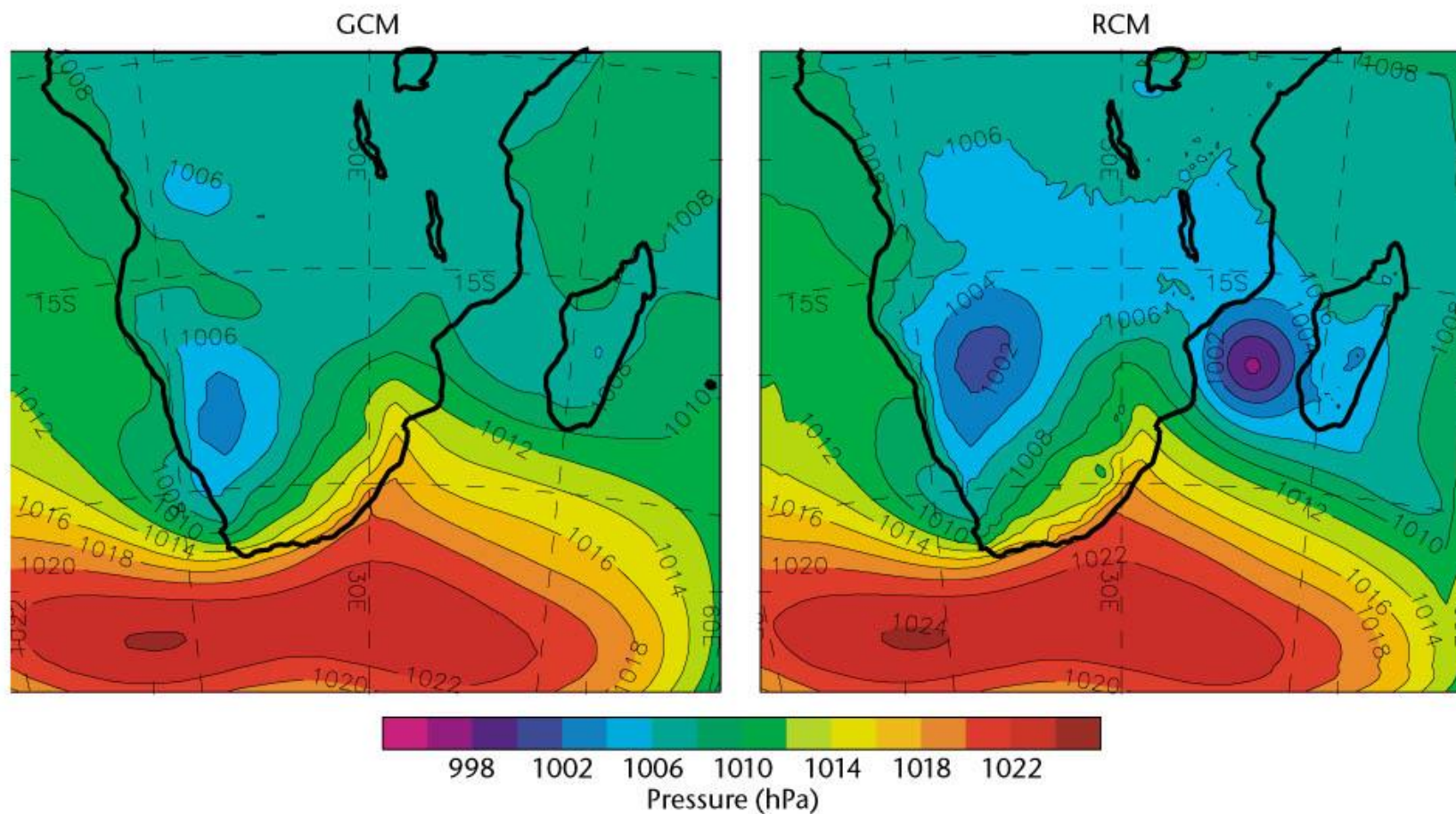
Downscaling
(2-way nesting)

Existing information for establishing climate rationale often at coarse resolution

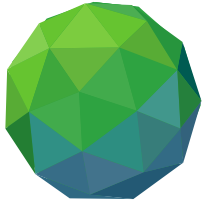


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High-Resolution Climate Models

