CLIMATE RESEARCH FOR DEVELOPMENT (CR4D) INITIATIVE

"Towards a Coherent Climate Research in Support of Development Planning in Africa"

The Climate Research for Development (CR4D) in Africa initiative was launched to strengthen links between climate science research and climate information needs in support development planning in Africa. CR4D is an African-led initiative supported by partnership between African Climate Policy Centre (ACPC) of the United Nations Economic Commission for Africa (ECA), the African Ministerial Conference on Meteorology (AMCOMET), the World Meteorological Organization (WMO), and the Global Framework for Climate Services (GFCS), where Secretariat is ACPC. CR4D is the outcome of the African Climate Conference 2013 (ACC-2013) that was held in Arusha, Tanzania, which brought together more than 300 participants including the African climate scientists, policy makers, climate service providers, and practitioners to discuss the state of African climate science and the existing gaps in climate knowledge. Participants of ACC (2013) recommended the establishment of an African climate research agenda for climate services and development and subsequently endorsed by the Third Conference of Climate and Development in Africa (October 2013). The CR4D initiative was officially launched in Cape Verde by the Third Session of AMCOMET (February 2015).

Why CR4D?

Climate knowledge gaps including weak collaborative research partnerships for co-designing, co-resourcing and co-producing demand-driven research and inadequate characterization of extremes and their impacts (risk profile/mapping) remain large in Africa. Moreover, climate research in Africa is fragmented and are not mainly demand-driven, responsive to the user needs, and be situated within the contexts of Agenda 2063, Sustainable Development Goals (SDGs) and the Paris Agreement. Addressing these challenges requires more than just understanding of future climate projections and risks, but also factoring in climate research findings into development policy, plans and practices within the climate sensitive socio-economic sectors such as agriculture and food security, health, disaster risk reduction, energy, and natural resources management (water, forests and others) as well as gender, migration, urbanization, infrastructure, marine and coastal zones, etc. The CR4D initiative is, therefore, representing a paradigm shift to deal with climate change and development in the continent by integrating Africa-wide climate research initiatives as it brings together the scientists, practitioners, institutions as well as development actors to deliver on priority end user needs. It will also play a critical role in mobilizing African climate researchers around a unified climate research agenda to address priority needs of policy makers and vulnerable communities in Africa; and building the capacity of African climate scientists through cross-regional exchanges, fellowship and secondments.

What are CR4D's goals?

The overarching mission of CR4D is to improve knowledge, access, quality, usability and mainstreaming of climate information into development planning and programmes in Africa emphasizing co-exploring, co-designing, co-producing and co-communicating. In a nutshell, CR4D builds a bridge between African decision makers and climate science researchers, and supports the production of actionable climate research outputs that will inform adaptation decisions in Africa by the mid-to end 21st Century. The initiative maximizes on the opportunities presented by climate variability and change while aiming at addressing challenges posed to the socio-economic development efforts of Africa. Hence, CR4D specifically sets the directions and priorities to catalyse pan-African multi-disciplinary climate research that is responsive to specific user as well as development planning needs at local, national and regional levels. It also seeks to create a platform through an interactive and collaborative approach uniting climate science, services and policy-making under a coordinated network of expertise and institutions. Furthermore, the CR4D improves knowledge, access, quality, usability and mainstreaming of climate information (CI) into development planning and programmes to attain Africa's development objectives as framed by the Sustainable Development Goals (SDGs), the Paris Agreement and the continent's Agenda 2063. Therefore, the CR4D initiative emphasizes on the following four structural goals to sustainable development and improvement of research capacity on the continent:

i. Co-designed multi-disciplinary research for improving climate forecast skill and reliability, across temporal and spatial scales;
ii. Improved information service delivery, including information from observing systems;
iii. Developed scientific and institutional capacity;
iv. Provide climate services and user interface platforms.

What are the CR4D Knowledge Frontiers?

Based on the African Climate Conference (ACC 2013) recommendations as well as emerging issues in climate science area, CR4D will advance African climate knowledge frontiers and provide a roadmap for mainstreaming Climate information into policy, practices and decision-making process. The CR4D knowledge frontiers for the period 2018-2022 are, therefore, grouped broadly into three major thematic areas such as:

- Foundational climate science;
- Impacts, information, translation, and communication;
- Engagement with policy, development and decision communities.

