



Driving Innovation in Climate Services

SAFE4ALL Africa Project Brochure

Safeguarding African Foodsheds and Ecosystems for all Actors across Local, regional, and international Levels to manage migration



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Project coordinator: Wageningen University and Research

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Climate Challenges in Africa

Africa is one of the most vulnerable continents to the impacts of climate change. The region faces increasing temperatures, unpredictable rainfall patterns, and extreme weather events such as droughts and floods. According to the Intergovernmental Panel on Climate Change (IPCC), average temperatures in Africa have increased by approximately 1 °C over the last century, and this trend is expected to continue.



Rising Temperatures

Temperature increases of up to 1.5 °C by 2030 and 3 °C by 2100 are projected, exacerbating heat stress on crops and livestock.



Variable Rainfall

Rainfall variability is expected to increase, with some regions experiencing up to 20 % less rainfall by 2050, affecting water availability for agriculture and human consumption.



Extreme Weather Events

The frequency and intensity of extreme weather events are on the rise. For example, the Horn of Africa has experienced severe droughts that have affected over 10 million people in recent years.

These climate stressors significantly impact agriculture, water resources, and ecosystems, posing severe risks to food security and livelihoods. The IPCC Sixth Assessment Report delivers stark findings for African agriculture, forecasting a potential 20 - 60 % decline in wheat yield for southern and northern Africa, and a 9 % decline in maize yield for west Africa, alongside reductions in coffee, tea, and sorghum production.



In Zimbabwe,

up to 70 % of the population depends on rainfed agriculture, making it highly vulnerable to climate fluctuations.

The 2022/23 season brought hope, but ongoing El Niño challenges pose significant risks. Droughts induced by El Niño can reduce productivity, impacting food security and raising prices.

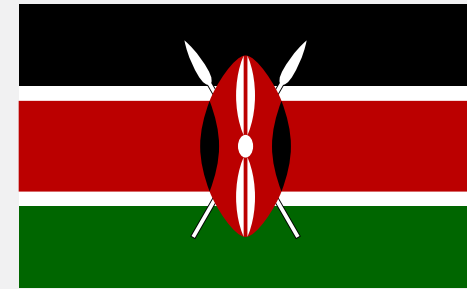
Investments in irrigation and water management are crucial.



Ghana

faces rural-urban migration due to drought and rainfall decrease, with projections of 7.3 to 27.3 million internal climate migrants by 2050. Drought affects

13 % of the population, and 45 % of the workforce relies on rainfed agriculture, making climate change a major threat to livelihoods.

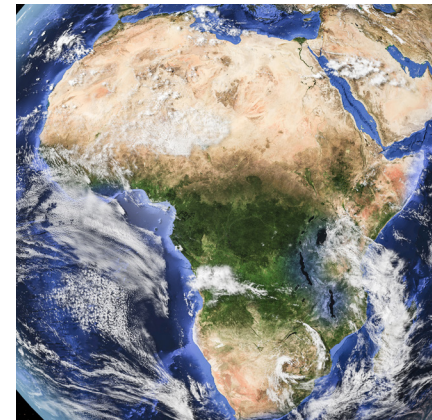


Kenya's

severe food insecurity rose from 15 % in 2015 to 28 % in 2021. The country has faced five consecutive below-average rainy seasons, causing the worst drought in 40 years. The ASAL region is particularly affected, with high levels of poverty and susceptibility to climatic shocks. With the population expected to double by 2050, addressing food insecurity is a pressing priority.

Introduction to SAFE4ALL Africa

SAFE4ALL Africa is a groundbreaking initiative aimed at enhancing climate resilience and food security across the African continent. Funded by the European Union under the Horizon Europe program, this project brings together a consortium of experts to tackle the pressing challenges posed by climate change. Through innovative tools and collaborative efforts, SAFE4ALL strives to empower local communities and build a sustainable future.



Project Duration

2024 - 2027
(48 months)

Funding

Supported by the European Union's Horizon Europe program

Project Consortium

17 key partners from Europe and Africa

Focus Areas

Climate resilience, food security, ecosystem health, policy integration

Innovative Tools

AI-based weather prediction, hydrological modeling, decision support systems

Ghana, Kenya & Zimbabwe

Three Co-Creation Studies

The SAFE4ALL project aims to enhance climate resilience in Kenya, Ghana, and Zimbabwe through co-creation studies. By engaging local communities, stakeholders, and researchers, the project develops tailored, sustainable, and scalable solutions to address climate challenges specific to each region.