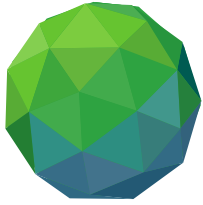


Project scale requirement for simulating extreme events e.g. tropical cyclones



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Climate Rationales in the Water Sector



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Climate Rationale and the Project Intervention



CLIMATE CHANGE

CLIMATE IMPACT

VULNERABILITY

INTERVENTION

PARADIGM SHIFT

1) Climate Science Basis
Scientific underpinning for evidence-based climate rationale and theory of change of all GCF-funded projects and activities



Adaptation	Mitigation
2a) Climate impacts the project/programme aims to address 2b) Vulnerabilities, exposure and hazards resulting in risks	2a) Emission trajectory for the relevant country and sector 2b) Potential pathways to shift projected emissions trajectory



3) Prioritized interventions for addressing barriers based on a multi-criteria analysis of options



4) Integration to broader domestic and international policy and decision-making processes



CLIMATE RATIONALES

Providing for an increased demand for water:

- Due to higher global temperatures – not urban heat islands
- More evaporation, evapotranspiration, increased domestic water use
- Increasing population – unless migration induced by climate change
- Most other per capita water use increases
- Industrial and agricultural expansion
- Deteriorating infrastructure



CLIMATE RATIONALES

Adapting to sea level rise:

- Thermal expansion of the oceans
- Melting icecaps
- Land subsidence due to groundwater extraction –
 - unless extraction was a result of another climate change impact
- Geological movements – e.g. post-Ice Age rebound



CLIMATE RATIONALES

Managing coastal and river erosion:

- Changing storm frequencies and magnitude
- Changing river flows
- Higher rainfall intensities

- Land use changes
- Sediment transport blocked by dams, groynes and breakwaters
- River flows reduced by abstractions
 - unless abstractions impacted by climate change themselves
- Sand mining



CLIMATE RATIONALES

Adapting to Saline intrusion:

- Rising sea levels
- Stronger and more frequent cyclones
- Larger storm surges
- Reduced fresh water flows
 - but not if caused by (most) upstream water abstractions
- Overpumping of coastal aquifers

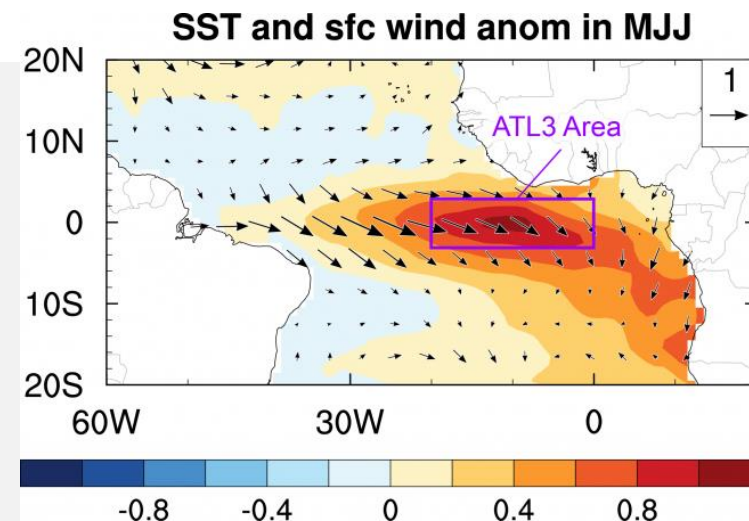


CLIMATE RATIONALES

El niño / La niña:

- Long term phenomena – since records began
- Not in itself GHG climate change induced
- Need evidence of trends

- But impacts may be greater when combined with other climate change impacts, e.g. glacial retreat and temperature rises leads to more rain, less snow, and higher runoff

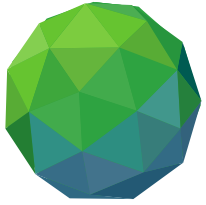




ADDITIONALITY

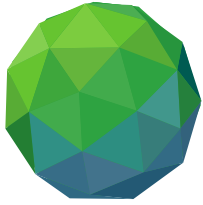
Summary:

- What would be happening if there were no GHG induced climate change?
- What is happening / will happen due to climate change?
- What extra impacts need to be addressed?



