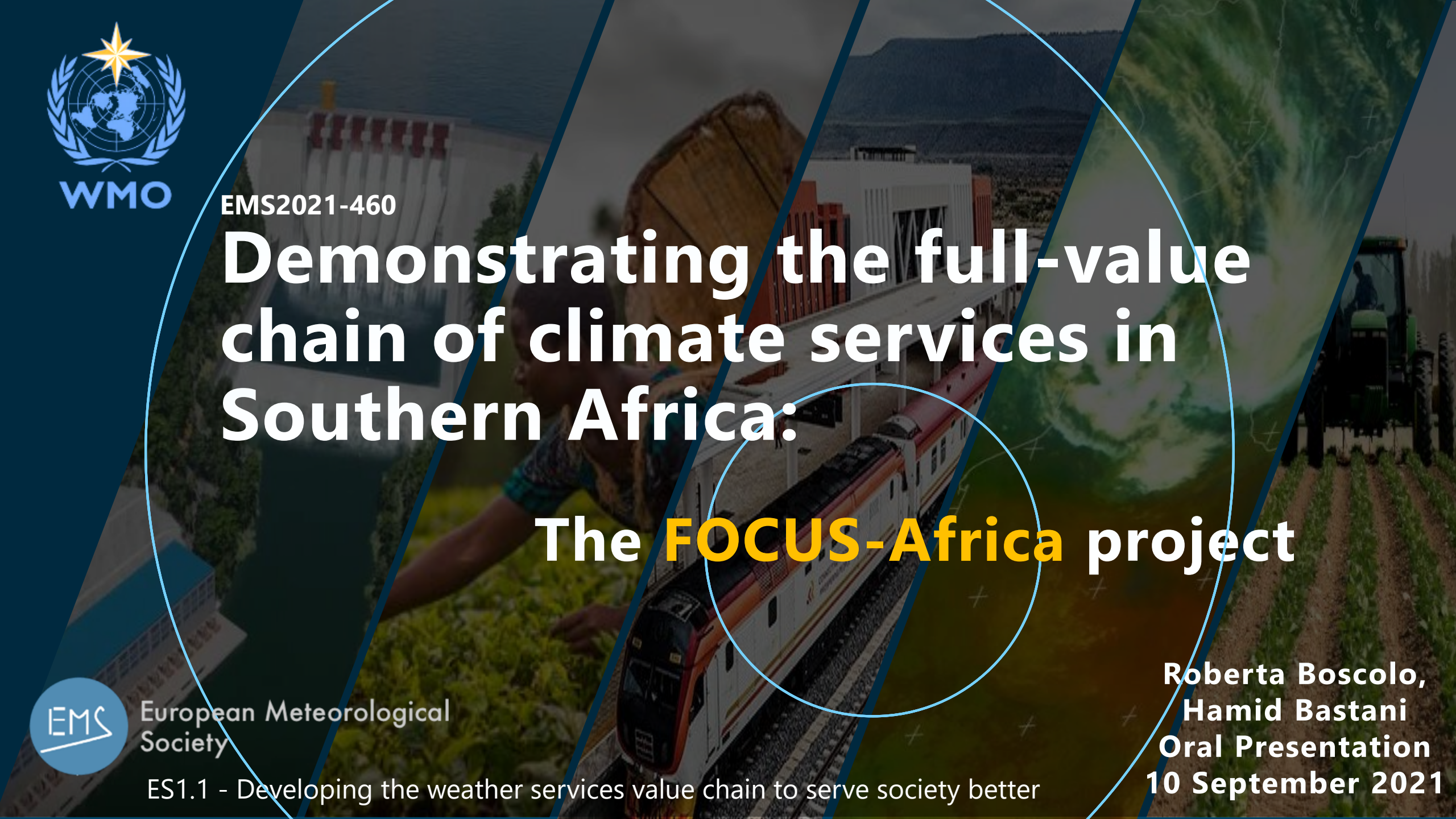


EMS2021-460

Demonstrating the full-value chain of climate services in Southern Africa:

The FOCUS-Africa project

Roberta Boscolo,
Hamid Bastani

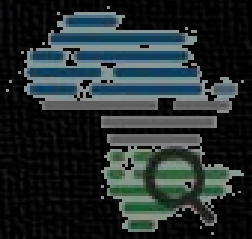
Oral Presentation
10 September 2021

European Meteorological Society

ES1.1 - Developing the weather services value chain to serve society better

Content

- Overview and structure of the project
- Work packages
- Project Case Studies
- Events, More information



Overview & structure of the project (Background)

Full value-chain Optimize Climate User-centric Services for Southern Africa (FOCUS-Africa)

Main objective

Develop **full value chain climate services** in the SADC region, by targeting specific sectors industry relevant case studies, while strengthening the underpinning climate prediction and projection science and assessment of associated socio-economic benefits.

Grant Amount : 7 million Euros funded by EU
Starting Date/ Duration : 1st September 2020/ 48 months
Main Sectors: Food security, Water, Energy, Infrastructure
Target Countries: South Africa, Tanzania, Mozambique, Malawi, Mauritius

