ACPC
African Climate Policy Centre

United Nations
Economic Commission for Africa

Climate Information Services (CIS)-Day

"Addressing the Missing Links for Enhanced Uptake and Use of CIS into Development Planning, Policy and Practice in Africa"

Report

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WISER
Weather and Climate Information Services for Africa

Part I: Introduction

1.1. The aim of climate information services (CIS) is to provide people and organizations with reliable, timely, user-friendly and tailored climate-related information to reduce climate-related losses and thereby enhance benefits[1]. Hence, factoring CIS into policy, planning and practices are crucial for Africa to achieve its aspirational goals for enhanced competitiveness, reduced poverty and sustainable economic growth. Moreover, advanced knowledge of climate information coupled with appropriate advisory services enhance the capacity of the African society to adapt to climate variability and climate change and thereby improve their capacity to manage climate-related risks. However, the relevance of weather and climate information to the end-users are largely dependent on a number of factors including the ability of scientists to provide fit-for-purpose information, packaged in formats that can be integrated easily into decision-making processes, and others[2].

1.2. The importance of Climate Information on systems has long been recognized in classical history of the Greek Epoch and Roman Empire. About 2500 years ago, a Greek physician named Hippocrates of Kos (460 – 370 BC), who is better known as the Father of Medicine for founding the first formal school of medicine called the Hippocratic School of Medicine, and who is also credited with what is known as the Hippocratic Oath, made remarkable observations on the influence of climate on public health. Hippocrates believed that people living in cities with different climates might suffer from different diseases. He observed that abrupt climatic changes or unusual weather conditions affect public health, especially the incidence and severity of various infectious diseases, including gastrointestinal infections, tuberculosis, and central nervous system infections. His scientific observations are therefore great early historic examples that stress to modern researchers and clinicians of infectious diseases the need to study intensively the impacts of the current on-going global climate changes to infectious diseases in order to help in the prevention of possible epidemics.

1.3. The uptake and use of CIS in Africa is influenced by many factors including the lack of reliable historical observations, coarse scale of future climate projections, weak coordinated CIS delivery, and others. Moreover, from the users' side, the main obstacles for poor uptake and utility of CIS include limited awareness about the existence of specific climate information, poor data accessibility, and lack of capacity to use climate information into decision making process. Accelerated CIS uptake for development planning in Africa also requires an enabling environment for substantive investments and uptake of climate information services, supported by applied research and policy analyses, as well as coordinated approaches to service delivery, strengthened knowledge frameworks and partnerships between public institutions, the private sector, civil society and vulnerable communities.

[1] Vaughan C. and Dessai S. (2014). Climate Services for Society: Origins, institutional arrangements, and design elements for an evaluation framework. *WIREs Climate Change* 587-603

2 Daron J.D., Sutherland K., Jack C. and Hewitson*, B.C. (2015). The role of regional climate projections in managing complex socioecological systems. Regional Environmental Change 15:1–12*

1.4. Africa has greater intention to improve CIS, most recently with the adoption of the Integrated African Strategy on Meteorology although climate information is not widely available and, even where available, it is not used effectively in decision-making process. Moreover, the existing donor-funded programmes are piecemeal, short-lived and not well targeted. Hence, an innovative CIS initiative that provides science-informed solutions to the prevailing climate science and policy challenges are vital for the effective implementation of the Paris Agreement, Agenda 2063 and 2030 Agenda in Africa. Countries in Africa should, therefore, invest on robust climate information and services delivery system for the effective implementation of Nationally Determined Contributions (NDCs) and associated mechanisms established through the global climate governance processes.

1.5. However, significant gaps are still existed in provision of precise downscaled location-specific, reliable, timely, and user-friendly weather forecast information that effectively addresses the needs of vulnerable community (gender, disabled, youth, elders, etc). Most community in Africa rely on indigenous knowledge (IK) for their seasonal forecasts, where locally observed variables and experiences are used to assess and predict the local weather conditions and particularly the onset of rains as it determines farming decisions. However, such IK experiences are not widely documented and often passed on from one generation to the other orally by local expertise, creating a wide inter-generational gap between its custodians and the younger generation.

1.6. Findings from the implementation of the pan-African component of WISER Phase I indicated that the uptake and use of CIS into development planning, policy and practice in Africa is largely dependent on the relevance of the information to the needs of the users. The study specifically noted that the policy and legislative environment does not provide sufficient incentives for the uptake and use of CIS. This could be attributed to weak institutional and human capacities to provide user-driven quality climate data and information. Furthermore, the existing numerous fragmented initiatives on the continent are unable to influence the policy and legislative agenda in the continent because of weak or complete absence of coordination mechanisms. Lack of appropriate strategies for brokering and managing the information and knowledge produced from the numerous initiatives and interventions do not yet exist to enhance the impact of CIS for end-users as well as to fully engage with CSOs, private sector, as well as NHMS and various government ministries. The collaborative research platform in the continent for co-designing, co-resourcing, co-producing and co-communicating user-driven climate information and services are also found to be not existing or weak, if existed.

1.7. The meeting on addressing the missing links for enhanced uptake and use of CIS into development planning, policy and practice in Africa is a full day deliberation with a structure of subsequent presentations grouped under three areas followed by views of the discussant. Specifically, it provides a platform to discuss:

- the missing link in CIS co-production, uptake and use
- investments and uptake of CIS in Africa, and (SEB and VfM)

- role of research in CIS generation, uptake and use

1.8. The meeting was held on 27th of October 2017 at the United Nations Conference Center (UNCC), Addis Ababa, Ethiopia.

1.9. The workshop was attended by about 100 climate scientists, practitioners, and researchers who came from different African countries and institutions.

