

# **STAKEHOLDER WORKSHOP**

## **Focus On Tanzania**

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**Second External Stakeholder Workshop,**

**14-15 September 2021**

**13:00 – 17:00 CET**

**14:00 – 18:00 EAT**



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# Roberta Boscolo

**Scientific Officer Climate and Energy  
World Meteorological Organization**

**FOCUS-Africa Coordinator**

**FOCUS-AFRICA PROJECT OVERVIEW**

# FOCUS-Africa: Full-value chain Optimized Climate User-centric Services for Southern Africa

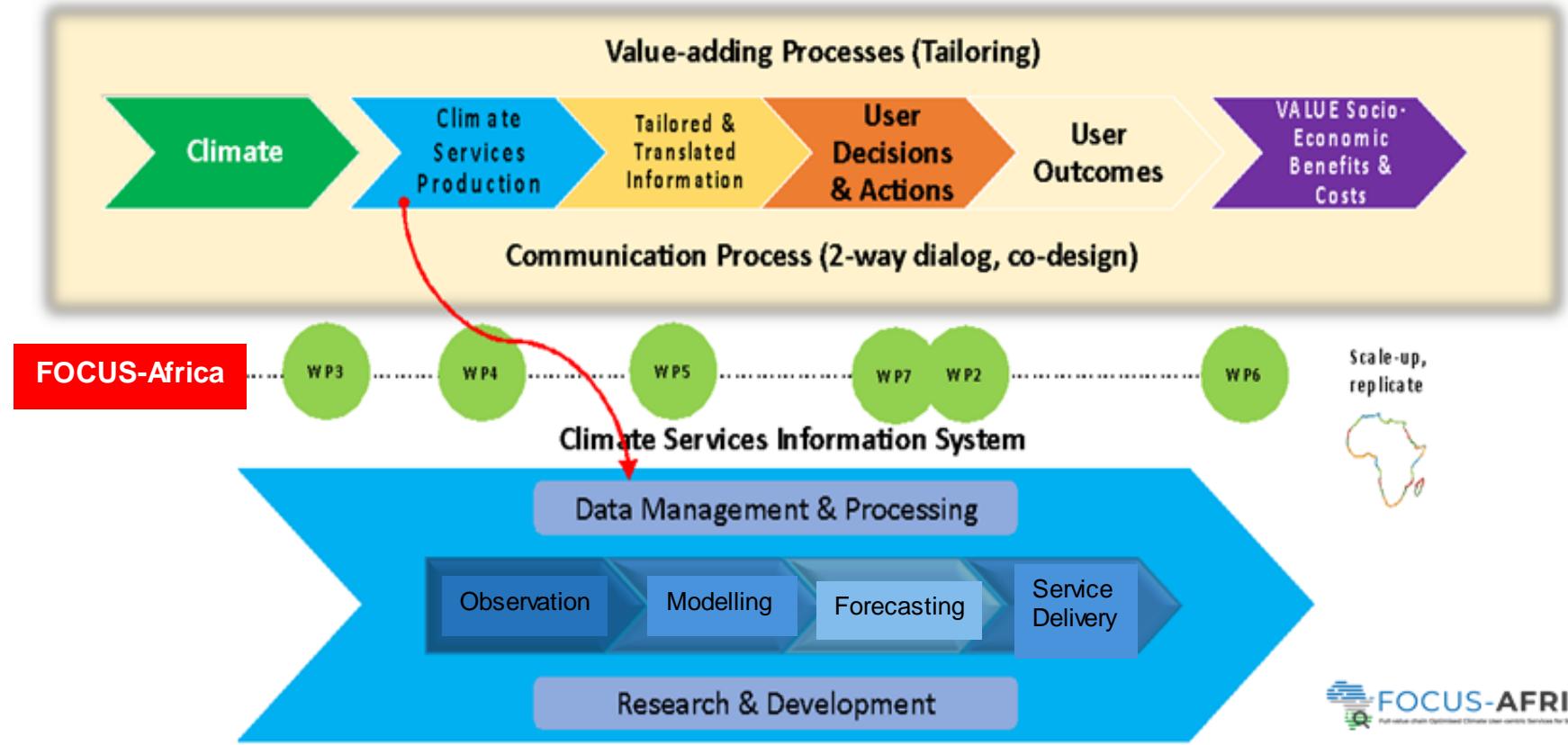


Develop **full value chain climate services** in the SADC region, by targeting specific sectors industry relevant case studies, while strengthening the underpinning climate prediction and projection science and assessment of associated socio-economic benefits.