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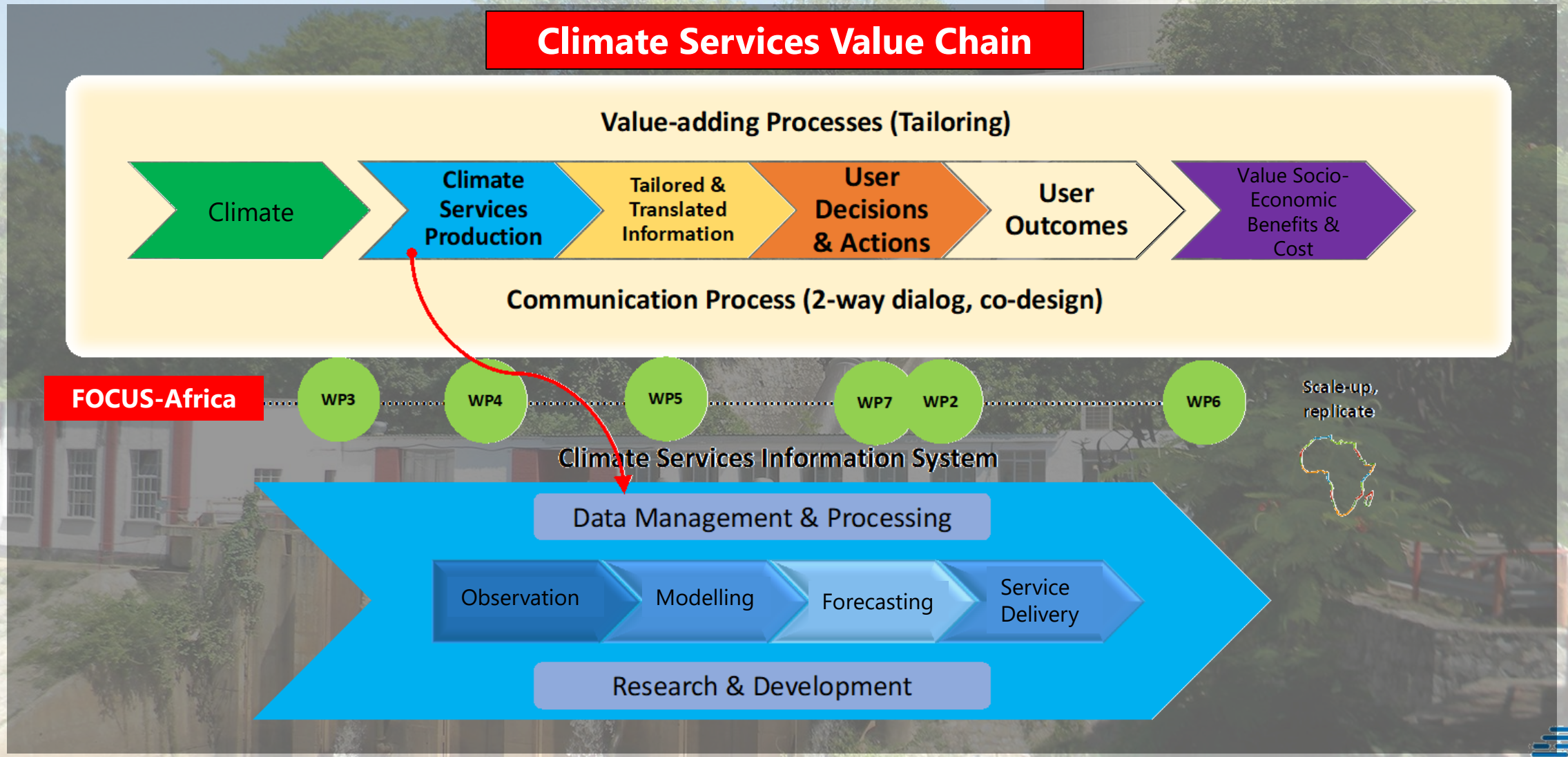
Overview & structure of the project (CS Value-Chain)



Overview & structure of the project (WPs, CSs)

Case Studies

Case Study	Country	Sector	Research / Timescale
CS1	South Africa	Food Security/Insurance	High-res Projections
CS2	Malawi	Food Security	Calibrated/Bias-corrected Seasonal Forecast
CS3	Mozambique	Food security / genetics	Seasonal Forecast/ projections
CS4	Tanzania	Food security	Seasonal Forecast / Projections
CS5	Tanzania	Infrastructure	Calibrated climate Projections
CS6	Tanzania	Renewable Energy	Seasonal Forecast / projections
CS7	Malawi	Energy/Water	Projections
CS8	Mauritius	Water	Seasonal forecast / drought indices

Work Packages

Work Packages	Topic	Responsible Entity
WP1	Stakeholder engagement, communication and dissemination	WMO
WP2	End-users' requirements and climate risks assessment	CSIR
WP3	Understand Climate Processes	MO
WP4	Methods and tools development	BSC
WP5	Prototypes of end-user tailored climate services development	WEMC
WP6	Socio-economic value assessment and Exploitation of climate services	LGI
WP7	Capacities Development	ACMAD
WP8	Project management	WMO & LGI

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Overview & structure of the project (Partners)

Project partners in Africa and Europe (16)

World Meteorological Organization, Barcelona Supercomputing Center, Met Office, World Energy & Meteorology Council, Southern African Development Comunnity, Electricité de France, African Centre of Meteorological Application Development, Council for Scientific and Industrial Research, LGI Consulting, University of the Witwatersrand Johannesburg, University of Cape town, Amigo SRL, JRC- Joint Research Centre – European Commission, Scuola Superiore di Studi Universitari e di Perfezionamento S Anna, Plan Italia Onlus, Department of Climate Change and Meteorological Services, Land and Agricultural Bank of South Africa, Instituto de Investigação Agrária de Moçambique, Mauritius Meteorological Services, Tanzania Meteorological Agency

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FOCUS-Africa
Work Packages

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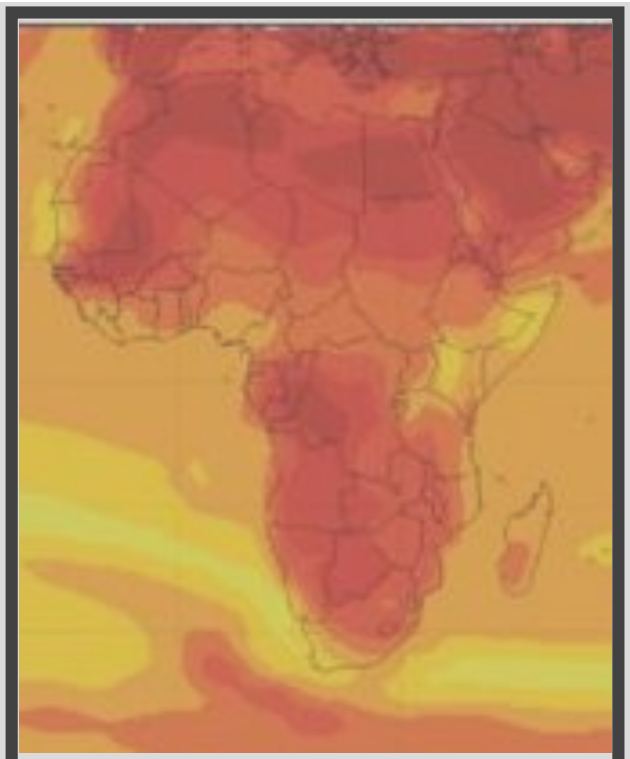

