CS4RRA
Climate Services for Risk Reduction in Africa

The CS4RRA initiative: Priorities and perspectives for a joint research agenda for West Africa

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2. Dr. Patrick Monfray, CNRS & AU-EU CCSE Partnership WG (Paris, FR)

WASCAL
West African Science Service Centre on Climate Change and Adapted Land Use

French National Research Institute for Sustainable Development
IRD
Institut de Recherche pour le Développement
FRANCE

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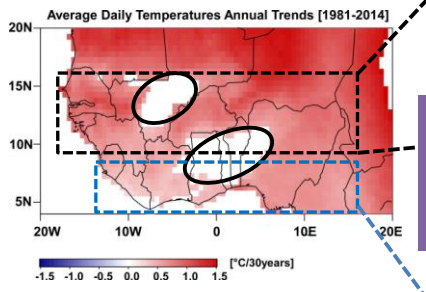
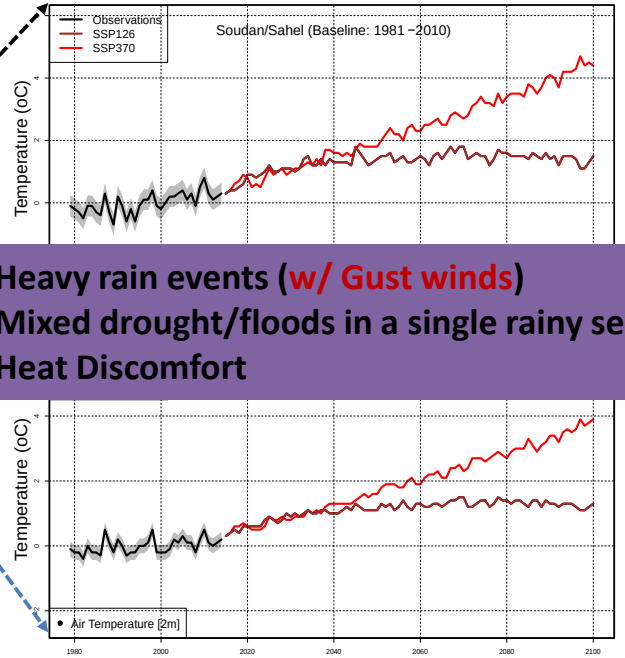
Introduction
Current state of Environment in West Africa

Quasi-stationary temperature island



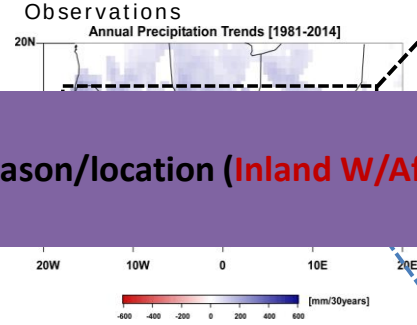
- Observed Regional warming outpassing the global average (**+0.8 to +1.2°C**)
- Amplified warming towards the end of the 21st Century

Observations/ Projections



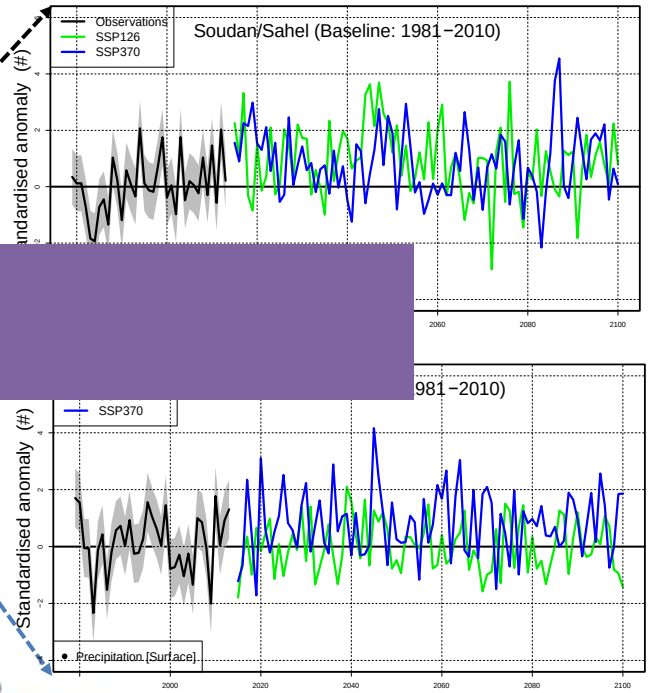
1. **Heavy rain events (w/ Gust winds)**
2. **Mixed drought/floods in a single rainy season/location (Inland W/Africa)**
3. **Heat Discomfort**

