Africa Climate Research for Development

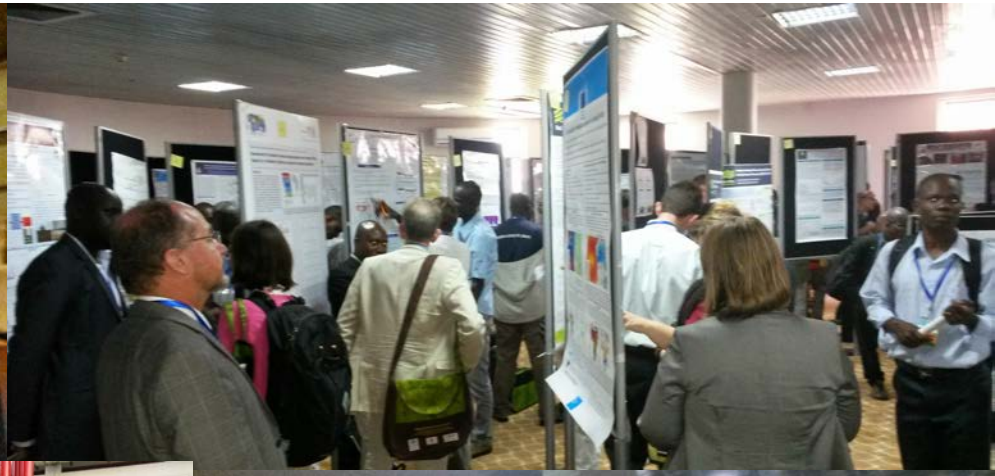
F. Semazzi, A. Tall, B. Hewitson, A. Pirani,
CLIVAR-GEWEX Africa Climate Panel,
ACC2013 Scietific Steering Committee

WCRP
World Climate Research Programme

WMO UNESCO IOC ICSU
International Council for Science

Africa Climate Research Priorities

Africa Climate Conference – ACC2013, October, 2013





Africa Climate Research Priorities

Africa Climate Conference – ACC2013

African Climate Science Frontiers: Addressing Priority Research Gaps to Inform Adaptation Decision-Making in Africa

User-driven Research Frontiers *(Community Paper)*

In alignment with the critical information needs of African end-users, policy-developers and vulnerable communities, to adapt to a changing climate and manage risks in the 21st Century:

-To support intra-seasonal risk monitoring and management to inform within-season operations (5 to 40 days range)
-To support strategic ahead-of-season planning (1-month to 12-months outlook)
-To support longer-term strategic planning/policy development (next 1-10 years)
-To support Climate change adaptation policy development/planning (next 50+ years)

-Assessing the current vulnerability due to recent climate events
-Estimation of the impacts of climate variability and change
-Decision making at local scales
-Building credibility and confidence in predictions, across timescales
-Mainstreaming climate services into policy formulation and decision making