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

## Climate Services Value Chain



# Project partners in Africa and Europe (16)



WORLD  
METEOROLOGICAL  
ORGANIZATION

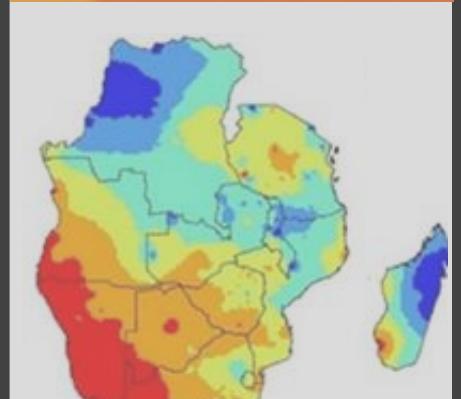
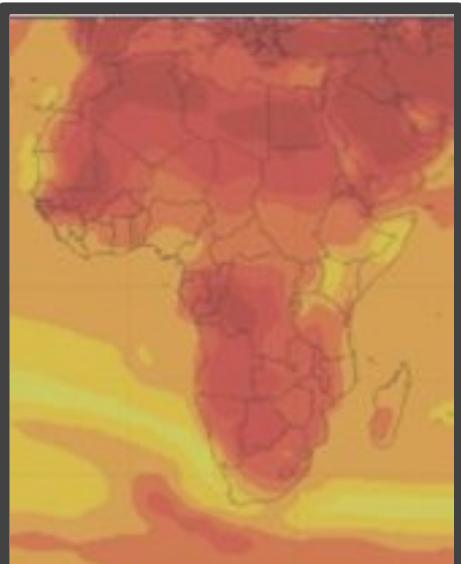


Sant'Anna  
School of Advanced Studies - Pisa





# FOCUS-Africa Work Packages



WMO



European Meteorological  
Society



## 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





# FOCUS-Africa Case Studies



WMO



European Meteorological  
Society



## CASE STUDY - FOOD SECURITY SOUTH AFRICA

### CONTEXT

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

Hot conditions and specific rain in 3 of the past 5 years have significantly impacted crop production.

The region is projected to experience large impacts in the 21st century under both high and low mitigation efforts.

The Land Bank finances commercial farms and agribusinesses, and also helps new entrants fund their operations.

Anticipating climate variability and extremes is key to the long-term success of agricultural investments.

Gathering climate risk information is essential to enabling credit markets to compensate for potential climate change impacts.

There is a great interest in the North West Province's western maize production, which is important for food security.



### TOOLS & APPROACH

Observed data and data will first be applied for a historical period to establish their representation of climate and other yields in the region.

Observed weather data

Downscaled climate simulations

Stochastic weather simulations

Crop simulation model

### EXPECTED RESULTS

1 Identify climate adaptation methods for future yield and biomass production requirements.

2 Assessment of impact of climate change on yield and biomass production.

3 Identification of adaptation measures and opportunities for climate change policy.

4 Agricultural yield model created to reflect climate change risks.

5 More informed financial decisions and advice given to farmers.

### THE TEAM

RESEARCH SERVICE PROVIDER END USER

WITS CSIR LAND BANK  
We build up you



FOCUS-AFRICA

No. 1000 Africa Climate Network Building Block No.  
Version 2020 Final Report: Food Security in South Africa

# II Food Security

## 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.**



## CASE STUDY - FOOD SECURITY

# MALAWI

### CONTEXT

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

- Climate projections indicate a warming trend, a decrease in the number of rainy days and an increase in temperature.
- Climate shifts such as floods and droughts resulting from these changes significantly impact local livelihoods.
- Malawi is one of the countries with the largest percentage of people experiencing a decreasing rainy season.
- As a result, Malawi is experiencing 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.



99  
Post-harvest food security and  
livelihoods with climate change  
impacts - opportunities for  
improving food security and  
livelihoods amid climate change

66

### CLIMATE INFORMATION & SERVICES COPRODUCTION



# II Food Security

## Contexts

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

## Tools and Approaches

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



## CASE STUDY - FOOD SECURITY

# MOZAMBIQUE

### CONTEXT



Households in Mozambique largely depend on smallholder farming.



