



Pan-Africa Component

Mapping of Institutions, Experts, Researchers and Initiatives Engaged in Climate Research and Related Activities in Africa

DRAFT



United Nations
Economic Commission for Africa

ACP^C
African Climate Policy Centre

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ACRONYMS

ACMAD	African Centre of Meteorological Applications for Development
ACPC	African Climate Policy Centre
AfDB	African Development Bank
AGRHYMET	Regional Centre of Agro-Hydro-Meteorology (CILSS)
AMCOMET	African Ministerial Conference on Meteorology
AMMA	African Monsoon Multidisciplinary Analysis
AMU	Arab Maghreb Union
AR5	Fifth Assessment Report (IPCC)
AU	African Union
CBOs	Community-based Organizations
COP	Conference of the Parties
CEN-SAD	Community of Sahel-Saharan States
CILSS	Comité permanent inter-État de lutte contre la sécheresse au Sahel (The Permanent Inter-State Committee for Drought Control in the Sahel)
ClimDev	Climate Development
CLIVAR	Climate and Ocean: Variability, Predictability and Change
COMESA	Common Market for Eastern and Southern Africa
CR4D	Climate Research for Development
EAC	East African Community
ECCAS	Economic Community of Central African States
ECOWAS	Economic Community of West African States
GECAF	Global Environmental Change and Food Security
GFCS	Global Framework for Climate Services
GIS	Global Information System
ICPAC	IGAD Climate Prediction and Applications Centre
IFAD	International Fund for Agricultural Development
IGAD	Intergovernmental Authority on Development
IIED	International Institute for Environment and Development
IMTR	Institute for Meteorological Training and Research
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for the Conservation of Nature
NGOs	Non-governmental Organizations
NMHSs	National Meteorological and Hydrological Services
NOAA	National Oceanic and Atmospheric Administration
PROVIA	Global Programme of Research on Climate Change Vulnerability, Impacts and Adaptation
RANET	Radio and Internet Technologies for the Communication of Hydro-Meteorological and Climate-Related Information
RCRPs	Regional Climate Research Partnerships
RECs	Regional Economic Communities
SAC	Scientific Advisory Committee
SADC	Southern African Development Community

SDGs	Sustainable Development Goals
SIDS	Small Islands Developing States
TMA	Tanzania Meteorological Agency
UNDESA	United Nations Department of Economic and Social Affairs
UNECA	United Nations Economic Commission for Africa
UNEP	United Nations Environmental Programme
UNFCCC	United Nations Framework Convention on Climate Change
UK	United Kingdom
USA	United States of America
VACS	Variability of African Climate Systems
WMO	World Meteorological Organization

Executive Summary

Africa as a whole is one of the most vulnerable continents to climate change. This is so due to its high exposure and low adaptive capacity. According to the Fifth Assessment Report (AR5) of the International Panel on Climate Change (IPCC), it is evident that warming across Africa, consistent with anthropogenic climate change, has increased considerably. The recounted changing climate has exerted potential impacts to the African ecosystems with complicated implications for the natural resource and economic sectors. Future impacts are likely to be overwhelming, from the emerging evidence that they are likely to cause wide fluctuations in thermal dynamics and thus influence greatly the atmospheric, land and ocean interactions.

In view of the escalating climate variability and change in Africa, the Climate Research for Development (CR4D), an African initiative, was officially launched in 2015. Its brief is to strengthen links between climate science research and climate information needs and thus enhance integration of climate change into policy and development planning in Africa. The activity needs to have a mechanism that identifies and connects all players in climate research and related activities in Africa. This mechanism needs to be easily accessible and informative. To achieve this goal CR4D has proposed to undertake a comprehensive mapping of all institutions, initiatives, experts, and others stakeholders engaged in climate and related research in Africa over the past 10 years. This document provides that comprehensive map for the purpose of focusing on the goal.

The mapping is an important step in understanding which institutions and organizations are involved in dealing with various areas of climate research and other related activities in Africa, and which provide information on what has already been achieved. The map also identifies the various experts, researchers and initiatives that are carrying out climate research and related activities. The data for the mapping was collected and put in a form that made it easily accessible for analysis and manipulation. In addition to putting the information in a tabular form, it was necessary to applying GIS mapping.

The mapping of all variables including research institutions, universities, and national meteorological and hydrological services (NMHSs) that are carrying out climate research and related activities and data archival responsibilities in Africa were included. Results of those activities show that much of climate research work and other related activities, including capacity-building in Africa, are done by many institutions in Southern, Eastern and Western Africa; most are undertaken by the University of Cape Town. These are also the areas with many experts carrying out related research activities. There are fewer institutions and activities in Central and Northern Africa. With respect to institutions, organizations and experts from outside Africa, many institutions, especially universities from the United States followed by the United Kingdom, support climate research work in Africa. Their contribution is very important in that, apart from getting the research results, they contribute in sharing knowledge and building the capacity of African scientists.

Various governments, organizations, development partners and non-governmental organizations (NGOs) have also conducted mapping in Africa to deal with adaptation and mitigation of climate-related impacts. The results show that there are many organizations and entities supporting these initiatives in different parts of Africa, especially in the Western, Eastern and Southern regions. The mapping results show that most of the initiatives are implemented in all countries. However greater effort is made in those countries that face frequent impacts of climate extremes, especially the least

developed countries. These are the areas at which United Nations entities and other development partners direct most of their support. It is clear that there is need for more effort in the coordination of these activities to ensure that resources are utilized effectively and efficiently.

There is need for institutions, organizations and experts carrying out climate research to be more coordinated by meeting and holding workshops regularly at regional, subregional, and national levels. CR4D can act as the coordinating platform for such activities.

1.0 Introduction

Africa is one of the most vulnerable continents to climate change. This is so due to its high exposure and low adaptive capacity. Respective divisions based on similar climatic, ecological zones and regional economic communities (RECs) have been used to feature in this climate-related research assessment.

1.1 Structure of the regions

Africa is the world's second largest and most populous continent (1 billion in 2010) behind Asia (UNDESA Population Division, 2013). It is organized in regions under the African Union (AU), the continent's foremost political body. The AU's Assembly of Heads of State and Government has officially recognized eight RECs (Ruppel, 2009). Except for the Sahrawi Arab Democratic Republic, all AU member states are affiliated with one or more of these RECs. These RECs are the Arab Maghreb Union, with 5 countries in Northern Africa; the Community of Sahel-Saharan States (CEN-SAD), grouping 27 countries; the Common Market for Eastern and Southern Africa (COMESA), grouping 19 countries in Eastern and Southern Africa; the East African Community (EAC), with 5 countries; the Economic Community of Central African States (ECCAS), with 10 countries; the Economic Community of West African States (ECOWAS), with 15 countries; the Intergovernmental Authority on Development (IGAD) and the Southern African Development Community (SADC), each comprising 8 countries. In order to simplify matters in this study, the regions considered are the Northern, Western, Central, Eastern and Southern.

1.2 Observed climate trends, future projections, climate extremes and impacts

According to the Fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Change (IPCC), it is evident that warming across Africa, consistent with anthropogenic climate change, has increased considerably, making the continent one of the most vulnerable due to its high exposure and low adaptive capacity (Niang et al, 2014).

Near surface temperatures have increased by 0.5°C or more during the last 50 to 100 years over most parts of Africa, with minimum temperatures warming more rapidly than maximum temperatures (Nicholson et al., 2013). The worst aspect is that temperatures in Africa are projected to rise faster than the global average increase during the 21st century (James and Washington, 2013).

Recent findings indicate decreases in the trend of mean annual precipitation over the past century over many parts of the Western and Sahel regions as well as in Northern Africa. Relatively, very likely increasing trends were noted over many parts of Eastern and Southern Africa (Nikulin et al., 2012). Precipitation projections are speculated to be more uncertain than temperature projections

(Rowell, 2012) and tend to exhibit higher spatial and seasonal variability than temperature projections (Orlowsky and Seneviratne, 2012).

Projected changes in extreme temperature and precipitation are also presented. Precipitation anomalies lead to droughts or floods. Unlike temperature, regional model studies suggest an increase in the number of extreme rainfall days and more intense and more frequent occurrences of extreme rainfall over West Africa and the Sahel during the main seasons lasting between May and September (Vizy and Cook, 2012). Likewise, extreme precipitation changes over Eastern and Southern Africa such as droughts and heavy rainfall have been experienced more frequently during the last 30 to 60 years during the long rain seasons occurring between March and May (Lyon and DeWitt, 2012).

Generally, future precipitation projections show changes in the scale of the rainfall probability distribution, indicating that extremes of both signs may become more frequent in the future (Kay and Washington, 2008).

The recounted climate changes have exerted potential impacts on the African ecosystems with complicated implications for the natural resource and economic sectors. Future impacts are likely to be overwhelming; and from the emerging evidence likely to cause wide fluctuations in the thermal dynamics and thus influence greatly the atmospheric, land and ocean interactions (Olaka et al., 2010).

With Africa's future decrease in water abundance, agricultural production systems will be the most vulnerable because of extensive reliance on rainfed crop production. High intra- and interseasonal climate variability, recurrent droughts and floods will affect crops and livestock. The resulting food insecurity, high burdens of health outcomes, size and characteristics of rural and urban human settlements, and persistent poverty will limit the capacity to adapt (Boko et al., 2007).

Barriers to climate adaptation in Africa have been highlighted from national to local scales to constrain adaptation; these include institutional, political, social, cultural, biophysical, cognitive, behavioural, and gender-related aspects (Ludi et al., 2012). This fact combined with Africa's vulnerability to climate change means that planned adaptation is becoming a must. Most adaptation measures such as better management of agriculture and water resources through the development of a more reliable system of seasonal predictions, and diversifying livelihood sources through engaging in different economic activities, including utilizing forest products as a buffer to climate-induced crop failure from farming in climatically marginal areas (Dube et al. 2005), are also a necessity for the present circumstances.

Simultaneous to global efforts to stabilize greenhouse gas emissions that prevent dangerous anthropogenic interference with the climate system, Africa is gradually gaining experience in conceptualizing, planning, and beginning to implement and support adaptation activities, from local to national levels and across a growing range of sectors (Ludi et al., 2012 and Jones, 2012).

1.3. Importance of institutions, experts and initiatives in mapping

In Africa, several institutions, experts and initiatives are engaged in climate research and related activities.

The institutions are within and outside Africa. Efforts have been made to determine the specific work of these institutions and experts regarding climate. For example, the United Nations Environment Programme (2009) has taken stock of organizations and projects focused on climate change adaptation in Africa. The current planned mapping effort is an important step towards understanding that, and which bodies are involved in climate research. The mapping of researchers will also provide information on areas of Africa still lacking expertise in climate research and to areas at which future research should be directed. This information gathered will improve Africa's collective knowledge on its remaining challenges in the climate science so that the continent's decision makers on climate adaptation measures can make full use climate services (VACS CLIVAR, 2012).

It is well known that the society's ability to anticipate some of the impacts of climate change can help countries and communities to develop management programmes that help ecosystems adapt to climate change. This depends on timely provision of reliable scientific climate information.

1.4. Examples of climate institutional mapping in Africa

Some of the relevant mappings that have been done include those of UNEP (2009): "A Preliminary Stocktaking: Organizations and Projects focused on Climate Change Adaptation in Africa"; the Climate for Development in Africa (ClimDev Africa) Framework Programme document (ClimDev, 2008); Wilby (2014) on ClimDev - Climate Services and Services for Africa - Strategic Research Opportunities for ClimDev and VACS CLIVAR (2012) on Mapping African Climate Research: Institutions & Researchers. These previous studies had various objectives. For example, the ClimDev study presented the ClimDev-Africa Partnership with a much narrower set of strategic research options with which the African Climate Policy Centre and the African Development Bank, in particular, could establish a unique presence in climate research and resilience planning. The UNEP (2009) report provided a network of experts in Africa working in global climate change adaptation. The report aimed to document as many experts as possible and their strengths. As a result, hitherto under-represented sectors and regions would be better equipped to manage risks as well as maximize development opportunities presented by climate variability and change.

This current mapping will help to identify additional institutions that had been missed before and will enhance collaboration among African climate scientists. It will also provide information on institutions that are responsible for relevant climate data archiving.

1.5 The African climate and related research initiative

In view of escalating climate variability and change in Africa, the Climate Research for Development (CR4D) was officially launched in 2015. Its purpose is to strengthen links between climate science research and climate information needs, thereby enabling the integration of climate change into policy and development planning in Africa.

CR4D is an African-led initiative supported by partnership between African Climate Policy Centre of the United Nations Economic Commission for Africa (UNECA), the Africa Ministerial Conference on Meteorology, the World Meteorological Organization (WMO), and the Global Framework

for Climate Services (GFCS). The initiative facilitates integration of the African climate research community (scientists and institutions) with end-user climate information needs. The CR4D Secretariat is at the African Climate Policy Centre.

The Climate Research for Development collaborative platform promotes multi-stakeholder collaboration that brings climate science, services and policymaking under a coordinated multidisciplinary network of expertise and institutions to tackle, collectively, the challenges while maximizing the opportunities presented by climate change and variability to socioeconomic development in Africa. The network promotes participatory climate research by facilitating and strengthening the interaction of institutions and stakeholders to enable and enhance co-production of demand-driven climate information and services. This will lead to improved access, quality, usability, dissemination and mainstreaming of climate information into socioeconomic planning, and critical for Africa meeting its commitments under the COP21 agreement, Agenda 2063, as well as the Sustainable Development Goals.

The overarching mission of CR4D is to create a Pan-Africa collaborative platform and a federated network of African climate science, services, policy, and practice communities as well as development partners and other stakeholders. Using this platform, they will co-explore, co-design, co-produce and co-communicate climate information and services; thus, improving access, quality, and usability as well as mainstreaming of climate information into development planning in Africa. To achieve this objective, CR4D's Scientific Advisory Committee (SAC) - in conjunction with the CR4D Secretariat, the Institutional Collaboration Platform, and the Oversight Board - supports implementation of the CR4D initiatives. In addition to these formal components of the governance structure, achieving CR4D goals will focus on six federated Regional Climate Research Partnerships (RCRPs) for East, West, Central, South, North Africa and the continent's Small Islands Developing States (SIDS). The Regional Climate Research Partnerships will form the regional nodes for bringing together multiple stakeholders and institutions.

In view of this background, there is great need for CR4D to have a mechanism that identifies and connects all players in climate and related research in Africa. This mechanism needs to be easily accessible and well informative. To achieve this, CR4D is proposing to undertake a comprehensive mapping of all institutions, various initiatives, experts and others stakeholders that are engage in climate and related research in Africa over the past 10 years.

1.6. Scope of mapping effort

The scope of this assessment was to collect data on relevant institutions, researchers, other experts and initiatives; upload, process and store geospatial data in a manner that enhances knowledge about available resources in Africa for climate research and related activities. This will enable African scientists and the policymakers to share knowledge to make effective decisions on adaptation, mitigation and management of climate extremes. Institutions, experts and initiatives working on climate and related research were identified and mapped in tabular form as provided in annexes 1, 2 and 3 respectively. Then google maps, including web-based service that provide detailed spatial geoinformation about geographical regions and sites around the world, were used.

1.7. Report Structure

From the information given above the structure of this report will contain the following major areas:

- 1.** Executive summary
- 2.** Introduction
- 3.** Objective
- 4.** Data and methodology
- 5.** Institutional mapping in climate research and related activities
- 6.** Major challenges during mapping
- 7.** Conclusions
- 8.** Major recommendations
- 9.** The way forward
- 10.** References
- 11.** Annexes

2.0 Study Objective

2.1 Main objective

The main objective of this study is to undertake a comprehensive mapping of all institutions, experts and initiatives in Africa that are engaged in climate-related research, climate data archiving, applications, services, and policy. The other climate-related initiatives by development agencies, NGOs, CGO, civil society organizations and people for the last 10 years in Africa will also be included by developing an interactive (google) map of these bodies and people.

2.2 Activities to be implemented

In order to achieve the intended goal the following activities will be carried out:

- 1) Make an extensive search for identification and creation of a database of institutions, researchers and initiatives relevant for inclusion in the mapping.
- 2) Document links and archives of existing climate databases relevant for climate research and analysis in Africa.
- 3) Compile a master, searchable, database containing all the information derived from the mapping.
- 4) Develop an interactive (google-type) map of Africa with links to databases of all institutions, researchers, other experts and initiatives working on climate and related research including applications, services and policy.

2.3 Expected outputs

The main outputs expected are:

- Detailed documentation on the mapping effort
- An interactive (google) map of institutions, researchers, other experts, and initiatives working on climate research and related activities, applications, services, policy, data archives in Africa.

3.0 Data Use and Methodology

Data and method employed is discussed in the following subsections. The data used in this study consisted of various variables including global, subregional and national institutions, researchers, other experts and initiatives that are involved in climate research relevant to Africa. These institutions and persons are from within and outside Africa. Additional data for institutions includes those of all national meteorological and hydrological services in Africa involved in making climate observations, capacity-building in human resources, infrastructural development, and data archiving. These data are a useful primary input for climate research.

Some national focal institutions in Africa coordinating climate change matters and international organizations supporting African countries in dealing with climate phenomena are also considered. These included institutions supporting African countries in focusing on initiatives that aim to develop national or regional climate change policies and adaptation strategies.

Major sources of data used in this study included those from previous ones, website-based sources, responses from a questionnaire sent to various experts in African institutions, and physical interaction with experts. Unfortunately, response from institutions was not very good. Furthermore, efforts were made to get information from previous attempts at mapping climate research institutions in Africa.

The questionnaire sent to the various institutions requested for the following information:

- The name of the institutional, researcher, expert and initiative
- The aspect of climate research being undertaken
- The added value of the initiative on the research subject
- The countries which the institution, experts and initiative serves
- The areas in a particular subregional for which the institution is responsible

The data was collected and arranged in a form that was easily accessible for analysis and manipulation (see annexes 1, 2, and 3). In addition to presenting the information in a tabular form, it was necessary to apply appropriate methods for mapping the information. The mapping methods included steps towards processing all available spatially distributed geographical data collected for this purpose. Emphasis was on scientific hypothesis testing through powerful logical concepts and

sophisticated mathematical techniques as demonstrated by Kraak, Menno-Jan (2001). This approach also involved adapting techniques for inputting the spatial geographical data into a suitable geographical information system (GIS), which is the selected computer-based capability for data manipulation. Initial steps included getting data converted to digital formats followed by techniques for storing such formats on computer disks or digital storage media. The data was subjected to several methods for automated analysis to search for patterns, through combining data available from different locations and a host of other tasks. Final techniques were applied for display of the processed data in the form of maps, images, interpretation of results, and justification of conclusions.

Data collected and mapped is given in annexes 1 (for institutions), 2 (for researchers and other experts), and 3 (for initiatives) as follows:

Annex 1:

Part 1: Mapping institutions and organizations including universities that are enabling climate research and climate-related activities in Africa.

Part 2: Mapping institutions with archival of climate data for African climate research and related activities.

Annex 2:

Part 1: Mapping experts and researchers active in the frontiers of African climate research and related initiatives.

Part 2: Mapping experts focusing on climate change issues related to the United Nations Framework Convention on Climate Change Activities.

Part 3: Mapping experts dealing with climate change assessment on science, vulnerability and adaptation, as well as mitigation options related to the activities of the Intergovernmental Panel on Climate Change.

Annex 3:

Part 1: Mapping various climate research and related activities implemented in each country.

Part 2: Various activities mapped according to specific areas.

Part 3: Mapping focal points for the Intergovernmental Panel.

Part 4: Mapping UNFCCC focal points for the Framework Convention.

4.0 Analysis

The mapping analysis included registering the available data to a formal coordinate system, which is always unstable but changes with time is referred to as georeferencing. It was then followed by subjecting the available data to the relevant mathematical expressions that segregates distance into space-time functions called metrics. The metrics are twofold: the separate and composite metrics which work simultaneously in treating the concept of distance in space and time separately to

accommodate the spherical nature of earth. The two play significant roles of determining spatial entropy and statistical moments crucial in space-time predictive mapping. The spherical trigonometry provides the necessary rules to measure and relate the angles and sides of triangles on the surface of the spherical earth.

This mapping analysis is geared as a sort of one stop shop for climate-related information portraying available data and institutions related to climate research and other related activities at regional scale. The knowledge gained from these activities is also important for disaster reduction and recovery. This sort of shop is expected to provide an online tool for access to comprehensive regional and country data related to climate change for development. The successful integration of scientific information in decision-making often depends on the use of flexible frameworks, data, and tools that can provide comprehensive information to a wide range of users, allowing them to evaluate how to apply the scientific information to the design of governing policies for climate change management.

5.0 Results

5.1 Mapping institutions

5.1.1 Mapping institutions enabling climate research and related activities in Africa

The mapping of all variables including research institutions, organizations and universities that are carrying out climate research and climate-related activities in Africa was carried out as described in section 3. The institutions were mapped in a tabular form as presented in annex 1 (parts 1 and 2) and then subjected to GIS mapping, which produced an interactive google map showing the distribution of those institutions in and outside Africa. This draft google map is available from http://www.meteo.go.tz/african/index_1.php. Layer selector will enable different options of strata to be viewed, and zooming will provide an option for showing detailed information at a particular location.