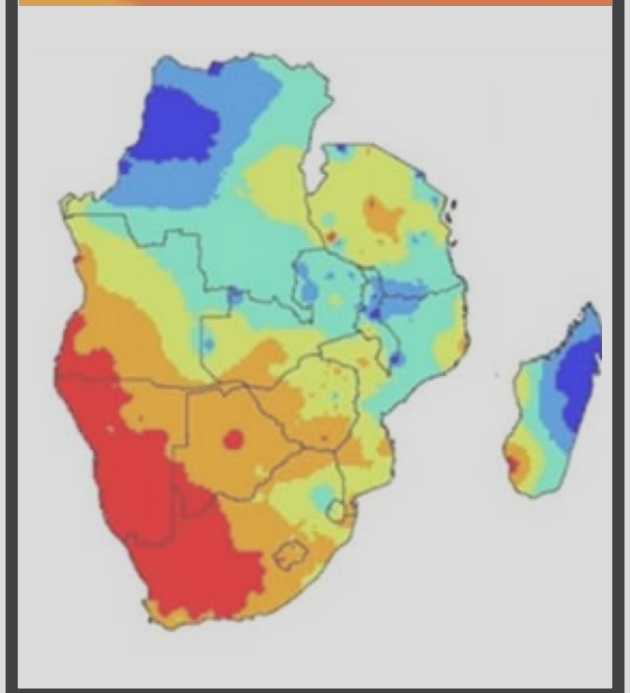

WP1: Stakeholder engagement, communication and dissemination (WMO)

This work package will ensure that the project results are shared with the wider stakeholder community to maximize the impacts in the SADC region and in the African and European continents.

Task 1	Plan and execution of stakeholders' workshops and consultations
Task 2	Establishment of the Advisory Board and project evaluation system
Task 3	Development and Execution of a dissemination and communication plan to outreach a wider stakeholder community in coordination with other relevant ongoing projects in Africa
Task 4	Implement Communication and Dissemination actions and develop materials to boost engagement
Task 5	Engage Stakeholders in a Responsible Research and Innovation Approach

1st Stakeholder Workshop

2nd Stakeholder workshop

To be held online from 14-15 September 2021
from 13:00 – 17:00 CET/14:00 – 18:00 EAT.
TOPIC:
Stakeholder needs, capacities and challenges in terms of climate services in Tanzania in Food Security, Energy, & infrastructure

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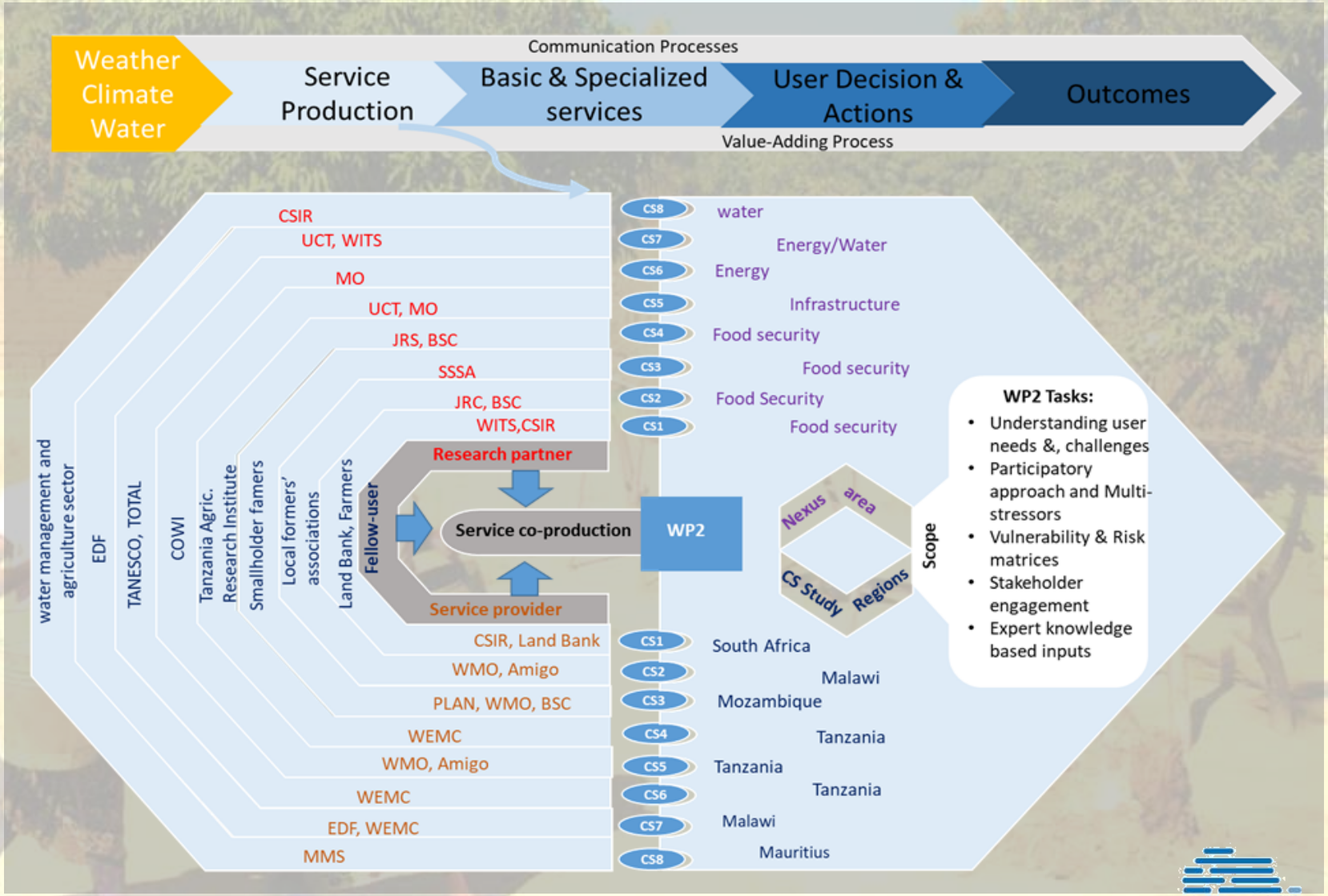
WP2: End-users' requirements and climate risks assessment (CSIR)

This work package will ensure users engagement for prioritising development needs and realistic solutions through innovative methods developed in the last few years in the context of climate variability and change as well as risk exposure and vulnerability.