Africa Climate Conference - ACC 2013

Plenary

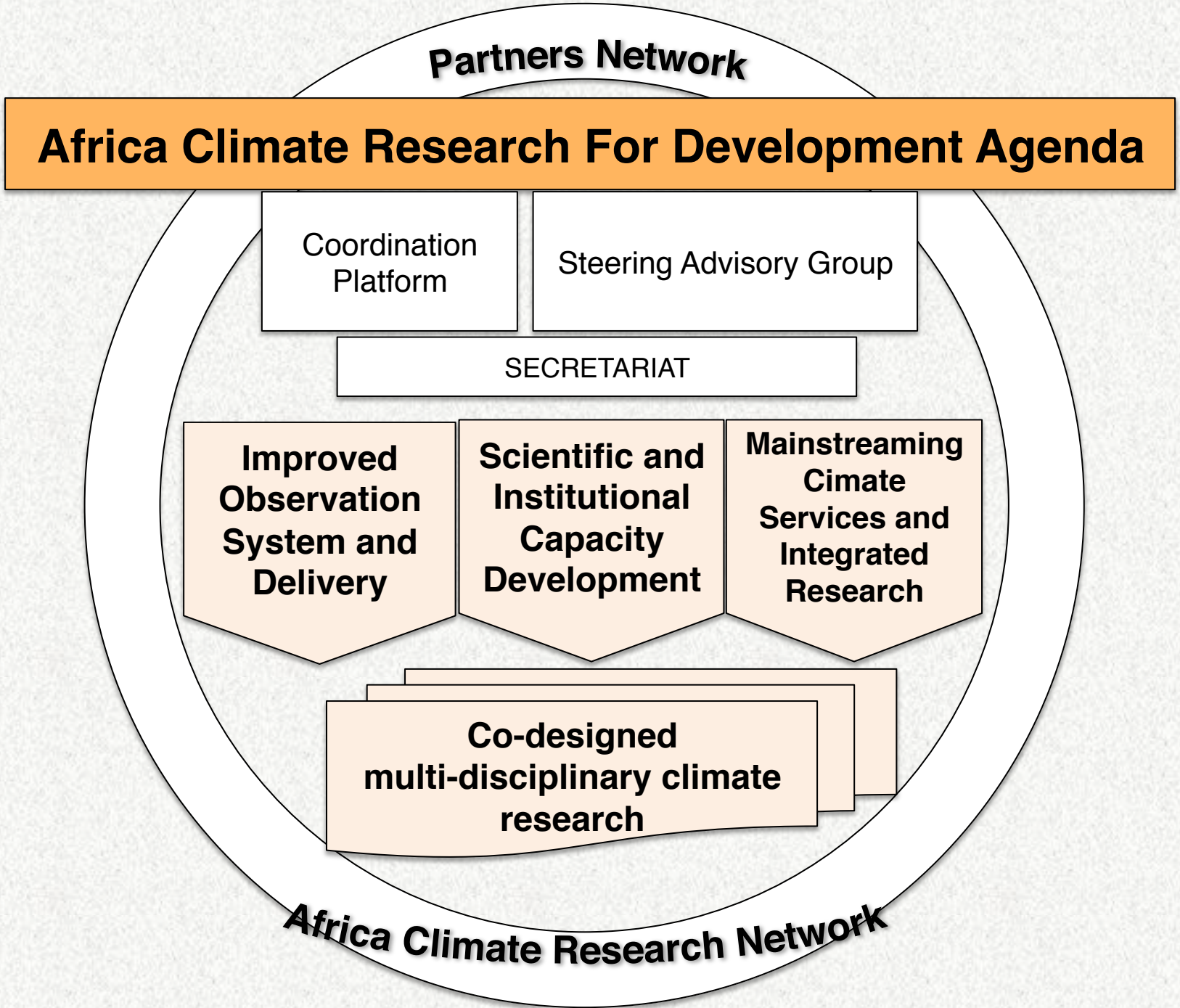
State of Knowledge, Research Gaps and Strategies to Address Research Gaps- towards coordinated pan-African Research
Lessons Learned
Short range planning and Extremes preparedness
Long-Term Planning
Parallel Session Recommendations
Market Place for a future research agenda
Partners Roundtable - Shaping Future Opportunities

Parallel Sessions & Posters

Climate Impacts
Mainstreaming Climate Information
Climate Variability and Predictability
Observations, Extremes and D&A
Africa in a Changing Climate
Regional downscaling

Side Events

AfDB - Pilot Project on Climate Resilience
Losses and Damages due to extreme climate events : ACMAD
HyVIC
AMCOMET, UNESCO, WMO Event
DfID Future Climate Future Africa
Participatory Game Session on Attribution


Partners Network
Africa Climate Research For Development Agenda
Coordination Platform
Steering Advisory Group
SECRETARIAT
Improved Observation System and Delivery
Scientific and Institutional Capacity Development
Mainstreaming Cimate Services and Integrated Research
Co-designed multi-disciplinary climate research
Africa Climate Research Network