What are the governing structure of CR4D?

CR4D's governance structure includes an Oversight Board (OB), Scientific Advisory Committee (SAC) and an Institutional Collaboration Platform (ICP). These entities are supported by the CR4D secretariat, hosted by the ACPC. However, the CR4D will continuously seek optimal ways to ensure an effective and efficient mechanism for implementation. The ICP and SAC would establish sub-committees that are responsible for specific and time-bound tasks, as the agreed actions require. Moreover, a Grant Management Framework (GMF) to be established for management of extra-budgetary funds/resources and will operate a transparent, high-quality, independent and objective research commissioning, grant administration, and management systems. The GMF has a Grants' Review sub-committee[1], which is constituted on ad-hoc basis, to review CR4D grant/project proposals. The CR4D Secretariat and SAC co-chairs lead the process. The overall structure of the CR4D implementation mechanism is illustrated in Figure 1 below.

- *The CR4D Oversight Board (OB)*: composed of the representative of the ACPC, Director of AMCOMET Secretariat, the AMCOMET Bureau chair, the Directorate of Rural Economy and Agriculture (DREA) of the African Union Commission (AUC), the Climate Change Directorate (CCD) of the African Development Bank (AfDB), and the chair of the ICP. Its roles include provision of strategic direction on the CR4D Agenda; reviews and endorsement of the budgets of CR4D; and provision of oversight in the operation of SAC (including its membership) and ICP.

- *The Scientific Advisory Committee (SAC)*: a volunteer committee whose principal role is to provide guidance for CR4D research priorities, and scientific assessment. Members of SAC are appointed by the OB. The SAC is the core of the CR4D structure in terms of providing coordinated and converged advice and guidance for issues concerning African climate research in the overall CR4D implementation.

- *The Institutional Collaboration Platform (ICP)*: a continent-wide platform of participating and collaborating climate research institutions, academia, Regional Climate Centers (RCCs), Regional Economic Communities (RECs), Civil Servant Organizations (CSOs) including user sectors and related institutions and others. Continuous consultation with the users and partners is a key essence of CR4D, as is providing guidance to the overall CR4D implementation to ensure that research is relevant to the climate knowledge users in Africa.

[1] Resources will be made available for the sub-committee to facilitate the review process

- *The CR4D Secretariat*: hosted at the ACPC and expected to coordinate and assist the implementation of CR4D agenda on a day-to-day basis. It has been central in establishing the CR4D SAC and ICP, as well as in the initial phase of launching CR4D actions identified in Marrakech 2014[2]. In the coming period, the principal role of the Secretariat is to facilitate the work of OB, ICP and SAC to implement the agreed plans efficiently and effectively. The Secretariat reports to the OB.

- *Development Partner Forum:* CR4D shall continuously seek opportunities to interact with various donors. A Donor Forum shall be the main platform through which interested partners can convene in support of a unified climate research agenda in Africa.

- *The Editorial Sub-Committee*: The SAC is also tasked with coordinating editorial and peer-review process of papers submitted for publication in the CR4D proposed journal. The SAC co-chairs, in consultation with the CR4D Secretariat and broader representation of the African climate community, will constitute the Journal Editorial Sub-Committee.

CR4D Research Grant Management

The operationalization of the CR4D research grant management is one of the critical steps leading to the delivery of some of the CR4D structural goals as outlined in the ACC 2013. This grant management framework envisaged to pilot a small but potentially scalable research grant management facility. The overall objective of the CR4D grant management mechanism is, therefore, to provide both research programme funding and an efficient and responsive research commissioning and management facility that able to deliver against the CR4D research priorities. The CR4D initiative principles underscore, inter alia, that the grant managing institution (i) must be African-owned and Africa based institution with strong legitimacy in the African climate science and climate policy communities; (ii) operates a transparent, high-quality, independent and objective research commissioning, grant administration, and management systems; (iii) runs a research programme with longevity and scalability to ensure that such research programme lasts long and attracts funding from additional donors in the long-run; and (iv) conducts open competition and full transparency in decision making to ensure that the review and selection of projects meets technical and operational standards.