Annex 1, part 1 provides mapping of institutions and organizations including universities that are enabling climate research and climate-related activities in Africa. The initial mapping results show that much of climate research work and other related activities including capacity-building in Africa are being done by many institutions in Southern, Eastern and Western Africa. The University of Cape Town undertakes many research and capacity-building activities, while the University of Nairobi from Eastern Africa carries out research in collaboration with other institutions like the IGAD Climate Prediction and Applications Centre (ICPAC). There are fewer institutions and activities in Central and Northern Africa. With respect to institutions from outside Africa many, especially universities in the United States followed by the United Kingdom, support climate research work and other related activities in Africa.

5.1.2 Mapping Institutions with archives of climate data for African climate research

The mapping of institutions with archives of climate data for climate research and related activities in Africa is given in annex 1 (part 2). The institutions are the national meteorological and hydro-

logical services (NMHSs). Each of these services is a member of the World Meteorological Organization (WMO). The organization assists them, especially those of developing and least developed countries in Africa, in their efforts to contribute to national development and to become full partners in global collaborative efforts.

The organization's convention reaffirms the vital importance of the mission of these services in observing and understanding weather and climate and in providing meteorological, hydrological and related services in support of relevant national needs. These needs include but are not limited to the following areas:

- (a) Protection of life and property.
- (b) Safeguarding the environment.
- (c) Contributing to sustainable development.
- (d) Promoting long-term observation and collection of meteorological, hydrological and climatological data, including related environmental data.
- (e) Contributing to international cooperation.

National meteorological and hydrological services are also important in the development of the relevant human resources that are the backbone of climate research activities. They also provide the necessary infrastructure and communication links on meteorological aspects between countries in the continent and globally.

5.2 Mappers and others engaged in African climate research

The mapping of experts conducting climate research in Africa was carried out as described in section 3. The researchers were listed and mapped in a tabular form as given in annex 2 (parts 1-3). Then, they were subjected to GIS mapping, which produced an interactive google map showing the distribution of those experts and researchers in and outside Africa. This google map available from http://www.meteo.go.tz/african/index_2.php. Layer selector will enable different options of layers to be viewed and zooming will provide an option for showing detailed information at a particular location.

Scientists from national, regional, and international institutions are focusing on priority research gaps to inform climate-related issues, including adaptation decision-making in Africa. There are a number of areas where climate research and development is crucial to make climate science outputs useful to decision makers. These areas include:

- Assessing the current vulnerability due to recent climate events
- Decision makers' need for climate information pertinent to the geographical scales for which decisions are made
- Research on integration of climate predictions on all timescales with application modelling. This remains a priority to help optimize usefulness to users
- Building credibility and confidence in predictions
- Mainstreaming climate services for all timescales

Climate research and development may also be important in the communication of climate services and enhancing the understanding between providers and users of climate information. Emphasis on open partnership between practitioners of such traditional systems of climate prediction and climate scientists is needed to bridge the cultural divide and improve the local relevance of scientific forecasts for local decision-making.

Below is the description of the results on the assessment made through mapping of experts and researchers. The results are grouped in the categories as described below.

5.2.1 Extending seasonal prediction lead times

Efforts in extended seasonal prediction lead time are being made in order to improve long-lead forecast for the benefit of different users. The mapping shows that Southern and Eastern Africa institutions have more experts working in this area of research. Western and Northern Africa have fewer. There was no information from Central Africa on the subject.

5.2.2 Robust climate change projections

The work on robust climate change projections is important in tackling long-term issues related to impacts of climate change, especially on adaptation. The mapping shows that Southern, Eastern and Western Africa have researchers in this area. Southern Africa, especially South Africa, has the majority of researchers in this area.

5.2.3 Public education and outreach

Public education and outreach is important in creating awareness of climate information and products among various users, including policymakers. The mapping shows that few experts research in this area and they are spread across Africa.

5.2.4 Understanding drivers of climate variability; uncovering source of climate model errors

Understanding drivers of climate variability particularly at season timescales is very important. Natural climate variability plays an important role in defining the climate of some parts of Africa's regions on inter-annual (year-by-year) timescales. There are several important drivers of climate variability; these include systems such as El-Niño Southern Oscillation, the Antarctic Oscillation, and the Indian Ocean Dipole. Studying and understanding the contributions of these systems to climate variability is important. Experts and researchers from Southern Africa, especially South Africa, Eastern Africa and Western Africa, mainly Nigeria, work on this area of research.

5.2.5 Attribution of extremes

This is part of understanding drivers of climate variability, particularly at seasonal timescales. For example, Nigeria is trying to improve meningitis prediction by understanding various impacts of climate change. Many researchers at Nigerian institutions and, separately, a few from Southern and Eastern Africa are working on this problem.

5.2.6 Rainfall onset, cessation and intraseasonal statistics

Results of research on the onset and cessation of rainy seasons are vital to climate information users, especially those in the agriculture sector. This is information farmers and others in the allied industry have been asking of scientists, which has spurred research on the issue in Eastern and Western Africa. For example, in Uganda a researcher has been assessing the drivers of current and future climate variability and change, and how climate extremes associated with two variables impact society.

5.2.7 Bridging the gap between science and adaptation decision-making: identification of user needs, user-driven research

Researchers in this area are seeking innovative methods to communicate climate science to end-users, among them policymakers. Researchers are also trying to identify user needs to direct this aspect of climate research. Meantime, these experts and researchers working in this area support programmes such as the Global Framework for Climate Services and regional centres of excellence in climate services.

5.2.8 Experts working on initiatives identified United Nations Framework Convention on Climate Change

The experts under this category are those implementing activities in the countries that respond to initiatives (annex 2, part 2) of the Framework Convention, such as the preparation of national adaptation programmes, the Nairobi Work Programme on Adaptation, and enhancement of climate observations. Most of these experts are the focal points for the Framework Convention's activities in their respective countries. Therefore, they are important contacts on issues related to research and on climate change country policies. The majority of these focal points are either diplomats or senior government officials.

5.2.9 Experts working on activities related to Intergovernmental Panel on Climate Change

In all African countries, there is a focal point on climate-related activities as part of providing input in the three working groups (annex 2, part 3) of the Intergovernmental Panel on Climate Change. In this report, it has been possible to name the Panel's national focal points who identify all other scientists contributing to national scientific assessments of climate-related activities. In most cases these scientists work in various national institutions.

5.3 Mapping country activities on climate research, applications, policy, adaptation

Annex 3 (parts 1 to 4) show various climate research and related activities implemented in each African country, and those dealing with adaptation and mitigation options. The countries are grouped in regions: Western, Central, Northern, Eastern, Southern and Small Island Developing States. Annex 3, part 1 shows that African countries are focusing on adaptation and resilience to impacts of climate change activities, which for them holds greater relevance. There are a few countries with mitigation options such as reforestation.

The google mapping results are hosted in the server temporarily hosted at the Tanzania Meteorological Agency available from http://www.meteo.go.tz/african/index_3.php. T CR4D will host its own website as soon the study is completed.

5.4 Mapping climate research into capacity development, adaptation and externally supported projects

Non-Annex I countries including those from Africa are becoming involved in increasing capacity on climate change actions and negotiations that affect their future. Countries are focusing on the need to adapt to the challenges of climate change as well as in finding ways to benefit from the rewards of low-carbon growth. This requires support across a wide range of areas so that these countries can interact more effectively with the United Nations Framework Convention on Climate Change, the Intergovernmental Panel on Climate Change, and other global mechanisms. Such countries are listed in annex 3, part 2. Annex 3, part 2 shows various activities that are mapped according to specific areas as indicated below. The activities are mapped according to the areas being addressed. The list of these initiatives is not exhaustive as this contains information that has been easily accessible during the study.

5.4.1 Capacity-building and development programmes

There are a number of organizations contributing to capacity-building and development programmes. The World Meteorological Organization is one. In addition to improving the climate observation network by supporting national meteorological and hydrological services, it helps train experts who contribute in climate researchers of various institutions. Another agency is the United Nations Development Programme. Under its African Adaptation Programme, the agency is building capacities in climate resilience and disaster risk reduction. Additionally, it supports professional development of journalists in all 20 countries participating in the Adaptation Programme, building their knowledge of climate change issues. The programme also provides journalists a forum for discussion on climate issues,

The African Development Bank supports national and regional technical and human resource and technical capacity development for institutions with activities in climate variability and change. The Bank's support has been very helpful in building technical and human resources capacities of climate regional institutions for the Permanent Inter-State Committee for Drought Control in the Sahel CILSS, the Intergovernmental Authority on Development, and the Southern Africa Development Community.

CARE International, a leading non-governmental organization fighting global poverty, aims to empower poor and marginalized people to take action on climate change at all levels, and to build knowledge for global change through its Adaptation Learning Programme in Africa. Since 2010, the programme has been working with communities, government institutions and civil society organizations in Ghana, Kenya, Mozambique and Niger, with outreach to other countries. The programme's community-based approaches to climate information services have stirred significant interest and engagement supporting decision-making processes and capacity for forward-looking decisions on adaptation, livelihoods, agriculture, local development planning, early warning and disaster risk management.

5.4.2 Impacts, vulnerability and adaptation projects

Many players focus on these initiatives. A few examples are given here.

The United Nations Development Programme enhances current and future development to climate change impacts by strengthening adaptive capacity and building resilience of the society and ecosystems of various countries. A good example is Ghana, where the agency has supported development of a national climate change adaptation strategy. It also has programmes on strengthening early warning systems for extreme weather events. The agency has also supported a project, through Oxford University, to produce country climate profiles, which are “off-the-shelf” analyses of climate data, and also make available the underlying data for each country for use in further research in all African countries.

The United States Agency for International Development - through its activities of PREPARED and other FEWSNET-related undertakings in West, Eastern, and Southern Africa - produces several geospatial climate products, including within a season or next season forecasts and climatology. The Agency also has access to the largest *in situ* climate data in the United States. The PREPARED project has done much work on impacts and vulnerability for Eastern Africa countries.

The World Health Organization, along with UNDP, launched in 2010 the first global project on public health adaptation to climate change projects. The aim was to “increase adaptive capacity of national health system institutions, including field practitioners, to respond to climate-sensitive health risks”, relevant for Africa. The projects have enhanced systems of early warning and early action; built capacity of national actors; piloted specific health risk reduction interventions; documented and shared lessons learned in tackling the health risks associated with climate change in their areas.

The African Development Bank has continued to back studies on vulnerability assessment and adaptation on impacts of climate change in Western, Eastern, and Southern Africa. This initiative is being done through the regional centres of African Centre for Meteorological Applications for Development, SADC- Climate Services Centre, ICPAC, and the Regional Centre of Agro-Hydro-Meteorology, or AGRYMET.

The World Bank, too, has laid out a plan of action. This is aimed at adaptation to climate change in Africa, seizing mitigation opportunities on the continent, building knowledge and capacity, and making more financing available. Launched in 2009, “Making Development Climate Resilient in Sub-Saharan Africa” identifies knowledge gaps, expected impacts and key actions to be taken over time by African governments and their partners.

5.4.3 Policy support for sustainable development

Future Agriculture is a United Nations programme that advocates understanding of the policy processes at national and international levels that define the links between climate change and agriculture. Future Agriculture has been tried in Ghana, Kenya and South Africa.

UNDP has developed a toolkit for practitioners in designing, measuring and verifying climate change adaptation initiatives. The toolkit provides step-by-step guidance and, in this way, seeks an answer to the question on the basic steps needed in planning and designing an adaptation initiative.

The Climate Emergency Institute advocates for the human rights of the populations and countries most vulnerable to climate change. The institute is comprised of a diverse professional faculty, each of whom specializes in one or more aspects of the global climate emergency.

Under the UNDP's African Adaptation Programme, the agency provides methodologies and resources to support countries in adaptation initiatives that include the Adaptation Policy Framework, and the Toolkit for Designing Climate Change Adaptation Initiatives and Country Adaptation Profiles.

SADC and IGAD support climate change adaptation through developing national and regional climate change adaptation policies in their respective areas. They support plans, strategies and activities that strengthen the ability to anticipate, cope, resist and recover from climate change shocks.

WMO, through the Global Framework for Climate Services, will help to guide decision makers and public health authorities to provide well-targeted climate services in African countries through operationalizing the Framework to obtain accessible and accurate climate service information. The Framework is a new collaborative programme with the World Health Organization, the World Food Programme, and the International Federation of the Red Cross and Red Crescent Societies.

5.4.4 Gender climate-related activities

UNDP has developed policy briefs and training modules on gender and climate change for practitioners and policymakers in Africa. The themes are of specific relevance to Africa, and include a general overview of climate change issues, adaptation, agriculture and food security, equitable energy access, and climate finance. The modules were initially implemented in Malawi and Tanzania

New Course, an international non-governmental organization, recognizes the powerful role that women, as the primary users of their communities' natural resources, can play in bolstering community resiliency while also reducing future climate impacts. To ensure resilient, sustainable communities, New Course enables women to manage their resources and renew their environments, for example improving watershed management in Kenya and Uganda.

5.4.5 Application of climate information

The WMO's CLIPS project, and related programmes, has been tried in many countries in support of development and application of climate information in various sectors. The project is in collaboration with WHO, UNDP, World Bank and has supported ICPAC, ACMAD, SADC CSC, NMHSs and other entities in the generation and application of climate information in different sectors in Africa. It has also supported activities geared at building capacities of generators of

information and users. As a follow up to this project, the Global Framework for Climate Services is taking over its role and already some trials are being undertaken in Chad, Malawi, Niger and Tanzania

5.5 Mapping institutions involved in climate research

The African countries form part of the 195 members constituting the Inter-governmental Panel of Climate Change. The purpose of the Panel is to provide guidance to members on the scientific and technical aspects of its work. This work is basically assessment of research on climate change; particularly the physical science basis, impacts, adaptation and vulnerability as well as mitigation. The Panel provides advice on related management and strategic issues, and on how to take decisions on specific issues within its mandate, in accordance with the Principles Governing.

Each member country of the Panel has a focal point identified by the relevant authorities in each country. The focal points prepare and update the list of national experts to help implement the Panel's work programme. These persons also arrange for the provision of integrated comments on the accuracy and completeness of the scientific and technical content, and on their balance in draft reports.

The Panel has on several requests from national experts, through national focal points, to contribute to special reports as may be requested by members. The issues include impacts, vulnerability, extreme events and others.

The list of the Panel's national focal points is listed in annex 3, part 3.

5.6 Mapping UNFCCC national focal point institutions in Africa

African countries are members to the 197 Parties to the United Nations Convention for Climate Change (UNFCCC) involved in the international climate change negotiations. Most of these countries are categorized as non-Annex 1 parties, being developing countries and some the least developed. This is because most are vulnerable to the negative effects of climate change in large part and lack the domestic resources to support projects and innovations that would, for example, help stave off agricultural disasters or ease the transition to clean energy economies. Financial, technical and other support is crucial to help them deal with the adaptation and mitigation issues acknowledged in the Convention. The magnitude of need requires close cooperation between developing and developed countries.

The national focal point of each country is represented in the UNFCCC. Tasks of non-Annex 1 parties include but are not limited to the following:

- 1) Meet reporting requirements under the Convention.
- 2) Present information in a consistent, transparent and comparable, as well as flexible manner, taking into account specific national circumstances.
- 3) Ensure that the Conference of the Parties has sufficient information to carry out its responsibility for assessing the implementation of the Convention by Parties.

In order to perform some of the above tasks, developing countries are usually funded by Convention to carry out national climate assessment studies whose results are an input to the work of the Convention.

All countries involved are listed in annex 3, part 4.

From the above mapping, it is observed that most of the activities are implemented in all countries, especially the least developed ones. These are the countries in which agencies of the United Nations and other development partners provide most support.

6.0 Challenges During Mapping

Data was obtained from respondents to questionnaires sent to most of the known climate research institutions, universities, experts and organizations in all African countries. In some countries, most did not respond to these questionnaires making it difficult to have adequate data on some of the continent's regions. As a result, some of the information for the mapping had to be sought from the Internet, which took a lot of time. One other hindrance was the difficulty in getting information published in French-speaking countries.

Obtaining the precise coordinates of a specific group of institutions in one place is difficult. For example, more than four institutions are in Nairobi, Kenya, or many experts are from Cape Town, South Africa. Therefore, mapping is just generalized as a single coordinate system. In such cases, visualization of mapped information is a problem. Institutions are very close that users may be unable to view the points in the standard mode, hence need to zoom for all points to be seen clearly.

CartODB web has been used for displaying purposes. This tool is meant for commercial purposes. Currently it has a maximum of four layers for free hosting per project. Therefore, difficulty is encountered in host free for more than four layers.

During this study, the server was hosted at the Tanzania Meteorological Agency available from www.meteo.go.tz/african/index.php. However, it will move to its own facility soon after completion of the study CR4D.

7.0 Conclusion and Recommendations

7.1 Institutions

This study has shown that there are many institutions carrying out climate research and related activities in Africa. The results indicate that institutions in Southern and Eastern Africa are more engaged in various aspects of such research such as modeling, climate services and adaptation. Institutions in the West are also engaged in climate research, especially under the AMMA Programme. Central and Northern Africa have relatively less research work going on when compared with the aforementioned regions. Yet in some of these areas, there could be some ongoing activities on which information is not easily accessible.

In Southern Africa, the presence of active institutions of higher learning such as the University of Cape Town and that of KwaZulu-Natal seem to contribute significantly to climate research and other related activities. Similarly, for Eastern and Western regions of Africa, institutions of higher learning contribute to advancing the climate research agenda. In addition to the presence of active institutions of higher learning, regional centres such as ICPAC for IGAD, SADC, CSC and AC-MAD also support the climate research for their respective subregions.

Extra-African institutions, principally those of the United States and United Kingdom, have done good climate research in different parts of Africa. The contribution of these institutions is very important in that, apart from getting the research results, they share knowledge and building capacity of African scientists. The following are some of the recommendations:

1. In order to ensure that African institutions build their climate research capacities there is need to encourage young scientists to play a major role in taking up climate research and related activities. Those who do well need to be awarded as part of their encouragement.
2. Research work needs reliable data. It is recommended that African national meteorological and hydrological services strive to improve their data observation network and data management systems as this ensures availability of quality information.
3. It is highly recommended that interaction between African climate research institutions and those from outside be encouraged and maintained.
4. This study has been done within a very short time and that the responses from institutions were few. If more time was allocated and more comprehensive survey was done, more valuable information would have been received and used in the study. The results would have been more informative. It is recommended, therefore, that a more comprehensive study be done that will provide more consultation time.

7.2 Experts and researchers

The mapping of experts and researchers shows that there are more working on climate research and related climate activities in Southern Africa, Eastern Africa and Western Africa. In Southern Africa the University of Cape Town and South African Weather Services have more such personnel, especially on the extended seasonal to long-term modeling aspect on climate research. In Eastern Africa, Kenya and Tanzania have more researching on impacts, attribution and outreach; while in West Africa, Nigeria and Senegal have experts focused on climate and related research. It is clear that in countries with strong institutions of higher learning, research centres and national meteorological and hydrological services produce more experts and researchers. Good examples of this observation are in Kenya, Nigeria, Senegal and South Africa. In most of the other countries, experts are mainly at their institutions of higher learning or meteorological and hydrological services, for example in Benin, Botswana, Malawi, Morocco and Sudan. There is no clear evidence that there is proper coordination of experts and researchers among countries or between subregions. However, there could be some coordination within the countries especially in cases where meteorological and hydrological service experts are collaborating with institutions of higher learning, for example in Kenya and Tanzania. In Tanzania, experts from the two services participate in

teaching and supervising meteorology students at institutions of higher learning. The results show that Africa has good capacity of potential researchers who need more training and exposure to current research trends. The results support observations made from previous studies that are mentioned before, like that of Wilby, R. (2014).

In order to get a better picture, it is recommended that each Climate Research for Development subregion carryout this effort so that a better regional picture of experts, researchers, and research priorities is obtained.

7.3 Initiatives rerated to climate research and related activities

The study shows that many international organizations are undertaking initiatives in climate research and related activities in Western, Southern and Eastern Africa. Some of these activities are well coordinated between funding agencies. In some cases, this is not clearly observed. Proper coordination within regions and countries in implementing these initiatives is highly recommended. The results of this study provide an insight into the need to carry out more rigorous studies that can clearly show the involvement of different players in supporting the initiatives in climate research and related activities.

It is recommended that Climate Research for Development carry out this type of assessment, regularly, in order to have a proper record of these initiatives in Africa so that gaps are identified and solutions to fill them are sought.

8.0 The Way Forward

There is need for institutions that are carrying out climate and related research activities to be more coordinated by holding meetings and workshops at regional, subregional, and national levels. Climate Research for Development can also act as a coordinator of such initiatives.

The results show the possibility of some coordination among researchers and other experts in climate and related research within Africa. However, a greater level of coordination exists within countries. Therefore, it is important to ensure that there is a proper coordination mechanism at country to continental level. Through this coordination, it is possible to prioritize areas of climate and related research that countries, regions and Africa can carry out. It would also be helpful to ensure that there is a continental programme that brings youths together to enable them interact frequently and share information and results on climate research activities. This will help to develop African scientists that will contribute effectively in international processes such as the Intergovernmental Panel on Climate Change and the United Nations Convention for Climate Change where Africa's participation is at a minimum.

It is important to realize that all initiatives carried out by different players are not useful if they do not serve the interests of their communities at local level. As a way forward, it will be important for Climate Research for Development to ensure that the efforts by different players on climate research and related activities help to solve problems that affect communities, especially those that are underprivileged.