Africa Climate Research Priorities

Federation of Africa CR4D Research Proposals

www.africa-climate.org

Subseasonal to Seasonal Prediction Project for Africa
R. Graham (UK Met Office), A. Robertson (IRI), O. Ndiaye (ANACIM)

Integrated Climate Science, Applications and Policy Research: HyVIC Project
F. Semazzi, R. Cornforth, H. Houghton-Carr, C. Bain, R. Anyah, R. Roberts, L. Xie, L. Ogallo, P. Waniha, A. Githeko, F. Mutua

Towards Robust Climate change projections over Africa: integrated CORDEX user-driven analysis
B. Hewitson, M. Shongwe

African Climate Data and information System (ACDIS)
A. Kamga, A. Klein Tank, A. van Engelen, T. Dinku, A. Giannini, O. Baddour

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Re-thinking capacity building for climate science in Africa
B. Hewitson

Climate Information Partnerships for Resilience and Early Warning – Africa (CIPREWA)
R. Graham, F. Lucio

Placing the decision first: learning from experience in decision-making under deep uncertainty to guide the priorities for climate science
N. Ranger

Co-production of Climate Knowledge
M. Daly, Y. Mkwizu, H. Mahoo

Capacity Building Framework for Climate Services at RCCs
F. Semazzi

Africa Climate Research For Development Agenda

Coordination Platform

Steering Advisory Group

SECRETARIAT

Co-designed multi-disciplinary climate research

Improved Observation System and Delivery

Scientific and Institutional Capacity Development

Mainstreaming Cimate Services and Integrated Research

WMO

START
global change SysTem for Analysis, Research & Training

futureearth
research for global sustainability

WCRP
World Climate Research Programme

Africa Climate Research Priorities

Africa Climate Research for Development (CR4D) Agenda

Documents

African Climate Science Frontiers: Addressing Priority Research Gaps to Inform Adaptation Decision-Making in Africa

Steering Committee for the African Climate Conference 2013

Africa Climate Conference Final Statement 2013

Endorsed by ACC2013 Participants and CCDA3 2013 Participants

Addressing Climate-Related Challenges and Information Needs in Africa – *Africa Climate Conference 2013; Arusha, Tanzania, 15–18 October 2013*

M. E. Shongwe, A. Pirani and S. Bekele, 2014. *Eos Trans. AGU*, **95**(22), DOI: 10.1002/2014EO220006.

Climate Sciences and Services for Africa – Strategic Research Opportunities for ClimDev - Report, 2014

Africa Climate Research for Development (CR4D): Network and Programme – Future Earth Fast Track Initiative/Cluster Proposal, A. Tall et al. 2014, accepted

Africa Climate Resaerch for Development: Building a Cohesive Contiental Framework – C. Kane, 2104, in preparation

Africa Climate Research Priorities: Next Steps

Africa CR4D Coordination Platform Meeting
Fall 2014

Objective:
Defining a Sustainable Mechanism - the Institutional Platform - for Implementing Climate Research for Development (CR4D-Africa) Agenda

African Union, ClimDev-Africa (ACPC, Africa Development Bank, AUC)

WMO, WCRP, WWRP, GFCS, AMCOMET, Future Earth

ACMAD, Regional Climate Centers, Regional Economic Centers, NHMS and University representatives

Partner organizations (e.g. FARA, ASARECA, ROPPA, CGIAR-CCAFS, WASCAL, SASCAL, START, partner research insittutions (e.g. UKMO, Meteo France, DWD, IRI, NOAA, ECMWF, EUMETSAT)

Presentation of Africa CR4D Federation of Proposals

Africa Climate Research Priorities

Africa CR4D Coordination Platform Meeting
Fall 2014

Expected Outcomes:

- Joint statement on priorities for African climate research (*leadership, ownership*) to be shared with all major donor agencies;
- Agreement on a sustainable coordination mechanism to implement CR4D Agenda
- Establishment of an institutional arrangement to manage and coordinate the CR4D Agenda (Secretariat)
- Establishment of various Task Teams to advance CR4D Agenda
- Launch of the new CR4D-Africa Scientific Steering Group (develop ToRs)

Follow up with **Regional CR4D Engagement 'Road Show'** - across 5 African regions, co-organized by AMCOMET, GFCS, AU and RECs, to secure regional ownership of the agenda, ensure agenda reflects regional priorities for research-for-development, and ensure inclusion and buy-in of all relevant national/regional entities (eg ministries of research, NHMSs, sectors)

Africa Climate Research Priorities

Action Items

There is a substantial need to bring cohesion from the fragmented Africa community and for international investment to engage in Africa-led science.