Task 1	Climate services requirements, co-production and end user's challenges landscape
Task 2	Climate risk and vulnerability assessment



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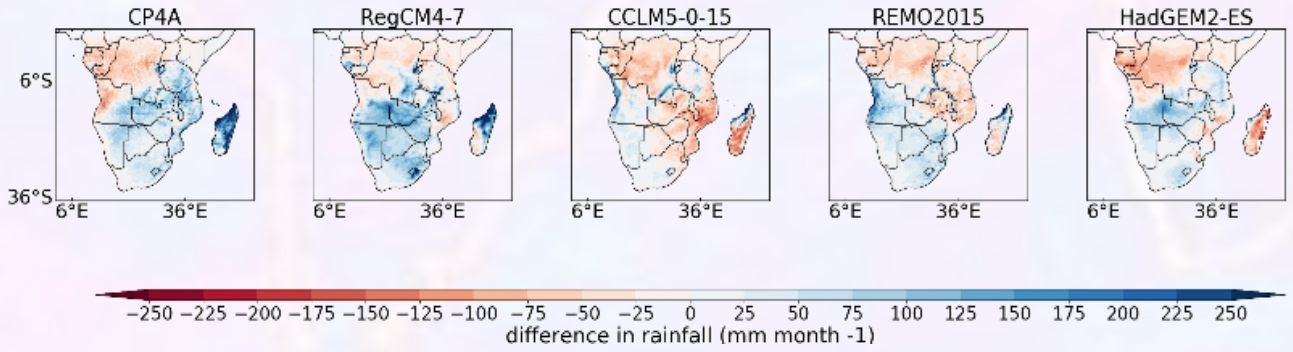
WP3: Understand Climate Processes (MO)

The aim of this task is to analyse the future climate and associated processes in the region in terms of wind, rainfall, solar and air temperature conditions based on the most recent high-resolution regional climate projections available (i.e. HELIX, PRIMAVERA, IMPALA).

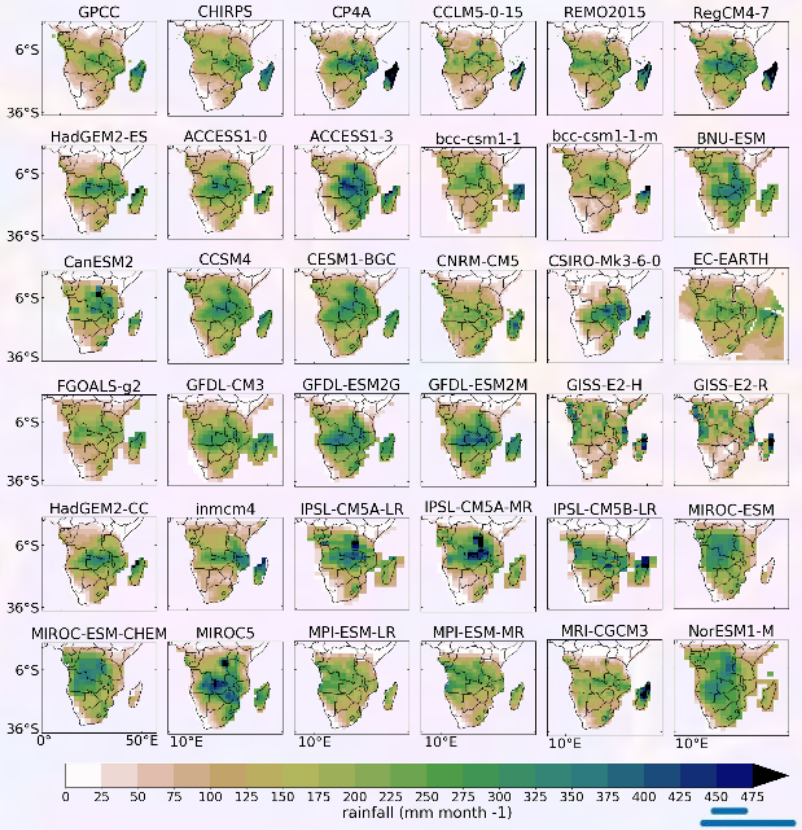
Task 1	High-resolution climate projection analysis
Task 2	Analysis of the predictability of seasonal and decadal forecasts
Task 3	Extreme events identification and variability

CMIP5, CORDEX & CP4A average rainfall bias over SADC when compared to CHIRPS (December, January, February)



Task 3.1 (August 2021): High-resolution climate projections analysis – UCT, MO, WITS, EDF

CMIP5, CORDEX & CP4A average rainfall comparison over SADC (December, January, February)



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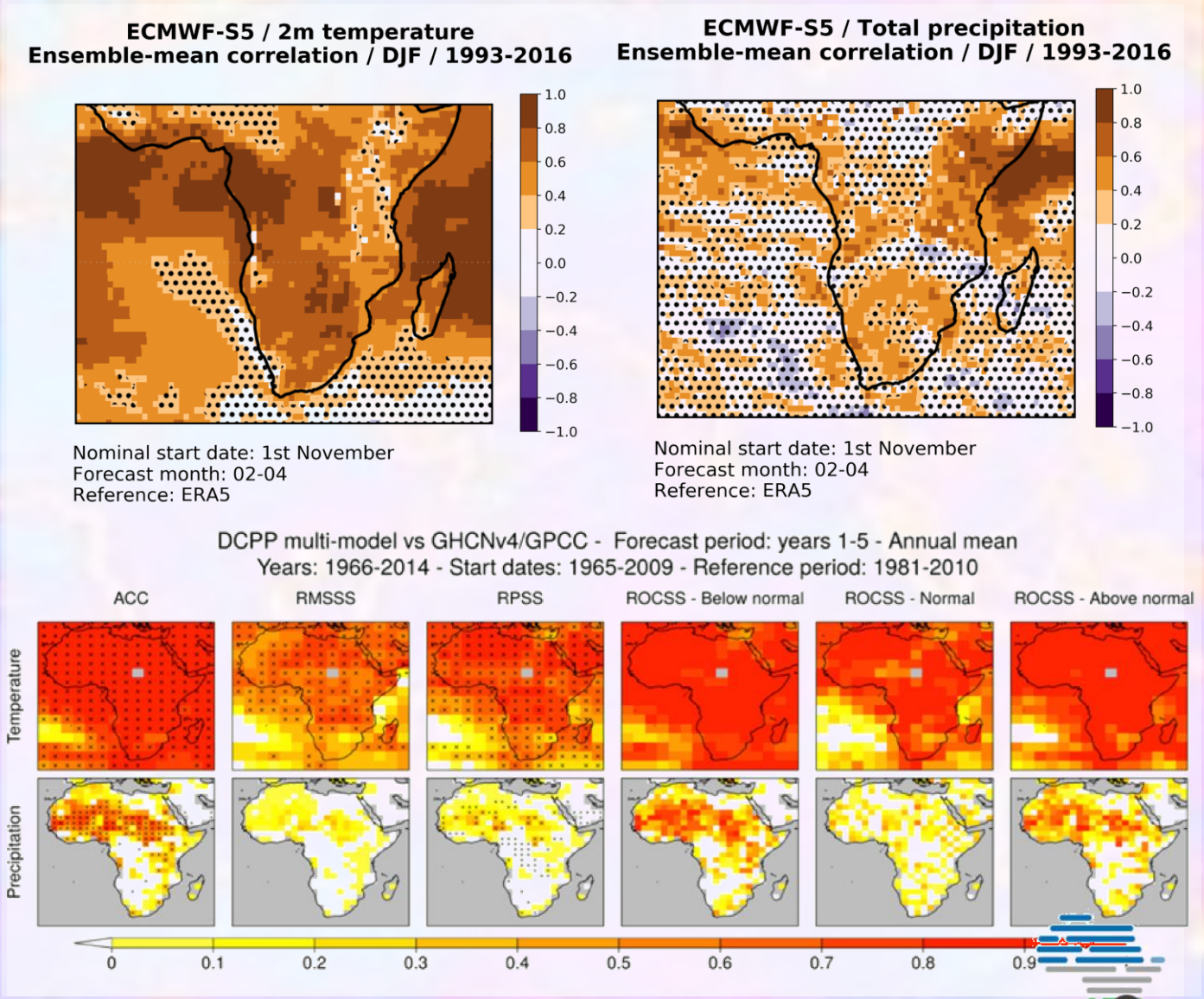
WP4: Methods and tools development (BSC)

