



Frontiers of African Climate Science Research

*Delivering as One on Climate Research
and Service Delivery in Africa*

Steering Committee,
“Advancing Climate Knowledge for Development in Africa”
UNECA, Addis Abba, October 20, 2012



Disjointed Scientific Climate Information

“Information coming from the science community is disjointed”

– Bai-Mass Tall

“We can no longer wait. Climate Change challenges at local level are happening, they need to be addressed NOW... If you don't get your act together, we'll go back to re-hiring witch doctors!”

– Arba Diallo, Mayor of Ouagadougou

“We can't continue to have fragmented initiatives in Africa”

– Fatima Denton, ACPC

Our struggle for coherence...



Urgently needed

- Coordination to Deliver as One on Climate Research in Africa, to address the real information needs of those who need climate services most

Principles

1. Coordinating research on African climate, from across disciplinary divides, across Africa
2. Harmonizing delivery of climate research outputs, working through and building on existing climate service delivery mechanisms
 - NHMSs at national level
 - Regional strategies and RECs at regional and continental levels
 - GFCS at global level

Pre-requisite:

Identification of End-User Priority Information Needs & Mapping of Current Knowledge Gaps

- Identifying what climate information and services end-users need to inform critical climate risk management and adaptation decisions now, to the mid-to-late 21st century
- Mapping of Current Gaps in our collective knowledge of the African climate system, thwarting our delivery of need climate information
- Dissaggregating Users: who are the end-users?

What Do Users Want?

- #1: Strategic ahead-of-season planning (1-month to 6-months lead range)

1.	<p>Process: Strategic ahead-of-season planning (1- month to 6-months lead range).</p> <p>End-users:</p> <ul style="list-style-type: none">• Farmers/pastoralists/communities at risk (e.g.: selection of cultivars, crops)• Disaster planners/managers (guide disaster preparedness operations: READY)• Public health planners• Water managers <p>Information gaps:</p> <ul style="list-style-type: none">• Onset, cessation timing• Likelihood of dry/very wet spells (risks)• Expected seasonal rainfall distribution <p>Information needing improvement:</p> <ul style="list-style-type: none">• Seasonal rainfall totals: better skill and definition of user-relevant thresholds (beyond terciles)• Seasonal temperature outlook: better skill and definition of user-relevant thresholds (beyond terciles)• Knowledge on appropriate communication channels to deliver seasonal climate information to specific end-users
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What Knowledge Gaps Thwart Scientists from Providing User Requested information?

- #1: Strategic ahead-of-season planning (1-month to 6-months lead range)
- *Key Research Frontiers:*
 - Prediction of ocean variability (e.g. IOD and Trop Atlantic as well as ENSO)
 - Understanding of teleconnections
 - Improved representation of land-atmosphere coupling
 - Improved representation of convective processes

What Do Users Want?

- #2: Intra-seasonal Risk monitoring and management / Within-season operations (1-2 weeks to 40 days range)

2.	<p>Process: Intra-seasonal Risk monitoring and management / Within-season operations (1-2 weeks to 40 days range)</p> <p>End-users:</p> <ul style="list-style-type: none"> • Farmers/pastoralists/communities at risk (e.g.: determination of harvest timing, pesticide application timing) • Disaster planning (guide disaster preparedness operations: SET) • Public health planners (operations) • Dam managers (guide water release decisions) <p>Information gaps:</p> <ul style="list-style-type: none"> • More precise information on expected timing of onset/cessation • timing/duration/intensity of dry/very wet spells <p>Information needing improvement:</p> <ul style="list-style-type: none"> • Knowledge on appropriate communication channels to deliver short to mid range climate/weather information to specific end-users
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What Knowledge Gaps Thwart Scientists from providing User Requested information?

- #2: Strategic ahead-of-season planning (1- month to 6-months lead range)
- *Key Research Frontiers:*
 - **intra-seasonal predictability**
 - **full characterization and assessment of current levels of skill of sub-seasonal forecasts**
 - **greater availability of products**
 - **Identification of appropriate delivery channels to reach end-users with salient information to support their within-season decisions and operations, working through existing delivery and extension mechanisms**
 - **Evaluation of salience of intra-seasonal forecast systems and products to meet end user needs**

What Do Users Want?

- #3: Improved downscaling of climate/weather information

Process: strategic operations planning at local scale

IMPROVED DOWNSCALING OF CLIMATE/WEATHER INFORMATION

End-users:

- Farmers/pastoralists/communities at risk (e.g.: determination of harvest timing, pesticide application timing)
- Sub-national city/community development planning
- Sub-national disaster planning (guide disaster preparedness operations)
- Public health planners (operations)

Information needing improvement:

Amount of geographical detail in forecasts

What Knowledge Gaps thwart Scientists from providing User requested information?

- #3: Improved downscaling of climate/weather information
- *Key Research Frontiers:*
 - understanding and characterization of the downscaling process
 - quantification of skill benefits
 - obtaining ‘ground truth’ at fine scale
 - **Capacity to downscale at RCCs**
 - Evaluation of salience of downscaled forecast products to meet end user needs

What Do Users Want?