Part II: Opening Session

2.1. The welcoming remark was delivered by Dr. James Murombedzi, the Officer-in-Charge of the African Climate Policy Centre (ACPC). Before he asked Dr. Fatima Denton and Dr. Joseph Mukabana to make their opening remarks, he took the moment to welcome all participants to Addis Ababa for this important meeting. He reminded participants that the event is a full day meeting designed to cover lot of topics related to Weather and Climate Information Services (CIS). Without a further undo, I would like to invite Dr. Fatima Denton, director of the Special Initiative Division of ECA, to make an opening remark.

2.2. Dr. Fatima Denton started her opening remarks by saying "a happy CIS-day". She reminded participants that when we talk about CIS in Africa, our language is often negative including "what it lacks" or "how the quality of CIS is poor", or "its accessibility issue", or other. But, today, it is a celebratory day as we are going to talk about the potential of CIS. However, our explanation about the potential of CIS often aspirational – what it can do for agriculture, water, energy, and other development sectors. Hence, we must move from explaining "*potentials*" to "*tangible evidences*" by enlightening "*how CIS helps us in connecting to policy formulation in critical development sectors and major development agendas*". She believed that this CIS-day meeting provides participants a learning hub to share information and experiences on CIS.

2.3. In terms of the African Climate Policy Centre (ACPC) experience, she said, it is safe to announce the issue of CIS is coming over-aged. Our understanding in the past was - the higher officials and development partners knew about CIS but they are not fully taking of its advantages. However, when we met them in person, their responses about CIS were vague. This complicated our efforts to make a compelling argument on how CIS reduces poverty in the continent. Couple of years later, we are able to acknowledge CIS moved beyond its aspirational potentials. However, this does not to mean the issue of CIS density and coverage, absence of relevant observation systems, lack of computational capacity and lack of digitize data addressed in Africa. Rather, our language should be coined to convince policy makers to invest on CIS by giving evidences on how we lament about the poor observations in Africa, how low the scientific understanding of CIS, how poor the current and historical data, how we unable to get relevant data on wind, temperature, and precipitation and others.

2.4. With extreme event happening almost everywhere, she thought, a large segment of politicians began to say there are areas where we are taking advantage of CIS. When users got a timely, relevant and quality CIS, they can make good and strategic decision at macro and micro levels. She wrapped up her opening speech by asking participants to discuss and get answer on the following three questions.

   a) If we indeed to move from aspirational to application, the issue of "scale" can take a central stage. Hence, the question is "how we scale up/out CIS?"
   b) CIS is still in slow lane and the question is "how can move CIS to the fast lane to exploit its full potential?"

c) Given its importance, how do we connect CIS with greater development agendas (2063 Agenda and Agenda 2030) and resonate with decision-making process to reduce poverty?

2.5. Generally, we diagnose the problem quite extensively but now we need to work for the solution to serve the CIS users very well. With this, she liked to wish all participants a happy CIS day and a fruitful deliberation.

2.6. Dr. Joseph R. Mukabana, Director, Offices for Africa and Least Developed Countries (AFLDC) and African Ministerial Conference on Meteorology (AMCOMET) Secretariat delivered his opening speech by thanking the ACPC for this innovation of establishing the "CIS Day". Coming from WMO, a specialized agency that deals with weather, climate and water, he believed that such events could help to identify, capture, evaluate, retrieve and share knowledge that meets user needs. He reminded participants that chain of events leading to CIS is critical but must be properly contextualised. Climate Information Services encapsulates both the provision of climate and weather information and related advisory services at temporal and spatial scales relevant to a range of stakeholders, including decision makers across levels – from regional and national down to local or stakeholders at the grassroots level like peasant or small-holder farmers, fishermen, pastoralists and small-scale traders.

2.7. He noted that there is presently a growing interest in CIS activities on the African continent. This is because over 60% of socio-economic activities on the continent are weather and climate related and about 90% of all natural disasters on the continent are hydrometeorological. It is also estimated that weather and climate related disasters could cause devastation to property and infrastructure of a country and affect the Gross Domestic Product (GDP) by 10 – 20 % and could reverse the gains made in economic growth and development. Proper use and application of climate services, therefore, strengthens the ability of rural communities to reduce their vulnerability to extreme weather and climate events. To adequately address these extremes requires the involvement of the National Meteorological and Hydrological Services (NMHSs) as key stakeholders with a national mandate to observe, forecast, and issue warnings for expected weather, climate, and water threats. However, the challenges of many of the NMHSs are enormous. They are required to recover operational costs, as well as the costs associated with maintaining and expanding their observational networks. The resources to face these challenges are grossly deficient and as a result, some NMHSs lack the capacity to provide even a basic level of climate services.

2.8. The benefits of using climate information are very huge, since the scope of social and economic activities affected by weather and climatic conditions is enormous. Even small improvements in agricultural productivity, effectiveness of investments or management of disease outbreaks, through the use of

climate information, can translate into significant benefits if widely applied across multiple sectors. Moreover, since the livelihoods of millions of people in Africa are influenced by (or are greatly dependent on) activities sensitive to climatic conditions, the significant gaps in the quality and availability of climate information to users limits the realization of potential benefits in many sectors and countries in the continent. Providing decision-makers with timely, accurate information on climate and weather variations can help inform decisions that enhance agricultural production and avoid harvest loss, thereby improving food security, lifting agricultural incomes, and increasing the resilience of farmers to future shocks and stresses.