This WP will focus on seasonal forecasts, decadal predictions and climate projections.

Task 1	Seasonal forecast quality assessment
Task 2	Climate projection and decadal assessment
Task 3	Implementation of multi-model and downscaling for seasonal forecasts
Task 4	Implementation of multi-model and downscaling for projections and decadal predictions
Task 5	Derived products using seasonal forecasts, climate projections and / or decadal predictions



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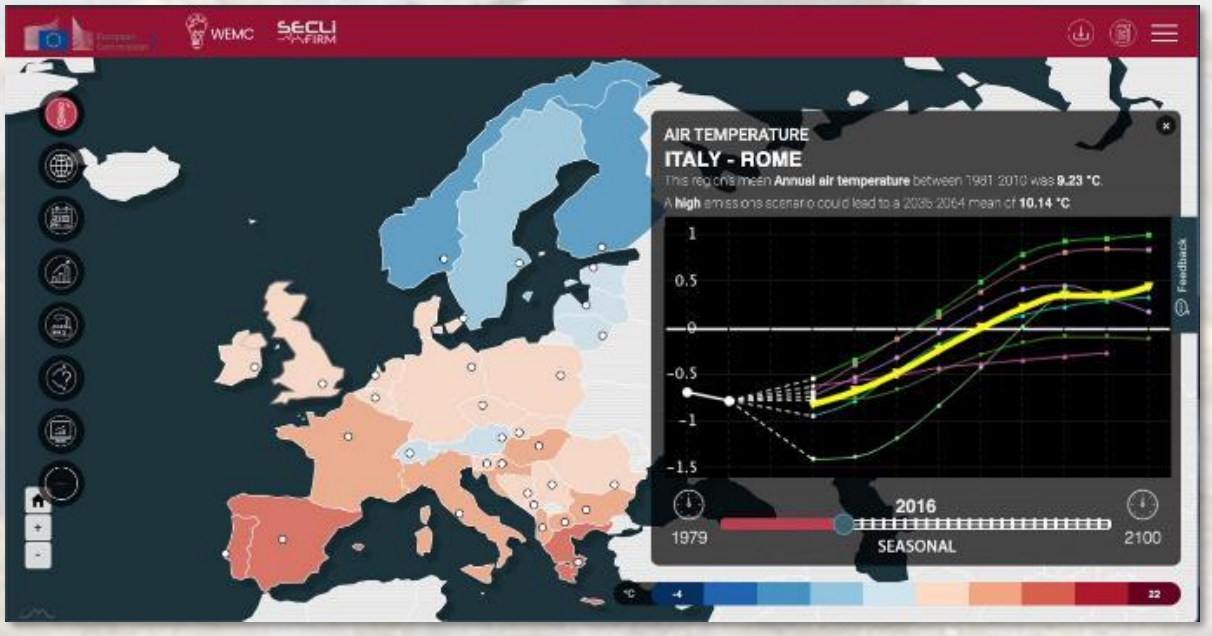
WP5: Prototypes of end-user tailored climate services development (WEMC)

This task will collate the output from relevant WPs (especially WPs 3 and 4) required to develop the case study prototypes. Work will be coordinated amongst all service delivery partners to ensure best practice is adopted, and possible commonalities are exploited.

Task 1	Collate output required to develop prototypes
Task 2	Plan co-designed and co-developed case study prototypes
Task 3	Development and delivery of prototype climate services



Building on EU projects such as SECLI-FIRM, S2S4E, CLARA, C3S (Energy, etc).

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WP6: Socio-economic value assessment and Exploitation of climate services(LGI)

The aim of this task is to define processes, methods and tools to be used all along the project to evaluate the socio-economic impact of the developed climate services.

4 Impact Assessment macro-categories

- Inclusive Economic Growth,
- Food Water Energy Nexus,
- Governance, Innovation, Partnership & Capacity Building,
- Climate Change & Disaster Resilience.

8 guiding principals:
Co-design, Relevant, Common language, coherent, transparent, pragmatic, ethical, long-term

Task 1	Definition of a socio-economic impact assessment approach tailored to the FOCUS-Africa context
Task 2	Ex-ante analysis. Subtask 6.2.1 Evaluation of the socio-economic situation. Subtask 6.2.2 Assessment of expected impacts and recommendations for improvement
Task 3	Ex-post analysis
Task 4	Market analysis and Scalability and Replicability Analysis (SRA)
Task 5	Definition of exploitation strategies

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WP7: Capacity Development (ACMAD)

This work package aimed at strengthening NMHSs and other climate services providers capacity using latest advances in science and technology

- Assess training needs,
- Review and upgrade existing curricula on data, monitoring, forecasting and climate change detection and scenario development,
- Develop and test new materials with RCOFs and intra ACP GFCS initiatives.