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Climate Rationale in successful projects



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Maldives- Vulnerable Community Support Project



Location : Indian ocean

Small-low lying coral islands : 1190 (24 atolls)

Inhabited islands : 194

Population/beneficiaries : 399,000/105,000

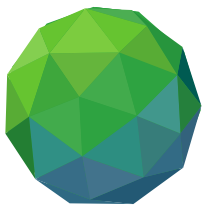




Maldives Project – Climate Rationale

The rationale was based on - historic meteorological records ,output of GCM's , studies by different organizations

- **Rainfall - decrease and change in pattern**
Greater extremes (dry periods and heavy rainfall) - risks of droughts and floods
- **Groundwater- vulnerable**
Freshwater lens decrease (at least 50% or complete) - during the dry season or successive low rainfall years.
- **Sea level rise – island overtopping and coastal erosion**
Increase saline intrusion into freshwater lenses
- **Hydro-meteorological disasters**
Storm surges and coastal flooding - 90 islands (at least once every year)



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Maldives- Impacts & Interventions

Primary Impact: Available drinking water supplies

Project Interventions : Climate resilient water supply system

1. Rainwater harvesting systems
2. Desalination plants
3. Groundwater recharge systems & monitoring protocols
4. Early warning systems



Senegal - Integrated Urban Flood Management Project

Location : Senegal, West Africa

Population : 15.85 million /25% in Greater Dakar region

Background issues : rapid urbanization-unplanned urban development, intense population growth and urban migration.

Primary Impact: frequent urban flooding- high intensity rainfall events





Senegal Project – Climate Rationale

The rationale was based on – Ensemble model project outputs, past studies and statistical projections

Temperature change:

- Mean annual temperature - increased by 0.9°C since 1960, an average rate of 0.20°C per decade.

Rainfall decrease and change in pattern:

- Significant decreases -10 to 15 mm per decade in the southern regions of Senegal – longer dry periods
- Overall decrease, but a greater proportion of this precipitation will occur in heavy rainfall events - flooding



Senegal Project Interventions

- Flood risk mapping and awareness raising campaigns
- Regulatory recommendations – guidebooks – proposition of incentives
- Tools for adequate investment in flood management infrastructure
- Drainage and sanitation infrastructure in Pikine Irrégulier Sud
- Real-time hazard monitoring in Greater Dakar.
- Support to integrated flood risk management policy-making.
- Project management assistance



Samoa - Integrated Flood Management to Enhance Climate Resilience of the Vaisigano River Catchment

Location : Samoa (SIDS), Pacific ocean

Population/beneficiaries : 190,000/65,528

Coastal areas : 70% population

Economy : Agriculture, fisheries, development aid and remittances





Samoa Project – Climate Rationale

Projected climate change scenarios cited by the Australian Commonwealth Scientific and Industrial Research Organization (CSIRO) and other reports,

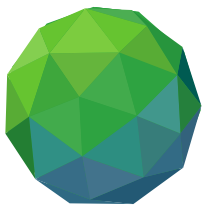
Rainfall pattern:

- More frequent and extreme rainfall events
- Frequent and longer drought events

Extreme events:

- Increased air and water temperatures
- Sea level rise
- More frequent extreme wind events- cyclones and storms





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Samoa Impacts & Interventions

Impact :

- Cyclone Evan (Category Three)-2012, damages- more than US\$200 million.
- Flooding of the Vaisigano River - drainage system was unable to cope resulting in extensive flooding of lower Apia

Project Interventions:

- Developing an integrated sewage system for Aua village.
- Resilient key infrastructure development along the Vaisigano River.
- Support climate resilient livelihood options in the Vaisigano River catchment.
- Developing a climate resilient drainage master plan and also upgrading drainage systems in specific high priority hazard area.



