Transformational Climate Resilience Water Project Concepts
in Africa for the Green Climate Fund

GCF Climate Rationale, focus Water

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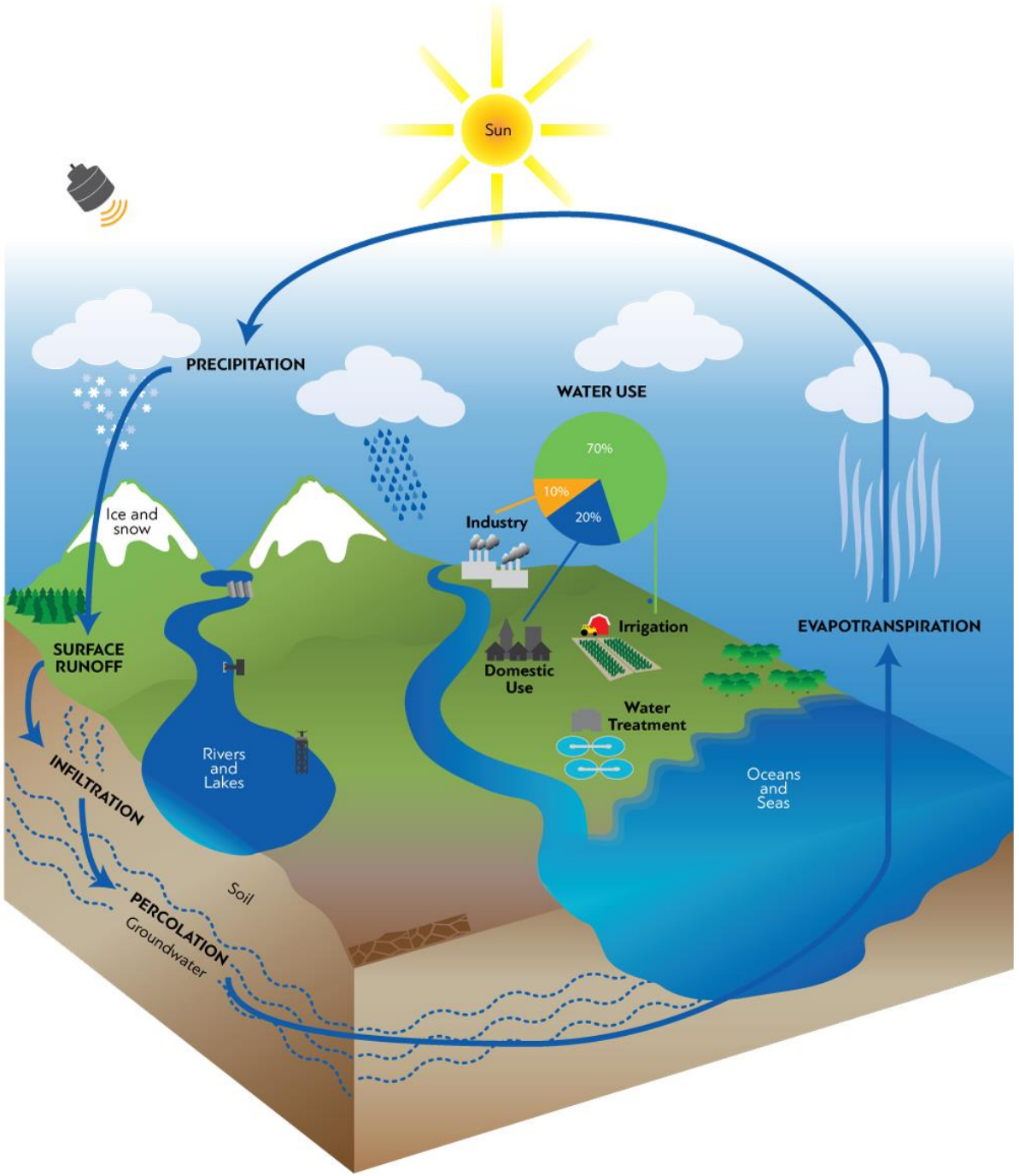
Messages

- **Water complexity: sound decisions based on appropriate data: a value chain**
- **Sustainability of achievements**
- **Converging goals, Networked activities**
- **WMO is dedicated to support efforts in Climate and Water**