Task 1	Assess capacity development needs and review and upgrade curricula
Task 2	Develop and test training materials
Task 3	Develop online resources

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FOCUS-Africa
Case Studies



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CS1: South Africa – Food Security

Climate variability in South Africa can cause multi-year droughts resulting in severe losses for farmers and investors.

Contexts

- Significant impact of hot conditions in 3 of the past 5 years,
- Expected large impacts in the 21st century under high/low mitigation efforts,
- Land Bank finance,
- Anticipating climate variability and extremes,
- Obtaining climate risk info.

Tools and Approaches

- Observed weather data,
- Downscaled climate simulation,
- Stochastic weather simulation,
- Crop simulation model.

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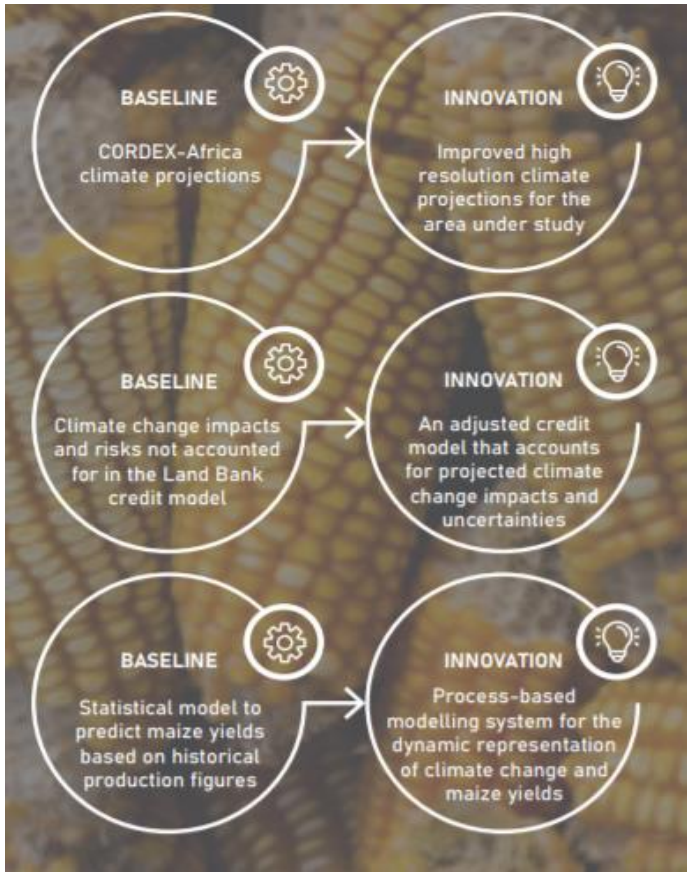
Climate Services



CS2: Malawi – Food Security

The economy in Malawi is heavily based on rainfed agriculture. 80% of the population is engaged in subsistence farming.

Aim

Improvement of seasonal climate prediction, delivery of seasonal and decadal products and characterisation of future weather extremes.

Context

Climate projections indicate warming trend, a decrease in the number of rainy days, and an increase in heavy rainfall, which will significantly impact local livelihoods

A large percentage of the country is experiencing a decreasing rainy season, which in turn is creates uncertainty around seeding time, crop diversification planning and postharvest management.

All this calls for improved seasonal climate prediction, delivery of seasonal and decadal products and characterisation of future weather extremes.

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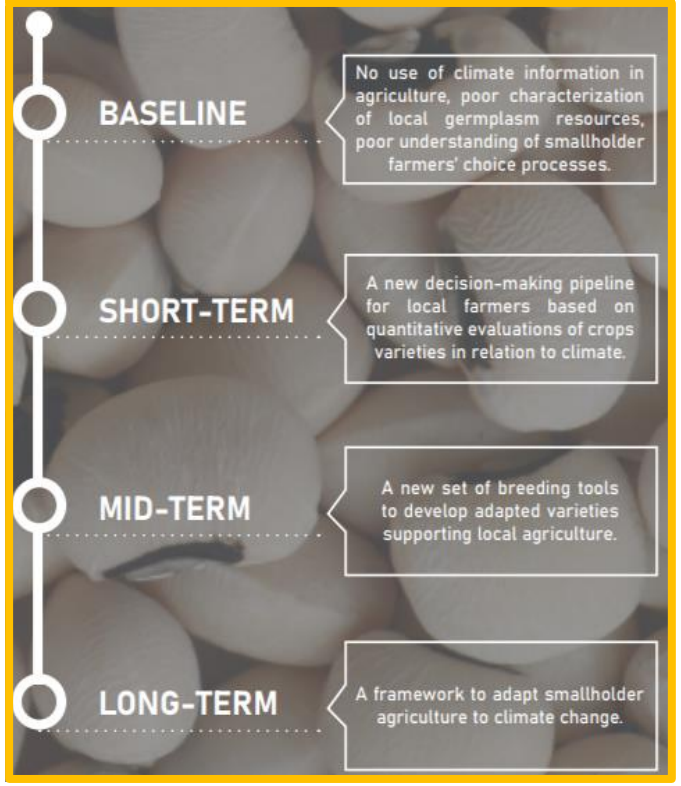
CLIMATE INFORMATION & SERVICES COPRODUCTION

BASELINE	INNOVATION
Uncalibrated seasonal and decadal predictions, CMIP5 data	Bias adjusted seasonal and decadal predictions, RCM and high resolution GCM data
ASAP warning system	ASAP upgrade using new seasonal and decadal predictions
WOFOST	WOFOST (ECroPS) upgrade using local agricultural data, new climate projections and decadal predictions
APHLIS post-harvest tool	APHLIS upgrade using seasonal data

CS3: Mozambique– Food Security

Livelihoods in Mozambique largely depend on smallholder farming.

Climate Services



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Tools and approaches

- Surveys in small holder villages and participatory variety selection,
- Next generation sequencing and landscape genomics of plant genetic resources,
- Development of seasonal prediction tools,
- Provision of seasonal information to farming communities.

Expected results

- Farmers knowledge evaluation on Agroclimate,
- Mapping of Agroclimate needs in Manpula (North),
- DNA sequencing of 500 traditional variants
- Characterisation,
- genotypes and set up of breeding efforts,
- Develop Agroclimate tailored products to farmers for S2S forecasting.