Observations



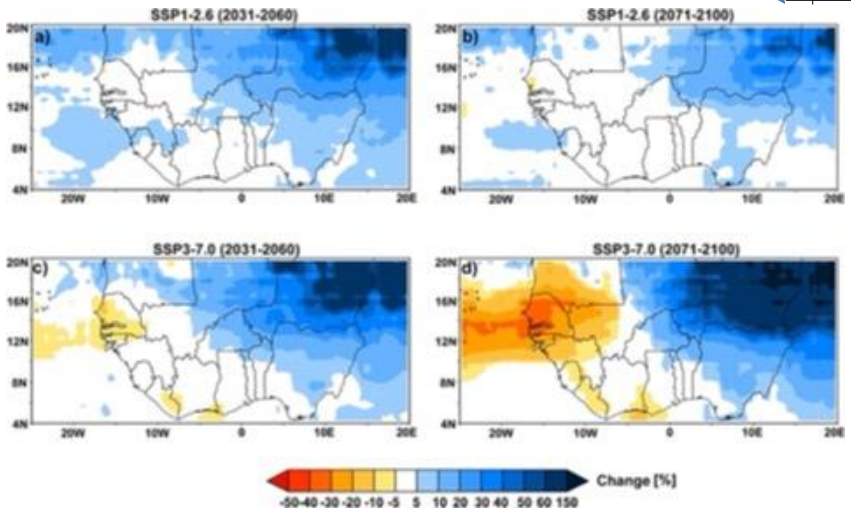
- Highly variable regime in Soudan/Sahel
- Slight increase rainfall (Soudan/Sahel) and quasi-stationary (South) in the mid-to-end of 21st Century (**SSP126/370**)

Observations/ Projections

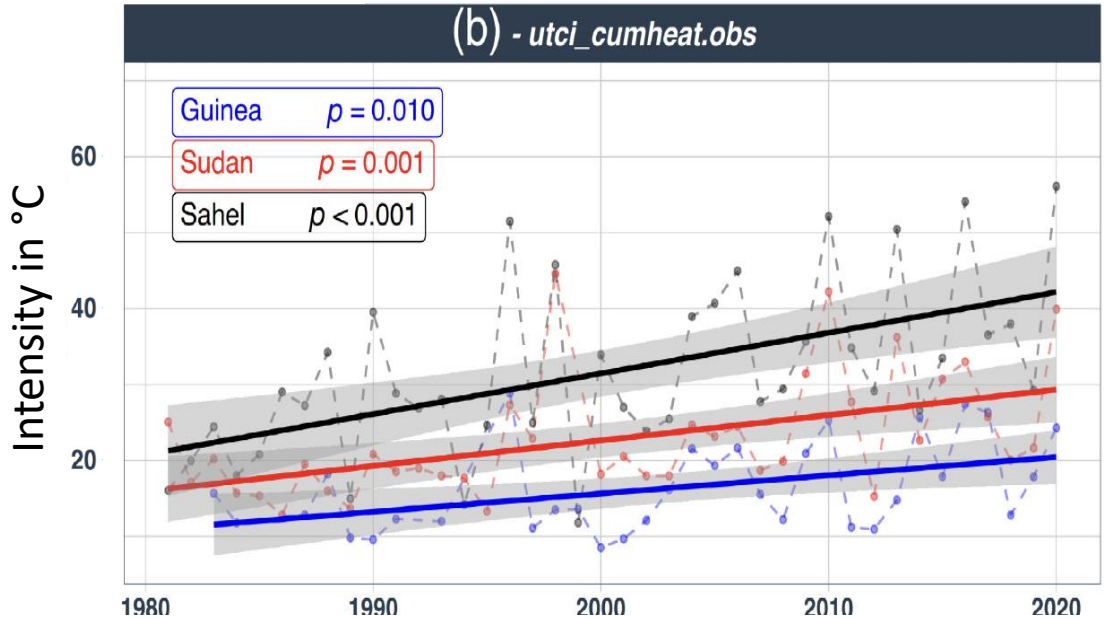


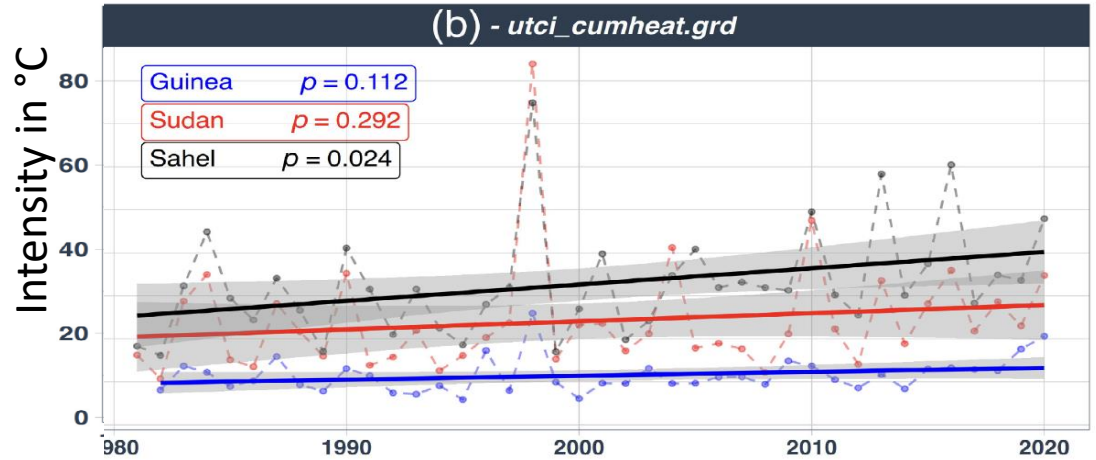
Model consensus (Statistically significant patterns)