Hydrological cycle Complexity



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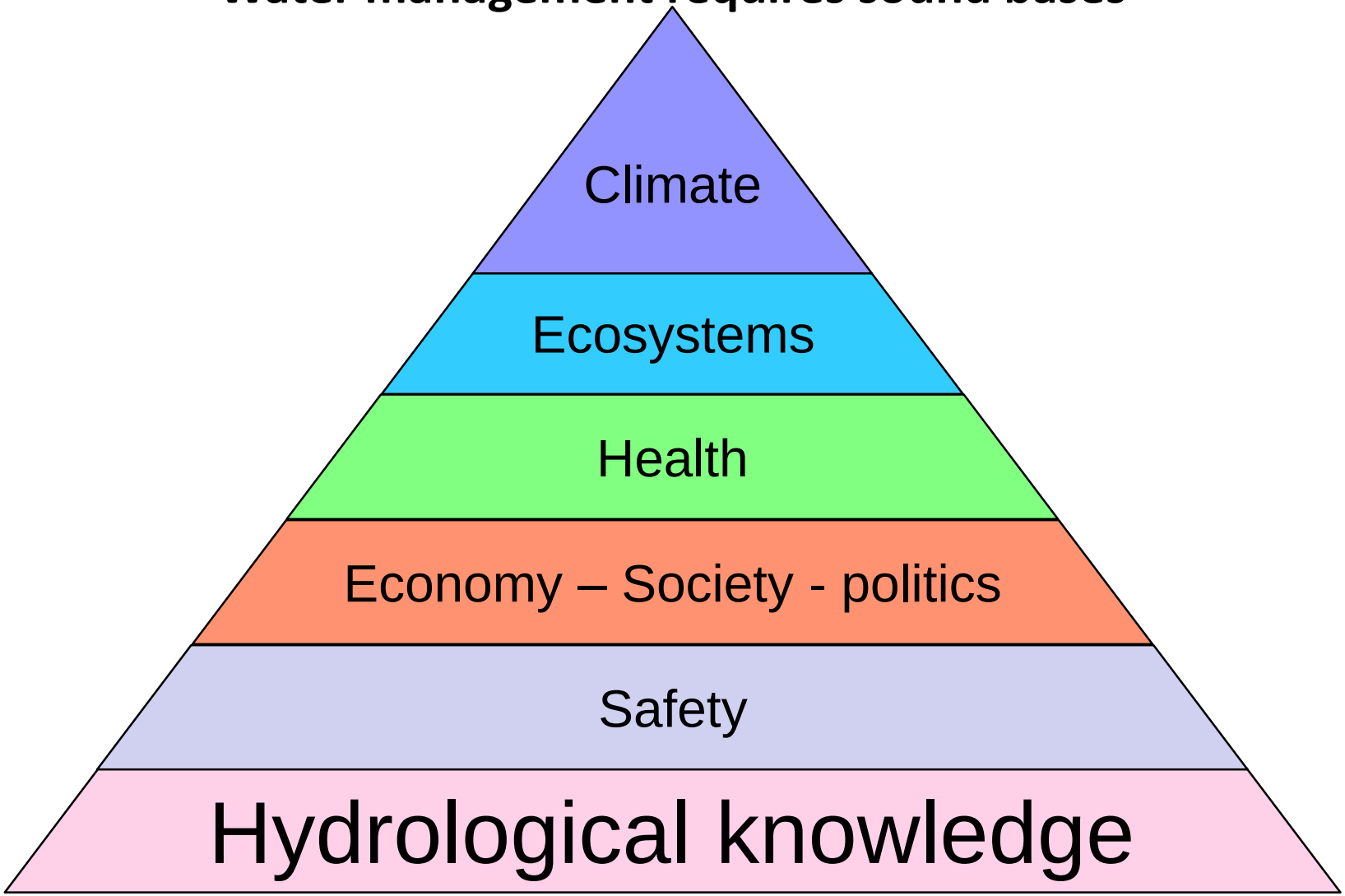
Water management requires sound bases



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GCF climate rationale **value proposition**

- **Country priorities and capacity**

- **Projects**: Better GCF projects
  - "don't do stupid things" - climate risk proofing of GCF investments
  - "no regrets"
  - "best bang for the buck" - climate effectiveness

- **Achievements**: sustainable!

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Climate rationale **guiding principles**

- **Best available data and science**
- **Simplicity**: Climate rationale concept, methodology, and GCF guidelines need to be easily understood and applicable

- **Common standards**: GCF climate rationale will create a common standard
  - Headline indicators used by all countries and projects
  - Context-specific indicators related to 8 GCF results areas
- **Impact beyond GCF**:
  - strengthen climate evidence and more evidence based country decision making
  - Strengthen National Meteorological and Hydrological Services

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From data to rationale – climate rationale **value chain**

- **Appropriate data**:
  - define which data and dataset is appropriate to use, where to find it, and how to process it
  - Assess dataset quality, uncertainties and prediction capabilities
- **Setup data products**
  - Analyzes, statistics, models
  - understand what it is saying
  - make appropriate interpretation
- **Appropriate response options**
  - identify and prioritize appropriate response options
  - taking into account other considerations such as feasibility, capacity, etc.