Kenya

End Users

Nairobi County
Narok County
Kisumu County
Farmer extension workers
Rural & Urban farmers



Ghana

End Users

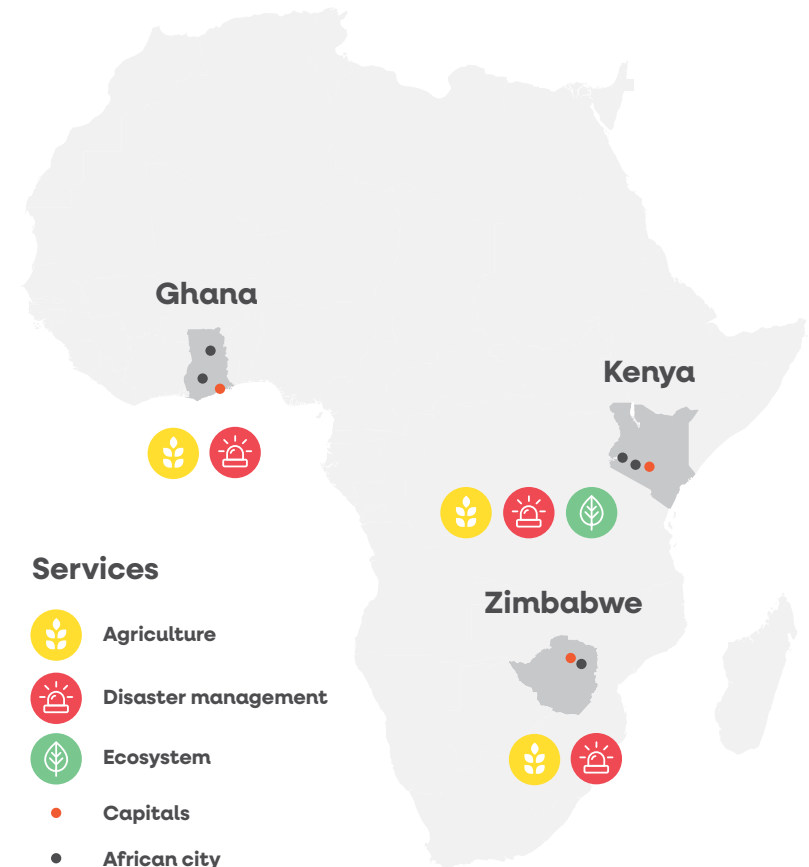
Tamale Metropolitan Assembly
Accra Metropolitan Assembly
Kumasi Metropolitan Assembly
Rural & Urban farmers



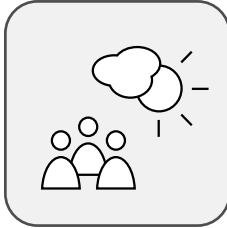
Zimbabwe

End Users

Harare City
Marondera City



Project Concepts



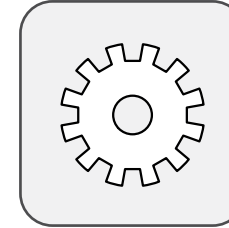
Aligning Climate Services with Local Needs

Developing climate services that meet local adaptation policies and requirements by actively engaging stakeholders in LivingLabs.



Holistic Urban-Rural Connections

Using the foodshed concept to understand how migration patterns impact food demand and supply in cities as the climate changes.



Supporting Governance and Management

Utilizing an interdisciplinary, intersectoral, and international approach combined with focused actions, analyses, and ambitions to adapt and improve continuously.



Scaling Up Good Practices

Sharing successful strategies and tools from co-creation cases to a wider audience through existing platforms.



Customizable and Sustainable Tools

Enhancing climate service tools to be fit for purpose and ensuring they have sustainable business models post-project.