2.9. He went to further explain that one of the pillars of Global Framework for Climate Services (GFCS) is the Climate Services Information System (CSIS). This is the principal GFCS mechanism through which information about climate is archived, analyzed, modeled, exchanged and processed. It is the "operational core" of the GFCS. It produces and delivers authoritative climate information products through operational mechanisms, technical standards, communication and authentication. Its functions include climate analysis and monitoring, assessment and attribution, prediction (monthly, seasonal, decadal) and projection (centennial scale).

2.10. To help ensure that user requirements are serviced optimally, we need to formulate a process of regular review and update of user requirements for climate data, products and information, as well as of the use of climate information in real-world contexts. The data and products delivered under CIS mechanism would require a formal agreed standards and specifications across all geographical levels. I am aware that it may not be feasible to standardize all products and services because of the diversity of information and services needed by each region or country but there should be concerted effort to provide reference guide for all stakeholders. The focus for CIS should, therefore, be on ensuring that the continent is able to build and maintain the capacity to generate and disseminate operational Climate Information Services and to mainstream their use in policies and national programmes of Member States and relevant institutions. A large share of CIS resources must be directed towards capacity development that will support the establishment of operational entities in the continent as well as the development of crucial human resources. In this regard, he recognized the tremendous support of ACPC in underscoring the importance of production, delivery of climate services through different communication channels to end-users in African countries and the application of the climate information and services for DRR, Socio-economic development, conservation of the natural environment and for adaptation to build resilience of communities and economies to cope with adverse shocks brought about by extreme events occasioned by climate change. He said, this is a good example of coproduction of climate information in the overall interest of our communities in the continent. Finally, he wished all a happy CIS Day.

Part III: The Missing Link in CIS Co-Production, Uptake and Use

This session was chaired by Dr. Johnson Nkem. After he recapped the key messages from the opening remarks, he requested Dr. James Murombedzi to give his presentation on "*enhancing the uptake and use of CIS in development policy, planning and practice: Strengthening linkages between production and uptake*".

3.1. Dr. Murombezdi highlighted that Africa is a party to agenda 2030, 2063 agenda, the Paris Agreement and Addis Ababa Action Agenda (AAAA) and members have an obligation to full fill these agendas. A successful implementation of any of these frameworks is, however, fundamentally contingent on actions taken regionally and globally to address the negative impacts of climate change on the one hand, and/or to explore and use some of the development opportunities from climate change. Hence, countries must integrate climate considerations in development policy and planning. There is also need for enhanced investment in climate change due to the heavy reliance of African countries on climate sensitive economy. The UN Economic Commission of Africa (UNECA) through the African Climate Policy Centre (ACPC) is implementing initiatives to improve: (a) availability of Climate Information Services through packaging and dissemination; (b) quality analysis of Climate Information for decision making, and (c) enhancing Climate Information Services uptake. These initiatives include (i) Climate for Development in Africa (ClimDev-Africa), Climate Research for Africa (CR4D), Africa Resilient Infrastructure Facility (AfriRes) and the Weather and Climate Information Services (WISER).

3.2. According to the presenter, ClimDev-Africa is a joint pan-African initiative of African Union Commission (AUC), UNECA and African Development Bank (AfDB) and received its mandate from the Heads of States. Each of the institution is focusing on different components of climate and development linkage in Africa. The CR4D is a partnership between ACPC, AMCOMET, GFCS and World Climate research Programme (WCRP), which is designed to link climate research and CIS need in support of development planning. The AfriRes initiative seeks to strength capacity of African institutions to plan, design and implement climate resilient infrastructural investment. WISER, is a DFID funded demand-driven initiative to support CIS generation, uptake and use where ACPC is seeking to deliver the enabling environment. The main question here is "why enabling environment for Climate Information Services uptake?". Dr. James explained that there is a strong need for an enabling environment for substantive investments and uptake of climate information services. Specifically, enabling environment for CIS uptake is crucial in Africa for (i) intellectual leadership in climate science, practice and policy; (ii) advisory services and technical assistance to different planning processes; (iii) human

and technical capacities in CIS, and (iv) convening spaces for science, policy and practice. The generation, management and customization of climate data and associated knowledge products to effectively communicate climate solution to key constituency of climate smart development is another reason for having enabling environment.

3.3. The CIS uptake and use in development planning in Africa is virtually low, which could attribute to the following reasons. These reasons are, however, not exhaustive although they are indicative to warrant responses. The first reason is related to the existing policy and legislative environment. During the implementation of the above mentioned initiatives od ACPC, it was identified that the policy and legislative environment does not provide sufficient incentives for uptake and use of Climate Information Services. Particularly, it is important to note that climate change and cis are seen as challenges postpone to future time in allocation of budgetary and resources even if we know that climate change contributed/posed danger to many sectors. Moreover, limited capacity in Climate information and Climate Information Services sector in Africa; proliferation of initiatives and small scale projects with very limited coordination makes difficult for policy maker; absence of collaborative partnership framework for service delivery; limited strategic knowledge management and communication approaches and absence of coordinated and integrated monitoring, evaluation and learning approaches are contributing to low CIS uptake and use in Africa.