WCRP - *through ACC2013* - facilitated the emergence of a single voice to the international agencies.

- Enhance and support coordinated engagement in Africa (eg by CLIVAR, GEWEX, WGSIP, WGRC, see DFID-ClimDev report)

African science is led by agendas and initiatives established and led from outside the continent.

- Prioritize the emergence of African science leadership
- Build a high-level dialogue between *science-active* African-research individuals and groups to build strategic cohesion

Modeling processes studies to understanding mechanisms for climate drivers, variability and change; and developing region-specific relevant models.

Establishment of new approaches to the analysis of the deluge of climate data.

- Facilitate a new WCRP Analysis thrust – incorporating regional, GCM and observational communities, building on WGRC distillation workshop Fall 2014.

Africa Climate Research Priorities
2015 Engagement Opportunities

2nd WCRP-ICTP Summer School, Spring 2015
Climate System Prediction and the Delivery of Actionable Regional Climate Information
Hosted by ANACIM, Senegal

Joint with WGSIP and WGRC

JSC36 2015, Kampala Uganda

Hosted by Uganda Meteorology Authority, in collaboration with the Uganda Ministry of Agriculture (TBC)

GEWEX Conference 14-17, July, The Hague, Netherlands

- **6 HyVic presentations (posters and oral talks)**
- **HyVic side meeting event**

HyVic GEWEX Regional Hydroclimate Project (Proposed)

Fredrick Semazzi (Chair, HyVic International Planning Committee)
North Carolina State University, Raleigh, 27606, USA

Background

•Lake Victoria Basin is the **social-economic nerve center** for East Africa (Burundi, Rwanda, Kenya, Tanzania, Uganda) – 30 to 40 million people.
• Mainly a rain fed agricultural economy, with LV supplying **fish as a major part of the diet.**
• Lake Victoria also provides **hydroelectric energy** and a relatively inexpensive form of transportation.
• The Lake Victoria Basin is geopolitically significant as the **source of the White Nile.**

Why HyVic?

• **Multi-disciplinary, multi-institutional and international research** collaboration to identify:
→leading policy issues,
→corresponding climate vulnerability thresholds,
→strategies for building resilience to climate variability and change.
• **Current links among international initiatives addressing different aspects of the problem are very weak or non-existent. Initiatives operate independently and disjointedly**.
→inefficient use of fiscal and intellectual resources,
→failure to fill critical gaps in knowledge,
→unnecessary repetition.
• **HyVic will build an international network: research, operations, policy & applications; leads to resilience to climate variability/change.**

Regional Grass Roots Support

•**HyVic Initial Source of Inspiration:** Feasibility study funded by the East African Community (EAC), with full participation of the regional National Meteorological and Hydrological Services (NMHS).

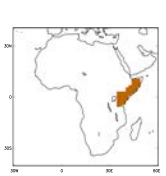
•**EAC Feasibility Study:** "Enhancing Safety of Navigation and Efficient Exploitation of Natural Resources over Lake Victoria and Its Basin by Strengthening Meteorological Services for Lake Victoria"
•**Recommendation of Feasibility Study:** "… we suggest creation of the Regional Hydroclimate Project (HYVIC) GEWEX …"

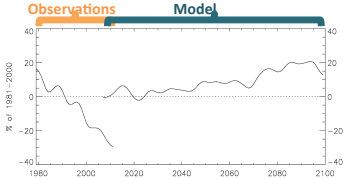
•**LVB-HyNEWS (Lake Victoria Basin - HydroClimate to Nowcasting for Early Warning Systems)** - Formed to enhance the coordination, visibility and sustainability of:
→ HyVic
→ SWNDP (Severe Weather Nowcasting Development and Demonstration Project)
→ EAC NEWS (Navigation Early Warning System)

Governed by an executive committee consisting of: EAC/LVBC, Heads of NMHS and AMCOMET Secretariat (invited observer). Projects' PIs and five NMHS technical contacts act as a day-to-day coordinating team.