Working through these steps is an accompanied process

Climate rationale – **scientific elements**

- **State of the climate indicators** – "Headline" indicators characterizing the state of the climate system
  - Means, trends and variability of surface temperature, precipitation, sea-ice extent, glacial extent, sea level, ocean heat content and acidity
- **Sector- and impact-specific indexes** – Context-specific climate-related indexes associated with specific socio-economically relevant/sector outcomes
  - Essential climate variables relevant for climate-sensitive sectors (soil moisture, humidity, vegetation, streamflow, solar radiation, wind speed), sector-specific indices
- **High-impact events** – Events potentially associated with significant and widespread, multi-sectoral, impacts
  - Heatwaves, floods, droughts, storms, severe weather, etc. and their return periods

Climate rationale – **Summary at this stage**

Bad news: you need data

Good news: you need data

Other Good news: you are not alone…

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Current status of availability and access to data and products from CSIS entities

Availability of data and products (Non-exhaustive list)

More than 10 types of proxies (corals, insects, pollen, tree rings, …)

Paleoclimatology proxies
CRU, NOAA

Reconstructed variables
CRU, NOAA

Frequency: Sub-daily, daily or monthly

In situ data

Global	Regional	National
GHCN-Daily	RBSN	BOM CDO
~90 000 stations	~4 000 stations	~16 000 stations

More than 200 variables available from stations

Climate extreme indices
ETCCDI: 27 indices for more than 100 countries
ICA&D: > 50 indices for more than 15 000 stations

Gridded data and gridded merged data
CRU: 0.5° × 0.5°
GPCP: 1.0° × 1.0°
CMAP: 2.5° × 2.5°

Remote sensing data
EUMETSAT, WDC-RSAT: satellite-based data ~few km
NOAA NCEI: radar data ~few km

Atmospheric measurements
6 GAW WDCs: > 1 400 stations

Reanalysis
more than 10 global reanalysis: > 100 km
ERA-Interim, ERA-15, ERA-40, NCEP-NCAR, JRA-55, …
dynamical downscaling of global reanalysis: CORDEX, CaRD10
regional reanalysis: NARR, ASR
~10-50 km

Graphical tools

ENACTS
maps
data: > 30 years, 4-5 km grid

IRI Map Room
maps, graphics, animations, data

ClimatView
station monthly T2m, RR
1982-present, > 2 500 stations

WMO WWIS
station normals T2m, RR
~1 900 stations

Frequency: Daily to monthly

Monthy/seasonal LRF
Global

13 GPCLRFs	maps
2 Lead Centers	data ~2.5° × 2.5°
APCC	hindcasts ~20-30 yrs
IRI	skill scores

T2m, RR, SSTs, MSLP, T850, Z500

Frequency: Monthly

Monthy/seasonal LRF
Regional

8 RCCs	maps
3 RCC-Networks	data ~30 km

T2m, RR

Frequency: Quarterly

Updates
Global
GSCU (Trial)
El Niño/La Niña Update

Major circulation features

Frequency: Once or twice per year

Probabilistic outlook and consensus statement

Regional	National
19 RCOFs	NCOFs

T2m, RR

Frequency: Annual

Annual to Decadal predictions
Global
GPC-ADCP
LC-ADCP
global maps
variables averaged over year 1 and years 1-5
data
time resolution: daily
hindcast data

T2m, RR, SLP, MOC

Updates
Global
GA2DCU (Concept)

Major circulation features

Climate change projections

CMIP5
61 models
~20-200 km
historical run: 1850-2005
nominal timescale
time period: 2100 and beyond
time resolution: daily