- **SSP126** ➔ Central South/North-West **stationary** + Centre/North-East **humides** (10-30%, statistically significant)
- **SSP370** ➔ **Persistant** regional **dipole** ➔ Dryer West (Amplified) **Vs** Wetter East



Significant increase of deadly heat waves in West Africa





Significant increase in humid oppresive heat waves
In West Africa since 1980

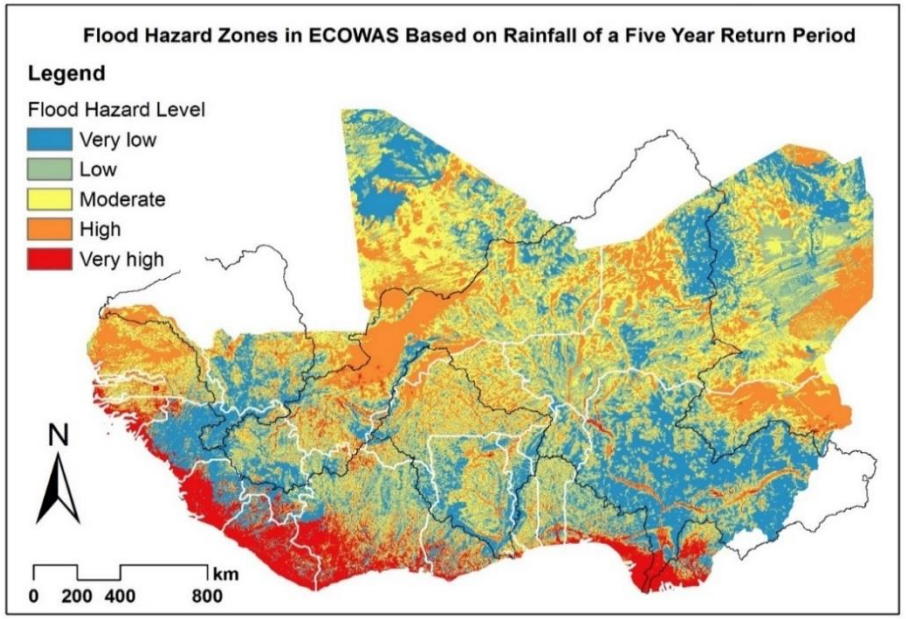
Station data show an increase in all climate zones, whereas ERA-5 heat under estimate trend

Future projection show a concerning increase in deadly (humid) heatwaves in the region

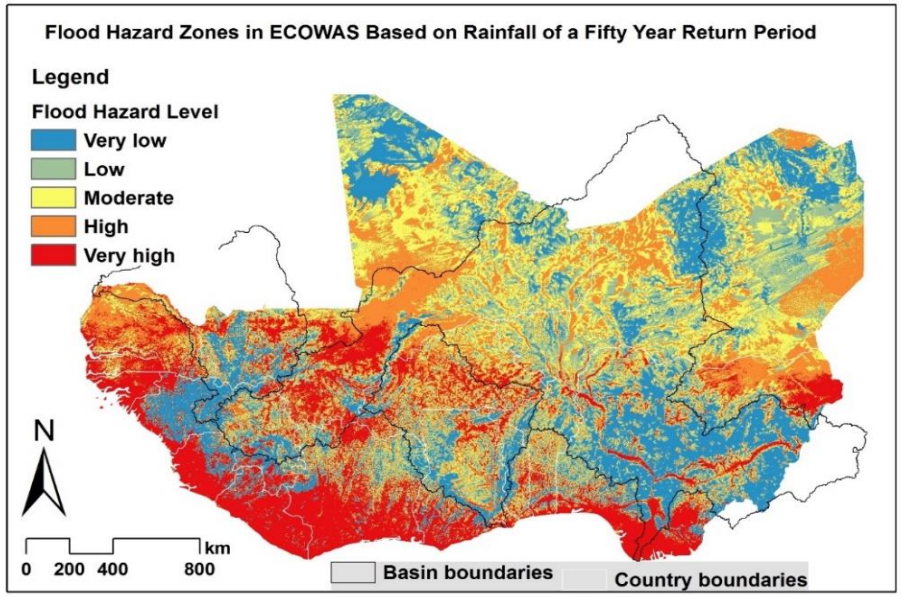
Ragatoa et al., (2024)

Introduction Cont'd

Flood Hotspot Mapping over West Africa.