The ECA in partnership with the African Academy of Science (AAS) implement and manage the WISER-funded CR4D research grant. The AAS implements the WISER-funded CR4D research grant through the programmatic arm of the Academy, the Alliance for Accelerating Excellence in Science in Africa (AESA), created in partnership with the African Union Development NEPAD (AUDA-NEPAD) Agency provides the funding and agenda setting to support the best minds in Africa.

[2] Climate Research for Development (CR4D) strategy meeting: https://www.wmo.int/amcomet/sites/default/files/field/doc/events/africa_collaboration_platform_concept_note_01102014r.pdf

[8] AMCOMET in Fig 1 refers to the Director of AMCOMET Secretariat and the AMCOMET Bureau chair

WISER-funded CR4D Research Grant

The WISER-funded CR4D is a US$3.5 M initiative implemented by ACPC, The AAS and WISER programme to strengthen links between climate science research and climate information needs to support development planning in Africa. The 21 grantees, over half of whom are women, were selected from a competitive pool of nearly 200 applicants. The grantees are from a range of climate sensitive sectors, such as forestry, health and food security, economics to better prepare Africa's people to deal with the impacts of climate change. The projects distributed across four African regions in the west, east, central and south, will each receive up to $100,000 for a period of 18 months.

Confirmed Awardees, their Nationalities and their Host Institutions

- ***Dr Diodone Alemagi, Cameroonian, University of Ghana:*** Alemagi's project examines and identify strategies for advancing the implementation REDD+, a mechanism to support developing countries to reduce emissions by promoting the conservation and the sustainable management of their forests, in Cameroon and Ghana, where the rate of deforestation and forest degradation remain extremely high.

- ***Dr Olumuyiwa Adegun, Nigerian, Federal University of Technology, Akure:*** Impacts of extreme weather events are already a reality within informal settlements - places where a significant proportion of the urban population in Africa live. More impacts are expected, given the level of vulnerability. Adegun's research focuses on strengthening adaptation and improving the application of climate information within these disadvantaged urban areas.

- ***Dr Anderson Kabila, Cameroonian, Stockholm Environment Institute, Kenya branch:*** Despite increasing interests in transitioning to low-carbon economies in Africa, policy making is hindered by the lack of necessary data and decision-support tools to bring about transformational change. Kabila's research seeks to bridge these gaps in science, technology and policy by providing decision makers with the information and tools they need (low-carbon economic models, quantified simulation scenarios, transition pathways and indicators) for measuring and evaluating the roll out of policies and programmes in East Africa.

- ***Dr Philip Antwan-Agyei, Ghanaian, Kwame Nkrumah University of Science and Technology:*** By 2030, the impacts of climate change could cause enhanced levels of extreme poverty, especially in West Africa, where climate change presents a major development challenge with disproportionate effects on agriculture and agro-based livelihoods. Antwan-Agyei's research focuses on advancing knowledge on how to mainstream climate information in resilience building in agricultural systems to support sustainable agricultural productivity and economic development in Ghana.

- ***Dr George Otieno, Kenyan, Intergovernmental Authority for Development Climate Prediction and Applications Centre:*** The various sectors of the Greater Horn of Africa (GHA) — Djibouti, Eritrea, Ethiopia, and Somalia — including agricultural and food security, water and energy, livestock and health are already experiencing more

droughts due to climate change. This will worsen as Africa is projected to warm fastest than any other continent. Otieno's research focuses on how seasonal forecasts can be improved better, including the introduction of climate change information to enhance early warning systems and disaster preparedness for effective response over the GHA region.

- ***Dr Stella Kabiri-Marial, Ugandan, Mukono Zonal Agricultural Research and Development Institute:*** The projected impacts of 2 degrees global warming are more dangerous than initially thought and brings us closer to several critical tipping points. We have only 12 years for drastic action if we are to have any chance of achieving the 1.5 degrees' target. In a bid to save emissions from Industrial fertilizer production, this research focuses on demonstrating a green-energy driven technology solution to support the on-site fertilizer production in Africa. The aim is to provide cost-affordable, green-made Nitrogen fertilizers to local small-scale farms.

- ***Dr Asanterabi Lowassa, Tanzanian, Tanzania Wildlife Research Institute:*** The project aims to provide a broad understanding on the impact of gender inequality on the climate change and mitigation measures/coping strategies used by men and women. The ultimate goal is to influence policy and decision makers to consider the gender aspects of climate change and develop a gender-responsive approach.