3.4. In order to strengthen linkages between the generation, uptake and use of CIS in Africa, Dr. James suggested the following: (i) demonstrating socio-economic benefit of Climate Information Services and value for money in guiding investments, project design and implementation; (ii) developing capacity of human and institutions; (iii) facilitating Climate Information Services coordination and partnerships for service delivery and data sharing; (iv) invest in development strategies and frameworks for knowledge management, communication and dissemination and (v) integrated intellectual approach such as in CR4D for co-designing, co-producing and co-communication of climate information.

3.5. The moderator, Dr. Johnsom Nkem, thanked the presenter and summarized the key messages as the continent is vulnerable to climate change; it is a member of several global frameworks, different initiatives and upplications of CIS, why enabling environment and low uptake, and how to strength the linkage. With these points in mind, he called up on the panelists to share their experience on how to enhance CIS uptake. The panelists, Dr. Richard Muita, Kenya Meteorological Department; Dr. Joseph Mutemi, ICPAC; Dr. Byron Anangwe, RCMRD, Kenya; and Dr. Micheal Menker, Ministry of Water, Irrigation and Electricity, Ethiopia discussed various issues related to CIS generation, uptake and use including:

- *Physical infrastructure*: A panelist stressed that African countries lacked the right physical infrastructure on observation network; and if existed, they are scattered in various sectors and working mostly in isolation

- *Tailored products*: Climate centers need to provide high resolution tailored information products to inform policy-planning processes in a wide range of development sectors by carrying out quality modelling and prediction (dynamic, analytical statistical, etc.) in their respective regions. These require; (i) critical mass of resources, (ii) skilled human power and (iii) application of appropriate technology in generating information. There is also a need for continuous climate data generation, monitoring and sharing among member countries to address the main climate challenges.

- *Fitting CIS to its purposes*: it was noted that there is need to bridge the gap between science-policy-development. We should clearly articulate "what is CIS", "what CIS encompasses" and "how it is generated". Moreover, we need to work hard to fill our gaps on communication and knowledge management of CIS by putting the needs of communities' at the center.

- *Working to upscale CIS*: we should adopt the best approaches by conducting a very elaborating scoping exercise to move CIS from aspirational to application. It often witnessed that scientists ignore the potential roles of users in generation and uptake of CIS. This gap can be closed by engaging the end users in information generation. Hence, for effective up scaling, we must ask "what users exactly want", "what they can also offer - the indigenous knowledge" and define "what channel we shall use to communicate CIS".

- *Quality historical records*. Historical records, which are capable of providing information on relative climate variability, are scares in Africa to carryout long-term analysis of climate variability. When available they should also be interpreted with caution. Hence, efforts to establish a centralized dataset are needed to provide valuable information for past and future climate research.

3.6. In order to enhance the generation, uptake and use of CIS in Africa, the plenary agreed on the following:

- a strong need for an enabling environment for substantive investments and uptake of CIS, supported by applied research and policy analyses, as well as coordinated approaches to service delivery, strengthened knowledge frameworks and partnerships between public institutions, the private sector, civil society and vulnerable communities.

- African governments should build both physical infrastructure and human resource capacity in Met Services for better generation of CIS.

- relevant HydoMet services providing agencies should work under a common mission of increasing the relevance, accuracy and accessibility of CIS

- strong collaboration is needed among different institutions/actors to realize fully the benefit of CIS in support of development planning in Africa.
- uncertainties in communicating CIS should be reduced by avoiding jargons and preferably use local language. The current and potential communication channels and strategies for CIS shall be, therefore, defined in a way to reach farmers, fisher folks and pastoralists with tailored information.
- a pan-Africa intellectual approaches such as CR4D should be promoted for better co-designing, co-producing and co-communication of CIS.
- the structure of Met services in many countries are problematic (mostly under aviation) and lacked independence to provide quality and relevant services to various sectors. Hence, a centralized data sharing mechanism is needed to access/share available data generated by different actors.
- end-users should be engaged by climate scientists and climate science should be considered as a democratic science that involves all players (scientists, farmers, fisher folks, pastoralists, policy makers, etc.) for better CIS generation, knowledge and communication.
- there is a need to develop a curriculum in primary schools and train extension workers and media with topics on CIS to demystify CIS and communicate with the last mile-local language.
- RECs should be engaged about the initiatives/projects running in their respective regions.
- quick move from data availability to data utility is needed by taking into account both modern and indigenous knowledge.
- effective utilization of the existing fora specially the Climate Outlook Forum (COFs) as a best way of developing a consensus information by both producers and users of data.

Part IV: Climate Research for Development (CR4D) in Africa

4.1. This session was chaired by Dr. Ernest Afiesimamafis, WMO. He stated that the Climate Research for Development (CR4D) is African-led initiative supported by partnership between ACPC-UNECA, AMCOMET, WMO and GFCS to bridge between climate science research and climate information needs in support development planning in Africa. It is an outcome of the African Climate Conference 2013 (ACC-2013), where multi-disciplinary experts, policy makers, indigenous knowledge holders, CIS users, and other relevant stakeholder gathered in Arusha, Tanzania, to put CIS at the hands of users. He later called on Mr. Frank Rutabingwa to make a brief introduction on CR4D history, its achievements and 5-years strategy. The presenter later described the major milestones of CR4D as shown below starting to ACC 2013 to the first CR4D governance meeting (Fig. 1).