Flood hazard maps for return periods of 5 years (WASCAL CoC, 2021)



Flood hazard map for return period of 50 years

- ✓ **In general, very high potential areas to be flooded, increases with increasing return period, while the moderate areas reduce with increasing return period.**
- ✓ **For the 50-year return period, 20% of the area of West Africa is classified as high potentially flooded zone.**

Introduction Cont'd

Hazard mapping: Floods Impacts on Yields & Animals

Yield changes (%) of different crops under rainfed/irrigated regimes & warming

Cocoa, Cashew & Shea Nut

↓

Pest/diseases, Soil waterlogging, winds gusts, shift (unfit) of production areas

↓

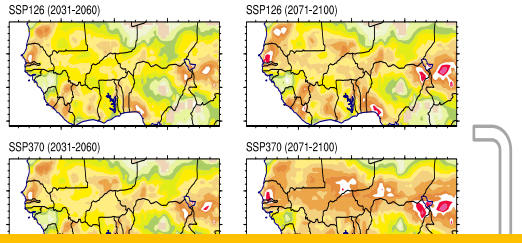
Decreasing Prodcution by 2050s

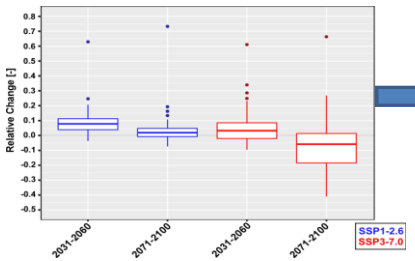
Crop	Farming Regime	Yield Change (%)		Timeline (Horizon)
		Average	Confidence Interval	
Maize	Rainfed	-11.6	[-27 ; -2.0]	2031-2060
Sorghum	Rainfed	-16.7	[-42 ; +7.0]	2015-2050
Millet	Rainfed	-6.0	[-19 ; 0.0]	2031-2060
Groundnut	Rainfed	+3.7	[-11.6 ; +21]	2035-2050
Cassava	Rainfed			
Soybean	Rainfed			
Yam	Rainfed			
Cotton	Rainfed			
Rice	Irrigated			
Rice	Rainfed			

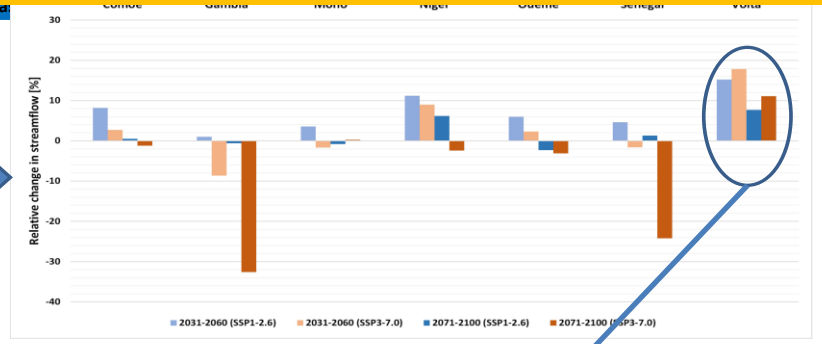
Decrease

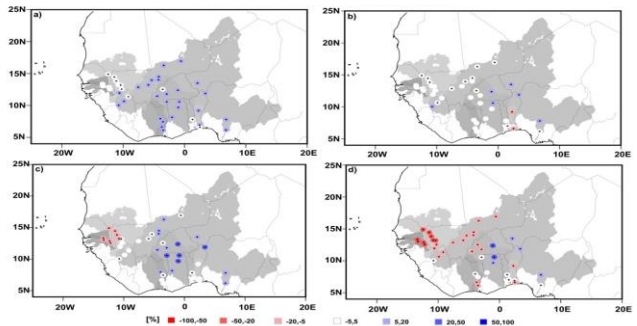
1. **Heat Discomfort for livestock (Heat stress)**
2. **Staple crops yield much vunelrable than ever except few (Soyabean, cassava)**
3. **Floods, erosion, salinazation (W/African coasts & litorals)**

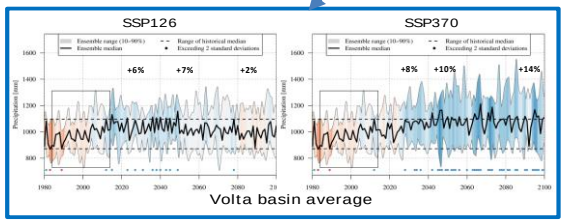
Heat stress (water availability) For livestock











(Re)distribution of grazing spaces, corridors & infectious diseases

Shifts (increase) in transhumance, increasing competition over natural resources (land, water, grass), agropastoral conflicts

- Reduction in reproductive performance, milk and meat production &
- Weak immune system & Outbreak of diseases

Insight to Climate Services for Risk reduction in Africa initiative (CS4RRA)

- Conscious of the importance of improving understanding of climate change impacts in West Africa

- the Climate Services for Risk Reduction in Africa (CS4RRA) was initiated by France and Germany through their ministries of Higher education and research (MESR and BMBF respectively) in 2023;

- The implementation partners are WASCAL and IRD, other partnership are; the European Joint Programming Initiative on Climate (JPI Climate) and the African Union – European Union STI Partnership on Climate Change and Sustainable Energy (CCSE), ECOWAS, AGRHYMET, ACMAD, CILSS.

Core concept of Climate Services for Risk Reduction

Core Concept: What are climate services?

Climate services provide not only tailored climate-related information but also tools or training/advice to help users make decisions that reduce risks and improve resilience.

CS4RRA overall goals

- Describe pathways and priorities related to Knowledge, Innovation and Capacity (KIC) for longer-term cooperation West Africa - EU (DE-FR);
- Identify actionable and complementary steps to boost KIC via trilateral or multilateral joint actions.