- ***Dr Isaac Mugume, Ugandan, Makerere University:*** The project will focus on the implications of the 1.5-2.0 degree Celsius to Uganda climate, agriculture and water nexus and will investigate the probable influence of this temperature limit on crop production and water needs including the influence on rainfall, humidity, winds and cloudiness over Uganda. This study will contribute to the research profile of the department of Geography, Geo-informatics and Climatic Sciences of Makerere University at the same time mentoring and supporting three graduate students carrying out research in areas of agriculture, hydrology, environment and climate among others.

- ***Dr Mary-Jane Bopape, South African, South African Weather Service:*** Weather and climate early warning systems which are crucial for the safety of life and property, rely on the use of numerical models, none of which were developed in Africa. Bopape's research will focus on the improvement of thunderstorm simulations over Southern Africa using numerical weather prediction models through modification of the boundary layer and microphysics parametrisation schemes. Output from the models will also be used to develop products for the agriculture, water, disaster risk reduction, energy and health sectors.

- ***Dr Marthe Montcho, Beninese, University of Abomey-Calavi:*** The warming due to climate change affects the quantity and quality of milk in several livestock systems. Due to the importance of dairy livestock for dairy women cooperatives in West Africa, Montcho's research focuses on simulation of the best strategies required by dairy women cooperatives to address climate change based on their current strategies for milk production and their profit improvement.

- ***Dr Monrovian Barimalala, Malagasy, University of Cape Town:*** The economic growth of the African island states over southwest Indian Ocean (SWIO) region is threatened by the impacts of climate change. There is however a limited understanding of the basic mechanisms that drive the climate variability in the area; analyses of conventional climate model outputs, both present day and projections under different global warming levels are very scarce. The critically limited climate information available for major climate-sensitive decisions hampers these countries' efforts toward sustainable development. With a particular focus on Madagascar, the project will contribute on scientific understanding of the climate variability and change in the island in order to integrate a science-based knowledge into the country's climate-sensitive decisions, climate change adaptation and mitigation plans as well as on the national risk awareness.

- ***Dr N`Datchoh Evelyne Toure, Ivorian, West African Science Service Center on Climate Change and Adapted Land Use:*** This project Flood Risk Reduction under Paris Agreement (FLORR-PA) aims to provide valuable information about projected flood occurrences in three West African cities of Abidjan, Dakar and Ouagadougou under global warming target of 1.5^{o}C and 2^{o}C.

- ***Dr Olga Aliza Kupika, Zimbabwean, Chinhoyi University of Technology:*** This study aims to explore the impact of climate change on riparian based ecosystems and livelihoods dependent on two river systems, the Ronde and Save River in the south-eastern Lowveld, Zimbabwe. The project will adopt a case study approach whereby two study communities located along the margins of the rivers in drought prone Chiredzi and Mwenezi Districts will be selected to collect data using smart-mobile phones.

- ***Dr Dimphna Ezikanyi, Nigerian, Mountain Top University:*** The study seeks to evaluate the allergenic potentials of some plants and this will inform climate policy on selection of non-allergenic plants for tree planting approach to mitigation. The work will develop allergen specific immunotherapy for prevention of allergic diseases and evaluate the prophylactic potentials of seeds and Euphorbia in attenuating allergies.

- ***Dr Ibrahim Sy, Senegalese, Centre de Suivi Ecologique:*** The health impact of climate change has been clearly demonstrated and that heat waves lead to morbidity and mortality excess, especially in Sahel strip countries marked by temperatures increase. However, there are still no climate services for the health sector that can assist in the monitoring and prevention of health risks associated with heat waves. The availability of health climate services (weather forecasts, seasonal forecasts and climate scenarios) can help to better integrate this emerging public health issue into health policy priorities in order to reduce morbidity and mortality due to heat waves in Sahel regions.

- ***Dr Eleni Yitbarek, Ethiopian, University of Pretoria:*** In this study, we propose to investigate the impacts of crop diversification (both cereal and cash crop diversification) on farm household's food and nutrition security. The study focuses on Ethiopia, Nigeria and Uganda, where the levels of crop diversification are generally low, and incidence of food insecurity and nutrition deficiency are high.