9.0 Annexes

Annex 1

Institutions and programmes engaged in climate research, applications, services, adaptation, policy, capacity-building in Africa.

Available from http://www.meteo.go.tz/african/index_1.php)

Part 1: Institutions carrying activities within countries and including institution of higher learning

REGION (West, East, South, North, Central, SIDS)	COUNTRY	INSTITUTION	TYPE OF INSTITUTION (e.g academic, research, policy, NGO)	KEY AREAS of FOCUS (e.g type of training or research programs, adaptation and mitigation, policy, community-based programmes)	INSTITUTION'S WEBSITE/PORTAL LINK (Move names to table for sub-report on experts)
Africa	All countries	Africa Climate Panel (VACS) at the then Drought Monitoring Centre Nairobi, Kenya. First Meeting in 2001, WCRP Informal Report No 10/2001	WCRP CLIVAR Panel for Africa convened at the Research-based Drought Monitoring Centre now referred to as ICPAC	Representative panel bringing together the world's best climate science on the variability of the African climate system	The Director IGAD Climate Prediction & Applications Centre (ICPAC) P.O. BOX 10304, 00100 Nairobi, Kenya Email: info@icpac.net Tel: +2540203514426/ +254714435259/ +254739167809; http://www.icpac.net

Africa	All countries of Africa	The ClimDev-Africa based in Addis Ababa, Ethiopia, is an initiative of African Union Commission, United Nations Economic Commission for Africa and the African Development Bank. First developed in April 2006 with focus on leading response to climate change in Africa	Enhanced research capacity in climate change producing effective and quality policy-supporting analyses and best practices on regional to national levels	Enhanced Quality policy support in provided primarily by the research communities of Africa, including efficient sharing of information, climate change impact assessments, decision support tools for adaptive management for development. to enhance climate services in Africa	ClimDev-Africa c/o UNECA, African Climate Policy Centre (ACPC) Menelik II Rd, P.O. Box 3001 Addis Ababa, Ethiopia; Tel: +251 11 551 7200 Fax: +251 11 551 0350 Email: info@climdev-africa.org Web: www.climdev-africa.org
Africa	All African countries	Nairobi-based UNEP/PROVIA	Global programme of research on climate change vulnerability, impacts and adaptation	Focus is on international agenda of research, advice and scientific information, communication with vulnerability, impact assessment (VIA), community guidelines and VIA assessment tools	PROVIA Secretariat, P.O. Box 30552, Nairobi 00100, Kenya Tel: +254 20 762 762 3231, Email: provia@provia-climatechange.org, Web: undp.org/provia

Asia	Rep of Korea,	Korean Meteorological Administration (KMA)	KMA signed memorandum of understanding with IGAD countries of Africa on research in 2010	Focus is to cooperate in research in the field of climate variability and change technologies	Korea Meteorological Administration, Address: 61 16-GIL YEOUIDAEBANG-RO DONGJAK-GU Seoul 156-720, http://www.kma.go.kr
Central Africa	Chad	National Framework for Climate Services was launched in Chad in 2013 in collaboration with <i>Direction des Ressources en Eau et de la Meteorologie</i> (DREM)	DREM is the national meteorological and hydrological service for climate service in Chad	The framework will be an appropriate response to the suboptimal use of weather information and climate services identified and decried by all sectors of development of the country that need them	Direction Generale de la Meteorologie Nationale (DGMN) Telephone + 235 22 52 30 81 Email mbaitoubame@live.fr Address: Direction des Ressources en eau et de la météorologie N'Djamena Chad

Eastern Africa	Kenya	ICPAC	Regional centre of excellence for climate prediction and applications for climate risk management, environmental management, and sustainable development in IGAD countries based in Nairobi, Kenya	The centre is involved in provision of timely climate early warning information and supporting specific sector applications to enable the region cope with various risks associated with extreme climate variability and change for poverty alleviation, environment management and sustainable development of the member countries	The Director IGAD Climate Prediction & Applications Centre (ICPAC) P.O. BOX 10304, 00100 Nairobi, Kenya Email: info@icpac.net Tel: +2540203514426/ +254714435259/ +254739167809 web: http://www.icpac.net
Eastern Africa	Kenya	Institute for Meteorological Training and Research (IMTR) Nairobi – Regional Training Centre Kenya	IMTR is an academic institution involved in teaching operational meteorological training and aeronautical meteorological forecasting courses. IMTR is part of the Kenya NMHS	IMTR trains NMHSs staff in making basic operational weather and climate observations, operational aeronautical meteorological forecasting and basic research in Eastern and Southern African member states	Dagoretti Corner, Ngong Road, P.O. Box 30259-00100 GPO, Nairobi, Kenya Tel: (254-20) 3867 880-5 http://www.meteo.go.ke

East Africa	Tanzania	East Africa Community (EAC)	Climate Change Unit as part of the EAC in place to develop policies that govern climate change policies, strategies and action plans to cushion the region from the adverse impacts emanating from global warming	EAC developed in 2010 Climate Change policy to address the adverse impacts of climate change for sustainable development in the region along with respective climate change strategy in 2011 and master plan (2011-2031) to ensure implementation of the policy	http://www.eac.int
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Eastern Africa	Tanzania	Tanzania Meteorological Agency (TMA)	TMA as the country's NMHS implements WMO Global Framework for Climate Services (GFCS) in the United Republic of Tanzania	TMA implements GFCS initiative to guide the development and application of science-based climate information and services in support of decision-making in four climate sensitive sectors namely agriculture and food security, health and disasters reduction	http://www.meteo.go.tz
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EUROPE	Italy	ICTP in Trieste	Centre for Global and Regional Climate Modelling Research	Global and regional models are presented to assist in the understanding of the many processes that govern climate system. Builds LDC modelling capacity. Many scientists from Africa have benefited	https://www.ictp.it/
Europe	United Kingdom,	UK Dept for International Development (DFID) and Met Office Climate Science Research Partnership – CSRP partnership	Research Programme on model development and improvement and capacity-building solely on Africa	The partnership between the duo is working in consultation with African stakeholders, to improve predictions of climate variability and change	http://www.metoffice.gov.uk

North Africa	Algeria	Hydromet Institute of Training and Research	Training and research in Meteorology and climate applications	Deliveries include training of WMO class one meteorologists, senior technicians and short courses in various disciplines of meteorology	BP 7019 Séddikia, Oran, Algérie https://www.wmo.int/
North Africa	Egypt	RTC Egypt, The Egyptian Meteorological Authority	Training and research in meteorology and climate applications	Training of WMO class one meteorologists, meteorological technicians and various short courses in meteorology	http://www.nwp.gov.eg
North Africa	Morocco	North African Regional Climate Centre (RCC)-Network	Coordinates to implement RCC network for North Africa	Functions include climate monitoring, data services, training and highly recommended functions in NMHSs of Algeria, Egypt, Morocco and Tunisia	http://www.rccnara1.maroc-meteo.ma
Southern Africa	Angola	RTC Angola	Training and research in meteorology and climate applications	Instituto Nacional de Meteorologia e Geofísica (INAMET)	Coordinateur RTC, C. P. 1228 C, Luanda, Angola http://www.inamet.gov.ao/

Southern Africa (SADC)	Botswana	SADC Climate Services Centre	Climate Services Centre, which caters for seasonal climate forecasts and regional climate change information	Develops new methodologies for climate monitoring, including issuance of seasonal weather forecasting and applications for SADC member states	http://www.sadc.int/
Southern Africa	Madagascar,	WMO Regional Training Centre (RTC), Madagascar	Training and research in Meteorology and climate applications	Ecole Supérieure Polytechnique d'Antananarivo (ESPA)	ESPA – B.P. 1500 Ambohitsaina – Antananarivo 101 https://www.wmo.int/

Southern Africa	Malawi	Department of Climate Change and Meteorological Services	The Department of Climate Change and Meteorological Services implements WMO Global Framework for Climate Services (GFCS) in Malawi.	The meteorological service implements GFCS initiatives to enable better management of the risks of climate variability and change and through incorporation of science based climate information into planning, policy and practice on the global, regional and national scale advisories for agriculture, health and disasters reduction	http://www.metmalawi.com
Southern Africa	South Africa	South African Weather Service Long-range Forecasting Group	Climate prediction research (with more emphasis on Africa)	Operational and research on sub-seasonal to longer timescales	http://www.weathersa.co.za

SOUTHERN AFRICA	South Africa	CORDEX – Africa	Developing methods and tools to analyse atmospheric processes over Africa and how these may change into the future	Initiative in place to analyse downscaled regional climate data over the CORDEX-African domain, train young climate scientists in climate data analysis techniques and engage users of climate information in both users of climate information in both sector specific and region/space based applications	http://www.csag.uct.ac.za/cordex-africa
Southern Africa	South Africa	Future Resilience for African Cities and Lands (FRAC-TAL)	Co-design and transdisciplinary processes to support the integration of climate knowledge into real-world decision making	Address climate change necessity for building urban resilience so that people, infrastructure and economic activities are to withstand complex climate risks and vulnerabilities	http://www.fractal.org.za

Southern Africa	South Africa	CSIR - South Africa	The Council for Scientific and Industrial Research (CSIR) undertakes research and development for social economic growth	CSIR has a special programme with initiative for integrated ocean governance framework for sustainable growth of the oceans economy all while ensuring adequate ocean environment	http://www.csir.co.za
Southern Africa	South Africa	Gina Ziervogel	Innovating research to explore adaptation to climate change in a development context	Focus is on vulnerable groups that are faced with a range of stressors on livelihoods including water availability, health and food security	http://www.csag.uct.ac.za
Southern Africa	South Africa	WMO RTC South Africa	Training and research in meteorology and climate applications	The RTC offers full-time, accredited and short courses in various discipline of meteorology	https://www.wmo.int

United Nations	Switzerland	CLIPS/WMO	WMO initiative to support initiatives in climate prediction and services	Support through NMHSs to build capacities in generation and application of climate services	https://www.wmo.int
United Nations	Switzerland	WMO	WMO Global Framework for Climate Service provision	Network of national hydrometeorological services across Africa, novel initiative to establish a framework to implement national frameworks for climate services	https://www.wmo.int
United Nations	Switzerland	Global Climate Observing System programme/WMO	A collaborative programme for installing climate observing systems	Strengthening climate monitoring; good practical experience working with African NMHSs	http://www.wmo.int
United Nations	Switzerland	World Climate Research Programme (WRCP)	A collaborative global climate research programme	Working on the advancement of climate research in different time scales	http://www.wmo.int

United Nations	Ethiopia	UNECA, Africa Climate Policy Centre (ACPC)	ACPAC is a hub for demand led knowledge generation on climate change in Africa.	ACPC addresses the need for greatly improved climate information for Africa and strengthening the use of such information for decision making by improving analytical capacity, knowledge management and dissemination activities	http://www.wmo.int/acpc/
United Nations	Africa,	UNDP Africa Adaptation Programme (AAP)	UNDP programme for climate change adaptation	Support and capacity-building for national climate research institutions and researchers in Africa, network of national climate researchers	https://www.undp-aap.org
USA	Eastern, West, Central, Southern, Washington DC	START (System for Analysis, Research and Training)	Building capacity for research on global environmental change - strong focus on Africa	Support to CCA and, fostering Future Earth-related knowledge action networks in Africa	http://www.start.org/

USA	USA	IRI at Columbia	IRI develops strategic research to enhance capability to understand, anticipate and manage impacts of climate in order to improve human welfare. Integrating data on current variability into agricultural planning. Climate risk management	Very good experience of developing climate applications in seasonal forecasts, applications, climate variability and change in Western, Eastern and Southern Africa. Using climate data to improve agricultural productivity and reduce vulnerability to climate hazards.	http://www.iri.columbia.edu/
USA	USA,	USAID - Africa Bureau	Support for climate change research to improve access to and delivery of among many health services in Africa	Major donor for climate-related projects for sustainable development in Africa	https://www.usaid.gov/
USA	USAnimet,	Climate Hazards Group – UCSB	USAID PREPARED and other FEWSNET-related activities	Produces several geospatial climate products, including within/next season forecasts and climatology. It also has access to the largest <i>in situ</i> climate data in USA.	https://www.usaid.gov/

USA	USA	UCAR-Africa Initiative	Goal of UCAR is to enhance opportunities for African scientists to perform research on problems relevant to their continent in climate-related issues	Real-time weather and climate forecast applications in the health sector	http://www.Africa.ucar.edu/
USA	All countries	NOAA Africa Desk	Africa Center of the US National Oceanic and Atmospheric Administration (NOAA)	Forecasts, climate information and services for drought, flood, severe weather and climate change over Africa	http://www.cpc.ncep.noaa.gov/
West Africa	Niger	RTC Niger	Training and research in meteorology and climate applications	Embarks on both short- and long-term training as well as research	https://www.wmo.int/

West Africa	Nigeria	Nigerian Meteorological Agency (NiMet)	Observe, collate, process and document weather and climate data and information for socioeconomic impacts in Nigeria	Providing weather and climate information for sustainable development and safety	http://www.nimet.gov.ng/
West Africa	Nigeria,	Federal University of Technology, Akure (FUTA)- RTC Nigeria	Research institution to focus on weather service to expand to cover climate services as part of the implementation of the Global Framework for Climate Services (GFCS)	Training NMHSs staff in operational climate prediction, monitoring, data management, etc.	Department of Meteorology, P.M.B. 704 AKURE, Nigeria Tel: (034) 20 00 90 http://www.futa.edu.ng/

West Africa	Niger	WMO Global Framework for GFCS in collaboration with Directeur de la Meteorologie Nationale Service meteorologique	World Meteorological Organization Framework for Climate Services and the NMHS to facilitate identification of specific gaps and needs in the country as well as critical elements for the implementation of climate services	Roadmap to build national frameworks for climate services in Niger developed to enable tailored products and services to support decision-making	https://www.wmo.int/
West Africa	Niger	ACMAD	ACMAD is the Weather and Climate Centre with African continental competence in climate applications for development	ACMAD's mission includes provision of weather and climate information for promotion of sustainable development notably within the context of national strategies for poverty eradication in Africa	http://www.acmad.net/

West Africa	Niger	AGRHYMET	Early warning regional centre for 17 ECOWAS countries of West Africa	Monitor the rainfall seasons, the crop status, water resource availability in order to issue periodical information and alert in case of severe drought or flood for decision-making	http://www.agrhymet.ne/
West Africa	Senegal	AMMA2	African Monsoon Multidisciplinary Analysis (AMMA) project was organized in recent years with the main goal of obtaining a better understanding of the intraseasonal and inter-annual variability of the West African monsoons	Goal of AMMA phase 2 has always been to better understand and model the influence of the spatial temporal variability of surface processes on the atmospheric circulation patterns and the regional water cycle.	https://www.wcrp-climate.org

West Africa	Senegal	IDRC/CCA	Canadian International Development Research Centre provides developing-country researchers financial resources, advice, and training to help them find solutions to local problems including climate change.	Support extended to climate change adaptation research in Africa and usage of climate services for adaptation decision-making	https://www.idrc.ca/
West Africa	Senegal	ANACIM National Agency of Civil Aviation and Meteorology	Senegal NMHS responsible for development of seasonal rainfall forecasting showing onset dates, intraseasonal and use of indigenous knowledge	Observed meteorological data, MOS, statistical correction, climate change high rate of adoption	http://www.anacim.sn

Western, Eastern, Southern Africa	Ghana, Kenya Malawi	AAI - Action Aid International	Poverty reduction	Integration of disaster risk reduction into schools	http://www.actionaid.org/
Eastern, Southern Africa	Kenya, Malawi, South Africa	ACTS - African Centre for Technology Studies	Food security - harnessing science and technology for sustainable development	Community-based adaptation to climate change and integrating vulnerability and adaptation to climate change into sustainable development policy planning	http://www.acts-net.org/
All Africa	Kenya	ATPS - African Technology Policy Studies Network	African Technology Policy Studies Network - The ATPS is a trans-disciplinary network of researchers, policymakers, private sector actors and the civil society that promote the generation, dissemination, use and mastery of STI for African development, environmental	Mainstreaming climate change integrated water resources management; STI for climate change adaptation, innovation systems for climate change adaptation in agriculture; and training programmes on climate	http://www.atpsnet.org/

			sustainability and global inclusion	change adoption for policymakers, researchers and the private sector.	
Western Africa	Niger	AGRHYMET	Produce and disseminate Agrometeorological information to reduce vulnerability to current climate variability	Provide seasonal forecasts and information on current climate variability to farmers	http://www.agrhymet.ne/
All Africa	USA	AIACC - Assessments of Impacts and Adaptations to Climate Change	Enhanced least development countries' capacity to assess vulnerability and adaptation to climate change. AIACC is a global initiative developed in collaboration with the UNEP/WMO Intergovernmental Panel on Climate Change and funded by the Global	Improved seasonal forecasting, enhanced adaptive capacity by making climate data more accessible to agriculture. AIACC aims to enhance the scientific capacity of developing countries to assess cli-	http://www.aiaccproject.org/

			Environment Facility to advance scientific understanding of climate change vulnerabilities and adaptation options in developing countries	mate change vulnerabilities and adaptations, and generate and communicate information useful for adaptation planning and action. AIACC is implemented by the United Nations Environment Programme and executed jointly by START and the Third World Academy of Sciences	
Western Africa	Burkina Faso	CILSS - Comité permanent inter-État de lutte contre la sécheresse au Sahel (The Permanent Interstate Committee for Drought Control in the Sahel)	Food security in the Sahel Region and impacts of climate change. The organization's mandate is to invest in research for food security and the fight against the effects of drought and desertification for a new ecological balance in the Sahel. The Sahel is a transition area between the very dry North and tropical forests on the coast. It mostly displays bushes,	Improved use of water, solar powered pumping of ground water, small-scale irrigation and natural resources management	http://www.cilss.bf/

			herbs and very small trees and does not offer regular harvests to its inhabitants		
Western, Central Africa	Cameroon	COMIFAC – Central African Forest Commission	Forest conservation. Mostly Central and Western Africa	The Central African Forest Commission (French: Commission des Forêts d’Afrique Centrale, or COMIFAC) is an intergovernmental organization in Central Africa. Its goal is to manage the forests of Central Africa in a sustainable manner and is supported by the wildlife trade monitoring network TRAFFIC [1]. The secretariat is based in ---- --	http://www.biodiv.be/comifac2 http://www.comifac.org/

Western Africa	Nigeria	ECOWAS - Economic Community of West African States	Economic Community of West African States is a regional grouping of 15 countries	Coordinates regional climate change activities.	http://www.comm.ecowas.int/
Arab region	Tunisia	ENDA – Microfinancing Institution	Lobbying and policy dialogue and multilateral agreements on climate change	Supports community-level climate change adaptation programmes. Multiscalar activities.	http://www.enda.sn http://www.tuniseproject.com/
All Africa	Mostly whole region	GECAF	Global environmental change and food security. Assessing vulnerability and adaptation options	Research into adaptation options to improve food security	http://www.gecafs.org/

All Africa	Kenya	ICRAF - International Centre for Research in Agroforestry. It is an ultimate purpose guiding its research	Crop development, water management, land-use system design. It is to work towards mitigating tropical deforestation, land depletion and rural poverty through improved agroforestry systems. Its goal is to initiate and assist in the generation and dissemination of appropriate agroforestry technologies for resource-poor farmers and other land users	Building resilience into agricultural systems, rainwater harvesting techniques	http://www.worldagroforestry.org/
All Africa	Canada	IDRC – International Development Research Centre	Run climatic change adaptation in Africa with DFID, focusing on reducing agricultural vulnerability to present and future climate	Varied, for example integrating data from climate change scenarios into water planning, running a radio play about adaptation	http://www.idrc.ca/

Eastern, Southern Africa	Kenya	IFAD	Food security	Integrating adaptation into their loan portfolio	http://www.ifad.org/
All Africa	United Kingdom	IIED – International Institute for Environment and Development	Adaptation and capacity-building. IIED is one of a small group of independent, not-for-profit organizations that has provided core concepts and methods for thinking about sustainability and social change. IIED's main way of working is through partnership with like-minded organizations in Africa, Asia and Latin America. The institute's work is currently divided into five main areas: natural resources; climate change; human settlements; sustainable markets; and governance.	Capacity building, coordinate LCA and CLACC	http://www.iied.org/

All Africa	Canada	IISD – International Institute for Sustainable Development	<p>IISD is an independent, non-profit organization that provides practical solutions to the challenge of integrating environmental and social priorities with economic development.</p> <p>Adaptation and vulnerability, some work on adaptation in agriculture (e.g. Kenya project)</p>	<p>Livelihood-based approach and CRISTAL tool for screening adaptation projects. Various projects under adaptation to climate change in East and Southern Africa, e.g. Increasing resilience to drought in Kenya (drip irrigation, diversifying crops and livelihoods)</p>	<p>http://www.iisd.org/climate/</p>
<p>Western and Central Africa</p> <p>Eastern and Southern Africa</p>	Nairobi	IUCN	<p>Biodiversity, protected areas, natural resources management, people and livelihoods</p>	<p>Protected areas in Africa. Have used CRISTAL for some projects</p>	<p>http://www.iucn.org</p> <p>http://www.iunc.org/esaro</p>

Western and Northern Africa		OSS – Sahara and Sahel Observatory	Early warning and monitoring system for agriculture, food security and drought in Africa	Mainstreaming adaptation to climate change in least developed countries. Climate change. A number of research articles have been produced	
East Africa	United Kingdom	Oxfam	Livelihoods	Oxfam Kenya working in Northern Kenya with pastoralist communities	http://www.oxfarm.org/
All Africa	Kenya	RANET	Communicating information on current variability for climate risk management	Season forecasts and current meteorological information helps adaptation to current variability	http://www.ranetproject.net/