Project Objectives

- ✓ Establishment of a collaborative, co-creation and engagement platform
- ✓ Identification of adaptation challenges, requirements, enabling and hindering factors in adapting to the wider socio-economic environment
- ✓ Exploration and harnessing existing climate services and development of a new suite of user-centered climate services
- ✓ Tailor the services and tools in SO3 to local policy contexts for each SAFE4ALL country
- ✓ Sustain, scale up and scale out bundled climate services
- ✓ Recommend and implement sustainable business models
- ✓ Foster multi- and interdisciplinary links and collaborations through partnerships across Europe and Africa

Consortium and Partners

The SAFE4ALL project consortium, consisting of 17 partners from Europe and Africa, demonstrates a collaborative effort across academia, government, non-governmental organizations, and the private sector towards sustainable climate services. Each partner brings unique expertise and resources to tackle the challenges of climate resilience and food security in Africa.

Notable participants include national meteorological institutions from Ghana, Kenya, and Zimbabwe, and local organizations emphasizing grassroots engagement. European partners showcase diverse initiatives ranging from weather forecasting to research. Academic institutions provide cutting-edge research to inform the project's objectives.



Wageningen University and Research
Netherlands

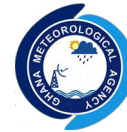




Climate Adaptation Services Foundation
Netherlands



Delft University of Technology
Netherlands



Ghana Meteorological Agency
Ghana



Global Resilient Cities Network
Netherlands



International Organization for Migration
Switzerland



Jomo Kenyatta University of Agriculture and Technology
Kenya



Kenya Meteorological Department
Kenya



Meteorological Service Department of Zimbabwe
Zimbabwe



MicroStep-MIS
Slovakia



Neuralio Artificial Intelligence
Greece



Potsdam Institute for Climate Impact Research
Germany



Trans-African Hydro-Meteorological Observatory
Kenya



University for Development Studies
Ghana



Volontariato Internazionale Per Lo Sviluppo
Italy



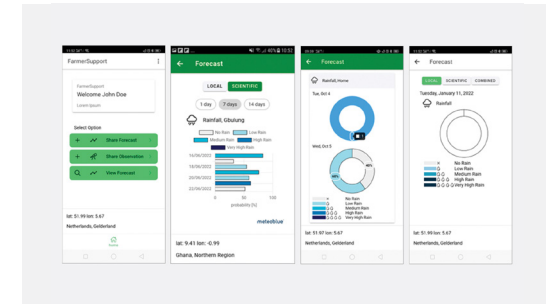
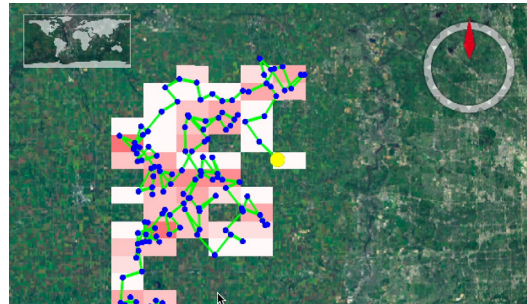
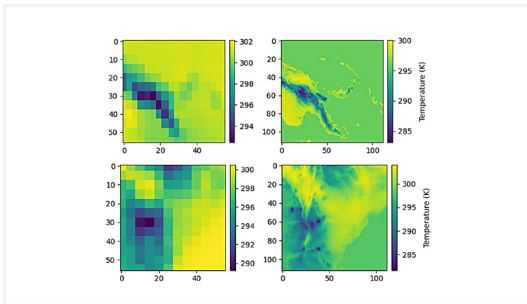
Weather Impact
Netherlands



Zimbabwe Farmers Union
Zimbabwe

Innovation and Technology

The SAFE4ALL Africa project leverages advanced technology to develop innovative climate services and tools that enhance the resilience of agriculture and ecosystems across the continent. These tools provide vital data and support to farmers, communities, and policymakers, enabling them to make informed decisions in the face of climate change.



Hyperlocal Weather Intelligence Engine by Neuralio Artificial Intelligence

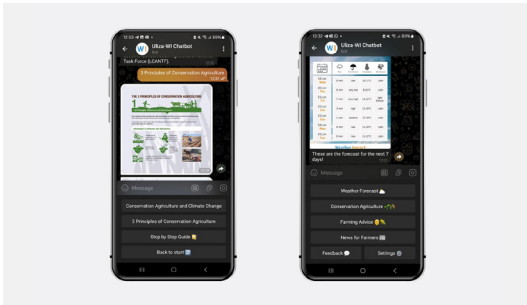
This tool employs Generative Adversarial Networks (GANs) for statistical downscaling of climate predictions, providing high-resolution sub-seasonal forecasts. It uses climate data and digital elevation models to enhance accuracy.