Ethiopia- Responding to the increasing risk of drought: building gender-responsive resilience of the most vulnerable communities

Location : Ethiopia (60% dry land)

Impacted by: Droughts

Beneficiaries : 300,000 (50% women)

Agriculture : Rainfed

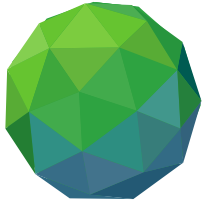




Ethiopia Project – Climate Rationale

Climate projections, IPCC, UNFCCC and other studies reports that;

1. Increasingly high variability in rainfall between years
 - incidence of droughts and floods - increased in the last 10 years
 - low food and water security
2. Changing weather patterns +land overexploitation+ deforestation
 - increased soil degradation and water stress, drought, and crop failure.
3. Temperatures increases
 - mean annual temperature, increase in the range of 0.9-1.1°C



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Ethiopia Impacts & Interventions

Impacts:

2015/16, a severe drought threatened 1/10th of the country's population (c.10.3 million people) with catastrophic food shortages.

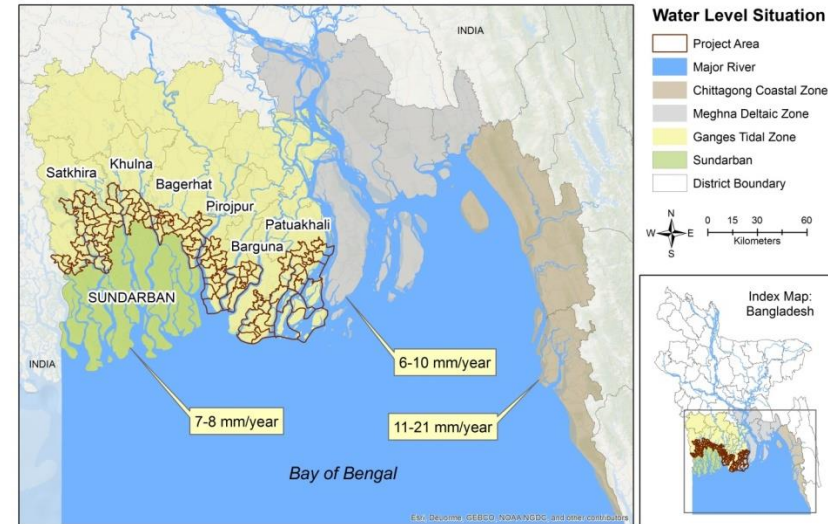
Project Interventions:

- Develop water schemes
- Small scale irrigation and water retention structures
- Manage degraded lands around the water sources
- Improved capacity development of both men and women - management and administration of irrigation and potable water schemes and enhanced communication and learning
- Institutional framework and local management instruments strengthened



Bangladesh- Enhancing adaptive capacities of coastal communities, (women) to cope with climate change induced salinity

Location : Khulna and Satkhira, Bangladesh
Coastal zone : 38.52 million people
Beneficiaries : 719,229





Bangladesh Project – Climate Rationale

The rationale was based on - meteorological records ,several climate models, studies by different organizations

1. Storm surges and cyclones:

- increased intensities of tropical storms
- surface water salinity

2. Sea Level Rise : increase of 6-21 mm/ year

- Increased coastal flooding, erosion and saltwater intrusion

3. Rainfall and temperature : higher than average monsoon rainfall

- winter months becoming warmer and drier
- monsoon months become warmer and wetter.
- Increased monsoon rainfall may lead to high intensity floods

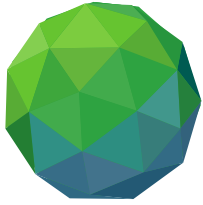
4. Salinity :

- increase surface and groundwater salinity
- soil salinity (agriculture affected)