The farming system has poor resilience when experiencing climatic stresses such as lack of water availability.

The challenges farmers currently face include poor adaptation of crop varieties, poor use of inputs such as fertilizer and irrigation, and highly diversified farming communities.

Farmers base their decisions in relation to climate resilience on traditional knowledge and do not necessarily take any 'scientific information' into account.



### EXPECTED RESULTS

1 Evaluation of farmers' traditional knowledge in relation to climate smart agriculture and adaptation.

2 Mapping of climate-related needs in Manpula (North) 4 provinces in the north.

3 DNA sequencing of over 1000 traditional variants from across the country.

4 Characterisation of variation of specific genotypes and set up of breeding efforts valuing their diversity.

5 New improved and enhanced agricultural interventions related to farmer needs.

6 A real life climate seasonal and sub-seasonal forecasts to smallholder farmers.

### THE TEAM

### TOOLS & APPROACH



Surveys in smallholder villages and peri-urban variety selection.



Next generation sequencing and landscape genetics of plant genetic resources.



Development of seasonal prediction tools.



Provision of essential information to farming communities.

### CLIMATE SERVICES



BASELINE



The first phase of the project will consist of a baseline survey of local agroclimatic conditions and the identification of key challenges faced by farmers.



SHORT-TERM



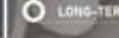
A new decision-making journey for local farmers based on a better understanding of their agroclimatic conditions and the development of a new climate-based forecast system.



MID-TERM



If successful, this will lead to the development of climate-based forecasting models for smallholder farmers.



LONG-TERM



A continuous climate-based forecasting system for smallholder farmers.

# II Food Security

## 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.



# CASE STUDY - FOOD SECURITY TANZANIA

## CONTEXT

Agriculture in Tanzania is mainly rainfed.

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

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

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

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

Data sets for improved seasonal climate predictions, delivery of seasonal and disease products and characterization of future weather extremes.



## CLIMATE INFORMATION AND SERVICES

### APPROACH



# II Food Security

## Expected Results

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



## CASE STUDY - INFRASTRUCTURE

# TANZANIA

### CONTEXT

The government of Tanzania has recently allocated 700 million US\$ for the construction of the Standard Gauge Railway (SGR).



The SGR will go from Dar es Salaam to Makutopora, covering a distance of 722 kilometers.

COWI is lead-user & responsible for the design of the section running from Dar es Salaam to Makutopora.

This type of infrastructure is vulnerable to climate variations, especially flooding.

This case study will demonstrate the issue to better characterize future weather patterns and extremes to derive future design values and operational thresholds under different conditions.

Ensuring appropriate protection against extreme events and addressing emergency preparedness plans and activities that can be integrated into normal operations will reduce climate risks.

• This case study will demonstrate the issue to better characterize future weather patterns and extremes to derive future design values and operational thresholds under different conditions.

### TOOLS & APPROACH

Close engagement with COWI to ensure that the enabling decision-making processes will integrate climate risk both strategically and operationally.

Analysis of latest high-resolution projections in terms of potential changes in weather regimes and extremes for rainfall and air temperatures.

Derivation of design values, from climate data, required by the SGR Design Standard. Major input using an in-house Advanced non-stationary Extreme Value Analysis (EVA).

### EXPECTED RESULTS

1 Application of bias-corrected or high-resolution projection

2 Application of tailored non-stationary EVA methods

3 Derivative rail structures 100 per design values

### THE TEAM

200 000

RESEARCH SERVICE PROVIDER END USER



### CLIMATE SERVICES



FOCUS-AFRICA

The FOCUS-AFRICA project received funding from the Horizon 2020 Programme under grant agreement No 645270.

# 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 kilometers,
- 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.



# CASE STUDY - ENERGY TANZANIA

## CONTEXT

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

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

Climate variability can lead to energy shortages and limits in generation capacity.

The current energy mix is significantly dependent on reserves and hydropower.

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

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

TANESCO and Tazara need to know how climate variability/change will affect renewable power generation and development plans.



## TOOLS & APPROACH

## EXPECTED RESULTS



A close collaboration and co-production with end-users and climate services providers.



- 1 Reducing climatic risks and long-term sustainability.
- 2 Incorporation of assessed seasonal data into the existing TANESCO production forecast model.

## CLIMATE SERVICES

### BASELINE

From availability rate of seasonal and medium-horizon forecasts and climate projections.