CS4: Tanzania – Food Security

Aim

Improvement of seasonal climate predictions, delivery of seasonal and decadal products & characterisation of future weather extremes.

Context

Agriculture in Tanzania is mainly Rainfed.

Above-average rainfall brings short-term positive impacts on yields in some regions, but can lead to floods and post-harvest losses.

Shifts in rainy season, prolonged dry spells, floods and outbreaks of pests and diseases affect agricultural productivity.

Severe droughts are associated with low crop yield, food crisis, and water and electricity shortages.

Climate projections indicate an increase in heatwave intensity and heavy rainfall events, and an increased occurrence of droughts.

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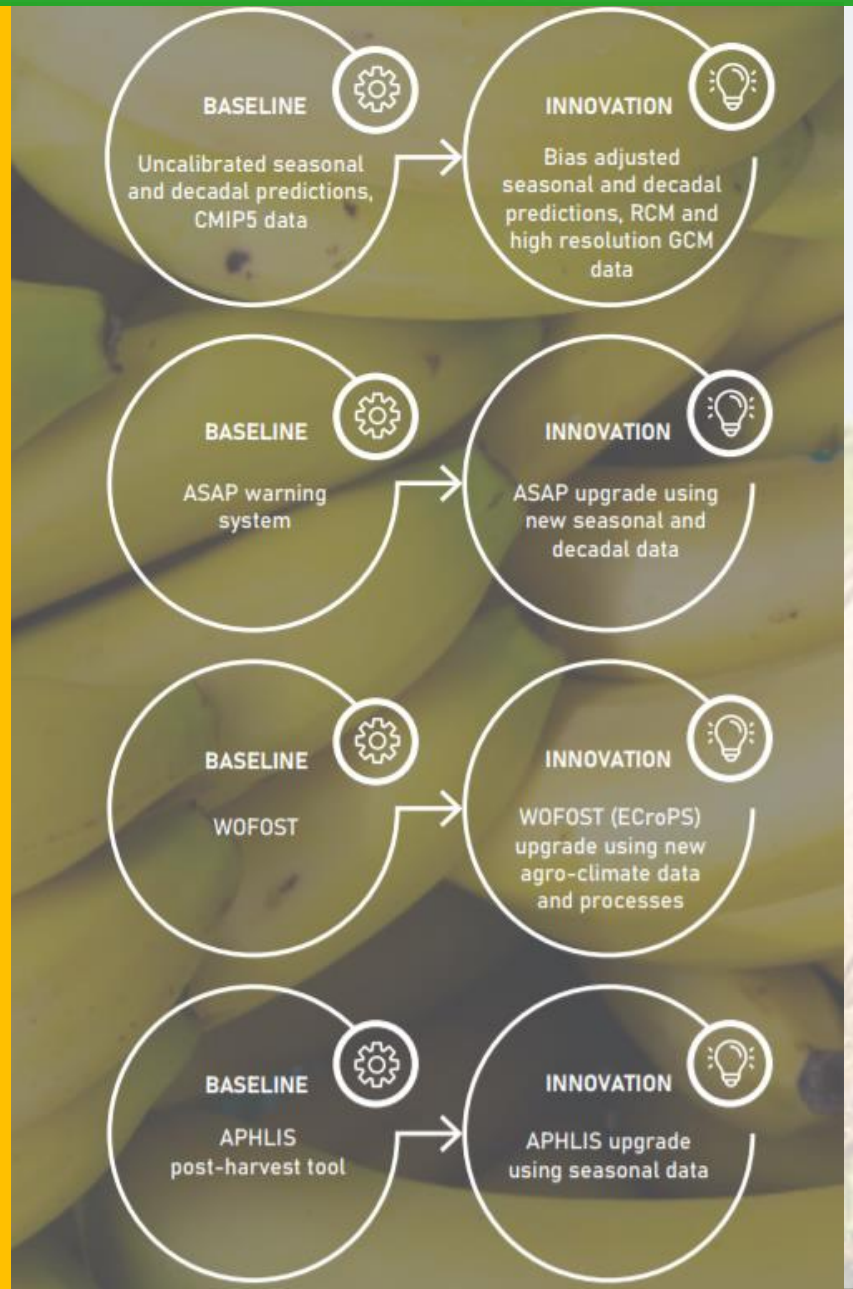

Expected results

- Improved usability and relevance of ASAP, APHLIS and WOFOST (ECroPS),
- Better informed agricultural planning and post-harvest management,
- More sustainable adaptation pathways.

CS5: Tanzania - Infrastructure

Context

- The government of Tanzania has recently allocated 700 million US$ for the construction of the Standard Gauge Railway (SGR), which will go from Dar es Salaam to Makutopora, covering a distance of 722 kilometres,
- This type of infrastructure is **vulnerable to climate variations,** especially flooding.

Aim

- **Better characterize future weather patterns and extremes to derive future design values and operational thresholds under different conditions.**

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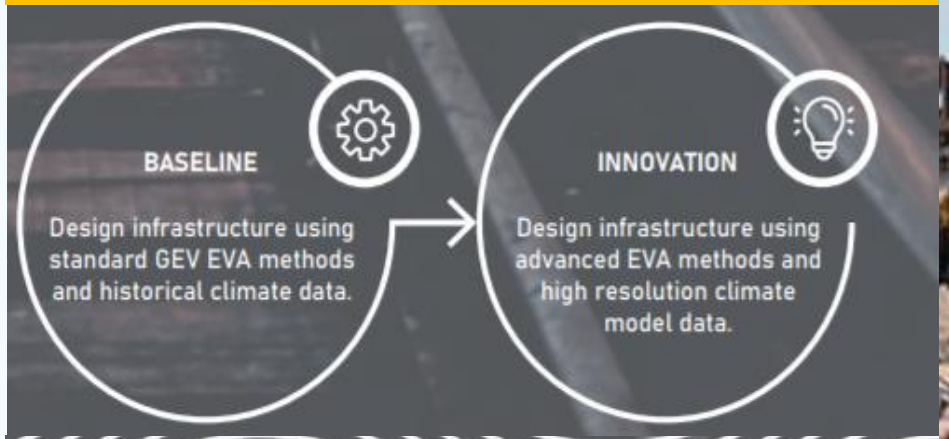
Climate Services



CS6: Tanzania – Energy

Aim

How climate variability/change will affect renewable power generation and development plans (TANESCO).