Past and Projections - East African Paradox

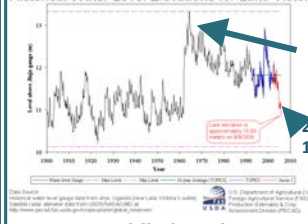
Rainfall and Lake Levels:
→ **Persistent decline** in the past and currently
→ Projected **reversal and increase**





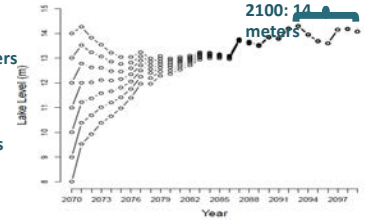
Low-pass filtered rainfall (>10yr), MAM average over Greater Horn of Africa (*Rowell, UKMO, 2013*)

Historical Water Level Elevations for Lake Victoria



1960: 13 meters

2010: 11 meters



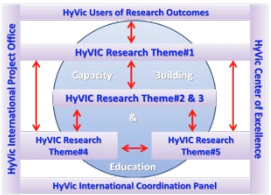
RegCM downscaled rainfall for 2071-2100 used as input for the Tate et al (2004) WBM to compute the LL. (Smith, 2011) ; evaporation is 13.5% above present level based on A2 scenario. Thus projection is 2 meters above present lake levels. (Smith et al, 2013)

→Likely to have profound implications on Lake Victoria Basin sustainable development

Overarching Science Questions

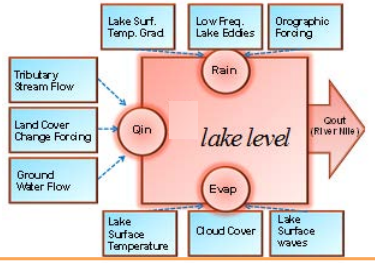
We propose to incorporate the effects of natural decadal variability (NDV), land cover change (LCC) and Global Warming (GW) in the climate models;
→ Determine if indeed the **projected reversal in rainfall will occur**;
→ Determine the **timing of the reversal**;
→ Determine these two with sufficiently high levels of **confidence to support adaptation and mitigation initiatives.**

HyVIC Science Research Agenda



HyVIC Research Theme-1: Translational Research Interface with Applications
HyVIC Research Theme-2: Severe Weather and Water Currents (collaboration with WWRP-LVP)
HyVIC Research Theme-3: Lake Victoria Basin Water Budget
HyVIC Research Theme-4: HyVic Earth System Model (EaSM); Climate Variability/Projections
HyVIC Research Theme-5: Observation of the Hydroclimatological System *(Customized from GEO)*

Lake Victoria Hydrological Inputs



International Planning Committee (IPC)
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Rosalind Cornforth, U. Reading
Andrew Githeko, Kenya Medical Research Institute
Helen Houghton-Carr, CEH/NERC
Felix Mutua, Jomo Kenyatta University of Agriculture and Technology
Laban Ogallo, ICPAC
Rita Roberts, UCAR
Pascal Waniha, Tanzania Meteorological Agency
Lian Xie, NCSU

Further Information:

1) EAC Feasibility Study: http://climlab.meas.ncsu.edu/Final_Report_LVBC.pdf
2) Draft HyVic Science Plan: http://climlab.meas.ncsu.edu/HYVIC/HYVIC-Science_Plan.pdf
3) Contact Information: Prof. Fredrick Semazzi (IPC Chair): **fred_semazzi@ncsu.edu**

HyVic Timeline