All Africa	Switzerland	Red Cross	Disaster relief	Disaster Risk Reduction and climate change adaptation e.g. Kenya and Malawi	http://www.redcross.org/
Western Africa	Ghana	Science and Technology Policy Research Institute	Biotechnology	Climate change adaptation and biotechnology	
Southern Africa	South Africa	SSN - South South North	Community-based adaptation and mitigation projects	Community-based, capacity-building. Various projects, e.g. solar powered water pumps (Mozambique), more drought resistant rooibos tea varieties (S. Africa)	http://www.southsouth-north.org/

All Africa	United Kingdom	Tyndall Centre	Modelling, adaptation, and institutional barriers	Research into institutional barriers and opportunities for adaptation, for example in the case of trans-boundary watershed management of the Nile and Limpopo rivers	http://www.tyndall.ac.uk/
All Africa	Switzerland	WAMIS	Operates from WMO by providing data on current variability, and agrometeorological tools to farmers and decisions makers	Provides data and tools to help farmers manage current climate variability, e.g. regular agrometeorological bulletins	http://www.wamis.org/
Southern Africa	Mainly in Zimbabwe	ZERO	Agricultural productivity, rural energy generation	Working as part of LCA and CLACC on capacity-building. Looking at how to scale up local adaptation needs to national and international policy	http://www.zero-regional.com/

Universities in Africa

Southern Africa	South Africa	University of Cape Town African Climate and Development Initiative (ACDI)	ACDI is a university-wide initiative at the University of Cape Town which supports collaborative research and training in climate change and development	The centre facilitates and undertakes research programmes concerned with the scientific, engineering, legal, social and political aspects of climate change	http://www.acdi.uct.ac.za	mark.new@acdi.uct.ac.za
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Southern Africa	South Africa	University of Cape Town Climate Systems Analysis Group (CSAG)	CSAG is a unique research group within Africa. CSAG seeks to apply its core research to meet the knowledge needs of responding to climate variability and change	Activities include statistical downscaling, regional climate modelling, extreme events, dynamical climate downscaling, seasonal forecasts, climate change projections and end user communication	http://www.csag.uct.ac.za/	Bruce Hewitson [hewitson@csag.uct.ac.za]
Southern Africa	South Africa	University of Cape Town, Dept of Oceanography	Focus of the department is teaching and research in physical oceanography, atmospheric science and climatology in South Africa and elsewhere in Africa	The department has research groupings in seagoing observations, satellite marine remote sensing, coastal oceanography, numerical modelling, the science underpinning operational oceanography, marine and coastal meteorology, severe weather, and climate change and variability	www.sea.uct.ac.za/	Mathieu Rouault [Mathieu.Rouault@uct.ac.za]

Southern Africa	South Africa	University of Kwa-Zulu Natal, School of Environmental Sciences	Focus includes environmental management and geographic information systems (GIS).	Emphasis is on modules, concepts and themes in geomatics for the application in rural and urban development, environmental management and GIS	http://www.ukzn.ac.za/	
Southern Africa	Botswana	University of Botswana	Training and research at undergraduate and postgraduate degree level in physical meteorology and climate among many	Training of new generation of professional meteorologists in Botswana and for Africa	http://www.ub.bw/	adedoyin@mopipi.ub.bw

West Africa	Senegal	University Cheikh Anta Diop of Dakar (UCAD) Laboratory of Atmos- pheric Physics for West Af- rica (LPAO)	UCAD models the West Afri- can climate system	Research coordina- tion in rainfall varia- bility during the West African monsoons and climate simula- tions for climate change and variabil- ity.	https://www.liverpool.ac.uk/	atgaye@ucad.edu.sn / msylla@ictp.it
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Eastern Africa	Tanzania	University of Dar es Salaam, Institute for Resource Assessment (IRA)	IRA is a training and research centre including climate change at master's degree	Focus is on training and research in climate change adaptation for decision-making.	http://www.ira.udsm.ac.tz/	yanda@ira.udsm.ac.tz
	Tanzania	University of Dar-es-Salaam – Physics Department in collaboration with TMA	Offers training in first degree and post graduate studies in meteorology	Offers training in meteorology with emphasis on climate variability and change	http://www.udsm.ac.tz/	

	Tanzania	Sokoine University - Morogoro	Offers training in environmental sciences and agriculture climate related studies especially research			
Eastern Africa	Kenya	Department of Meteorology, University of Nairobi	Capacity-building in climate related research and application of climate services	Training in first degree to Ph.D degree levels and research including inter and intra seasonal rainfall variability in East Africa	http://meteorology.uonbi.ac.ke/	jnmutemi@yahoo.co.uk

Eastern Africa	Kenya	University of Nairobi Institute for Climate Change and Adaptation (ICCA)	Capacity-building in climate change adaptation at post-graduate level	Successful research outputs from ICCA including high correlation of migration and conflicts and impacts of climate change in IGAD countries	http://icca.uonbi.ac.ke/	wandigas@uonbi.ac.ke ; icca@uonbi.ac.ke
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Eastern Africa	Uganda	The Regional Universities Forum hosted by Makerere University for Capacity-Building in Agriculture (RUFORUM),	RUFORUM has mandate to oversee graduate training and networks of specialization in the Common Market for Eastern and Southern Africa (COMESA).	In July, 2014, RUFORUM signed a cooperation agreement with the African Union to support the implementation of the new African Union for Science, Technology and Innovation Strategy for Africa, 2024 (STISA 2024).	http://www.ruforum.org/	a.eguru@ruforum.org
Universities in the United Kingdom (UK)						

EUROPE	United Kingdom	University of Leeds, Dept of Environmental Science	Core research areas include tackling complex global challenges such as climate change, energy security and natural hazard management	<p>Focus for a cooperative programme of research and its implementation are being developed in for Africa including:</p> <p>(i) Supporting East African institutional efforts to reduce vulnerability to climate.</p> <p>(ii) Assessment and application of seasonal-interannual forecasting for crop early warning systems</p>	https://www.see.leeds.ac.uk/	Doug Parker [d.j.parker@leeds.ac.uk]
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EUROPE	United Kingdom	University of Oxford	The University of Oxford is one of the leading universities in the world	The African Studies Centre, within the School of Interdisciplinary Area Studies, acts as a focal point for graduate level work and faculty research on Africa	https://www.ox.ac.uk	richard.washington@ouce.ox.ac.uk http://country.Profiles.geog.ox.ac.uk/
EUROPE	United Kingdom	University of Liverpool	Research interests in applying current weather and climate forecast information for humanitarian well-being through the use	Research links being developed for Africa includes climate applications, ensemble prediction systems, seasonal forecasts, uncertainty, business applications of climate data, disease models, malaria,	https://www.liverpool.ac.uk	A.P.Morse@liverpool.ac.uk

			of application models and methodologies	West African monsoon, meningitis, forecasts		
Universities in USA						
USA	USA	University of Oklahoma, CIMMS	The Cooperative Institute for Mesoscale Meteorological Studies (CIMMS) at the University of Oklahoma is a joint research institute affiliated with NOAA. CIMMS supports scientists and graduate students including Africa who conduct research in hazardous weather, mesoscale me-	CIMMS collaborates with ACMAD in seasonal climate forecasting for the continent	https://www.cimms.ou.edu	plamb@ou.edu

			teorology, re- gional climate and related subject areas			
USA	USA	University of Texas at Austin	Key pro- gramme in Af- rican climate dynamics	Fundamental under- standing of processes and ability of models to simulate climate	Kerry Cook	kc@jsg.utexas.edu

USA	USA	University of Albany	University of Albany maintains Africana Resources Links with the United Nations Economic Commission for Africa and offers resources full-text documents as well as a host of links to relevant economic issues about the African continent	Focus on research in West African monsoon: climate-chemistry interactions	www.albany.edu/	chris@atmos.albany.edu
USA	USA	University of North Carolina	University of North Carolina through the Department of Marine, Earth and Atmospheric Sciences (MEAS) investigate research in the global fundamental forces of nature	MEAS leads an international initiative in East Africa that pairs climate science with economic development planning	https://meas.sciences.ncsu.edu/	semazzi@ncsu.edu

USA	USA	University of Connecticut	The University through the Department of Natural Resources and the Environment focuses its research, academics and outreach to renew, manage and conserve our planet's limited natural resources.	Recent initiatives towards Africa include modeling climate variability and change over the Greater Horn of Africa and initiative on NWP	www.nrme.uconn.edu	Richard.Anyah@uconn.edu
USA	USA	Penn State University	Penn State engagement in Africa is in ways that integrate the social science, physical science, engineering, humanities and educational initiatives of Penn State researchers and students in the context of the developmental	Department of Meteorology at Penn State has recently worked on challenges of modelling climate variability and change in West Africa	https://aeseda.psu.edu	petra@psu.edu

			challenges facing Africa			
USA	USA	Howard University	Howard University in partnership with NASA operate a climate system observation research to understand atmospheric processes through atmospheric observing systems and analytical methods	Strong research focus over West Africa	https://www2.howard.edu/	Gregory.s.jenkins@gmail.com
Part 2: Mapping Institutions/Research centres/Hubs/with Archival of Climate Data for African Climate Research						
REGION	COUNTRY	INSTITUTION	TYPE OF INSTITUTION	KEY AREAS OF FOCUS	INSTITUTION WEBSITE	5- Contact Address

African Context	Niger	ACMAD's mission is to provide weather and climate information that will support sustainable development of Africa within the context of national strategies for poverty eradication in the region	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Director General ACMAD, Adama Alhasane Diallo. http://www.acmad.net	T/el: +227 20 73 49 92 Email: dgacmad@acmad.ne dgacmad@acmad.org Address: 85 Avenue des ministeres, bp:13184 Niamey, Niger
Central Africa	Central African Republic	Direction Generale de l'Aviation Civile et la Météorologique	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Central African Republic with WMO, Mr Jean Pierre Dackou.	Telephone: +236 21 61 37 288, Email: dackouj@yahoo.fr Address: Direction Generale l'aviation civile de la meteorologie, Bangui, Central African Republic.

Central Africa	Chad	Direction des Ressources en Eau et de la Météorologie	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Chad with WMO, Mr Elie Mbaitoubam	Tel: +23522523081 Email: mbaitoubame@live.fr Address: Direction des Ressources en eau et de météorologie N'Djamena, Chad
Central Africa	Democratic Republic of Congo	Agence Nationale de Météorologie et de Télé-détection per Satellite	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Democratic Republic of Congo with WMO, Mr Jean-Pierre Mpundu Elonga	Tel: +243 9 98 20 6242 Email: meteod-congo@yahoo.fr Address: BP 4715 Kinshasa II Democratic Republic of Congo
Central Africa	Republic of Congo	Direction de la Météorologie Nationale	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Congo with WMO, Mr Alphonse Kanga	Tel: +242055392256 Email: alphonsekanga@gmail.com Brazzaville

Central Africa	Gabon	Direction de la Météorologique Nationale	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Gabon with WMO, Mr Martin ONDO ELLA	Tel: +24107198773 Email: ondoellamartin@gmail.com Address: Cabinet du Ministre des Transport et de L'Aviation Civile, B. P. 377 Libreville, Gabon
Eastern Africa	Burundi Bujumbura	Institut Géographique du Burundi	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Burundi with WMO, Mr Aloyce Rurantije	Telephone: +25779957912 Email: arurantije@yahoo.fr Address: Boite postale 34 Gitega, Burundi
Eastern Africa	Djibouti	Service de la Météorologique	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Djibouti with WMO, Mr Osman Saad Said	Tel: +25321340500 Email: mtodji@intnet.dj Address: BP 204 Djibouti, Djibouti

Eastern Africa	Eritrea	Civil Aviation Authority	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Eritrea with WMO, Mr Paulos Kahsay	Tel: +2911189121 Email: ercaahq@gmail.com Address: P.O. Box 252, Asmara, Eritrea
Eastern Africa	Ethiopia	National Meteorological Services Agency	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Ethiopia with WMO, Mr Fetene Teshame	Tel: +251116615791 Email: te-tenekoketo@yahoo.com Address: P.O. Box 1090, Addis Ababa, Ethiopia
Eastern Africa	Kenya	Kenya Meteorological Department	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Angola with WMO, Mr James G. Kongoti	Tel: +254203867880 Email: director@meteo.go.ke Address: Dagoretti Corner P.O. Box 30259 Nairobi, Kenya

Eastern Africa	Rwanda	Rwanda Meteorological Agency	Climate monitoring, reduction and research	Climate data availability and generation of climate products	Permanent Representative of Rwanda with WMO, Mr John Ntaganda Semafara	Tel: +250575813 Email: johnntaganda@yahoo.com, Address: Ministere des Infrastructures, BP 898, Kigali, Rwanda
Eastern Africa	Somalia	Permanent Mission of Somalia	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Somalia with WMO, Eng. Omar H. M. Shurie	Tel: +252616577876 Email: omarshurie@gmail.com Address: Telecommunication Building, Mogadishu, Somalia
Eastern Africa	South Sudan	South Sudan Weather Service	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of South Sudan with WMO, Mr Mojwork Ogawi Modo Ayoker	Tel: +211 956 601 521 Email: mojwokm@gmail.com Address: Avenue de France, Geneva

Eastern Africa	Uganda	Uganda Meteorological Authority	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Uganda with WMO, Mr Festus Luboyera	Tel: +256 41 251 798 Email: festus.luboyera@unma.go.ug Address: P. O. Box 7025 Kampala, Uganda
Eastern Africa	Tanzania	Tanzania Meteorological Agency	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of United Republic of Tanzania with WMO, Dr Agnes L. Kijazi	Tel: +255 22 246 0706 Email: agnes.kijazi@meteo.go.tz Address: P. O. Box 3056, Dar es Salaam, United Republic of Tanzania

Eastern Africa	Kenya	ICPAC	The centre is part of IGAD in Eastern Africa. The centre's aim is to foster sub-regional and national capacity for climate information, prediction products and services, early warning and related applications as a contribution to sustainable development in climate monitoring, prediction and research	Climate research, data availability and generation of climate products	, The director of ICPAC, Dr Guleid Atang	Tel: +254 0203514426/714435259 Email: info@icpac.net Address: P.O. Box 10304, 00100 Nairobi, Kenya
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North Africa	Algeria	Office National De La Meteorologie	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Algeria with WMO Mr Brahim Ihadadene	Telephone + 213 21 50 69 10 Email ihadadene.brahim@gmail.com Address B.P. 477, El-Biar Algiers Algeria ,
North Africa	Egypt	Egyptian Meteorological Authority	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Egypt with WMO, Dr Ahmed Abd el-Aal	Tel: +20226849860 Email: ema.support@ema.gov.eg Address: P.O. Box 11784, Koulbry El-Quobba, Cairo Egypt
North Africa	Libya	Libya National Meteorological Centre	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Libya with WMO (NO NAME)	Tel: +0229598900 Email: mission.libye@bluewin.ch Address: 25 rue de Richemont 1202 Geneva

North Africa	Mauritania	Office National de Météorologie	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Mauritania with WMO, Mr Mohamed Batta Cheikh Mohamed el Mamy	Tel: +22236110123 Email: batta22000@gmail.com Address: Boite Postale 1330 Nouakchott, Mauritania
North Africa	Morocco	Direction de la Météorologie Nationale	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Morocco with WMO, Mr Abdullah Mokssit	Tel: +21222913682 Email: dmn@mtpnet.gov.ma moksst@marocmeteo.ma Address: Direction de la Meteorologie Nationale, B P 8106 Casablanca, Morocco
North Africa	Sudan	Sudan Meteorological Authority	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Sudan with WMO, Dr Ahmed Mohamed Abdelkarim	Tel: +249 183 771 693 Email: info@ersad.gov.sd Address: P.O. Box 574 Khartoum Sudan

North Africa	Tunisia	National Institute of Meteorology	Climate monitoring, Prediction and research	Climate data availability and generation of climate products	Permanent Representative of Tunisia with WMO, Mr Abdelwaheb Nmiri	Tel: +216 71 773 400 Email: nmiri@meteo.tn Address: Rue Mohamed Ali Akid, B.P. 156, Changula, Tunis-Carthage, Tunisia
Small Island State	Comoros	Direction de la Météorologique Nationale	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Comoros with WMO, Mr Farid Hassane	Tel: +2693340300 Email: faridhasane@yahoo.fr Address: BP 78 Moroni, Comoros
Small Island State	Madagascar	Direction Générale de la Météorologique	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Madagascar with WMO, Ms Soarijaona S Rahariveloarimiza	Tel: +2613405560 Email: s.rahariveloarimiza@gmail.com Address: Boite postale 1254 Antananarivo, Madagascar

Small Island State	Mauritius	Mauritius Meteorological Services	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Mauritius with WMO, Mr Rajan Mungra	Tel: +2306861031 Email: meteo@intnet.mu Address: St Paul Road Vacoas, Mauritius
Small Island State	Sao Tome e Principe	Institut National de Meteorologie	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Sao Tome e Principe with WMO, Mr Joao Vicente Vaz Lima	Tel: +239 1222686 Address: BP 30 Sao Tome, Sao Tome e Principe
Small Island State	Seychelles	National Meteorological Services	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Seychelles with WMO, Mr Wills Auricle	Tel: +2484384352 Email: w.agricole@env.gov.sc Address: Department of Environment and Energy, Mahe, Seychelles

Southern Africa	Angola	Instituto Nacional de Hidrometeorologia e Geofisica	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Angola with WMO, Mr Domingos Jose Do Nascimento	Instituto Nacional de Hidrometeorologia de Angola P.O. Box 1228C Luanda Rep. de angola
Southern Africa	Botswana	Department of Meteorological Services	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of WMO with WMO, Mr Thabang Leslie Botshoma	Plot 54216, Corner Maaloso - Metsimotlhabe Road, P.O. Box 10100, Gaborone, Botswana Tel: +267 3612200 Fax: +267 3956282 Email: meteo@gov.bw
Southern Africa	Lesotho	Lesotho Meteorological Services	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Lesotho with WMO, Ms Mabafokeng Felesiah Mahahabisa	Tel: +26622317250 Email: mahahabisa@gmail.com Address: P.O. Box 14515, Maseru 100, Lesotho

Southern Africa	Malawi	Department of Climate Change and Meteorological Services	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Malawi with WMO, Mr Jolamu L Nkhokwe	Tel: +2651822014 Email: jnk-hokwe@metmalawi.com Address: P. O. Box 1808 MWI, Blantyre Malawi
Southern Africa	Mozambique	Instituto Nacional de Meteorologia	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Mozambique with WMO, Mrs Candida Ines Sete Nhapule	Telephone: +25821493193, Email: ?? Address: Rua de Mukumbura 164, Maputo, Mozambique.
Southern Africa	Namibia	Meteorological Service	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Namibia with WMO, Mr Franz Uirab	Tel: +264612877001 Email: fuirab@metona.com Address: Private Bag 13224 Windhoek, Namibia

Southern Africa	South Africa	South African Weather Service	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of South Africa with WMO, Dr Linda Makuleni (Ms)	Tel: +(012) 367 6000 Email: linda.makuleni@weathersa.co.za Address: 442 Rigel Avenue South, Erasmusrand 0181, Private Bag X097, Pretoria 0001, South Africa
Southern Africa	Swaziland	Swaziland Meteorological Service	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Swaziland with WMO, Ms Duduzile Nhelegetwa-Masina	Tel: +268 2404 8859 Email: dudu@swazimet.gov.sz Address: Ministry of Tourism and Environmental Affairs, P.O. Box 2652 Mbabane, Swaziland

Southern Africa	Zambia	Zambia Meteorological Department	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Zambia with WMO, Mr Jacob Nkomoki	Tel: +260 977 8831 89 Email: jnkomoki@gmail.com Address: P. O. Box 30200 Lusaka, Zambia
Southern Africa	Zimbabwe	Zimbabwe Meteorological Services Department	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Zimbabwe with WMO, Dr Amos Makarau	Tel: +263 4 77 82 09 Email: makaraua@gmail.com Address: Cnr Hudson & Bishop Gaul Avenue, P. O. Box BE 150 Belvedere, Harare, Zimbabwe

Southern Africa	Botswana	SADC CSC	Climate monitoring, prediction and research	Climate data availability and generation of climate products	<p>Coordinator, Dr Bradwell Garanganga.</p> <p>SADC CSC monitors and predicts seasonal weather on behalf of the 15 member countries of SADC. The centre develops and disseminates meteorological, environmental and hydrometeorological products, which contribute to improve disaster risk management at national and regional levels</p>	<p>Email: bgaranganga@sadc.int Address: SADC CSC, Private Bag 0095 Gaborone, Botswana</p>
West Africa	Benin	Service Météorologique National	Climate monitoring, prediction and research	Climate data availability and generation of climate products	<p>Permanent Representative of Benin with WMO, Mr Marcelin Kokou Nakpon</p>	<p>Tel: +22995969985 Email: nakponmarcelin@yahoo.fr Address: BP 379 Cotonou, Benin</p>