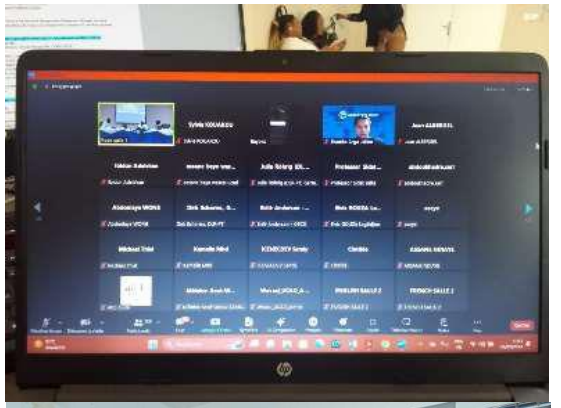
To this aim, it co-designs events with West African partners from three complementary angles:

- *Knowledge of the regional climate system* at relevant scales for those working in the field within different sectors;
- *Innovation of climate services*, meeting the actual needs of sectors exposed to current and future climate change;
- *Capacity building*, in particular for new African generations within the public and private sectors of the countries concerned.

CS4RRA Webinar' Forum in West Africa 2023-24

Four Co-design webinars (local organizing committees) were organized , engage all stakeholders in West Africa (civil society, private sector, governments, operational services, universities, etc.

- **Improvement of early warning system and adaptation measures for disaster risk reduction**, *Uni. Lomé, Lomé, Togo, September 2023*
- **Excessive water management**, *Uni. F.H.B., Abidjan, Ivory Coast, October 2023*
- **Climate impacts and resilience under present and future scenarios**, *Uni. C.A.D., Dakar, Senegal,* February 8, 2024
- **Climate-smart agriculture and sustainable landscapes**, *Uni. K.N., Kumasi, Ghana, May 2024*



The 4 reports from the 4 webinars serve as the basis **for the stocktaking conference.**

➢ **A White Paper generated**

(visit www.wascal.CS4RRA.org)

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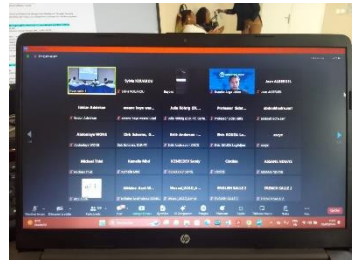

Webinar 1: Early Warning Systems and Adaptation Measures for Disaster Risk Reduction; Uni. Lomé, Lomé, Togo, September 28th 2023

Main outcomes:

- **Improve forecasts and use (from weather, subseasonal to seasonal forecasts) and impact-based forecasting ;**
- Build on citizen science , local observation network and satellite data;
- Integrate local knowledge in Early Warning System (preparation and response);
- Use of AI in Climate services for Disater Risk Reduction (link hazards to exposure and vulnerability) and in forecasting;
- **Improve dissemination strategy (mobile phone and local language);**

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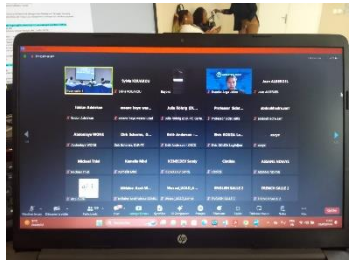

Webinar 2: Climate Services for Water Excess Management; University Félix Houphouet Boigny, Abidjan, Ivory Coast, November 6th, 2023

Main outcomes:

- Improve hydrological modeling, monitoring and flood risk mapping
- Use of satellite derived products combined with citizen science and new technologies (AI)
- **Solutions integrating trade off between water excess and dry spells management and the water, energy and food nexus**
- **Nature based solutions (opportunities)**
- Integration of climate services to support/guide decision making and policy making (dialogue science and policy)
- Interdisciplinary approaches

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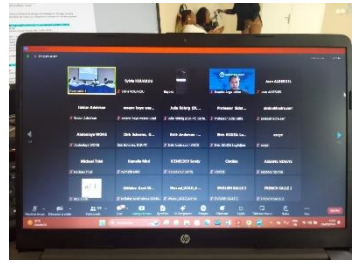

Webinar 3: Climate impacts and resilience under present and future scenarios; University Cheikh Anta Diop, Dakar, Senegal, February 8th 2024

- **Main outcomes:**

- Improve hydro, agricultural, climate modelling and model evaluation ;
- Impact and risk assessment studies ;
- **Linking climate change and development (alignment with the National Development Plans, NDCs) to meet the national political and economic agenda ;**
- Adressing the gap in the future change of energy demand and challenges for sustainable West African cities ;
- Rural development pathway and land degradation;
- Strengthen the capacities of all stakeholders, with an emphasis on the local level;
- **Sustainable funding and multi-level collaboration;**