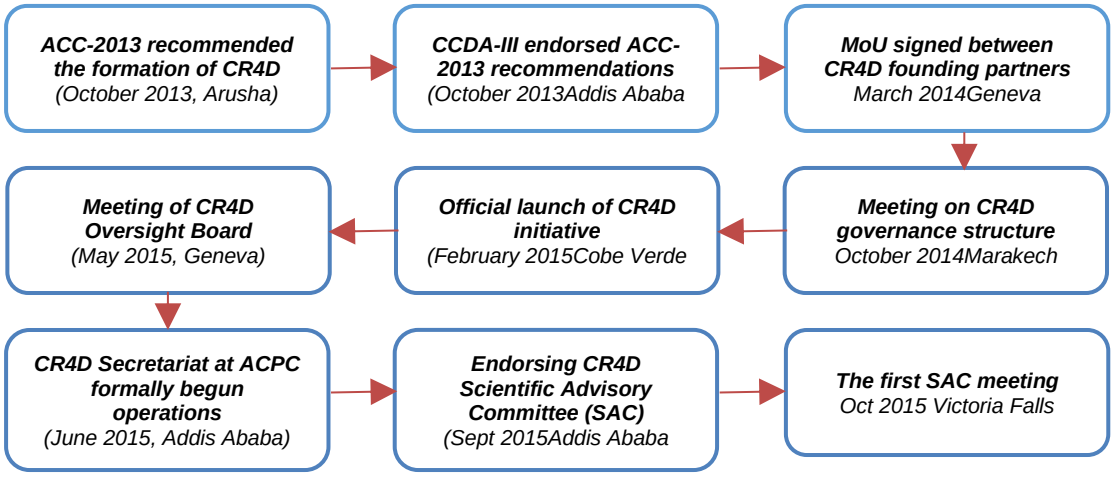

Figure 2. Key milestones in the history of CR4D

4.2. According to Mr. Frank, since the operationalization of the CR4D Secretariat in June 2015, the following activities implemented including:

- Establishment of CR4D governance structure essential for the realization of CR4D strategic goals, including selection and establishment of the SAC and identification of potential ICP Members;
- Mapping of institutions, initiatives, and experts engaged in climate and related research in Africa over the past 10 years in order to understand the climate research landscape and related activities in Africa;
- Development of an interactive google map showing institutions, initiatives and experts working on climate research and related activities in Africa;
- Organization of Regional Climate Research Partnership Workshops (RCRP) in Eastern and Southern Africa to solicit inputs from relevant stakeholders to CR4D agenda and define regional user-inspired climate research priorities;
- Establishment of a minimum set of standards for the Grant Management Mechanism;
- Organization of three CR4D-SAC and Oversight Board meetings to set the course for the CR4D Agenda;
- Development of the 5-years draft CR4D Strategy document (ready to be reviewed during the upcoming ICP launching meeting; 8-9 December 2017);
- Coordination of two sub-seasonal to seasonal (S2S) pilot projects in West and Central Africa to explore and assess the unique challenges and opportunities for multi-institution/multi-stakeholder climate research network (Annex 9.7) and promote effective use of climate information services in the agricultural sector;
- Provision of training on S2S forecasting for 68 climate scientists, practitioners and researchers coming from 30 countries;

- Development of a dedicated website portal to enhance the visibility of the CR4D Agenda www.climdev-africa.org/cr4d;
- Organization of CR4D Side Events during the Conferences on Climate Change and Development in Africa (CCDAs), the AMCOMET-HydroMet Forum and other relevant conferences.

4.3. Mr Frank further noted that, the CR4D Secretariat and the Scientific Advisory Committee (SAC) are in the process of finalizing the 5-years CR4D Strategic Plan (2018-2022) to maximize the opportunities presented by climate change and variability while aiming to address challenges posed to the socio-economic development efforts of Africa. It 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, 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 strategic plan improves knowledge, access, quality, usability and mainstreaming of climate information into development planning and programmes in Africa.

4.4. Based on the African Climate Conference (ACC 2013) recommendations as well as emerging issues in climate science area, CR4D strategic plan 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 are, therefore, grouped in three major thematic areas such as:

1. foundational climate science;
2. impacts, information, translation, and communication;
3. engagement with policy, development and decision communities.

4.5. He concluded his brief presentation by reminding participants that the implementation of CR4D strategic plan generally requires inputs from diverse experts in climate science research, applications and policy in its effort to guide climate research for the five years period and thereby bring the greatest benefits to last mile user communities. He called all to contribute their part in making this initiative a success.

4.6. On the topic of advancing scientific frontiers and the possibility to inform improved African climate service delivery, the following were raised:

- Climate model experiments are increasingly being used by planners and risk managers in Africa, to try to prepare for a changing climate, but the models have largely been developed and tested outside of the continent. For many parts of Africa, there has been limited work to evaluate the models' ability to capture key climate features. There is potential to deliver a dramatic improvement in understanding of climate models over Africa, by drawing on the wealth of local weather and climate expertise in African meteorological services, research institutes, and universities.

Tailored analysis is needed for every sub-region: there is no “one size fits all”. There has been a proposal to create a model evaluation “hub” for Africa, to coordinate further discussion, and ultimately develop diagnostics which could be embedded within model development infrastructure, and fast-track understanding of climate model behavior over Africa. It was suggested that linking this opportunity for an African model evaluation hub into the CR4D agenda is crucial. But the biggest question we need to answer is “What are the prospects for CR4D to coordinate donor support for such a hub?”