- #4: Longer-term strategic planning/policy (next 1-10 years)

Process: Longer-term strategic planning/policy (next 1-10 years)

End-users:

- Development planners
- Infrastructure planners
- Natural resource managers

Information gap:

- Forecasts of rainfall/temperature for next 1-2 years
- Trends/frequencies for rainfall/temperature over next 5-10 years

Expected impacts of likely climate changes

What Knowledge Gaps thwart Scientists from providing User requested information?

- #4: Longer-term strategic planning/policy (next 1-10 years)
- *Key Research Frontiers:*
 - Decadal and multi-decadal variability (IAMO, PDO)
 - Role of aerosols
 - Evaluation of salience of decadal prediction systems and products to meet end user need
 - Impacts modeling (crop yields modeling, hydrological modeling)

What Do Users Want?

- #5: More Robust climate change projections

5.	<p>Process: climate change adaptation policy development/planning (next 50 years)</p> <p>ROBUST CLIMATE CHANGE PROJECTIONS</p> <p>Information needing improvement:</p> <ul style="list-style-type: none">• Robust climate change projections (model improvement over Africa needed)• Evidence of the role of the
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What Knowledge Gaps thwart Scientists from providing User requested information?

- #5: More Robust climate change projections
- *Key Research Frontiers:*
 - Carbon cycle
 - Water cycle
 - Attribution Methodology: systems and products for attribution



Other User needs?

- Climate Extremes?
- Integration of Indigenous Knowledge into Scientific forecast development, for increased salience to local information needs

Summary: Key Climate Research Frontiers (CRFs) in Africa

Key Research Frontiers:

- **Prediction of ocean variability (e.g. IOD and Trop Atlantic as well as ENSO)**
- **Understanding of teleconnections**
- **Improved representation of land-atmosphere coupling**
- **Improved representation of convective processes**
- **intra-seasonal predictability**
- **full characterization and assessment of current levels of skill of sub-seasonal forecasts**
- **greater availability of products**
- **Identification of appropriate delivery channels to reach end-users with salient information to support their within-season decisions and operations, working through existing delivery and extension mechanisms**
- Evaluation of salience of intra-seasonal forecast systems and products to meet end user needs
- **understanding and characterization of the downscaling process**
- **quantification of skill benefits**
- **obtaining 'ground truth' at fine scale**
- **Capacity to downscale at RCCs**
- Evaluation of salience of downscaled forecast products to meet end user needs
- Decadal and multi-decadal variability (IAMO, PDO)
- Role of aerosols
- Evaluation of salience of decadal prediction systems and products to meet end user need
- Impacts modeling (crop yields modeling, hydrological modeling)
- Carbon cycle
- Water cycle
- Attribution Methodology: systems and products for attribution



The Africa Climate Conference 2013 (ACC – 2013)

Setting the priorities for climate research in Africa and putting climate knowledge into the hands of end-users

Pushing back the frontiers of African Climate Research, for improved salience to support adaptation decision-making in Africa

Africa Union Hall, Addis Ababa, Ethiopia - October 2013

The ACC will directly precede the Third Conference on Climate Change and Development in Africa (CCDA-III)



The Africa Climate Conference 2013 (ACC – 2013)

Objective:

Craft an Africa-wide agenda on climate research for sustainable development, linked to existing policy processes, partners and institutions (regional, national and sub-national) to deliver as one on African priorities on climate research, while addressing global research needs.



The Africa Climate Conference 2013

Specific Objectives:

- 1) Provide a wide international forum to exchange understanding on the current state of knowledge of the African climate and the drivers of African climate variability and change.
- 2) Deepen and broaden the consensus, begun at CCDA-II, on the priority knowledge gaps/climate science frontiers that need to be addressed.
- 3) Review and assess the state of knowledge on each climate science frontier identified (from the mapping of knowledge gaps in 1), through presentations by leading researchers in each field.
- 4) Identify missing links and obstacles that will need to be overcome in order to bridge African climate science and applications.
- 5) Develop pan-African climate research program proposals for each critical climate science frontier, for funding submission.
- 6) Leverage national, regional and international sources of funding to advance climate research for sustainable development in Africa.
- 7) Develop and strengthen the network of climate researchers and practitioners working on the African climate system, building on existing national/regional/continental climate research institutions and knowledge hubs.
- 8) Create a platform for knowledge sharing, advocacy and consensus building for climate research in Africa to serve sustainable development needs.



The Africa Climate Conference 2013 (ACC – 2013)

The ACC-2013 will deliver the definition and consensual validation of a coherent African climate research agenda, to be consolidated after the conference in the form of pan-African research proposals targeting new funding opportunities and collaborations.

The call for abstracts will be opened at the start of January 2013 and will close at the end of March 2013. We invite the community to look out for the announcements that ACPC, CLIVAR, WCRP and partners will issue by email and in their respective newsletters.

This Conference is Yours- please join the initiative!

Providing Coherence in Our Climate Research on Africa

Guidelines for Regional Working Group Discussions: User – Scientist Dialogue on CRFs

In Each Regional WG, define:

1. What are priority end user climate information and decision-support needs in your region
 - Who are the end users ? What are the decision-making processes needing to be informed?
 - Climate information and service needs for each decision-making process needing to be informed
2. Which fundamental Climate Research Frontiers / Knowledge gaps prevent us from delivering on expressed user needs
3. Validate a list of CRFs for your region

Report back to plenary in 30min!