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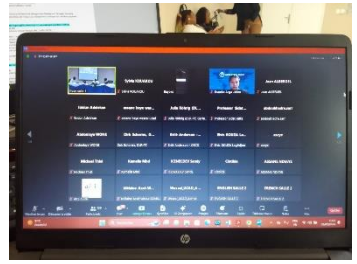
- **Webinar 4: Climate-smart agriculture and sustainable landscapes, Kwame Nkrumah University of Science and Technology, Ghana, May 2024**
- **Main outcomes:**
  - **Climate services (local scale & upscaling potential) for climate smart agriculture**
  - Innovations built on local knowledges and practices to transform Africa's food system
  - Scaling bundled agro-climate advisories for improved agricultural risk management
  - **Climate and environmental services for sustainable landscape**
  - Solutions to improve carbon sequestration (4 for 1000)
  - Improve modelling and parameterization of surface-atmosphere interactions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The main cross-cutting messages from the webinars

Citizen science can play a crucial role in addressing the issue of data availability quality by actively involving communities in the process of data collection

co-developing and co-creating of climate services and capacity development are needed

Data, modelling and forecasting challenges in Africa, and development & integration of advanced technologies in AI and IoT needed

Knowledge exchange and integration with local and indigenous knowledge systems, are very important to successfully develop and implement climate services.

There is a need for actionable steps and **projects aligned with national and regional development plans** to advance weather and climate resilience

The importance of building and maintaining **strong partnerships between African and European institutions**.

Involvement of end-users in the design and implementation of climate services using a co-development approach

Interdisciplinary collaboration as well as long-term **partnerships between researchers, policymakers, and practitioners** are needed to tackle climate challenges

Financial solutions need to be developed to secure sustainable funding for the climate services ecosystem

Priority and perspectives for a joint research agenda for West Africa

For a joint research agenda on West Africa, strategic priorities and perspectives are shaped by the region's unique challenges and opportunities, particularly in the face of climate variability, environmental pressures, and socio-economic development goals..

Promote Climate Adaptation and Resilience Building for agriculture, water management, and disaster risk reduction.

Promote opportunities in Early Warning Systems for Disaster Risk Reduction

Climate-Smart Agriculture and Sustainable Food Systems

Scale up Renewable Energy, and Sustainable Resource Management, circular economy, GH

Climate, Environmental and Mental Health

Promote Inclusive and citizen and governance Participation in Climate Action (Gender, Youth, marginalized group)

building capacity/technical expertise and leadership within West African institutions

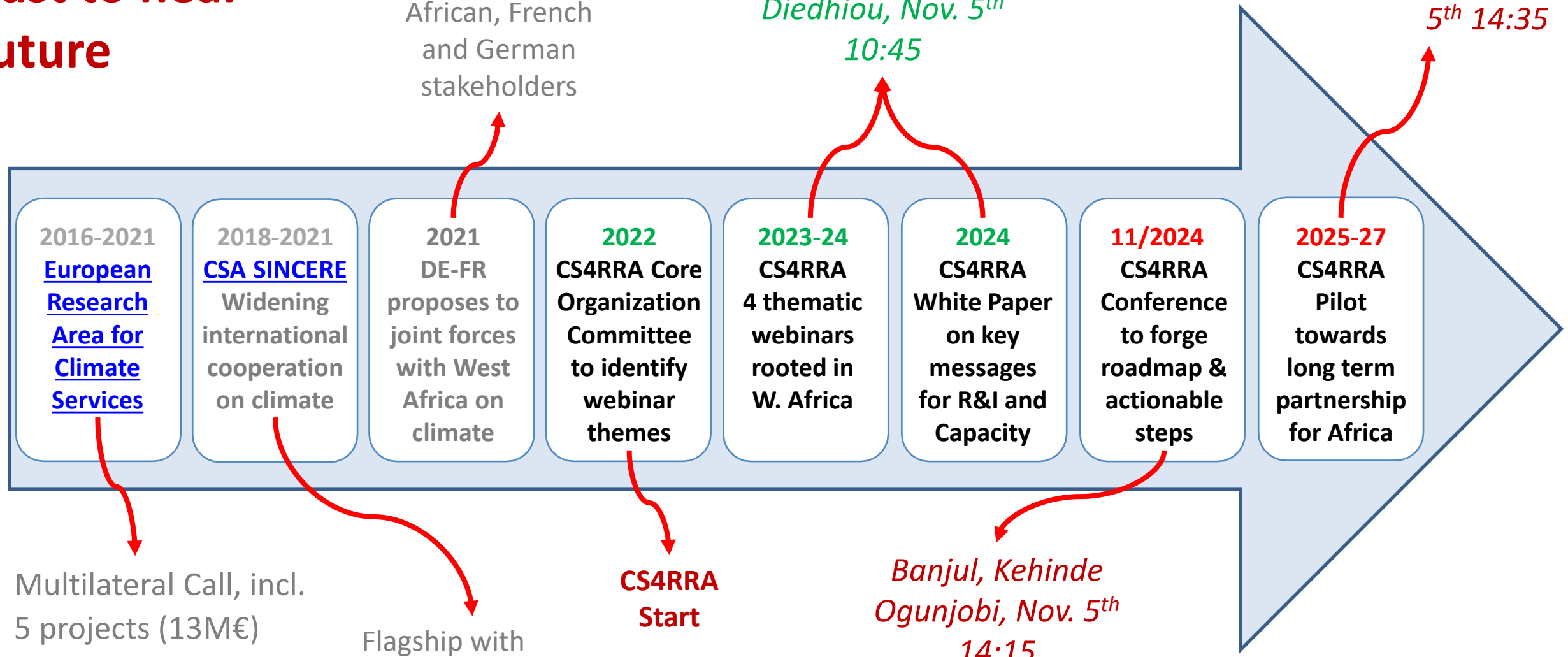
Data and Knowledge Sharing. Develop a centralized, accessible data hub for climate data, use of Ai, IoT for climate Action

R&I funders cooperation
from bilateral to multilateral

Why and how to create synergies between bilateral R&I cooperation on climate research and resilience?