West Africa	Burkina Faso	Direction de la Météorologie	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Burkina Faso with WMO, Mr Kouka Ernest Ouedraogo	Mr Kouka Ernest Ouedraogo Directeur Général 01 B.P. 576 Ouagadougou 01 Telephone: + 226 75 40 00 11 Fax: + 226 25 35 60 39 E-mail: ernest_ok@yahoo.com
West Africa	Cabo Verde	Instituto Nacional de Meteorologia e Geophysica	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Cabo Verde with WMO, Ms Ester Araujo De Brito	Tel: +238 2 411 276 Email: ester.brito@inmg.gov.cv Address: Espargos, C. P. No 76 Ilhu do Sai Cabo Verde
West Africa	Cameroon. Yaounde	Direction de la Meteorologie Nationale	Climate monitoring, Prediction and research	Climate data availability and generation of climate products	Permanent Representative of Cameroon with WMO, Mr Richard Philippe.	Telephone: +237 945 48 173 Email: bangawa2001@yahoo.fr Address: Ministry of Transport, Yaounde Cameroon

West Africa	Côte d'Ivoire	Direction de la Météorologique Nationale	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Côte d'Ivoire with WMO, Mr Domingos Jose Do Nascimento	Tel: +22521277163 Email: directeur.dmn@so-dexam.ci Address: 15 BP 990 Abidjan 15 Côte d'Ivoire
West Africa	Gambia	Department of Water Resources	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of The Gambia with WMO, Mr Lamin Mai Touray	Tel: +2204224122 Email: touraylm@yahoo.co.uk Address:7, Marina Parade, Banjul, Gambia
West Africa	Ghana	Ghana Meteorological Agency	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Ghana with WMO, Mr Stephen Yaokuma Komla	Tel: +23321511980 Email: meteokia@africaonline.com.gh Address: P.O. Box 87, Accra, Legon Accra Ghana

West Africa	Guinea	Direction Nationale de la Météorologique	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Guinea with WMO, Dr Mamadou Lamine Bah	Tel: +23321511980 Email: lamine_bah@yahoo.fr Address: B.P. 566 Conakry, Guinea
West Africa	Guinea-Bissau	Météorologique de Guinea Bissau	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Guinea-Bissau with WMO, Dr Joao Lona Tch-edna	Dr João Lona TCHEDNÁ Directeur Général Instituto Nacional de la Meteorología (INM-GB) SETC, Secrétariat d'État au Transport et Communications Av. du Brazil, Cx.P.75 B.P. 398 (Av. 3 A Bissau, Telephone: + 245 21 25 83 Fax: + 245 20 11 37 E-mail: dgmteobissau@yahoo.fr
West Africa	Liberia	Ministry of Transport	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Liberia with WMO, Mr Arthur Gar-Glahn	Tel: +231221580 Email: agarglahin@gmail.com Address: P.O. Box 9041, Monrovia, Liberia

West Africa	Mali	Direction Nationale de la Météorologie du Mali	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Mali with WMO, Mr Djibrilla Ariaboncana	Tel: +223292101 Email: dnm@mali-net.ml Address: Boite Postale 237 Bamako, Mali
West Africa	Niger	Directeur de la Meteorologie Nationale Service meteorologique	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Niger with WMO, Mr Labo Moussa	Tel: +22720732160 Email: dmn@int-net.ne Address: 25 rue de Richemont 1202 Geneva, Switzerland

West Africa	Nigeria	Nigerian Meteorological Agency	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Nigeria with WMO, Dr A.C. Anuforum	Tel: +234092916240 Email: a.anuforum@nimet.gov.ng Address: Bill Clinton Drive, Nnamdi Azikiwe International Airport Abuja, Nigeria
West Africa	Senegal	Direction de la Météorologique Nationale	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Senegal with WMO, Mr Magueye Maramé Ndao	Tel: +221338656001 Email: magueyemaramen.ndao@anacim.sn Address: Aeroport Leopold Sedar Senghor, Dakar Yoff, Senegal
West Africa	Sierra Leone	Meteorological Department	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Sierra Leone with WMO (no name)	Tel: +23276610494 Email: abzcarew@gmail.com Address: Ministry of Transport and Aviation, Freetown, Sierra Leone

West Africa	Togo	Direction de la Meteorologie Nationale	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Permanent Representative of Togo with WMO, Col. Dokissime Lata	Tel: +228 90181903 Email: meteo_togo@yahoo.fr Address: B.P. 1505 Lome, Togo
West Africa	Niger	AGY-HYMET	Climate monitoring, prediction and research	Climate data availability and generation of climate products	Director, Prof. Marcel Bouafou Kouame Guy. The regional centre is the Permanent Interstate Committee for Drought Control in the Sahel in permanent 13 countries. It informs and train on Sahelian food security, desertification control and water management	Tel: +227 20 31 53 16/20 31 54 36 Email: admin@agryhmet.ne Address: Box 11011 Niamey, Niger

Annex 2: Experts and researchers on African climate science, policy, adaptation, and services

(Available from http://www.meteo.go.tz/african/index_2.php)

PART 1: Mapping experts and researchers/people/universities active on African climate science, policy, adaptation, and services

REGION	COUNTRY	EXPERT	AFFILIATION	AREA OF EXPERTISE/RESEARCH AREA	CONTACT AND/OR HOMEPAGE
A) Extending seasonal prediction lead times					
Eastern Africa	Kenya	Zablon Weku Shilenje	Kenya Meteorological Department	Extending seasonal prediction lead times	zablonweku@meteo.go.ke
Eastern Africa	Kenya	Christopher Oludhe	University of Nairobi	Hydrological applications	coludhe@gmail.com
Eastern Africa	Kenya	Joseph Mutemi	University of Nairobi	Extending seasonal prediction lead times	jnmutemi@yahoo.co.uk

Eastern Africa	Kenya	Zachary Atheru	ICPAC	Extending seasonal prediction lead times	zatheru@icpac.int
Eastern Africa	Kenya	Laban Ogallo	ICPAC	Extending seasonal prediction lead times	laogallo@icpac.int
Eastern Africa	Sudan	Shara-feldein Idris	Sudan Meteorological Authority	Extending seasonal prediction lead times	sharaf@ersad.gov.sd
Eastern Africa	Tanzania	Buruhani Nyenzi	Climate Consult (T) LTD Tanzania	Extending seasonal prediction lead times	bnyenzi@gmail.com
Eastern Africa	Tanzania	Philibert Tibaijuka	Climate Consult (T) LTD Tanzania	Extending seasonal prediction lead times	tibaijukap@yahoo.com
Northern Africa	Morocco	Rachid Sebbari	Direction de la Météorologie Marocaine, Morocco	Extending seasonal prediction lead times	sebbari@gmail.com

Southern Africa	Botswana	Nsadisa Faka	SADC Climate Services Centre	Extending seasonal prediction lead times	fnsadisa@sadc.int
Southern Africa	Botswana	Bradwell Garanganga	SADC Climate Services Centre	Extending seasonal prediction lead times	bgaranganga@sadc.int
Southern Africa	South Africa	Nana Brown	University of Cape Coast, Ghana	Extending seasonal prediction lead times	amabrowne@gmail.com
Southern Africa	South Africa	Willem Landman	CSIR, South Africa	Extending seasonal prediction lead times	WALandman@csir.co.za
Southern Africa	South Africa	Asmerom Beraki	SAWS, South Africa	Extending seasonal prediction lead times	asmerom.beraki@weathersa.co.za

Southern Africa	South Africa	Cobus Olivier	SAWS, South Africa	Extending seasonal prediction lead times	cobus.olivier@weathersa.co.za
Southern Africa	South Africa	Steven Phakula	SAWS, South Africa	Extending seasonal prediction lead times	steven.phakula@weathersa.co.za
Southern Africa	South Africa	Babatunde Abiodun	UCT, South Africa	Extending seasonal prediction lead times	babiodun@csag.uct.ac.za
UNITED NATIONS OE	Switzerland WMO	Joseph Mukabana	WMO, RAI Office Kenya	Numerical weather prediction and development of NMHSs in Africa	jmukabana@wmo.int www.wmo.int

Western Africa	Niger	Adrea Kanga	ACMAD	Extending seasonal prediction lead times	http://www.acmad.net/
Western Africa	Niger	Diallo	ACMAD	Extending seasonal prediction lead times	http://www.acmad.net/

Western Africa	Senegal	Cheikh Mbow	ICRAF, Université Cheikh Anta Diop de Dakar, Dakar, Sénégal	Carbon sequestration, vegetation cover monitoring, identification of ecosystem-based adaptation options	cheikh1.mbow@ucad.edu.sn
B) Robust climate change projections					
Eastern Africa	Kenya	Emily Massawa	USAID-East Africa PREPARED Project	Robust climate change projections	Emily.Massawa@ea-prepared.org
Eastern Africa	Kenya	Richard Odingo	University of Nairobi	Robust climate change projections	odingoo@yahoo.com

Eastern Africa	Tanzania	Buruhani Nyenzi	ClimateConsult LTD Tanzania (T)	Robust projections for CC impacts on coastal zones	bnyenzi@gmail.com
Eastern Africa	Tanzania	Faustin Tilya	ClimateConsult LTD Tanzania (T)	Robust climate change projections	ftilya56@hotmail.com
Southern Africa	Zambia	Suman Jain	University of Zambia	Robust climate change projections	
Southern Africa	Mozambique	Genito Maure / Alberto Mavume	University Eduardo Mondlane (Mozambique)	Robust climate change projections	
Southern Africa	South Africa	Mark Tadross	UCT, South Africa	Robust climate change projections	mtadross@csag.uct.ac.za

Southern Africa	South Africa	Mxolisi Shongwe	CSC/SAWS, South Africa	Robust climate change projections	me_shongwe@yahoo.com , Mxolisi.Shongwe@weathersa.co.za
Southern Africa	South Africa	Emma Archer	CSIR, South Africa	Robust climate change projections	EArcher@csir.co.za
Southern Africa	South Africa	Thando Ndarana	SAWS, South Africa	Robust climate change projections	Thando.Ndarana@weathersa.co.za
Southern Africa	South Africa	Bruce Hewitson	UCT, South Africa	Striving for robust CC projections over Africa	hewitson@csag.uct.ac.za
Southern Africa	South Africa	Glwadys Aymone Gbetibouo	C4 Ecosolutions, South Africa	Robust projections for CC impacts on coastal zones	glwadys.gbetibouo@c4es.co.za

Southern Africa	South Africa	Lucky Ntsangwane	SAWS, South Africa	Robust projections for CC impacts on coastal zones	<u>lucky.ntsangwane@weathersa.co.za</u>
Southern Africa	South Africa	Ernst Brunke	SAWS, South Africa	Robust projections for CC impacts on coastal zones	<u>ernst.brunke@weathersa.co.za</u>
Southern Africa	South Africa	Bhahwoodien Parker	SAWS, South Africa	Robust projections for CC impacts on coastal zones	<u>bhahwoodien.parker@weathersa.co.za</u>
Southern Africa	South Africa	Thumeka Mkololo	SAWS, South Africa	Robust projections for CC impacts on coastal zones	<u>thumeka.mkololo@weathersa.co.za</u>

West Africa	Senegal	Isabelle Niang	UCAD, Senegal	Robust projections for CC impacts on coastal zones	isabelleniang@yahoo.fr
West Africa	Benin	Michel Boko	Université d'Abomey-Calavi-Bénin	Robust projections for CC impacts on coastal zones	bokomichel@gmail.com
C) Public education, communication and outreach					
Southern Africa	Botswana	Mable Bolele	Independent Consultant	Communication of climate information and impacts of climate variability and change	mbbolele@gmail.com
Eastern Africa	Kenya	Stephen King'uyu	Kenya Meteorological Department	Public education and outreach	King_yyu@yahoo.com

Eastern Africa	Kenya	Anastasia Kagunyu	Kenya Agricultural Research Institute	Public education and outreach	anakaguash@yahoo.com
Eastern Africa	Tanzania	Sarah Osima	Tanzania Meteorological Agency	Public education and outreach	sarah.osima@gmail.com
Eastern Africa	Uganda	Patrick Luganda	Independent consultant	Communication expert on climaterelated issues	
North Africa	Morocco	Fatima Driouech	Direction de la Météorologie Marocaine, Morocco	Public education and outreach	driouechfatima@yahoo.fr
Southern Africa	Malawi	Adams Chavula	Department of Climate Change and Meteorological Services, Malawi	Agrometeorology and climate change	adams.chavula@hotmail.com

Southern Africa	South Africa	Izidine Pinto	UCT, South Africa	Improving climate applications in water resources	izidinep@csag.uct.ac.za
West Africa	Nigeria	Olusegun Adeaga	University of Lagos, Nigeria	Public education and outreach	oadeaga@unilag.edu.ng
West Africa	Nigeria	Marvel Akinyemi	Covenant University, Ota, Nigeria	Agrometeorology and climate change	makinyemi@covenantuniversity.com
D) Understanding drivers of climate variability and adaptation to impacts, particularly at seasonal timescales and uncovering source of climate model errors					
Eastern Africa	Kenya	Laban Ogallo	ICPAC	Understanding drivers of climate variability and adaptation to impacts, particularly at seasonal timescales	laogallo@icpac.net

Eastern Africa	Tanzania	Agnes Kijazi	Tanzania Meteorological Agency	Understanding drivers of climate variability and adaptation to impacts, particularly at seasonal timescales	kijazi@meteo.go.tz
Eastern Africa	Kenya	Anastasia Kagunyu	Kenya Agricultural Research Institute	Understanding drivers of climate variability and adaptation to impacts, particularly at seasonal timescales	anakaguash@yahoo.com
Eastern Africa	Tanzania	Shadrack Mwakalila	University of Dar es Salaam	Assessment of climate variability and climate change impacts and adaptation limitations	
Eastern Africa	Tanzania,	Ladislaus Benedict Chan'ga	Tanzania Meteorological Agency	Understanding drivers of climate variability and adaptation to impacts, particularly at seasonal timescales	changa@meteo.go.tz , changa60@hotmail.com

Southern Africa	South Africa	Sepo Hachignota	SAWS, South Africa	Understanding drivers of climate variability and adaptation to impacts, particularly at seasonal timescales	sepo31@gmail.com
Southern Africa	Botswana	Opha Pauline Dube	Department of Environmental Science, University of Botswana, Private Bag 0022, Gaborone, Botswana. Phone +267 355 2513;	Understanding drivers of climate variability and adaptation to impacts, particularly at seasonal timescales	Email: dubeop@mopipi.ub.bw / dubemop@yahoo.com
Southern Africa	South Africa	Marshal Mdoka	UCT, South Africa	Understanding drivers of climate variability and adaptation to impacts, particularly at seasonal timescales	mmdoka@csag.uct.ac.za
Southern Africa	South Africa	Katlego Ncongwane	SAWS, South Africa	Understanding drivers of climate variability and adaptation to impacts, particularly at seasonal timescales	katlego.ncongwane@weathersa.co.za

Southern Africa	South Africa	Ernst Brunke	SAWS, South Africa	Understanding drivers of climate variability and adaptation to impacts, particularly at seasonal timescales	ernst.brunke@weathersa.co.za
Southern Africa	South Africa	Bhahwoodien Parker	SAWS, South Africa	Understanding drivers of climate variability and adaptation to impacts, particularly at seasonal timescales	bhahwoodien.parker@weathersa.co.za
Southern Africa	South Africa	Thumeka Mkololo	SAWS, South Africa	Understanding drivers of climate variability and adaptation to impacts, particularly at seasonal timescales	thumeka.mkololo@weathersa.co.za
Southern Africa	South Africa	Francois, Engelbrecht	CSIR, South Africa	Understanding drivers of climate variability and adaptation to impacts, particularly at seasonal timescales	fengelbrecht@csir.co.za

Southern Africa	South Africa	Mary-Jane Kgatuke	CSIR, South Africa	Understanding drivers of climate variability and adaptation to impacts, particularly at seasonal timescales	mkgatuke@csir.co.za
Southern Africa	South Africa	Chris Lennard	UCT, South Africa	Understanding drivers of climate variability and adaptation to impacts, particularly at seasonal timescales	lennard@csag.uct.ac.za
Southern Africa	South Africa	Babatunde Abiodun	UCT, South Africa	Understanding drivers of climate variability and adaptation to impacts, particularly at seasonal timescales	babiodun@csag.uct.ac.za
Western Africa	Niger	Benjamin Lamphy	ACDMAD	Understanding drivers of climate variability and adaptation to impacts, particularly at seasonal timescales	http://www.acmad.net/

Western Africa	Burkina Faso	Pascal Yaka	Burkina	Improving Meningitis prediction & changes with CC	<u>pascal_yaka@yahoo.fr</u>
Western Africa	Nigeria	Kamoru Abiodun Lawal	Nigerian Meteorological Agency/CSAG	Improving meningitis prediction and changes with CC	<u>lawal@csag.uct.ac.za</u>
Western Africa	Nigeria	Eniola Olaniyan	Nigerian Meteorological Agency/Federal University of Technology, Akura	Improving meningitis prediction and changes with CC	<u>Olaniyan.eniola67@gmail.com</u>

Western Africa	Nigeria	Mosun-mola Abiodun Idumu	Nigeria Meteorological Agency	Improving meningitis prediction and changes with CC	mosskayy@yahoo.co.uk
E) Attribution of Extremes					
Southern Africa	South Africa	Noureddine Gaaloul	Institution of Agricultural Research and Higher Education	Understanding drivers of climate variability, particularly at seasonal timescales	gaaloul.noureddine@iresa.agrinet.tn
Southern Africa	South Africa	Cobus Olivier	SAWS, South Africa	Understanding drivers of climate variability, particularly at seasonal timescales	cobus.olivier@weathersa.co.za

Western Africa	Nigeria	Marvel Akinyemi	Covenant University, Nigeria	Understanding drivers of climate variability, particularly at seasonal timescales	makinyemi@covenantuniversity.com
Western Africa	Nigeria	Ernest Afiesimama	AMMA/Nigerian Meteorological Agency	Understanding drivers of climate variability and adaptation to impacts, particularly at seasonal timescale	
Western Africa	Nigeria	Olusegun Adeaga	University of Lagos, Nigeria	Understanding drivers of climate variability and adaptation to impacts, particularly at seasonal timescales	oadeaga@unilag.edu.ng

Western Africa	Nigeria	Kamoru Abiodun Lawal	Nigerian Meteorological Agency/CSAG	Improving meningitis prediction & changes with climate change	<u>lawal@csag.uct.ac.za</u>
Western Africa	Nigeria	Eniola Olaniyan	Nigerian Meteorological Agency/Federal University of Technology, Akure	Improving meningitis prediction & changes with climate change	<u>Olaniyan.eniola67@gmail.com</u>
Western Africa	Nigeria	Mosunmola Abiodun Idumu	Nigerian Meteorological Agency	Improving Meningitis prediction & changes with climate change	<u>mosskayy@yahoo.co.uk</u>

Western Africa	Botswana	Akintayo Adedoyin	University of Botswana	Improving meningitis prediction & changes with CC	adedoyin@mopipi.ub.bw
Western Africa		Franklin opijah	THORPEX-Africa Numerical weather prediction	Impacts of extreme weather	
Netherlands	All countries	Maarten Van Aalst	Red Cross/Red Crescent Climate Centre	Attributing extremes in Africa	vanaalst@climatecentre.org

F) Onset, cessation, intraseasonal statistics

Southern Africa	Botswana	Akintayo Adedoyin	University of Botswana	Onset/cessation frontier research	adedoyin@mopipi.ub.bw
Western Africa	Senegal	Ousmane Ndiaye	Senegal Met office	Onset/cessation frontier research	ousmanen@yahoo.com
Western Africa	Cameroon	Andre Lenouo	University of Douala, Cameroon	Onset/cessation frontier research	lenouo@yahoo.fr
Western Africa	Nigeria	Olumide Arike Olaniyan	Nigerian Meteorological Agency/Federal University of Technology, Akure	Onset/cessation frontier research	Olaniyan_olu@yahoo.co.uk

Eastern Africa	Uganda	Geoffrey Sabiiti	Department of Geography, Geoinformatics & Climatic Sciences. P.O. Box 7062, Kampala, Uganda Tel: +256 414 531 261	Assessing the drivers of current climate variability and future climate change, and how the climate extremes associated with variability and change impact society	g.sabiti@caes.mak.ac.ug geog@caes.mak.ac.ug
G) Outreach: Bridging the gap between science and adaptation decision-making: identification of user needs, user-driven research					
Eastern Africa	Kenya	Alice Odingo	University of Nairobi	Application of climate information and impacts of climate change on gender issues	aaodingo@yahoo.com

Eastern Africa	Kenya	Maria Onyango	Jaramongi Oginga Ondinga University	Application of climate information and impacts of climate change in gender and through involving indigenous knowledge	http://www.jooust.ac.ke/downloads/Dr.%20Maria%20Onyango.pdf
Western Africa	Senegal	Arame Tall	Red Cross Red Crescent Climate Centre, Dakar / Johns Hopkins, Washington	Innovating methods to communicate climate science to final end-users, identification of user needs towards user-driven climate research	arametall@gmail.com

Southern Africa	South Africa	Gina Ziervogel	UCT, South Africa	Innovating methods to communicate climate science to final end-users, identification of user needs towards user-driven climate research	gina@csag.uct.ac.za
<p>PART 2: Addressing climate change issues related to UNFCCC activities</p>					
REGION	COUNTRY	EXPERT	AFFILIATION	AREA OF EXPERT-IZE/RESEARCH AREA	CONTACT AND/OR HOME-PAGE