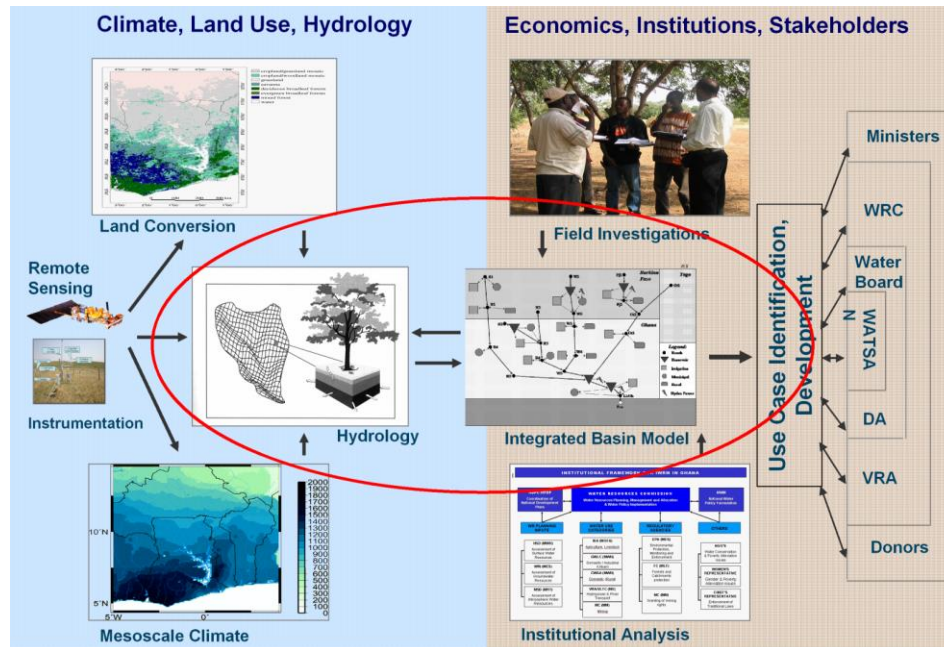
Bangladesh Project Interventions

- Enterprise and community-based implementation of climate-resilient livelihoods for women - for enhanced adaptive capacities of coastal agricultural communities
- Strengthened climate-resilient value-chains and market linkages for alternative, resilient livelihoods
- Community-based monitoring and last-mile dissemination of EWs for climate-risk informed, adaptive management of resilient livelihoods



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To sum up - Robust Climate Rationales



*Decision Support System for transboundary Volta Basin
(Source: GLOWA-Volta Basin Project)*

- Credible science, robust assessment of impacts and disaster risks (IPCC)
- A set of optimal interventions that comprehensively addresses underlying climate risks
- Integrating interventions into decision-making for long-term low-emission climate resilient development

For more info, visit www.greenclimate.fund

Quick links

[GCF 101](#)

[GCF portfolio](#)

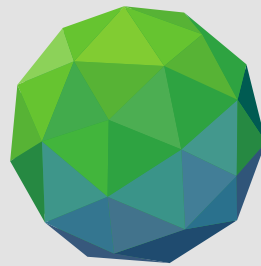
[Accredited Entity composition](#)

[Resources mobilized](#)

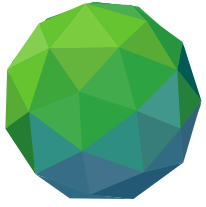
Alastair Morrison

GCF Water Sector Senior Specialist

amorrison@gcfund.org



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Ongoing development



Secretariat's Work on Enhancing Climate Rationale

* Objective

Develop the concept, scientific methodology, guidelines, data and other technical resources, and an implementation approach for enhancing the climate rationale of all GCF-financed projects and activities

* Value Proposition

- Provide the means for analysis as well as inputs that can strengthen the articulation of the climate rationale in country programs and GCF funded activities and investments
- Promote climate information development and improve project climate rationale
- Provide technical assistance to entities and NDAs in designing of Concept Notes and Funding Proposals

Expected Outcomes

(1 of 2)



Better GCF projects

- Climate risk-proofing of GCF investments
- Climate effectiveness – Value for investment
- Improve the quality of GCF funded activities based on objective, scientific, evidence-based, data-driven conclusions and analysis
- Robustness of climate information at project scale

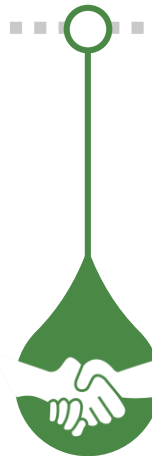


Alignment to mandate

- Focus on climate change vs. development (transformational projects)
- Incremental and full costs of proposals
- Concessionality
- Co-financing

Addressing of country priorities

- Better and evidence-based country climate priority setting as reflected in NDCs – linked to the Paris Agreement Global Stocktake 2020
- Input to IPCC reports