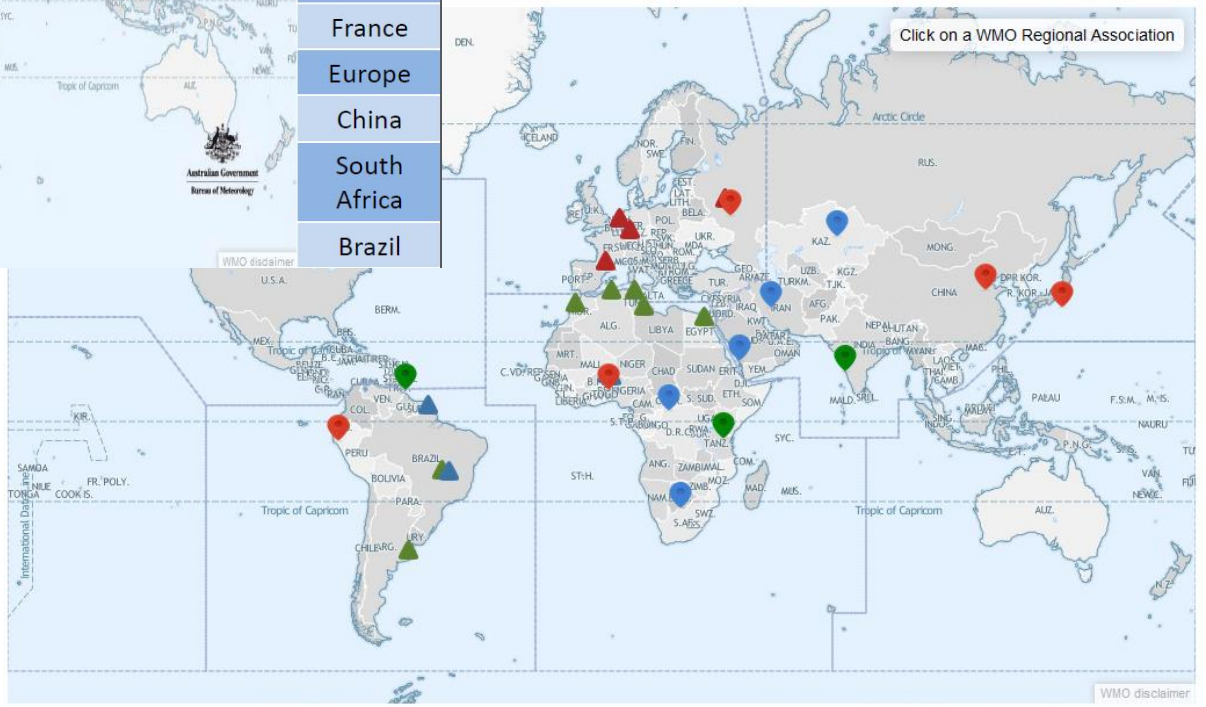
CORDEX
Several global/regional models
14 domains
~12-50 km
nominal timescale
time period: until 2100
time resolution: daily

Climate rationale - **WMO network** delivery partners

GPCs	Countries
Montreal	Canada
Washington	USA
Moscow	Russia
Exeter	UK
Seoul	Korea
Tokyo	Japan
Melbourne	Australia
Toulouse	France
ECMWF	Europe
Beijing	China
Pretoria	South Africa
CPTEC	Brazil

- NMHSs
- Regional Climate Centres

- Global Producing Centres
- Global data centres and other specialized centres



Legend

designated RCC
RCC in demonstration phase
RCC proposed
designated RCC-Network
RCC-Network in demonstation phase
RCC-Network proposed

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River basin scale indicators

- Hydrological regime and its change
- Freshwater withdrawal/derivation as a proportion of available, renewable freshwater resources
- Specific discharge (mean value and different return period values)
- Large lakes and reservoir levels
- Groundwater level and recharge
- Standardized Precipitation Index
- Spatio-temporal limit of solid/liquid precipitation
- Snow cover and yearly repartition
- Glacier variation

Climate rationale, water and WMO

- Water resource and extremes highly impacted by Climate change
- Better understanding of natural and man-made processes
- Recomputation of event probabilities and magnitude

$\Rightarrow$ Increasing need of data and models

$\Rightarrow$ Especially data must be standardized for intercomparizon and sharing.

$\Rightarrow$ WMO is supporting the value chain from services to data

Activities in Hydrology

DATA PRODUCTION & COLLECTION	DATA PROCESSING & STORAGE	DATA VISIBILITY & AVAILABILITY	DATA RESCUE & SERVICES
World Hydrological Cycle Observing System (WHYCOS) Standardisation and quality management QMF	Meteorological, Climatological and Hydrological (MCH) Database Management System	WMO Hydrological Observing System (WHOS) Global Data Centers WaterML 2.0	Global Data Centers: Global Runoff Data Centre (GRDC), International Data Centre On Hydrology Of Lakes And Reservoirs (HYDROLARE) & International Groundwater Resources Assessment Centre (IGRAC)

HYDROHUB, the WMO Global Hydrometry Support Facility

WWDI, the Word Water Data Initiative

HydroSOS, the Status and Outlook System

MODELLING & FORECASTING | **EARLY WARNING DISSEMINATION** | **DECISION SUPPORT** | **RESPONSE TO WARNING**

CAPACITY BUILDING

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Climate rationale, next steps for WMO

- **3 selected pilot countries: Nepal, DRC and Antigua and Barbuda**
- **Pilot work in the next 18 months**
- **National workshops with regional focus**
- **Scaling up**

Conclusions

- **Water is a complex system: no good decision without good information: data are central**
- **Value chain from Decision to Data, Data to Decisions**
- **Different projects, partners and stakeholders, same interest: collaboration and coordination are key**
- **WMO can help!**

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Thank you
Merci

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