- Many European countries have developed bilateral cooperation with African countries, in particular in the domain of climate change and sustainable development
- Priorities and perspectives of different bilateral cooperation should respect specificities...
- but sharing knowledge, in-situ data, practices and activities could create synergies at multilateral level for benefit of all
- Within this broad challenge, two multilateral initiatives are converging:
  - **CS4RRA** initiated by West Africa, France and Germany with JPI Climate
  - **CCSE** Partnership initiated by African Union – European Union

CS4RRA from past to near future



First meeting June 1st between African, French and German stakeholders

Banjul, Arona Diedhiou, Nov. 5th 10:45

Banjul, Patrick Monfray, Nov. 5th 14:35

Multilateral Call, incl. 5 projects (13M€) with Africa CIREG, SENSES, CO-MICC, DustClim, MEDSCOPE

Flagship with African Academy of Science (AAS)

CS4RRA Start

Banjul, Kehinde Ogunjobi, Nov. 5th 14:15

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2017 UE-UA Summit endorsed a new STI Partnership on Climate Change and Sustainable Energy

CCSE

Pillar 1: Climate action for adaptation and mitigation

Pillar 2: Sustainable Energy

CCSE/Pillar 1 Roadmap 2017

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Development of Climate Services	Integrated knowledge for climate action
• Satellite observations • In-situ observations • Easy-to-use and low-maintenance technology • Capacity building of the regional and national services • Easy access to data & information • High value-services with and for users.	• Development of NDCs • Land-use for both adaptation and mitigation • Climate resilient strategies for energy • Enhancement f African Science • Enhance Science-Policy interaction • Gender and human development • Participatory approach and education

>>> EC had funded projects as CONFER, ACACIA, DOWN2EARTH, ALBATROSS, SAFE4ALL, TEMBO-Africa, FOCUS-Africa… -> see next session at 15:30

CCSE/Pillar 1 in 2024

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Development of Climate Services
• Satellite observations • In-situ observations • Easy-to-use and low-maintenance technology • Capacity building of the regional and national services • Easy access to data & information • High value-services with and for users

Integrated knowledge for climate action
• Development of NDCs • Land-use for both adaptation and mitigation • Climate resilient strategies for energy • Enhancement of African Science • Enhance Science-Policy interaction • Gender and human development • Participatory approach and education

>>> Despite specific supports of EC, WB or MS, the R&I landscape is underdeveloped and fragmented for climate risk reduction, resilience and adaptation