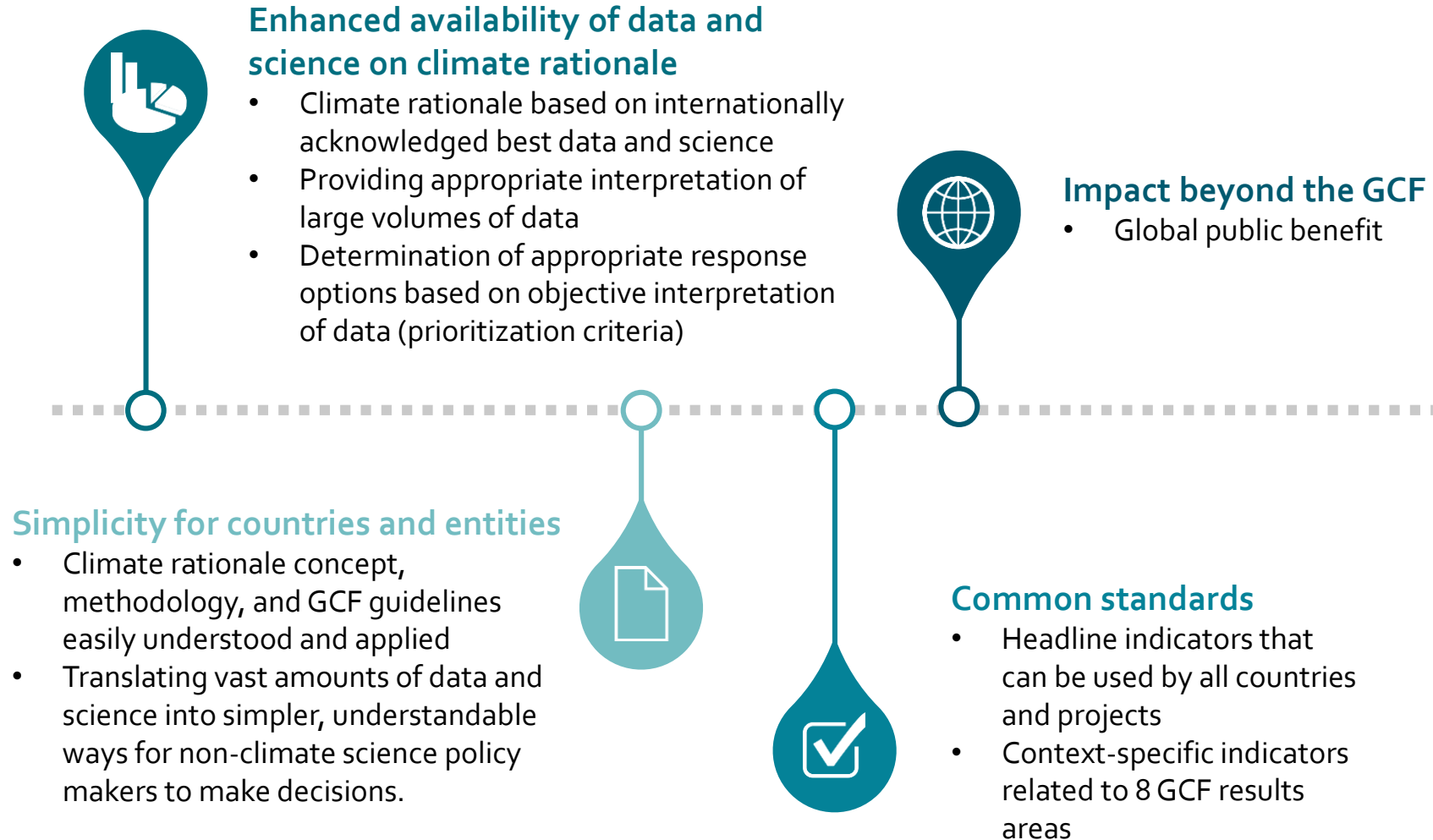


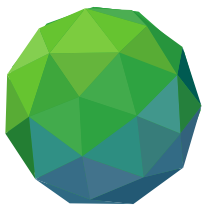
Strengthening of country capacity

- Better country capacity on climate analysis and delivery of climate services
- Strengthen National Meteorological and Hydrological Services (NMHS)
- Business driven, hands-on, capacity building for climate services provision

Expected Outcomes

(2 of 2)





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Roadmap