- The UK Met Office is leading research efforts producing the first ever simulations with a high-resolution convection-permitting climate model (CP4-Africa). This data is now available and demonstrate radical improvements in the Met Office HadGEM3 model’s ability to replicate observations over Africa, which will contribute significantly to decision-relevant, robust climate information products and tools in future. This research is being funded by the UK DFID under the Future Climate for Africa programme and the wealth of data is therefore publicly available in principle. The UK Met Office is very supportive of ensuring wider African use of the data, so it’s crucial for a network of African climate scientists to work with them to ensure long-term access to CP4A data and data processing computing capacity via the JASMIN portal. Supporting a network of African climate scientists to extend the legacy of CP4A beyond FCFA-affiliated researchers may be a key priority for CR4D to support.
- CR4D should be designed as a flexible grant management mechanism that can accept and disseminate funds from multiple funding sources effectively (not just a single donor, but multiple donors) including funds from African governments (there are many National Research Foundations that support national research). For this CR4D should work hard in designing as a sustainable mechanism for funding pan-African research over the long-term.
- The African climate research and policy communities should work hard towards promoting the African participation in the global climate governance including the upcoming IPCC report (AR6). It is noted that African scientists participation in the 5th Assessment Report is very minimal (out of approximately 8000 expert reviewers, only 92 (1.15%) were African). Hence, the draft 5-years strategic plan document of CR4D should also focus on interventions that increase African participation in international assessments and other "big science" programmes.

Part V: Report on Co-Production and Application of CIS: From Indigenous Knowledge Perspectives

5.1. The chairperson, Mr. Abani Ahmed Ali, ACMAD, began the session by sharing his thought on some of the processes that could help the production, uptake and use of CIS in Africa. He indicated that these were not in order but when the processes are combine together effectively and efficiently, they can help us to address the missing links for enhanced uptake and use of CIS into development planning, policy and practice in Africa. The processes include:

- *Scientific researching on user problem* (i.e., the research science should be a demand-driven logical grouping of actors or contributors in climate information services)
- *Production of data/information* (i.e the operation process depending on the availability of infrastructural, observation network and high performance computing systems)
- *The content development, packaging and distribution* (communication, knowledge management and dissemination)
- *Targeted education and training*
- *The users engagement* (along the CIS value chain through developing effective feedback mechanisms)
- *Strong partnership* (with relevant institutions/stakeholders including the indigenous knowledge to the level of integration with science.
- *Effective coordination* (levels of coordinating works done by institutions and organizations at national and regional level and the distribution of roles)
- *Sustained funding*
- *Strong networking*
- *Developing strategic advocacy committee* (Such committees can be used for the advocacy and advisory committee). When we look at all these processes or segment, we shall be able to come out with a guidance that will address those questions asked by Dr. Fatima Denton (para 2.4).

5.2. Later, Professor Hassan Kaya, Kwazulu-Natal University, gave a presentation on the Pan-African platform on Indigenous Knowledge System (KIS) and how it contributed to the theme of CIS day. He said that this platform is a partnership between five universities in Africa and sponsored by the department of science and technology. The African IKS pertaining to weather have not been fully integrated in climate change information services. This has led to existing weather information services to lack relevance to local communities. Such platform could serve as a coordinating tool for interfacing conventional/existing weather information services and indigenous knowledge systems-based climate (change) information services. This will make conventional weather information services more culturally and ecologically relevant, accessible and consumable. The platform will assist in building an interactive multi-media database informed by the nature and processes of production, sharing, storage and application of IKS-informed climate information, which are culturally and linguistically specific.

5.3. He went to say that the importance of African IKS in climate change information service was strongly emphasized during the knowledge management partnerships and communications workshop for WISER Programme organized the African Climate Policy Center (ACPC) of the UNECA in Addis Ababa - Ethiopia on 24 to 26 May 2017. The emphasis was meant to make conventional weather services more relevant and accessible, thereby increasing update and use by African local communities - considering their in-built indigenous knowledge weather forecasting practices established after long years of observation of their respective natural environments. Building up from the momentum gained in Addis, the Department of Science and Technology-National Research Foundation (NRF) Centre in Indigenous Knowledge Systems (CIKS) at the University of KwaZulu-Natal – Durban/South Africa took the initiative to convene a workshop of IKS stakeholders from East and Southern Africa on 14-15 June 2017 to develop a Pan-African IKS-informed Climate Information Service (CIS) Knowledge Management platform and Communication Strategy within the Pan-African WISER component. the Initiative was shared on 04 September 2017 with the Department of International Relations and Cooperation (DIRCO) South Africa, and which endorsed the initiative in October 2017.

5.4. The platform could help Africa better understand climate change and policy taking and making by providing:

- an understanding of the importance of IKS in explaining critically the symbiotic relationship between ecosystems and human dynamics for climate change adaptation and mitigation. This includes the correlation between habitat, ecosystem services, culture including language, natural resources and their collective impact on community livelihoods in terms of food security and nutrition and energy needs in the face of climate change and variability;
- a clear and broad conceptualization of climate change and variability in the African context across time where African cultural and ecological histories, including indicators of natural early warning systems and innovative adaptation strategies to climate variability and change documented;
- foundation for devising policy strategies which are culturally and ecologically specific. It will also identify IKS-based commonalities in ecologically and culturally comparable zones for climate change policy development and implementation.
- The holistic and multidisciplinary nature of an IKS and climate change platform gives stakeholders from diverse backgrounds including disciplines, sectors and cultures across the continent, an opportunity to engage in innovative climate information service policy development;
- The involvement of local communities, as producers and end users of climate information, at all stages of developing the IKS climate change

platform creates community ownership and sustainability of the process including policy development and implementation. This