Common shocks that drive or keep people in poverty…

Spikes in food prices and shocks to agricultural or ecosystem-based income

Natural disasters such as droughts, floods, and storms

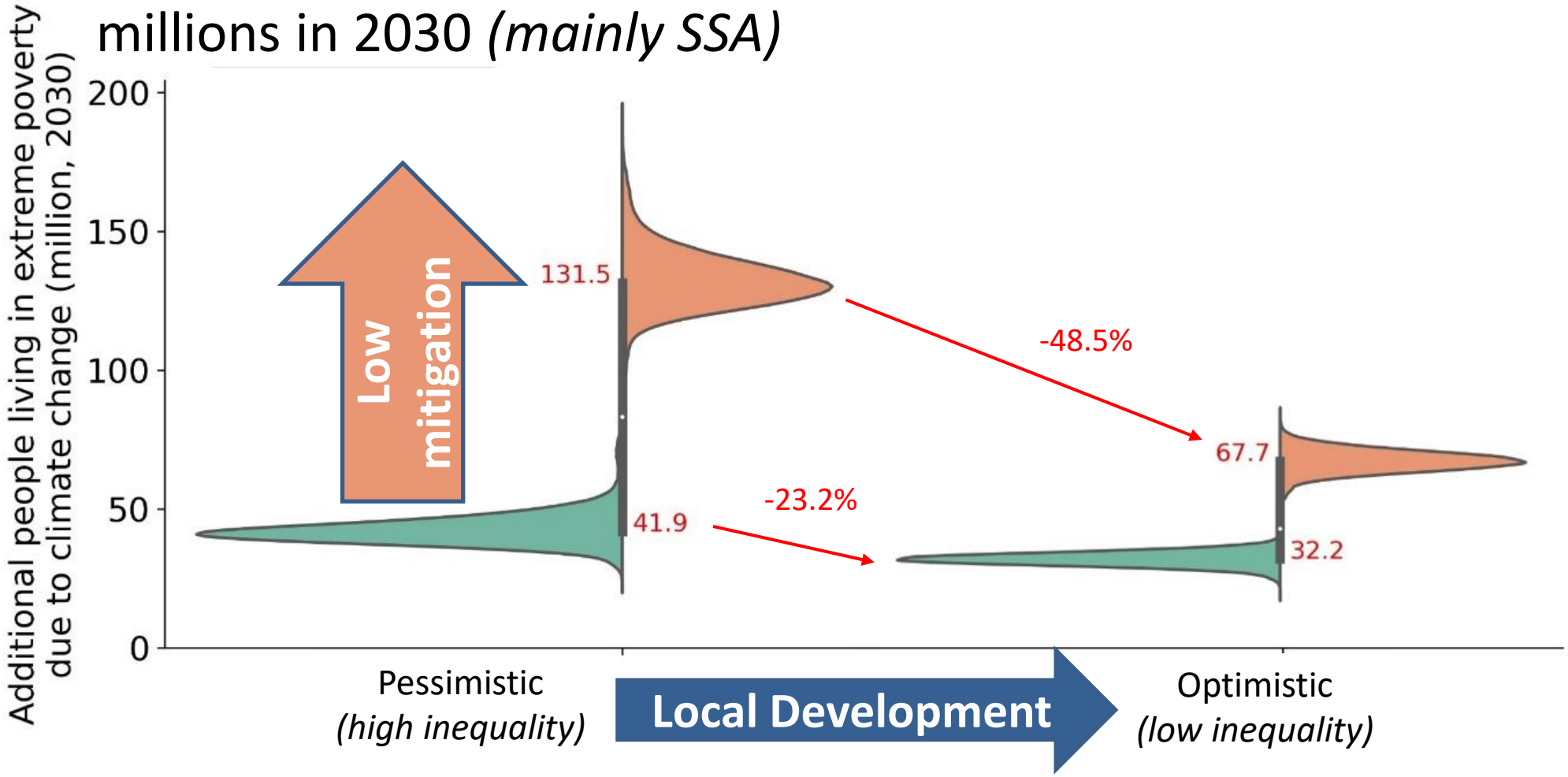
Disease and health shocks, such as malaria, diarrhea, stunting, and mental disorders

… will be worsened by climate change

Stéphane Hallegatte, WB, CCSE 1st Workshop, 2021

Climate change impacts on extreme poverty in Sub-Saharan Africa

➢ **Low global mitigation increases climate risks and extreme poverty**



➢ **Good local development reduces climate change vulnerability**

Adapted from Stéphane Hallegatte, WB CCSE 1st Workshop, 2021

Climate Services are urged by the new AU-EU Innovation Agenda

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3.1.1 **Identifying and sharing climate resilience and adaptation practices** during **consultative meetings**, aiming to avoid lock-in development paths and 'Combat Climate Change Impacts'

e.g. CS4RRA webinars and Banjul conference

CS4RRA Perspectives: 2023/25 -> a Pilot in W.A. 2025/27 -> Cooperation with key networks for extension to African Regions

3.1.3 **Supporting the development of innovative climate services** for risk reduction at local and regional level, based on **in-situ and remote networks of climate changes and impacts, as well as on resilience and adaptation practices**

e.g. in-situ/satellite synergy, citizen and transdisciplinary sciences -> Nov.6th WGs

e.g. socio-economics for resilience and climate-resilient development -> Nov.6th WGs

e.g. Capacity development and R&I Call priorities

3.3.1 **Tapping the full potential of sciences by promoting research** with a special focus on youth, women and demography, mitigation and management of global challenges (including those posed by **climate change and natural hazards**)

3.2.1 **Re-skilling and/or upskilling citizens** of all ages in countries in the AU and in the EU, to allow them all to profit from innovation and technologies, and to counteract the insurgence of new or the increase of **existing inequalities and/or discriminations**, targeting SDGs 8-9-**13**.

Towards a Long term European-African Partnership (LEAP) on Climate Risk Reduction, Resilience and Adaptation

- How **attract and connect the existing key networks** of
  - **i. Scientists**: EC funded projects, Centres of Excellence, ACMAD, Academies & ISC, Universities & RPOs, etc.
  - **ii. Funders**: JPI Climate, Belmont Forum, SGCI, WB, EC & others LEAPs, ClimSA, etc.
  - **iii. Stakeholders**: African Development Bank, NDRRSs, NAPs, AU Agenda 2063, etc.
- 1st opportunity: the Banjul Conference!
- 2nd opportunity: 2025 First Call for West Africa
- 3rd opportunity: 2025-27 Joint roadmap and future calls for all African Regions

➢ *Closed Funders Meeting, Nov. 5th 18:30-19:30, co-chairs MESR & BMBF*

➢ *Next Steps & Implementation Strategy, Plenary, Nov. 6th 14:30-16:00, Part I West Africa co-chairs MESR & BMBF, Part II Africa co-chairs AUC & EC*

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Merci - Thank you - Danke

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JPI Climate

ACMAD

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CLIMATE CHANCE

CCBAD
BIODIVERSITE
AGRICULTURE DURABLE
CHANGEMENT CLIMATIQUE

2iE

SINCERE

CILSS

CEDEAO
ECOWAS