- ***Dr Kouassi Richard M 'Bra, Ivorian, University of Peleforo Gon Coulibaly*:** In Côte d'Ivoire, malaria is the disease that has the most significant health burden with an estimated incidence of 330 cases per 1000 population. Malaria transmission could be impacted differently by the different climatic regime of the country. M'Bra's research aims to develop early warning systems to forecast periods of high malaria infection risk in Côte d'Ivoire.

- ***Dr Mokonen Adnew Degefu, Ethiopian, Debre Markos University:*** The effort towards establishing effective drought management system in the data poor drought prone parts of Africa is hampered due to insufficient knowledge on the spatiotemporal variability, drivers, poor data quality and limited capacity. Degefu's seeks to identify geospatial datasets and drought indices and identify the driver of drought development from large scale climate oscillation systems in Ethiopia. It intends to enhance data availability, methods and enhance the predictability of drought development

- ***Dr Ariane Amin, Ivorian, Centre Suisse de Recherches Scientifiques:*** The project seeks to supply decision-makers with contextual-based and evidence-based information to enhance decision making to tackle the impact of climate on cattle production in West Africa. It will also investigate the climate risk for cattle trade flows between Côte d'Ivoire and Sahelian countries and assess the cost of inaction.

- ***Dr Jessica Thorn, Namibian, University of Cape Town:*** The project will (1) determine impacts of seasonal variability on water supply in rural and peri-urban areas, (2) assess synergies and trade-offs of water-related ecological infrastructure, (3) identify barriers to the mainstreaming of ecological infrastructure for adaptation, and (4) examine diverse, scenarios to achieve desired futures outlined in the 2030 UN Sustainable Development Goals and the African Union Agenda 2063.

- ***Dr Madaka Tumbo, Tanzanian, University of Dar es Salaam:*** The research aims to address the trade-off between water savings, and productivity and soil fertility brought on by the use of alternate wetting and drying, a water management technique that uses much less water in rice irrigation. Rice, a staple food for 3 billion people, consumes more water than any other crop. In the coming decades, as demand for rice increases, freshwater resources dwindle and become more unpredictable due to climate change, and evaporation rates increase due to higher temperature, rice production will become unsustainable in most regions, requiring alternate wetting and drying but its use will need a trade-off to reduce organic nutrients being mineralised and to prevent the loss of soil fertility.

Quotes from key collaborative partners

1) WISER-funded CR4D Research Grant Partners

- *ECA, as one of the founding members and main implementers of CR4D initiative, is delighted to see the launch of the CR4D research grants. This comes after several years of investment in building partnerships with other institutions, eminent scientists and scholars, through which the CR4D collaborative governance structure and a five-year strategy were developed to guide the CR4D research agenda.*
- *Dr. Vera Songwe, the Executive Secretary of ECA, sees today's awards as "the beginning of a programme that will grow and enable Africa to develop a large pool of young scientists who are able to conduct research that can provide evidence to support development policy and planning for climate smart economy to ensure sustainable development in Africa."*
- *Prof. Nelson Torto, the Executive Director of the AAS noted that "the AAS has a long-term investment in scientific excellence in Africa and ensures that early career research leaders are mentored to achieve and maintain excellence in their respective fields. In keeping with this mandate, The AAS will invest in the career development of the 21 researchers selected for the CR4D research grants by inducting them into their Postdoctoral fellowship Programmes under the AAS Accelerating Excellence in Science in Africa (AESA) platform. Through AESA they will have access to bi-annual international networking and collaborative meetings, informal review from AAS's network of senior fellows in diverse STEM areas, conferences relevant to early career scientists and support to their host institutions to achieve good financial grant practice (GFGP). They will also have access to free publication of their research results and other data on AAS OpenResearch and have full time access to AAS programmes staff for any research support they may require during and after the period of their grant."*
- *The importance of CR4D initiative is underscored by the United Kingdom (UK) Minister for Africa, Honorable Harriett Baldwin's statement that "as climate extremes worsen, it is the world's poorest countries and communities which will be most affected, with Africa particularly vulnerable to climate shocks. Projects like this show how the UK is taking action and leading the way in helping African communities adapt to climate shocks, by investing in research and technical expertise"*
- *Ms. Charlotte Watts, the UK's Department for International Development (DFID) Chief Scientific Adviser also noted that, "if we are to fight the effects of climate change, we need strong scientific evidence to help us understand its dynamics and how this will affect Africa. These grants will help to fill important research gaps and we, as DFID, are thrilled to be the first to support this exciting opportunity"*
- *Science based reliable climate data and information and are crucial to understand climate phenomenon, develop appropriate early warning system, and make the necessary decisions noted Mr. Frank Rutabingwa of the Pan-Africa WISER project coordinator. The WISER-funded CR4D research grant improves the capacities and competencies of young African researchers and contributes to the development of more science based reliable and useful climate information in Africa.*