Multi-agent Reinforcement Learning Framework by Neuralio Artificial Intelligence

A virtual simulation tool that models interactions among various entities (agents), predicting environmental outcomes based on climate information, earth observation, and socioeconomic data. It supports strategic planning through a Reinforcement Learning module resulting in a clustering of suitable criteria that maximizes crop yield.

Hydro-climate Information Service - DROP App by Wageningen University and Research

The DROP App offers location-specific climate services, integrating scientific weather forecasts with local knowledge. It provides tailored hydro-climate information for better agricultural decision-making.

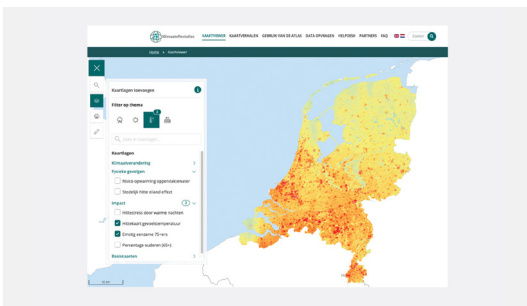
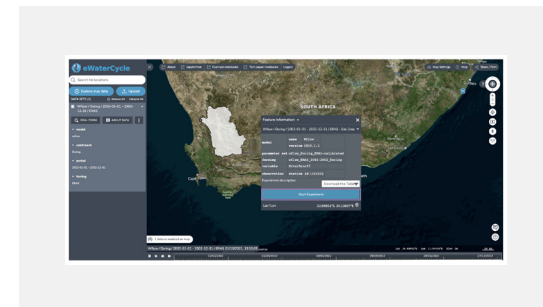


Agro-weather and -Season Decision Support Chatbot by Weather Impact

The Uliza-WI Chatbot delivers real-time weather and farming advice, accessible 24/7. It supports farmers with climate and agronomic resources, helping them make informed decisions to enhance crop yield.

e-WaterCycle – Platform for Open and FAIR Hydrological Modeling by Delft University of Technology

The e-WaterCycle platform offers open and FAIR (Findable, Accessible, Interoperable, Reusable) hydrological modeling, integrating various data sources and models for accurate hydrological predictions.



Climate Atlas and Critical Threshold Explorer by Climate Adaptation Services

The Climate Atlas provides interactive maps and tools for exploring climate impacts and critical thresholds, supporting climate adaptation planning. It includes regional portals with stories, demonstrators, and learning resources.

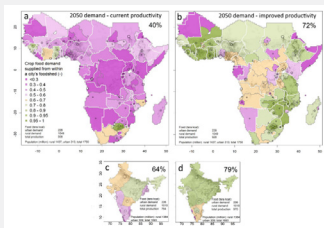


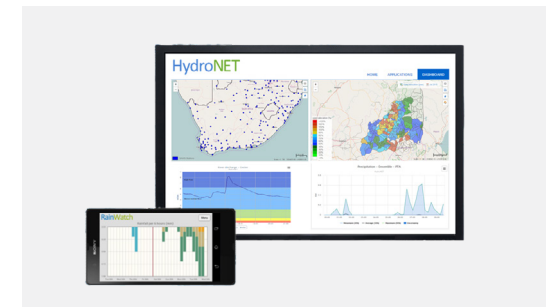
Figure 14: Sub-Saharan Africa and India's foodsheds in 2050, without (left, a and c) and with (right, b and d) water management and agronomic measures to close the yield gap

LPJmL Model - Hydro-climatic Impacts on Crops and Hydrology by Wageningen University and Research

This tool models the impacts of hydro-climatic variables on crops and hydrology using the LPJmL framework, helping to predict agricultural outcomes and water resource management.

TWIGA Platform by Trans-African Hydro-Meteorological Observatory

The TWIGA platform integrates ground-based observations with satellite data to enhance weather and climate services, supporting better decision-making in agriculture and water management.



High Impact Thunderstorm Nowcast by MicroStep-MIS

The tool provides precise thunderstorm nowcasts with a lead time of 30 minutes to 1 hour by using EUMETSAT satellite data and AI algorithms. It enables issuing of severe weather warnings, to safeguard people and property from harm.



SAFE4ALL
A F R I C A

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