Northern Africa	Algeria	Ms Ghalia Benziouche, diplomatic counsellor	Ministry of Foreign Affairs	Addressing activities related to limiting greenhouse gas emissions (mitigation) and also measures of adaptation to climate Variability and change	Address: 6 Promontoire des Annaser Kouba; Tel: (213) 5 57 54 4807; Email: ghalia.benziouche@gmail.com
Southern Africa	Angola	Ms Carla Esperance N. P. Da Silva UNFCCC National focal point	Ministry of Environment	Addressing activities related to limiting greenhouse gas emissions (mitigation) and also measures of adaptation to climate variability and change	Address: Rua dos Enganos, N5, 4 Andar Luanda, Angola; Tel: (244-2) 2201 0755; Email: carla.silva.pomillio@gmail.com
Western Africa	Benin	Mr Ibila Djibril, Director General des Changements Climatiques	Ministère du Cadre de Vie et du Development Durable	Addressing activities related to limiting greenhouse gas emissions (mitigation) and also measures of adaptation to climate variability and change	Address: 01 BP 3621 Cotonou, Benin; Telephone: (229) 2131-5596; Email: idjibril@yahoo.fr

Southern Africa	Botswana	Mr Thabang Lesile Botshoma, director	Ministry of Environment, Wildlife and Tourism	Addressing activities related to limiting greenhouse gas emissions (mitigation) and also measures of adaptation to climate variability and change	Address: P. O. Box 10100 Gaborone; Tel: (267) 361 2306; Email: tbotshoma@gov.bw
Western Africa	Burkina Faso	Mr Idrissa Semde, UNFCCC National Focal Point		Addressing activities related to limiting greenhouse gas emissions (mitigation) and also measures of adaptation to climate variability and change	Address: BP 6486 Ouagadougou; Tel: (226) 5031-2464; Email: spconedd@fasonet.bf , idsemde@yahoo.fr
Eastern Africa	Burundi	Ms Renilde Ndayishimiye, director general,	Institut Géographique du Burundi (IGEBU)	Addressing activities related to limiting greenhouse gas emissions (mitigation) and also measures of adaptation to climate variability and change	Address: B.P. 331 Bujumbura, Burundi; Tel: (257)22-4979/22-6718; Email: igebu@cbinf.com , renildend@gmail.com

Western Africa	Cabo Verde	Mr Carlos Alberto Tavares Moniz, UNFCCC national focal point,	National Institute of Meteorology and Geophysics	Addressing activities related to limiting greenhouse gas emissions (mitigation) and also measures of adaptation to climate variability and change	Address: B.O. 67 Esparagos, Liha do Sal, Cabo Verde; Tel: (213)241 1276; Email: camoniz@yahoo.co.br
Western Africa	Cameroon	Mr Valentin Wagnon Tchonkap, Inspecteur,	Ministere de l'Environnement	Addressing activities related to limiting greenhouse gas emissions (mitigation) and also measures of adaptation to climate variability and change	Address: Immeable Ministerial No 2 boulevard du 20 mai, Yaounde, Cameroun; Tel: (237) 222 9229; Email: valiwa1@yahoo.fr
Central Africa	Central African Republic	Mr Igor Gildas Tola Kogadou, Coordonateur de la REDD+	Ministere del L19 Environnement, du Developement Durable, des Eaux, Forets, chase et peche	Addressing activities related to limiting greenhouse gas emissions (mitigation) and also measures of adaptation to climate variability and change	Address: Rue Ambassadeur R. Guerrillot, BP 686 Bangui, CAR; Tel: (236) 7555 8222; Email: climatrca@gmail.com , gildastolakogadou@yahoo.fr

Northern Africa	Chad	Mr Hamid Abakar Souleymane, director of meteorology	Department of Meteorology	Addressing activities related to limiting greenhouse gas emissions (mitigation) and also measures of adaptation to climate variability and change	Address: PB: 429 N'Djamena; Tel: (235) 6200 0047; Email: haidzakaria1983@gmail.com, chogara11@yahoo.fr
Small Island State	Comoros	Mr Chekidine Said Madi	Ministere de la production et de l'Environnement	Addressing activities related to limiting greenhouse gas emissions (mitigation) and also measures of adaptation to climate variability and change	Address: BP 41 Moroni; Tel: (269) 7750000; Email: secretariat.dgfe@gmail.com, chekidine_said@yahoo.fr

Central Africa	Republic of Congo	Mr Marcel Pambou Tchiloemba, National Focal Point		Addressing activities related to limiting greenhouse gas emissions (mitigation) and also measures of adaptation to climate variability and change	Address: B.P.958, Brazzaville, Republic of Congo; Tel: (24-2) 678-1381; Email: marcel.pambou@yahoo.fr, marco.pambou@gmail.com
Western Africa	Côte d'Ivoire	Mr Agre Mathieu Richemond Assle, UN-FCCC national focal point,	Ministere de l'Environnement	Addressing activities related to limiting greenhouse gas emissions (mitigation) and also measures of adaptation to climate variability and change	Address: 20BPV 650 Abidjan 20; Tel: (225) 08392065; Email: r.assie@environnement.gouv.ci, riche-assie@gmail.com

<p>Central Africa</p>	<p>Democratic Republic of the Congo</p>	<p>Mr Aime Mbuyi Kalombo, Chef de</p>	<p>Division des Changements Climatiques, Ministère de l'Environnement</p>	<p>Addressing activities related to limiting greenhouse gas emissions (mitigation) and also measures of adaptation to climate variability and change</p>	<p>Address: 15 Avenue Papa ILEO, Commune de la Gombe Kinshasa, DRC; Tel: (243-81) 982-4410 Email: mbuyikalombo@gmail.com</p>
<p>Eastern Africa</p>	<p>Djibouti</p>	<p>H.E Mr Mohamed Moussa Ibrahim, minister</p>	<p>Ministere de l'Urbanisme et de l'Environnement</p>	<p>Addressing activities related to limiting greenhouse gas emissions (mitigation) and also measures of adaptation to climate variability and change</p>	<p>Address: Boulaos; Telephone: (253) 35-1618; Email: balala_ingeieur@hotmail.fr, dini.omar12@gmail.com</p>

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Eastern Africa	Ethiopia	H.E. Mr Shiferaw Te- lelemariam Menbacho, Minister,	Ministry of Environ- ment, Forestry and Climate Change	Addressing activities related to limiting greenhouse gas emis- sions (mitigation) and also measures of adap- tation to climate variability and change	Address: Addis Ababa, Ethiopia; Telephone: (251) 11558 0552; Email: esid@ethionet.et , <a href="mailto:mefc.ethio-
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PART 3: Climate change assessments on science, vulnerability/adaptation and mitigation options related to IPCC activities

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				mitigating climate change	
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Western Africa	Cameroon	Temothée Kagonbe	Ministère de l'Environnement, de la Protection de la Nature et du développement durable Delegué Régional du Centre	Contributes to the assessment of the physical scientific aspects of climate system and climate change, vulnerability of social economic and natural systems of climate change, and assessment of options for mitigating climate change	Address: Ministère de l'Environnement, de la Protection de la Nature et du développement durable Delegué Régional du Centre, B.P. 320 Tel: +237 77 44 27 31/99 87 5590 Email: kagonbet@yahoo.fr
Western Africa	Côte d'Ivoire	DJE Kouakou Bernard	SODEXAM - Direction de la Météorologie Nationale	Contributes to the assessment of the physical scientific aspects of climate system and climate change, vulnerability of social economic and natural systems of climate change, and assessment of options for mitigating climate change	Address: SODEXAM - Direction de la Météorologie Nationale , 15 BP 990 Tel: +225 2158 2001 Email: dkouakou_b@yahoo.fr

Western Africa	Gambia	Lamin Mai Touray	Department of Water Resources	Contributes to the assessment of the physical scientific aspects of climate system and climate change, vulnerability of social economic and natural systems of climate change, and assessment of options for mitigating climate change	Address: Department of Water Resources, 7 Marina Parade, Banjul, The Gambia; Tel: +220 422 4122 Email: touraylm@yahoo.co.uk
Western Africa	Ghana	Daniel Tutu Benefoh	Environmental Protection Agency Climate Change Unit	Contributes to the assessment of the physical scientific aspects of climate system and climate change, vulnerability of social economic and natural systems of climate change, and assessment of options for mitigating climate change	Address: Environmental Protection Agency Climate Change Unit , 91 Starlets Street, P.O. Box M326 Tel: + 302-664-697 / 246 114 652 Email: dbenefor2000@gmail.com

Western Africa	Guinea	Yaya Bangoura	Direction Nationale de la Météorologie	Contributes to the assessment of the physical scientific aspects of climate system and climate change, vulnerability of social economic and natural systems of climate change, and assessment of options for mitigating climate change	Address: Direction Nationale de la Météorologie, Face Jardin 2 Octobre B.P. 566 Tel: +22464564191/68457020 Email: alphayaya2009@yahoo.fr
Western Africa	Guinea-Bissau	João Lona Tchédná	National Institut of Meteorology of Guinea-Bissau	Contributes to the assessment of the physical scientific aspects of climate system and climate change, vulnerability of social economic and natural systems of climate change, and assessment of options for mitigating climate change	Address: National Institut of Meteorology of Guinea-Bissau, Avenida do Brasil Cx. P. No.75 Tel: + 245 574 84 90 Email: dgmteobissau@yahoo.fr

Western Africa	Liberia	Mr. Arthur Gar-Glahn	Ministry of Transport	Contributes to the assessment of the physical scientific aspects of climate system and climate change, vulnerability of social economic and natural systems of climate change, and assessment of options for mitigating climate change	Address: Ministry of Transport, P.O. Box 904, Monrovia, Liberia; Tel: +231221580 Email: Agarglahn98@gmail.com
Western Africa	Mauritania	Mohamed-Yahya Lafdal	Ministere de l'Environnement et du Developpement Durable	Contributes to the assessment of the physical scientific aspects of climate system and climate change, vulnerability of social economic and natural systems of climate change, and assessment of options for mitigating climate change	Address: Directeur de la Programmation, de la Coordination et de l'Information Environnementale, Ministere de l'Environnement et du Developpement Durable Tel: +222 46 00 8686 Email: lafdal@environnement.gov.mr

Western Africa	Niger	Moussa Labo	Direction de la Météorologie nationale	Contributes to the assessment of the physical scientific aspects of climate system and climate change, vulnerability of social economic and natural systems of climate change, and assessment of options for mitigating climate change	Address: Direction de la Météorologie nationale B.P. 218 Niamey, Niger; Tel: 227 20 73 21 60 Email: dmn@intnet.ne
Western Africa	Nigeria	The Head, Special Climate Change Unit	Special Climate Change Unit, Federal Ministry of Environment	Contributes to the assessment of the physical scientific aspects of climate system and climate change, vulnerability of social economic and natural systems of climate change, and assessment of options for mitigating climate change	Address: Special Climate Change Unit, Federal Ministry of Environment Tel: +234 8036460880 Email: jareadejuwon@yahoo.com

Western Africa	Senegal	Cherif Diop	Agence Nationale de la Meteorologie	Contributes to the assessment of the physical scientific aspects of climate system and climate change, vulnerability of social economic and natural systems of climate change, and assessment of options for mitigating climate change	Address: Agence Nationale de la Meteorologie, B.P. 8217 Tel: +221 635 4065 Email: cherifdiop@yahoo.fr
Western Africa	Togo	Kokou Sabi	Faculté des Sciences, Université de Lomé	Contributes to the assessment of the physical scientific aspects of climate system and climate change, vulnerability of social economic and natural systems of climate change, and assessment of options for mitigating climate change	Address: Faculté des Sciences, Université de Lomé, B.P. 1515 Lomé Tel: + 228 22363901 – 9001 Email: sabikokou@yahoo.fr

Annex 3

Climate research, applications, policy, adaptation and related initiatives in Africa

(Available from http://www.meteo.go.tz/african/index_3.php)

Part 1: Mapping country activities on climate research, applications, policy, adaptation, and related initiatives in Capacity-building/development programmes; impacts, vulnerability and adaptation projects/programme development; support on Policy for sustainable development; gender climate-related activities and application of climate information.						
REGION	COUNTRY	TYPE OF INITIATIVE (I.e Policy related, adaptation, capacity-building, private, public)	SPONSOR	IMPLEMENTING INSTITUTION, AGENCY, NGO, ETC	INITIATIVE'S WEBSITE/ PORTAL LINK	EMAIL CONTACT
Central Africa						
Central Africa	Central African Republic	Combating the effects of climate change on agricultural production and food security	UNDP	Coordinator de la REDD+, Ministere del L19 Environnement du Development Durable, des Eaux, Forets, chase et pêche		Email: cli-matrca@gmail.com

Central Africa	Congo	Building adaptive capacity and resilience of women and children in the Democratic Republic of the Congo to adopt and adapt livelihood strategies in innovative ways based on current and future climate changes scenarios	UNDP	Ministry of Environment, Conservation of Nature and Tourism through its Directorate for Sustainable Development	http://adaptation-undp.org/	http://adaptation-undp.org/
Central Africa	Democratic Republic of Congo	Reducing carbon emissions and enhancing forest carbon stocks 2012 to 2017	European Union	Congolese Institute for Nature Conservation, Centre for International Forestry Research	http://www.gcca.eu/	Email: mbuyi.kalombo@gail.com
Central Africa	Gabon	Creation of a "Climate Council" to systematically integrate climate issues into the national development plan in 2012	Gabon, United Kingdom, and United States of America	Secrétaire Permanent du Conseil National Climat President de la République	www.en.legabon.org	conseclimatdugabon@yahoo.fr
Eastern Africa						

Eastern Africa	Burundi	Enhancing climate risk management and adaptation in Burundi (African Development Bank	Director General, Institut Géographique du Burundi (IGEBU)	www.thegef.org	Email: igebu@cbinf.com
Eastern Africa	Djibouti	Diversify and promote climate resilient agropastoral practices in rural Djibouti	UNDP	Ministere de l'Urbanisme et de l'Environnement	www.adaptation-undp.org/	balala_ingeieur@hotmail.fr
Eastern Africa	Eritrea	Developed Anseba project to increase community resilience and adaptive capacity to climate change through integrated water management and agricultural development	UNDP	Ministry of Land, Water and Environment	www.tesfanews.net	tesfaigs@gmail.com
Eastern Africa	Ethiopia	Developed a strategy to build climate-resilient green economy	UNDP	Ministry of Environment, Forestry and Climate Change	www.undp.org	mefc.ethiopia@gmail.com

Eastern Africa	Kenya	Ministry of Environment, Water and Natural Resources	UNDP	Ministry of Environment, Water and Natural Resources	www.theguardian.com	juwangwakh@yahoo.com
East Africa	Rwanda	Project for reducing vulnerability to climate change by establishing early warning and disaster preparedness systems and support for integrated watershed in flood prone areas 2010-2014	GEF through UNDP and UNEP	Rwanda Environment Management Authority (REMA)	www.rema.gov.rw/	Email: mutalrho@hotmail.com
East Africa	Somalia	Enhancing climate resilience of the vulnerable communities and ecosystems in 2014	UNDP	Project Manager, Environment and Energy	www.adaptation.org	Email in Mogadishu and Nairobi: abdulqadir@undp.org
East Africa	Tanzania	Strengthening climate information and early warning systems for climate resilient development and adaptation	IUCN, GEF and UNDP	Division of Environment of the Vice President's Office	www.adaptation-undp.org	tanzania37@gmail.com

East Africa	Uganda	Developed National Climate Change Policy and Implementation Strategy in 2012/13	through UNDP	Ministry of Water and Environment	www4.unfccc.int/	mwe.gov.ug
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Northern Africa						
Northern Africa	Chad	Adapting to climate change in the Lake Chad Basin 2013-2018	German Federal Ministry for Economic Cooperation and Development	Lake Chad Basin Commission	www.giz.de	
Northern Africa	Egypt	Egypt's National Strategy for Adaptation to Climate Change and Disaster Risk Reduction	UNDP	Egyptian Environmental Affairs Agency	cairoclimatetalks.net/	heshae-issa.ccu@yahoo.com
Northern Africa	Libya	Strengthening capacities for climate risk management and climate change adaptation in the agriculture through a numerous initiatives and Programs by 2016	UNCSD Rio+20 Focal Point on Managing Climate in Libya	Government of Libya	iieng.org/images/proceedings_pdf/	char-gawi@gmail.com
Northern Africa	Morocco	Community adaptation programme seeking to preserve biodiversity and prevention of land degradation	UNDP	Secretariat General du Ministere délégué charge de l'Environnement	www.adaptation-undp.org/	sg@environnement.gov.ma

Northern Africa	South Sudan	NAPA prepared in 2014	UNDP and GEF through LDCF	Ministry of Environment	www.api.commissiomer.nl	johna_manyok@yahoo.com
Northern Africa	Sudan	Building Resilience in Agriculture and Water Sectors in Sudan	Canada and GEF through UNDP	Higher Council for Environment and Natural Resources of Sudan	www.adaptation-undp.org	mutasim2002@yahoo.com
Northern Africa	Tunisia	Climate Resilient Coastal Zone Development launched in 2010	Japan through UNDP	Ministry of Environment and Sustainable Development	www.arabclimateinitiative.org	dgegv@mineat.gov.tn
Northern Africa	Algeria	Algeria Second National Communication, 2010	UNDP	Ministry of Physical Planning Environment and Tourism	www.adaptation-undp.org/	Mr. Kamel Djemouai kdjemouai@yahoo.fr
Northern Africa	Algeria	National Climate Change Policy	European Union	Environment and Sustainable Development Department, Ministry of Foreign Affairs	www.climasouth.eu/en/norde/	Email: agriconsulting@agriconsulting.it

SIDS						
SIDS	Comoros	To reduce the risk of climate change on lives and livelihoods from impacts on water resources in Comoros between 2011 and 2015	UNDP	Minister of Environment of the Government of Comoros	www.adaptation-undp.org	
SIDS	Madagascar	Developed capacity for climate change analysis and adaptation by end of 2012	NORAD	Ministère de l'Environnement de l'Ecologie et des Forêts	https://www.norad.no/	omer.lai-vao@meeft.gov.mg
SIDS	Mauritius	Climate change adaptation in Mauritius' coastal zone being funded from 2011	UNDP	Ministry of Environment and Sustainable Development	https://www.adaptation-undp.org/projects	ojadoo@govmu.org
SIDS	Seychelles	Six-year project Initiative on Seychelles Marine Spatial Planning 2014	Japan	Seychelles Conservation and Climate Adaptation Trust	www.seymsp.com	w.agricole@pps.gov.sc

Southern Africa						
Southern Africa	Angola	National adaptation process in 2015 to Promote the development resilient to climate and enhancing adaptive capacity to support disaster risk in the Cuvelai River Basin, Cunene, and addressing the urgent adaptation needs in coastal areas, and strengthening national capacities	UNDP	Angola Ministry of Environment (MI-NAMB)	www.adaptation-undp.org/angola	www.minamb.gov.ao/
Southern Africa	Botswana	Impacts of climate change in the <u>COMESA- EAC- SADC</u> region are dealt with through successful adaptation and mitigation actions, which also build economic and social resilience for present and future generations	Five-year programme funded by Norway, DFID and the European Union initiative that started in 2010	Project Coordinator Tripartite Programme on Climate Change Adaptation and Mitigation SADC, Sebele Satellite Office P/Bag 0095 Gaborone, Botswana	www.sadc.int/	registry@sadc.int

Southern Africa	Botswana	Climate variability risk analysis and management. Focus on risk analysis	Botswana Government	Botswana Institute for Technology Research and Technology (BITRI)	http://www.bitri.co.bw/	Nnyaladzi Batisani nnyaladzi.batisani@gmail.com
Southern Africa	Botswana	Research on climate change-food security nexus. That is focusing on the food security challenges posed by climate change and also how climate change can bring business opportunities in the agricultural sector through niche cropping and livestock enterprises Impact of climate change and variability on food security	Botswana Government	National Agricultural Research and Development Institute (NARDI) based in Botswana	http://www.careerpoolbotswana.com	Nnyaladzi Batisani nnyaladzi.batisani@gmail.com

Southern Africa	Lesotho	Strengthened capacity for climate change adaptation in agriculture and experience and lessons gleaned from Lesotho in 2011	FAO	Ministry of Energy and Meteorology	www.fao.org/docrep/	Email: mahaha-bisa@les-met.org.ls
Southern Africa	Malawi	A 5-year project to implement urgent adaptation priorities through strengthened decentralized and national development plans	UNDP	UNFCCC focal point	www.mw.one.un.org/malawi_decides/	evans-njewa@gmail.com
Southern Africa	Mozambique	Mainstreaming climate change adaptation mechanisms in policy development and investment framework between 2009 and 2011	UNDP	Ministry for Coordination of Environmental Affairs	https://info.undp.org/	p.na-pica@micoa.gov.mz
Southern Africa	Namibia	Development of National Policy on Climate Change for Namibia in 2010	UNDP	Ministry of Environment and Tourism	www.adaptation-undp.org/ .	Email: ljooste@met.gov.na