5.5. The chairperson called on the discussant to make their contributions towards the topic. Participants agreed that there is a need to establish means to share information, the appropriate technology, interface indigenous knowledge with other knowledge systems, and also contextualize it. In this regards, the formation of Pan-Africa platform is necessary to demystify CIS. However, appropriate means of packaging information, where, who, when and how to share climate information with people from different backgrounds is very important. Hence, indigenous way of life in Africa is real and this must be incorporated into the design of CIS. Overall, it was agreed that platforms such as IKS helps to:

- Strengthen participation of local communities as co-producers and end users of CIS.
- Provide stakeholders from diverse backgrounds with an opportunity to engage in innovative policy development in an IKS-informed CIS strategy;
- Preserve IK-related climate information comprising three sets of attributes (i) culture (ii) factual knowledge (iii) articulated KM systems as a “one-stop-shop” for coproduction of culturally and ecologically relevant CIS;
- Coordinate and facilitate integration of IKS-informed CIS into educational and lifelong learning systems as part of contributing to Sustainable Development Goal (SDG 4);
- Enhance networking, regional collaboration and cross learning on IKS-informed CIS and strengthen mechanisms for engaging with the wider IKS-informed CIS community;
- Interface IKS-related climate information with conventional CIS and *vice versa* to facilitate the transformation of existing CIS to become more accessible and relevant to local communities - facilitate the translation of broad definitions of climate science into locally acceptable and accessible CIS;
- Map IK-related climate change resources (natural and human, climatic and non-climatic stressors) as hotspots and best practices for dissemination to wider audience/stakeholders.

5.6. Hence, the following recommended

- The holistic and multidisciplinary nature of IKS provides the platform with the opportunity to engage diverse stakeholders from across disciplines, cultures and ecological zones for the sustainability of the platform.

- The complementarity of knowledge systems makes the platform a unique tool for climate change research, innovation, policy development and human capital development.
- The interactive multi-media database will have the capacity to synthesize modern climatic information systems informed by community-based knowledge systems that will be applicable across biomes and regions.
- The identified gaps and strengths of the two climate information systems will be accommodated by the complementarity of the knowledge systems to mitigate impacts of climate change and variability.

Part VI: The Socio-Economic Benefits and Value-For-Money of CIS in Development Policy, Planning and Practice

6.7 This session was chaired by Dr. Linus Mofor, ECA, while the presentation given by Dr. Bradwell Garanganga. The presenter said that the SEB Framework presents the steps required for the effective identification and use of indicators to support a sectoral and integrated analysis of SEB in CIS for the benefit of DRR. The SEB assessment framework allows the development of an integrated Cost Benefit Analysis (CBA), where social, economic and environmental impacts – as well as policy outcomes– are considered. The CBA considers three main analytical components: investment, avoided costs and added benefits. The integrated CBA includes the economic valuation of environmental consequences.

6.8 Dr. Garanganga explained that the main goals of the ACPC SEB study was to exploit the evaluation of the socio-economic utility of DRR and using Socio-economic Benefit analysis to explore opportunities for CIS investment in countries of shared priority for WISER and ClimDev-Africa programmes. In particular, the study examined the application of the Socio-Economic Benefit framework developed during the WISER first phase to DRR. Part of the study has led to a modelling of SEB on CIS/DRR. There is need for stakeholder validation of the model. The study builds on the SEB assessment framework and model developed in phase 1 of the WISER project. The main objective was the customization of the assessment framework to make it applicable to DRR, and to refine climate impacts based on empirical data. Since impacts can vary by country, even by region, stakeholder validation is necessary to evaluate whether the full range of impacts has been captured, and to collect valuable feedback for improving the framework.

6.9 The Socio-economic Benefits (SEB) Framework built a business case for ongoing investment in CIS by showing the impacts of integrating climate information into the policy and resource allocation process. By turning the outcomes of CIS investment into

monetary terms, the framework illustrated whether the benefits of policies outweigh the amount of money invested in them. The SEB Framework presented the steps required for the effective identification and use of indicators to support a sectoral and integrated analysis of SEB in CIS. The steps presented were largely more relevant to climate vulnerability assessment, while others were more useful for adaptation and policy formulation/assessment. The steps that would lead to the implementation of an integrated Cost Benefit Analysis (CBA), where social, economic and environmental impacts – as well as policy outcomes, are considered. CBA considers three main analytical components:

i. Investment,
ii. Avoided costs, and
iii. Benefits.

6.10 The rational for the economic analysis for SEBs lies in the limits to growth of our current economic systems. Historically, GDP growth is slowing down, which implies that policy interventions are necessary that align economic growth and natural systems, and hence allow to realize socioeconomic benefits. There are different policy measures that can align priorities across sectors and facilitate economic growth. Hence, the system dynamics serves as integrative framework for the use of multiple different methodologies, and allows the assessment of SEBS from a systemic perspective

- Captures performance of the system over time
- Captures impacts across sectors and actors
- High degree of customization
- Integrated and dynamic modelling framework

6.11 He finally explained that the key aspects captured in the simulation model are

- Overview of climate impacts captured in the model
- Calibration of precipitation
  - Model captures seasonal precipitation
  - Changes of variability and simulation of different climate trends possible