Hydropower is the largest source of renewable electricity, but solar and wind power are projected to boost their generation capacity.

Climate change may increase the frequency of climate conditions that impact power generation, livelihoods, health and wellbeing.

Context

There are, however, significant climate-related challenges with developing additional renewable energy capacity.

Droughts increase the pressure on using available water for agriculture and sanitation.

The current energy mix is significantly dependent on reservoir -fed hydropower.

Climate Services

Baseline	• Some qualitative use of uncalibrated seasonal forecasts and climate projections.
Innovation1	• Application of bias adjusted or high-resolution projections to produce reliable climatological information for development planning.
Innovation2	• Optimized seasonal forecasts and climate projections for tailored power generation models.

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CS7: Malawi – Energy & Water

Malawi heavily relies on hydropower, which is projected to be increasingly exposed to climate variability.

Aim

Better characterize the future impacts of climate change on Lake Malawi and the Shire River catchments.

Climate services

Reliable local data; Meaningful impact indicators; Comprehensive visualization tools for decision makers; User-friendly platform.

Expected results

- A better understanding and attribution of past events, which had a significant impact on river flow & water availability,
- Estimation of future climate change impacts on Lake Malawi and the Shire River hydrological cycles,
- Evaluating the added-value of such a climate service for stakeholders,
- Making the designed approach replicable to other sites and end-users.

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CS8: Mauritius - Water

Aim

Improve spatiotemporal resolutions to manage water for domestic, industrial and agricultural use.

Context

Observations suggest that rainfall patterns have changed over the last decades.

WRU relies on 6-month seasonal outlooks and statistical models issued by the Mauritius Meteorological Service.

Extreme rainfall events and intra-seasonal variability pose challenges for water resource management.

Climate services

Biannual seasonal forecast derived from consensus forecast (SARCOF; SWIOCOF) and a quarterly seasonal forecast with a simple downscaling analogue model.

High-resolution statistical downscaled rainfall forecast.

High-resolution seasonal forecast verified and optimized for different watersheds.

Drought forecasting and monitoring early-warning system.

Expected results

- Developed thresholds for triggering drought or wet conditions alerts as a decision support tool,
- Generation of current and expected rainfall, drought and related likelihoods.

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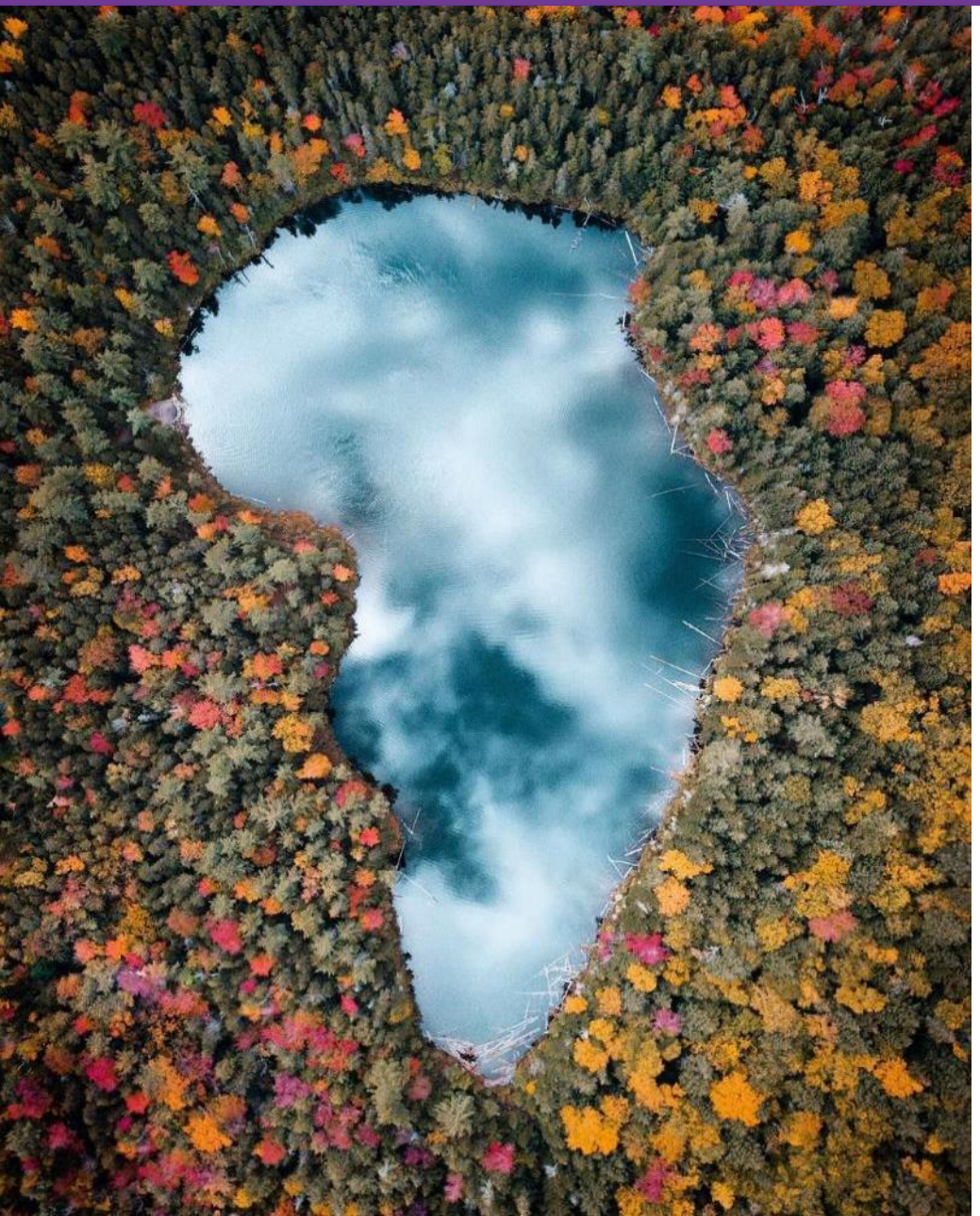
Events, Media, More information



FOCUS-AFRICA

Full-value chain Optimised Climate User-centric Services for Southern Africa

Project coordinator: Roberta Boscolo (WMO)

All project reports, news & events, are available on the FOCUS-Africa website: www.focus-africaproject.eu

Register for the project workshops and newsletters at www.focus-africaproject.eu

Email the project at hello@focus-africaproject.eu

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