Southern Africa	South Africa	Long-term adaptation scenarios 2013-2014	GIZ, Germany	Department of Environmental Affairs, Department of Climate Change and SANBI	www.sanbi.org/	Email: info@sanbi.org.za
Southern Africa	Swaziland	Adapting water resources management in Swaziland to manage expected climate change in 2012	UNDP	Ministries of Natural Resources, Tourism and Environment, Agriculture, National Water Authority and Department of Meteorology	www.adaptation-undp.org	ed_dlamini@swazimet.gov.sz
Southern Africa	Zambia	Adaptation to the effects of climate change and variability in agroecological regions I and II	UNDP	Ministry of Lands, Natural Resources and Environmental Protection	www.zm.undp.org	mfumurichard@yahoo.co.uk
Southern Africa	Zimbabwe	Supporting Zimbabwe to advance their NAP process	GEF-SCCF through UNDP	Ministry of Environment, Water, and Climate	www.adaptation-undp.org	climatechange@environment-undp.org

Western Africa						
Western Africa	Benin	Strengthen national institutions to access the Green Climate Fund alongside other significant sources of climate finance in 2016	UNDP and UNEP	Benin Ministère de l'Environnement et de la gestion des changements climatiques	www.adaptation-undp.org/benin	Dr. Iréné Bio Aboudou: irebioa@yahoo.fr
Western Africa	Benin	Strengthening economic skills and climate change adaptive capacity in 2010/2011 to address food insecurity	International Development Research Centre of Canada	Benin Ministère de l'Environnement et de la gestion des changements climatiques	www.climatechange.gc.ca/	Dr. Iréné Bio Aboudou: irebioa@yahoo.fr
Western Africa	Burkina Faso	Promote food security in Burkina Faso under a changing climate through developing climate smart village models in West Africa.	EU and IFAD under the programme Climate Change, Agriculture and Food Security	Mr Idrissa Semde, UNFCCC National Focal Point	www.ccafs.cgiar.org/burkina-faso	Address: BP 6486 Ouagadougou; Telephone: (226) 5031-2464; Email: spconedd@fasonet.bf , idsemde@yahoo.fr
Western Africa	Cabo Verde	Building adaptive capacity and resilience to climate change in the water sector in Cape Verde	UNDP	UNFCCC Focal Point, National Institute of Meteorology and Geophysics		Email: camoniz@yahoo.co.br

Western Africa	Cameroon	National Plan for Environmental Management Climate Change Adaptation Strategies, in the area of coastal zone management	UNDP	Inspecteur, Ministère de l'Environnement		Email: valiwa1@yahoo.fr
Western Africa	Côte d'Ivoire	Adaptation to social, environmental and climate change impacts on vectorborne diseases in Côte d'Ivoire in 2011/2012	IDRC of Canada	Ministère de la Salubrité, de l'Environnement et du Développement Durable	www.climatechange.gc.ca/	Email: r.as-sie@environnement.gouv.ci
Western Africa	Equatorial Guinea	Developed climate change plan to reduce carbon emissions and mitigate climate change in 2014	Plan supports sustainable energy and Fund for Climate Change in Africa	Nacional de Cambio Climatico y PF UNFCCC Ministerio de Pesca y Medio Ambiente	www.prnews-wire.com/	nicano-rona@gmail.com
Western Africa	Gambia	Developed national adaptation plan process for advancing Gambia's NAP process in 2015	UNDP	Ministry of Environment, Climate Change, Water and Wildlife	www.adaptation-undp.org/	info@mofwrmam.gov.gm
Western Africa	Ghana	Developed agriculture-climate change policy in 2012	UNDP	Director, National Focal Point Environmental Protection Agency	www.hubrural.org/	oboadl@apa-ghana.org

Western Africa	Guinea	Increased resilience and adaptation to adverse impacts of climate change in Guinea's vulnerable coastal zones	UNDP	Ministere de l'Environnement des Eaux et Forets	www.adaptation-undp.org	joesylla2002@gmail.com
Western Africa	Guinea-Bissau	Project to strengthen adaptive capacity and resilience to climate change in Guinea-Bissau in 2015	UNDP		www.adaptation-undp.org/	secobas-sama@gmail.com
Western Africa	Liberia	Plan to strengthen Liberia's capability to provide climate information and services to enhance climate resilient development and adaptation to climate change by 2017	UNDP	Coordinator, Environmental Protection Agency of Liberia	www.adaptation-undp.org/	benkarmorh@yahoo.com
Western Africa	Mali	Strengthened systems in place capable of building resilience under a range of climate scenarios	USAID	Point Focal National UNFCCC, Etat	https://www.usaid.gov/	ozone@afribone-mali.net

Western Africa	Mauritania	Implement the 2004 National Adaptation Programme of Action to Climate Change	UNFCCC	Point Focal National de la Convention Cadte sur le Change-ment Climatique	https://www.unfccc.int/	idjibril@yahoo.fr
Western Africa	Niger	National Adaptation Programme of Action for Niger finalized in 2006 has been the main framework to deal with the country's climate vulnerability	UNDP, UNITAR, WMO and Globar Water Partnership	National Council of Environment and Sustainable Development	https://www.adaptation-undp.org/sites/	kamaye-maazou@yahoo.fr
Western Africa	Nigeria	Developed Nigeria's Response to Climate Change Project to Promote Mainstreaming Climate Change Adaptation into Government Policies, Strategies and Programmes	CIDA of Canada	Nigerian Environmental Study/Action Team (NEST)	https://www.devex.com/	Email: nest@nestinteractive.org
Western Africa	Sao Tome e Principe	Strengthening climate information and early warning systems to support climate resilient development	GEF through UNDP	Ministry of Public Works and Natural Resources	www.adaptation-undp.org	aderitosantana@hotmail.com

Western Africa	Senegal	Implementation of the National Programme for Disaster Risk Reduction 2012	World bank	Senegalese Civil Protection Agency	www.worldbank.org/	dpcsen@hotmail.com
Western Africa	Sierra Leone	Strengthening climate information and early warning systems	UNDP	Sierra Leone Meteorological Department	www.adaptation-undp.org	alpha_bock@yahoo.com
Western Africa	Togo	Strengthening national and decentralized management for global environmental benefits in Togo	GEF through UNDP	Ministry of Environment and Forest Resources, Government of Togo	www.adaptation-undp	Email: yhounkpe_20@yahoo.fr

Part 2: Mapping climate research, applications, policy, adaptation, and related initiatives on capacity development, adaptation programmes and projects supported by organizations, NGOs and Multinationals

A) Capacity-building/development programmes

REGION	COUNTRY	TYPE OF INITIATIVE (i.e Policy-related, Adaptation, capacity-building, private, public)	SPONSOR	IMPLEMENTING INSTITUTION, AGENCY, NGO, ETC	INITIATIVE'S WEBSITE/POR-TAL LINK	EMAIL CONTACT
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Africa	All Countries	Improvement of observation network and supporting in training of climate experts	WMO	NMHSs including subregional institutions	www.wmo.int	Joseph Mukabana jmukabana@wmo.int
United Nations	USA, New York	Project aims to support the professional development of journalists in all 20 AAP countries while building their knowledge of climate change issues. The project further supports journalists in providing a forum for discussion on climate issues	UNDP	UNDP African Award Programme under the UNDP AAP Media Capacity Building Project. Originally nine journalists, selected from: Cameroon, Ethiopia, Ghana, Kenya, Morocco, Nigeria, Senegal, Tanzania	http://www.undp-aap.org/work-areas/media-capacity	
Africa	Côte d'Ivoire	Supports national and regional technical and human resource capacity development for institutions dealing with climate variability and climate change activities	African Development Bank	ACMAD (Niamey), IGAD ICPAC (Nairobi), SADC CSC (Gaborone), AGRHYMET (Niamey)	http://www.afdb.org/	Leandre GBeli L.GBELI@AFDB.org
Africa	Tanzania	It helps people to build their resilience and ability to adapt to climate shocks and	CARE International	CARE International, government institutions	info@careclimatechange.org	Kark Deering, regional coordinator –Africa Based in Dar-es-Salaam

		<p>stresses. Adaptation Learning Programme's (ALP's) community-based approaches to climate information services (CIS) have gained significant interest and engagement in Ghana, Kenya and Niger, supporting decision-making processes and capacity for forward looking decisions on adaptation, livelihoods, agriculture, local development planning, early warning and disaster risk management</p>	<p>CARE International aims at empowering poor and marginalized people to take action on climate change at all levels and to build knowledge for global change through its Adaptation Learning Programme in Africa. Since 2010, ALP has been working with communities, government institutions and civil society organizations in Ghana, Kenya, Mozambique and Niger with outreach to other African countries</p>	<p>and civil society organizations</p>	<p>http://www.care-international.org/</p>	
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Africa	All countries	<p>Focused on analyzing adaptation options through local institutions, and conducting vulnerability assessments with particular attention to migration, youth issues, and indigenous peoples — is already under way in some parts of West and East Africa.</p> <p>While promoting low carbon growth in middle income countries (e.g., South Africa and Botswana), the World Bank’s focus in other countries will be on expanding generation capacity and regional trade (through the East, West, and Southern Africa Power Pools), investing in geothermal (in East Africa), promoting gas flaring reduction (in West Africa), and supporting</p>	World Bank	World Bank, government institutions, NGOs and private sector	<p>http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/AFRICAEXT/0,,content-MDK:22410211~pagePK:146736~piPK:146830~theSitePK:258644,00.html</p> <p>http://go.worldbank.org/PLCPCNBSWO</p>	
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		off-grid renewable energy in several other countries				
B) Impacts, vulnerability and adaptation projects/programmes						
Africa	All countries	Climate change - Major donor for climate-related projects in Africa	UNDP-Africa Bureau (New York)	UNDP Country offices	http://www.africa.undp.org/	
Africa	All countries	Enhances current and future development to climate change impacts by strengthening adaptive capacity and building resilience of the society and ecosystems. Support preparation of national climate change adaptation strategies e.g. in Ghana	UNDP/UNEP New York/Nairobi	UNDP Country Office	http://www.undp.org/ http://www.unep.org/	Richard Tingem Munang email: Richard.Munang@unep.org

Eastern, Western and South- ern Africa	Burundi, Kenya, Rwanda, Tanzania, Uganda	<p>USAID PREPARED and other FEWSNET related activities in West, Eastern, southern.</p> <p>Produces several geospatial climate products, including within/next season forecasts and climatology. It also has access to the largest <i>in situ</i> climate data in SSA.</p>	USAID	National governments and regional institutions	https://www.usaid.gov/	Chris Funk cfunk@usgs.gov

All Africa	Africa	<p>Climate country profiles produced an “off the shelf” analysis of climate data, and make available the underlying data for each country for use in further research in African countries.</p> <p>Profiles developed to narrow the climate change information gap making use of existing climate data to generate country-level data plots from up-to-date climate observations and the multimodal projections</p>	UNDP	University of Oxford	http://country.profiles.geog.ox.ac.uk/	McSweeney, C., New, M. and Lizcano, G.
Africa	All Countries	WHO, along with UNDP, launched in 2010 the first global project on public health adaptation to climate change	WHO/UNDP	Country offices, governments institutions, NGOs	http://www.who.int/ http://www.undp.org/	

		<p>projects with an aim to “increase adaptive capacity of national health system institutions, including field practitioners, to respond to climate-sensitive health risks”, relevant for Africa. The project activities enhanced systems of early warning and early action; build capacity of national actors; pilot specific health risk reduction interventions; and document and share lessons learned in attending to the health risks associated with climate change in their area</p>				
<p>Western, Eastern, Southern Africa</p>	<p>Countries in Western, Eastern and Southern Africa</p>	<p>Supports national and regional studies on vulnerability assessment and adaptation on impacts of climate change in Western, Eastern,</p>	<p>African Development Bank</p>	<p>ACMAD (Niger), AGRHYMET (Niamey) ICPAC (Nairobi), SADC CSC (Gaborone)</p>	<p>http://www.afdb.org/</p>	<p>Leandre GBeli L.GBELI@AFDB.org</p>

		Southern Africa				
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Africa	Western, Eastern and Southern African countries	The World Bank has laid out a plan of action aimed at adaptation to climate change in Africa, seizing mitigation opportunities on the continent, building knowledge and capacity, and making more financing available. Launched in 2009, <i>Making Development Climate Resilient in Sub-Saharan Africa</i> identifies knowledge gaps, expected impacts and key actions to be taken over time by African governments and their partners	World Bank Since 2006, for example, the Bank has supported Madagascar, a country chronically exposed to cyclones, in a number of activities aimed at mitigating risks. These activities include conducting hydro-meteorological risk assessments for agriculture, cyclone impact modeling studies, and updating infrastructure norms and standards (Madagascar Disaster Risk Reduction Plan). The Bank has also worked	World Bank and governments	http://web.worldbank.org/WBSITE/EXTER-NAL/COUNTRIES/AFRICAEXT/0,,content-MDK:22777785~menuPK:2246551~pagePK:2865106~piPK:2865128~theSitePK:258644,00.html	
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			<p>with eight focus countries (Burkina Faso, Ethiopia, Ghana, Mali, Malawi, Mozambique, Senegal and Togo) to build national plans for disaster risk management that have been drafted and agreed upon with the national governments.</p> <p>In the energy sector, the Lighting Africa initiative aims to bring power by renewable energy sources and mechanical means. The initial pilot countries were Ghana and</p>			
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			Kenya and subsequent programme activities are being implemented in Ethiopia, Rwanda, Senegal, Tanzania and Zambia			
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C) Support on policy for sustainable development						
Africa	Western, Eastern and Southern Africa	Understanding policy processes at national and international levels that define the links between climate change and agriculture in Ghana, Kenya and South Africa	Future agriculture	NGOs	http://www.future-agricultures.org/research/climate-change/8012-climate-change-african-agriculture-health-and-cities-12-new-reviews	
Africa	All countries	UNDP has developed a toolkit for practitioners in designing climate change adaptation initiatives. The toolkit aspires to support all those involved in the design of measurable, verifiable, and reportable adaptation initiatives. It provides step-by-step guidance. As such, it seeks to answer the following question: What are the basic steps in planning and designing an adaptation initiative?	UNDP	UNDP country offices and governments	https://sustainabledevelopment.un.org/content/documents	

All regions	All countries	<p>The World Bank has devised a USD16bn (£10.6bn) strategy designed to help Africa adapt to climate change and prevent millions of people from sliding into poverty.</p> <p>By fast-tracking clean energy, efficient farming and urban protection, the measures promise to increase, greatly, renewable energy across the continent, bolster food production and lead to the planting of billions of trees</p>	World Bank	World Bank, governments institutions, NGOs, private sector	http://www.worldbank.org/en/news/press-release/2015/11/24/world-bank-group-unveils-16-billion-africa-climate-business-plan-to-tackle-urgent-climate-challenges	Contact: Aby Toure akonate@worldbank.org Tel : (202) 473-8302
All region	Kenya	The Climate Emergency Institute advocates for the human rights of the most climate change vulnerable populations and	Climate Emergency Institute	NGOs	http://www.climateemergencyinstitute.com/climate_change_and_africa.html	Joshua Ngaina Ph D Climate & meteorology Kenya

		countries. CEI is comprised of a diverse professional faculty, each of whom specializes in one or more aspects of the global climate emergency				
Africa	All African countries	UNDP African Adaptation Programme provides methodologies and resources to support countries in adaptation initiatives which include adaptation policy framework; toolkit for designing climate change adaptation initiatives, and country adaptation profiles	UNDP	UNDP country offices	http://www.undp.org/climatechange/adapt/apf.html http://www.undp.org/climatechange/docs/lecrds/toolkit.pdf http://country-profiles.geog.ox.ac.uk/	
Southern Africa	Botswana	SADC supports climate change adaptation through developing relevant national	SADC Secretariat	SADC States and SADC regional institutions	http://www.sadc.int/	SADC Secretariat, Gaborone

		and regional climate change adaptation policies in SADC countries				
North-Eastern Africa	Burundi, Djibouti, Eritrea, Ethiopia, Kenya, Rwanda, Somalia, South Sudan, Sudan, , Uganda	Subregion coordinates regional and national policies and strategies that support adaptation to impacts of climate change. This is achieved through supporting plans, strategies and activities that strengthen the ability to anticipate, cope, resist and recover from climate change shocks	IGAD	ICPAC and NMHSs	http://www.igad.int/	
Africa	All African countries	GFCS is new programme that will help to guide decision makers and public health authorities to provide well-targeted climate services in African countries through operationalizing the GFCS to obtain accessible and	WMO GFCS in collaboration with WHO, WFP& IFRC	NMHSs and NGOs	www.wmo.int	Filipe Lucio flucio@wmo.int

		accurate climate service information RC				
D) Gender climate-related activities						
Africa	All African countries	<p>Policy and capacity development on gender issues.</p> <p>UNDP has developed a series of policy briefs and training modules on gender and climate change for practitioners and policymakers in Africa. The themes are of specific relevance to Africa, and include a general overview of climate change issues, adaptation, agriculture and food security, equitable energy access, and climate finance initially implemented in Tanzania and Malawi</p>	UNDP	Countries offices, government and NGOs	http://www.undp.org/ http://www.africa.undp.org/	
Eastern Africa	Kenya, Uganda	New Course recognize the powerful role that women, as the primary users of their communities' natural	New Course	NGOs	http://anewcourse.org/climate-change/	

		resources, can play in bolstering their communities' resiliency while reducing future climate impacts. To ensure resilient, sustainable communities, New Course enables women to manage their resources, responsibly, and renew their environments. For example, improving watershed management in Kenya and Uganda			http://anewcourse.org/watershed-mgmt-east-africa/	
E) Application of climate information						
Africa	Africa all countries	WMO through its CLIPS project and other related programmes has pioneered in many countries in supporting development and application of climate information in various sectors	WMO programme in collaboration with WHO & UNDP	Projected supported ICPAC, ACMAD, SADC CSC, NMHSs and other institutions in the generation and application of climate information in different sectors in Africa	www.wmo.int	Rupa Kolli Rkolli@wmo.int

Part 3: Mapping institutions involved in climate-related research (IPCC national focal points)

REGION	COUNTRY	TYPE OF INITIATIVE (i.e Policy-related, adaptation, capacity-building, private, public)	SPONSOR	IMPLEMENTING INSTITUTION, AGENCY, NGO, ETC	INITIATIVE'S WEB-SITE/PORTAL LINK	CONTACT	EMAIL
Central Africa	Central African Republic	Coordination of IPCC national climate change assessments. Enhanced resilience to impacts of climate change	IPCC	Ministère des Transports et de l'Aviation Civile		Joël - Urbain Tetya, Ministère des Transports et de l'Aviation Civile B.P. 941	juteteya@yahoo.fr
Central Africa	Chad	Coordination of IPCC national climate change assessment activities. Enhanced resilience to impacts of climate change	IPCC	Direction de la météorologie nationale		Alie Maitoubam, Direction de la météorologie nationale	mbaitoubame@live.fr

Central Africa	Republic of Congo	Coordination of IPCC national climate change assessment activities. Enhanced resilience to impacts of climate change	IPCC	Direction Générale de l'Environnement - Ministère du Tourisme et de l'Environnement	http://www.meteo-congo-brazza.net	Gervais Ludovic Itsoua Madzous, Direction Générale de l'Environnement - Ministère du Tourisme et de l'Environnement +242 05 531 7411	imad-zous2@gmail.com
Central Africa	Democratic Republic of Congo	Coordination of IPCC national climate change assessment activities. Enhanced resilience to impacts of climate change	IPCC	Direction du Développement Durable Ministère de l'Environnement, Conservation de la Nature, Eaux et Forêts	http://www.meteo-congo-kinshasa.net	Aime Mbuyi Kalombo, Direction du Développement Durable Ministère de l'Environnement, Conservation de la Nature, Eaux et Forêts B.P. 16.137 +243 81 982 4410	mbuyikalombo@gmail.com
Western Africa	Mali	Coordination of IPCC national climate change assessment activities. Enhanced resilience to impacts of climate change	IPCC	Chef, Division Recherche et Développement Direction Nationale de la Météorologie	http://www.dnh-mali.org/	Birama Diarra, Chef, Division Recherche et Développement Direction Nationale de la Météorologie B.P. 237 +223 2020 6204	biramadia@yahoo.fr
Eastern Africa	Burundi	Coordination of IPCC national climate change	IPCC	Institut Géographique du	http://www.meteo.gov.bi/	Maurice Shiramanga, Institut Géographique du	mshiramanga@yahoo.com

		assessment activities. Enhanced resilience to impacts of climate change		Burundi (IGEUB)		Burundi (IGEUB) B.P. 331 +257 7773 5820	
Eastern Africa	Comoros	Coordination of IPCC national climate change assessment activities. Enhanced resilience to impacts of climate change	IPCC	ANACM, Comoros		Ms An-Ynaya Bintie Abdourzakou, ANACM, Boulevard Strasbourg, Moroni, Comoros +269 3297210	Masoibrah1@yahoo.fr
Eastern Africa	Djibouti	Coordination of IPCC national climate change assessment activities. Enhanced resilience to impacts of climate change	IPCC	Ministère de l'Habitat de l'Urbanisme et de l'environnement		Abdallah Omar Dini, Ministère de l'Urbanisme et de l'environnement B.P. 2091 +253 21 35 10 20	dini.omar12@gmail.com
Eastern Africa	Ethiopia	Coordination of IPCC national climate change assessment activities	IPCC	Director, Meteorological Forecast and Early Warning Directorate National Meteorological Agency	http://www.ethiomet.gov.et/	Diriba Korecha Dadi, director, Meteorological Forecast and Early Warning Directorate National Meteorological Agency, P.O. Box 1090 Addis Ababa + 251 116 61 5790	dkorecha@yahoo.com