  - Including rainfall variability into the model allows for the assessment of uncertainties and provides confidence ranges for projected outcomes
- Seasonal water needs
  - Calibration of the model to match domestic agriculture land use patterns
  - Model accounts for crop water needs and compares them to monthly rainfall to assess the water demand for irrigation and to estimate the amount of farmland at risk of getting stranded due to lack of water
- Seasonal shifts
  - Model is capable of simulating climate shifts, stepwise or incrementally

Closing session

In a closing session, the CIS day meeting participants called for several actions including, but not limited to,

- Need for CR4D to conduct a comprehensive assessment on the impact of 2/1.5 degree warming on GFCS priority sectors in Africa.
- Need to identify best policies and practices from GHACOF and rolling out advisory services to other African RCOFs
- Strengthen the linkages between production and uptake of CIS in the development policy, planning and practice in Africa using platforms that engage multi-stakeholders along the process. So that the final products from these forums will be user-oriented, easily taken and actionable
- Increased investment in human and infrastructure capacity for better generation and use of CI and CIS
- Need for effective ways of disseminating CIS to the grassroots as the traditional method of disseminating CIS such as newsletter are not effective
- Multi-stakeholder engagement and networking of climate researchers and operation centers is one of the value additions of CR4D and should be strengthened
- Need to complement indigenous weather forecasters by scientific weather forecasting. Participants recognized the contributions of indigenous forecasters in producing locally relevant CIS as they have knowledge of the environment. Moreover, they can help the scientists to translate the observation data in local language so that the abstractness/vagueness in scientific climate information can be erased.
- Need for practical work on the monitory contribution of CIS in broader development priorities such as poverty reduction, reduced hunger and resilience to climatic risks using simple SEB models.

Annex I: Agenda

Time	Events	Chair	Rapporteur
08:15-09:15	***Registration***		
PART I: OPENING SESSION			
09:15-09:35	***Opening remarks*** - *Dr. Fatima Denton, ECA* - *Dr. Joseph Mukabana, WMO*	*Dr. James Murombedzi, ECA*	*Dr. Yosef Amha, ECA*
PART II: UPTAKE AND USE OF CIS			
09:35-10:50	***Enhancing the uptake and use of CIS in development policy, planning and practice: Strengthening linkages between production and uptake -*** *Dr. James Murombedzi, ECA* <u>Panelist</u> 1. *Dr. Richard Muita, KMD* 2. *Dr. Joseph Mutemi, ICPAC* 3. *Dr. Byron Anangwe, RCMRD* 4. *Dr. Micheal Menker, Min. of Water, Irrigation & Electricity, Ethiopia*	*Dr. Johnson Nkem, ECA*	*Mr. Roland M, Uganda* *Mr. Joda T, Nigeria* *Dr. Yosef Amha, ECA*
10:50-11:10	***Coffee break***		
11:10-12:15	***Climate Research for Development (CR4D)*** *– Mr. Frank Rutabingwa, ECA* <u>Discussant</u> a. *Dr. Jean-Pierre Roux, South South North/FCFA* b. *Prof. Cush Ngonzo Luweso, DRC* *Discussion*	*Dr Ernest Afiessimama, WMO*	*Dr. Amegnaglo CJ, Benin* *Dr. Mkpado M, Nigeria*
12:15-13:15	***Co-production and application of CIS: from indigenous knowledge and gender perspectives*** *– Prof. Hassan Kaya, KwaZulu-Natal University* <u>Discussant</u> 1. *Mr. Mithika Mwenda, PACJA* 2. *Mr. Isaiah Esipisu, PAMACC*	*Mr. Abani Ahmed Ali, ACMAD*	*Ms. Rebecca S, Ghana* *Mr. Gbangou T, Burkina*

Time	Events	Chair	Rapporteur
08:15-09:15	***Registration***		
	Discussion		
13:15-14:15	***Lunch***		

Time	Events	Chair	Rapporteur
PART III: VALUE OF INVESTMENTS IN CIS			
14:15-15:30	***The Socio-Economic Benefits and Value-for-Money of CIS in development policy, planning and practice –*** *Dr. Bradwell Garangana, ECA* *<u>Discussant</u>* *1. Dr. Dawit Solomon, CCAFS* *2. Dr. Faka D., SADC-CSC* *Discussion*	*Dr. Linus Mofor, ECA*	*Dr. Georg Pallska* *Dr. Yosef Amha*
15:30-15:45	***Coffee break***		
PART IV: BEST PRACTICES AND INNOVATIONS IN CIS			
15:45-16:30	***How S2S climate forecast improves decision making in agricultural sector: case study from Central Africa*** *– Wilfried Pokam, Uni. of Yaoundé* *<u>Discussant</u>* *1. Dr. Ulrich Diasso, UNDP-CIRDA* *2. Dr. Sylla Bamba, WASCAL* *Discussion*	*Dr. Nyenzi Burhani, TMA*	*Mr. Tinni Seydou, Niger* *Dr. Mouhammed Ly, Togo*
16:30-16:45	***AOB*** ***Meeting and event announcement, special message,…***		

Time	Events	Chair	Rapporteur
16:45-17:45	***CIS innovations presentations*** • *One* • *Two* • *three* • *Four* • *Five* ***Q&A***	*Mr. Frank Rutabingwa*	*Mr. Charles Muraye, ECA* *Dr. Yosef Amha, ECA*
17:45-18:00	***Closing Remark***	*Dr. James Murombedzi, ECA*	
Rapporteurs shall submit the minutes before their departure to Dr. Yosef Amha using the following e-mail amhay@un.org			

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