2) *CR4D Founding Partners*

- *Dr. James Murombedzi, Chief of the ACPC and representative of the CR4D OB noted that "understanding of African climate and use of climate information for decision-making are restricted by a number of factors including inadequate research infrastructure, gaps in Africa's climate observation systems, inadequate data to assess the past and current states of the climate as well as communication gaps between climate scientists and decision-makers, vulnerable communities, development practitioners. The launching of the CR4D research grant is a step towards addressing these challenges."*
- *Dr. Joseph Mukabana, Director of AMCOMET Secretariat at the WMO stated that the operationalization of CR4D research grant provides opportunity to young African researchers to address critical gaps in the understanding of the African climate system and bridges the divide between climate science and policy,. Specifically, it contributes to multi-disciplinary climate research for improving climate forecast skill, observing systems and data delivery, scientific and institutional capacity, and mainstreaming climate services into decision-making.*
- *Dr. Lucio Philipe, Director of the GFCS, emphasized the need for co-exploring, co-designing, co-producing and co-communicating climate information service (CIS) to improve the quality, accessibility and usability of CIS into development planning in Africa and the launching of the CR4D research grant is, therefore, a positive step towards achieving this objective.*
- *The CR4D research grant is an exemplary commitment and investment across the science community, funding agencies, and other partners to support climate research in Africa; which embraces diversity, demands equality and builds capacity for the future, noted Dr. Boram Lee of WCRP. She emphasized that this support must be interwoven with the global implementation blueprint, scientific activities in all regions, and every infrastructure enhancement as we elevate this effort to the global and interdisciplinary scales.*

3) *CR4D Governing Bodies*

- *Prof. Amadou Gaye, the co-chair of the Scientific Advisory Committee of the CR4D, noted that, "there is an increasing need for tailored weather and climate services, adaptation strategies and sustained policy support that will reduce Africa's vulnerability to the vagaries of severe weather and extreme climate events. The launching of the CR4D research grants is a move towards a positive direction to promote participatory climate research and strengthening networking capacities of young African scientists, institutions and other stakeholders to co-design, co-produce and co-communicate demand-driven climate research in Africa"*
- *The launch of the CR4D research grant is a milestone not only for young African climate scientists in Africa, but also to the wider African community as it will contribute immensely in the production of evidence-based climate information needed for building the resilience of our people, economy and ecosystem, noted Mr. Mithika Mwenda, the Chair of ICP.*
- *On behalf of the CR4D Secretariat, Dr. Yosef Amha noted that the Secretariat would strive to foster better collaboration among scientists in universities, research institutes and other organizations in the continent in order to improve mainstreaming of climate services in decision-making process. Finally, he acknowledged all CR4D partners for their unlimited supports and looking forward to the research outcome that would enrich the capacity of young African scientists to engage with the society in the context of climate change.*

The Climate Research for Development in Africa (CR4D)

CR4D Founding Partners

United Nations Economic Commission for Africa

ACPC African Climate Policy Centre

WMO AFRICAN UNION AMCOMET

World Meteorological Organization

GFCS GLOBAL FRAMEWORK FOR CLIMATE SERVICES

WCRP World Climate Research Programme

WISER-funded CR4D Research Grant PARTNER institution

The African Academy of Sciences

Funded by

UKaid from the British people

For more information

CR4D Secretariat,
Africa Climate Policy Centre
Economic Commission for Africa
Menelik II Road, P.O.Box 3001
Addis Ababa, Ethiopia
www.uneca.org/cr4d

The African Academy of Sciences,
8 Miotoni Lane, Karen,
P.O. Box 24916-00502
Nairobi, Kenya
www.aasciences.ac.ke