### INNOVATION 1

Application of bias-reduced or high-resolution climate projections to inform climate adaptation planning.

### INNOVATION 2

Optimized seasonal forecasts and climate projections for tailored energy generation capacity.

## THE TEAM

RESEARCH	SERVICE PROVIDER	END USER
Met Office	TMA WAMC	TANESCO

## FOCUS-AFRICA

An FOCUS-AFRICA project received funding from the United States Agency for International Development (USAID) under grant agreement No. AID-14-A-00012.

# 💡 Energy

## Context

- Hydropower is the largest source of renewable electricity, but solar and wind power are projected to boost their generation capacity.
- Droughts increase the pressure on using available water for agriculture and sanitation
- There are, however, significant climate-related challenges with developing additional renewable energy capacity

## Aim

- How climate variability/change will affect renewable power generation and development plans .



## CASE STUDY - ENERGY & WATER

# MALAWI

## CONTEXT

EDF is interested in hydropower projects in Southern Africa, particularly in Malawi.

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

EDF wants to better characterize the future impacts of climate change on Lake Malawi and the Shire River catchments.



## EXPECTED RESULTS

1 A better understanding and attribution of past events, which had a significant impact on river flow & water availability.

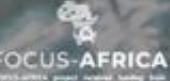
2 Estimation of future climate change impacts on Lake Malawi and the Shire River hydrological cycles.

3 Evaluating the added-value of such a climate service for stakeholders.

4 Making the designed approach replicable to other sites and end-users.

## THE TEAM

RESEARCH SERVICE PROVIDER ENG USER



# 💡 Energy

## 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.

## Aim

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



# CASE STUDY - WATER MAURITIUS

## CONTEXT

- The Water Resources Unit (WRU) is responsible for water resource management.
- Observations suggest that rainfall patterns have changed over the last decades.
- Extreme rainfall events and intra-seasonal variability pose challenges for water resource management.
- WRU relies on 6-month seasonal outlooks and statistical models issued by the Mauritius Meteorological Service.
- This study aims to improve spatiotemporal resolutions to manage water for domestic, industrial and agricultural use.



## EXPECTED RESULTS

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

## CLIMATE SERVICES

**HISTORICAL**  
Historical seasonal forecasts derived from the South African Weather Climate SWCCOM and a quarterly assessment for each with a simple downscaling ensemble model.

## TOOLS & APPROACH

- Collect historical data for rainfall and drought.
- Apply downscaling techniques.
- Assess model until for different lead-time.



## THE TEAM

**RESEARCH & SERVICE PROVIDER** CSIR

**END USER** WRU



FOCUS-AFRICA  
The FOCUS-Africa project received funding from the  
European Union's Horizon 2020 research and innovation programme under grant agreement No 846777.

## Context

- Observations suggest that rainfall patterns have changed over the last decades.**
- Extreme rainfall events and intra-seasonal variability pose challenges for water resource management.**
- Water sector relies on 6-month seasonal outlooks and statistical models issued by the Mauritius Meteorological Service.**

## 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**



# Water



Time	Topic
December 2020	Food Security South Africa
September 2021	Energy, Food Security, and Infrastructure in Tanzania
April 2022	Food Security in Mozambique
December 2022	Water Management in Mauritius
August 2023	Food Security and Energy in Malawi
April 2024	Water-Energy- Food Nexus in South Africa

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Published 1st issue  
Newsletter  
May 2021

**The project so far**  
*Project highlights, updates and latest news*

FOCUS-Africa and the WMO global effort for the operationalisation of climate services



“...FOCUS-Africa is an innovative example of an approach to link together all the CSIS components and support the full climate services value chain..."

[Read more.](#)



Resources from our first EU FOCUS-Africa External Stakeholder Workshop now available!

We successfully organised our first External Stakeholder Workshop, an online event, on the 9th December 2020. Our special thanks to all FOCUS-Africa partners, participants and our speakers:

[Access the resources](#)

Say hello to our sister-projects – CONFER & DOWN2EARTH

In the spirit of identifying areas of collaboration and creating synergies with other initiatives as encouraged by the European Commission, we introduce you to CONFER and DOWN2EARTH.

[Read more.](#)



## Earth Day Campaign

For Earth Day we shared the resources developed for the #FOCUSAfricaEarthDay



# THANK YOU

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**FOCUS-AFRICA**

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