Eastern Africa	Kenya	Coordination of IPCC national climate change assessment activities. Enhanced resilience to impacts of climate change	IPCC	Kenya Meteorological Department	http://www.meteo.go.ke/	Samwel Okinyi Omwoyo Marigi, senior assistant director, Forecasting Services Kenya Meteorological Department, Dagoretti Corner, Ngong Road, P.O. Box 30259, Nairobi +254 20 386 7880	marigi@meteo.go.ke
Eastern Africa	Rwanda	Coordination of IPCC national climate change assessment activities. Enhanced resilience to impacts of climate change	IPCC	Rwanda Meteorological Service	http://www.meteorwanda.go.rw/	John Ntaganda Semafara, Rwanda Meteorological Service, B.P. 898 +250 252 575813 +250 252 501343	meteo@rwanda1.com
Eastern Africa	Seychelles	Coordination of IPCC national climate change assessment activities. Enhanced resilience to impacts of climate change	IPCC	Meteorological Services of Seychelles, Department of Energy and Climate Change	http://www.meteo.gov.sc/	Mr. Wills Agricole, Meteorological Services of Seychelles, Department of Energy and Climate Change, Mahe, Seychelles	wagricole@env.gov.sc
Eastern Africa	Sudan	Coordination of IPCC national climate change	IPCC	Higher Council for Environ-		Eltom Elshami Omer Mohamed, Higher Council	hcnr2005@yahoo.com

		assessment activities. Enhanced resilience to impacts of climate change		ment & Natural Resources (HCENR) Secretary General		for Environment & Natural Resources (HCENR), Secretary General Gamaa Street, P.O. Box 10488, Khartoum	
Eastern Africa	Tanzania	Coordination of IPCC national Climate Change assessment activities. Enhanced resilience to impacts of climate change	IPCC	Tanzania Meteorological Agency	http://www.meteo.go.tz/	Ladislaus Chang'a, director research and applied meteorology. Tanzania Meteorological Agency, Ubungo Plaza, Morogoro Road, P.O. Box 3056, Dar-es-Salaam +255 22 2460706/8	ladislaus.changa@meteo.go.tz
Eastern Africa	Uganda	Coordination of IPCC national climate change assessment activities. Enhanced resilience to impacts of climate change	IPCC	Uganda Meteorological Authority	http://www.unma.go.ug/	James Magezi-Akiiki, Department of Meteorology, Clement Hill Road Postel Building, 10th Floor, P.O. Box 7025 Entebbe +256 414 251 798	mageziaki-ikibj@yahoo.co.uk

Eastern Africa	Seychelles	Coordination of IPCC national climate change assessment activities. Enhanced resilience to impacts of climate change	IPCC	Division of Policy Planning & Services Ministry of Environment & Natural Resources		Will Agricole, Division of Policy Planning & Services Ministry of Environment & Natural Resources, P.O. Box 1145 Mahe +248 670 400	w.agricole@meteo.gov.sc
North Africa	Algeria	Coordination of IPCC national climate change assessment activities. Enhanced resilience to impacts of climate change	IPCC	Centre for Renewable Energy Development (CDER)	http://www.meteo.dz	Nouredine Yassaa, Centre for Renewable Energy Development (CDER), BP 62, Route de L'Observatoire +21323189059	n.yassaa@cder.dz
North Africa	Egypt	Coordination of IPCC national climate change assessment activities. Enhanced resilience to impacts of climate change	IPCC	General director of climate change technology and researches	http://www.nwp.gov.eg/	Sherif Abd El Rahim, general director of climate change technology and researches, 30 Misr Helwan El-Zyrae Road, Maadi P.O. Box 11728 Cairo +202 2525 6452	ipcc_eg.cccu@yahoo.com
North Africa	Libya	Coordination of IPCC national climate change assessment activities. Enhanced	IPCC	National Meteorological Centre		Abdelfatah H. Shibani, National Meteorological Center, Eswani – El Krimia.	lfp.ipcc@gmail.com

		resilience to impacts of climate change				+ 218 92 5025414	
North Africa	Morocco	Coordination of IPCC national climate change assessment activities. Enhanced resilience to impacts of climate change	IPCC	Direction de la Météorologie Nationale	http://www.maroc-meteo.ma/	Direction de la Météorologie Nationale, Face Préfecture Hay Hassani Ain Chock B.P. 8106 +212 522 913 803	mok-ssit.abdalah@yahoo.fr
North Africa	Tunisia	Coordination of IPCC national climate change assessment activities. Enhanced resilience to impacts of climate change	IPCC	Ministère de l'Environnement et du Développement Durable	http://www.meteo.tn/	Imed Fadhel , Ministère de l'Environnement et du Développement Durable, Boulevard de la Terre - Centre Urbain Nord +216 71 70 728455/728480	i.fadhel@yahoo.fr
Southern Africa	Comoros	Coordination of IPCC national climate change assessment activities. Enhanced resilience to impacts of climate change	IPCC	Direction Générale de l'Environnement et des Forêts		Imed Fadhel, Ministère de l'Environnement et du Développement Durable B.P. 2185 +269 340 8018	benanthoy@yahoo.fr
Southern Africa	Mauritius	Coordination of IPCC national climate change	IPCC	Mauritius Meteorological Services	http://www.meteorological-service.intnet.mu/	Rajan Mungra , Mauritius Meteorological Services	meteo@intnet.mu

		assessment activities. Enhanced resilience to impacts of climate change				eteorological Services, St. Paul Road +230 696 5626	
Southern Africa	Angola	Coordination of IPCC national climate change assessment activities. Enhanced resilience to impacts of climate change	IPCC	Ministry of Environment		Luis Domingos Constantino, Ministry of Environment, Office for Climate Change, Ministry of Environment + 244 222 010 755	gac.minnamb@gmail.com
Southern Africa	Botswana	Coordination of IPCC national climate change assessment activities. Enhanced resilience to impacts of climate change	IPCC	Department of Meteorological Services	http://www.weather.info.bw/	Botshoma Thabang, Department of Meteorological Services, Ministry of Environment, Wildlife and Tourism, Department of Meteorological Services, P.O. Box 10100, Gaborone + 267 395 6284	tbotshoma@gov.bw
Southern Africa	Lesotho	Coordination of IPCC national climate change assessment activities. Enhanced	IPCC	Lesotho Meteorological Services	http://www.lesmet.org.ls/	Mabafokeng Felesiah Mahabisa, Lesotho Meteorological Services, P.O. Box 14515	mahabisa@gmail.com

		resilience to impacts of climate change				+266 22 317 250	
Southern Africa	Madagascar	Coordination of IPCC national climate change assessment activities. Enhanced resilience to impacts of climate change	IPCC	Direction Générale de la Météorologie	http://www.meteomadagascar.mg/	Soarijaona Samuëline Rahariveloarimiza Direction Générale de la Météorologie, B.P. 1254 +261 3405 560 98	s.rahariveloarimiza@gmail.com
Southern Africa	Malawi	Coordination of IPCC national climate change assessment activities. Enhanced resilience to impacts of climate change	IPCC	Malawi, Meteorological Services Department	http://www.metmalawi.com/	Gray K. Muntali, deputy director, Meteorological Services, P.O. Box 1808, Blantyre +265 1 822014/ +265 1 824698	gmuntali@metmalawi.com
Southern Africa	Mozambique	Coordination of IPCC national climate change assessment activities. Enhanced resilience to impacts of climate change	IPCC	Departamento de Cooperação Internacional Ministério Para a Coordenação da Acção Ambiental		Marília T.A. Manjate, Departamento de Cooperação Internacional Ministério Para a Coordenação da Acção Ambiental, Rua de Kasuende, 167 P. Box 2020, Maputo +258 21 492 403	telmanjate@yahoo.com.br

Southern Africa	Namibia	Coordination of IPCC national climate change assessment activities. Enhanced resilience to impacts of climate change	IPCC	Namibia Meteorological Services, Ministry of Transport	http://www.meteona.com/	Mr. Franz Uirab, Private Bag 13224, Windhoek, Namibia +264612877001	fuirab@meteona.com
Southern Africa	South Africa	Coordination of IPCC national climate change assessment activities. Enhanced resilience to impacts of climate change	IPCC	Senior policy adviser international climate change cooperation Department of Environmental Affairs	http://www.weathersa.co.za/	Maesela Kekana, senior policy adviser International Climate Change Cooperation Department of Environmental Affairs, Private Bag X 447 +27123103120	mjkekana@environment.gov.za
Southern Africa	Swaziland	Coordination of IPCC national climate change assessment activities. Enhanced resilience to impacts of climate change	IPCC	Swaziland Meteorological Service	http://www.swazimet.gov.sz/	Duduzile Nhlengethwa-Masina, Swaziland Meteorological Service, P.O. Box 2652, Manzini + 268 2404 8859	dudu@swazimet.gov.sz
Southern Africa	Zambia	Coordination of IPCC national climate change assessment activities. Enhanced	IPCC	Ministry of Lands, Natural Resources and Environmental Protection	http://www.mtwsc.go.zm/	Ephraim Mwehya Shitima, Ministry of Lands, Natural Resources and Environmental Protection, P.O.	emshitima40@gmail.com

		resilience to impacts of climate change				Box 50694, 15101 Ridgeway, Lusaka + 260 977 893 61	
Southern Africa	Zimbabwe	Coordination of IPCC national climate change assessment activities. Enhanced resilience to impacts of climate change	IPCC	Ministry of Environment, Water and Climate	http://www.weather.co.zw/	Washington Zhakata, Ministry of Environment, Water and Climate, Kaguvi Government Building, Cnr. 4th Street / Central Avenue, P. Bag 7753 Causeway +263 4 701 681/3	climatechange@environment.gov.zw
Western Africa	Burkina Faso	Coordination of IPCC national climate change assessment activities. Enhanced resilience to impacts of climate change	IPCC	Direction Générale de la Météorologie General Department of Meteorology	http://www.meteoburkina.bf/	Mr.Kouka Ouedraogo Directorate of Meteorology 01 B.P. 576 Ouagadougou Burkina Faso +22675400011	<u>Mr Kouka E</u> Ernest_ok@yahoo.com
Western Africa	Cabo Verde	Coordination of IPCC national climate change assessment activities. Enhanced	IPCC	National Institute of Meteorology and Geophysics		Francisco da Veiga Correi, National Institute of Meteorology and Geophysics,	franciscocorrei073@gmail.com

		resilience to impacts of climate change				Delegação do INMG - PRAIA BP. 467 Praia - Santiago +238 261 7891	
Western Africa	Cameroon	Coordination of IPCC national climate change assessment activities. Enhanced resilience to impacts of climate change	IPCC	Ministère de l'Environnement, de la Protection de la Nature et du développement durable Dele-gué Régional du Centre	http://www.meteo-cameroon.net	Temothée Kagonbe, Ministère de l'Environnement, de la Protection de la Nature et du développement durable Dele-gué Régional du Centre, B.P. 320 +237 77 44 27 31/99 87 5590	kagonbet@yahoo.fr
Western Africa	Côte d'Ivoire	Coordination of IPCC national climate change assessment activities. Enhanced resilience to impacts of climate change	IPCC	SODEXAM - Direction de la Météorologie Nationale		DJE Kouakou Bernard, SO-DEXAM - Direction de la Météorologie Nationale, 15 BP 990 +225 2158 2001	dkouakou_b@yahoo.fr
Western Africa	Gambia	Coordination of IPCC national climate change assessment activities. Enhanced resilience to impacts of climate change	IPCC	Department of Water Resources		Lamin Mai Touray, Department of Water Resources, 7 Marina Parade, Banjul +220 422 4122	touraylm@yahoo.co.uk

Western Africa	Ghana	Coordination of IPCC national climate change assessment activities. Enhanced resilience to impacts of climate change	IPCC	Environmental Protection Agency Climate Change Unit		Daniel Tutu Benefoh, Environmental Protection Agency Climate Change Unit, 91 Starlets Street, P.O. Box M326 + 302-664-697 / 246 114 652	dbenefor2000@gmail.com
Western Africa	Guinea	Coordination of IPCC national climate change assessment activities. Enhanced resilience to impacts of climate change	IPCC	Direction Nationale de la Météorologie		Yaya Bangoura, Direction Nationale de la Météorologie, Face Jardin 2 Octobre B.P. 566 +22464564191/6 8457020	alpha-yaya2009@yahoo.fr
Western Africa	Guinea-Bissau	Coordination of IPCC national climate change assessment activities. Enhanced resilience to impacts of climate change	IPCC	Enhanced climate resilience		João Lona Tchédná, National Institut of Meteorology of Guinea-Bissau, Avenida do Brasil Cx.P. No.75 + 245 574 84 90	dgmteobissau@yahoo.fr
Western Africa	Liberia	Coordination of IPCC national climate change assessment activities. Enhanced	IPCC	Ministry of Transport	http://www.molme.gov.lr/	Mr. Arthur Gar-Glahn, Ministry of Transport, P.O. Box 9041 Monrovia Liberia +231221580	Agar-glahn98@gmail.com

		resilience to impacts of climate change					
Western Africa	Mauritania	Coordination of IPCC national climate change assessment activities. Enhanced resilience to impacts of climate change	IPCC	Ministere de l'Environnement et du Developpement Durable		Mohamed-Yahya Lafdal , Ministere de l'Environnement et du Developpement Durable, Directeur de la Programmation, de la Coordination et de l'Information Environnementale, Ministere de l'Environnement et du Developpement Durable +222 46 00 8686	lafdal@environnement.gov.mr
Western Africa	Niger	Coordination of IPCC national climate change assessment activities. Enhanced resilience to impacts of climate change	IPCC	Direction de la Météorologie nationale		Moussa Labo, Direction de la Météorologie nationale, B.P. 218 Niamey +227 20 73 21 60	dmn@intnet.ne
Western Africa	Nigeria	Coordination of IPCC national climate change assessment activities. Enhanced	IPCC	Special Climate Change Unit Federal Ministry of Environment	http://nimet.gov.ng/	The Head, Special Climate Change Unit Federal Ministry of Environment	jar-eadejuwon@yahoo.com

		resilience to impacts of climate change				+234 8036460880	
Western Africa	Senegal	Coordination of IPCC national climate change assessment activities. Enhanced resilience to impacts of climate change	IPCC	Agence Nationale de la Meteorologie	http://www.anacim.sn/	Cherif Diop Agence Nationale de la Meteorologie, B.P. 8217 +221 635 4065	cherifdiop@yahoo.fr
Western Africa	Togo	Coordination of IPCC national climate change assessment activities. Enhanced resilience to impacts of climate change	IPCC	Faculté des Sciences, Université de Lomé		Kokou Sabi Faculté des Sciences, Université de Lomé, B.P. 1515 Lomé + 228 22363901 – 9001	sabikokou@yahoo.fr

Part 4: Mapping UNFCCC National Focal Point Institutions in Africa

REGION	COUNTRY	TYPE OF INITIATIVE (i.e Policy-related, adaptation, Capacity-building, private, public)	SPONSOR	IMPLEMENTING INSTITUTION, AGENCY, NGO, ETC	INITIATIVE'S WEB-SITE/PORTAL LINK	CONTACT	EMAIL
Northern Africa	Algeria	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on measures of adaptation to climate change impacts, especially in developing countries	UNFCCC	Ministry of Foreign Affairs	www.our-af-rica.org/algeria/climate-agriculture	Ms Ghalia Benziouche, diplomatic counsellor, Address: 6 Promontoire des Annaser Kouba; Telephone: (213) 5 57 54 4807;	Email: ghalia.benziouche@gmail.com

Southern Africa	Angola	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on measures of adaptation to climate change impacts, especially in developing countries	UNFCCC	Ministry of Environment	https://www.cbd.int/doc/world/ao/	Ms Carla Esperance N. P. Da Silva UNFCCC National Focal Point, Address: Rua dos Enganos, N5, 4 Andar Luanda; Telephone: (244-2) 2201 0755; Email:	carla.silva.pompilio@gmail.com
West Africa	Benin	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on measures of adaptation to climate change impacts, especially in developing countries	UNFCCC	Ministère du Cadre de Vie et du Développement Durable The main environmental issues facing the people of Benin are desertification, deforestation, wildlife endangerment, and water pollution. The spread of the desert into agricultural lands in the	https://factsreports.reviews.org/369	Mr Ibila Djibril Director General des Changements Climatiques Address: 01 BP 3621 Cotonou; Telephone: (229) 2131-5596;	idjibril@yahoo.fr

				north is accelerated by regular droughts			
Southern Africa	Botswana	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on measures of adaptation to climate change impacts especially in developing countries	UNFCCC	Ministry of Environment, Wildlife and Tourism	http://www.mewt.gov.bw/	Mr Thabang Lesile Botshoma, director, Address: P. O. Box 10100 Gaborone; Telephone: (267) 361 2306; Email:	tbotshoma@gov.bw
West Africa	Burkina Faso	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on measures of adaptation to climate change impacts especially in developing countries	UNFCCC	Mr Idrissa Semde, UNFCCC National Focal Point		Address: BP 6486 Ouagadougou; Telephone: (226) 5031-2464;	spconedd@fasonet.bf , idsemde@yahoo.fr

Eastern Africa	Burundi	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on measures of adaptation to climate change impacts especially in developing countries	UNFCCC	Institut Géographique du Burundi	http://www.meteor.gov.bi/saisoniere.php	Ms Renilde Ndayishimiye, director general. Address: B.P. 331 Bujumbura; Telephone: (257)22-4979/22-6718;	igebu@cbinf.com , renildend@gmail.com
West Africa	Cabo Verde	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on measures of adaptation to climate change impacts especially in developing countries	UNFCCC	National Institute of Meteorology and Geophysics	https://www.wmo.int/cpdb/cabo-verde	Mr Carlos Alberto Tavares Moniz, UNFCCC national focal point, Address: B.O. 67 Esparagos, Liha do Sal; Telephone: (213)241 1276;	camoniz@yahoo.co.br
West Africa	Cameroon	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on	UNFCCC	Ministere de l'Environnement	http://www.acronymfinder.com/Ministry-of-Environment-and-Forestry-(Cameroon)/	Mr Valentin Wagnon Tchoung, Inspecteur, Address: Immeuble Ministe-	valiwa1@yahoo.fr

		measures of adaptation to climate change impacts especially in developing countries				rial No 2 boulevard du 20 mai, Yaounde; Telephone: (237) 222 9229;	
Central Africa	Central African Republic	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on measures of adaptation to climate change impacts especially in developing countries	UNFCCC	Ministere del L19 Environnement, du Development Durable, des Eaux, Forets, chase et peche		Mr Igor Gildas Tola Kogadou, Coordinator de la REDD+ Address: Rue Ambassadeur R. Guerrillot, BP 686 Bangui; Telephone: (236) 7555 8222;	cli-matrc@gmail.com, gildastolakogadou@yahoo.fr
Central Africa	Chad	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on measures of adaptation to climate change impacts especially in developing countries	UNFCCC	Department of Meteorology		Mr Hamid Abakar Souleymane, director of meteorology, Address: PB: 429 N'Djamena; Telephone: (235) 6200 0047;	haidzaria1983@gmail.com, chogara11@yahoo.fr

Small Island State	Comoros	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on measures of adaptation to climate change impacts especially in developing countries	UNFCCC	Ministere de la production et de l'Environnement	https://www.thegef.org/gef/country_profile/KM	Mr Chekidine Said Madi, Address: BP 41 Moroni, Comoros; Telephone: (269) 7750000;	secretariat.dgfe@gmail.com, chekidine_said@yahoo.fr
Central Africa	Republic of Congo	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on measures of adaptation to climate change impacts especially in developing countries	UNFCCC	Mr Marcel Pambou Tchiloemba, national focal point		Address: B.P.958, Brazzaville; Telephone: (24-2) 678-1381;	marcel.pambou@yahoo.fr, marco.pambou@gmail.com
West Africa	Côte d'Ivoire	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on	UNFCCC	Mr Agre Mathieu Richemond Assle, UNFCCC National Focal	https://www.growaf-rica.com/.../ministry-environment-urban-	Address: 20BPV 650 Abidjan 20; Telephone: (225) 08392065;	r.assie@environnement.gouv.ci, richieassie@gmail.com

		measures of adaptation to climate change impacts especially in developing countries		Point, Ministère de l'Environnement	health-and-sustainable -development/		
Central Africa	Democratic Republic of the Congo	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on measures of adaptation to climate change impacts especially in developing countries	UNFCCC	Division des Changements Climatiques, Ministère de l'Environnement	https://www.socointernational.com/drc-ministry-of-environment-nature-conservation-and-tourism/	Mr Aime Mbuyi Kalombo, Chef de Address: 15 Avenue Papa ILEO, Commune de la Gombe, Kinshasa; Telephone: (243-81) 982-4410	mbuyikalombo@gmail.com
Eastern Africa	Djibouti	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on measures of adaptation to cli-	UNFCCC	Ministère de l'Urbanisme et de l'Environnement		H.E Mr Mohamed Moussa Ibrahim, ministre. Address: Boulaos; Telephone: (253) 35-1618;	balala_ingeieur@hotmail.fr , dini.omar12@gmail.com

		mate change impacts especially in developing countries					
Northern Africa	Egypt	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing measures of adaptation to climate change impacts especially in developing countries	UNFCCC	Mitigation & Clean Development Mechanism, Egyptian Environmental Affairs Agency	http://www.eeaa.gov.eg/en-us/home.aspx	Mr Hasham El-Sayed Ahed Eissa, general manager Address: 30 Misr; Helwan El-Zyrae Road, Maadi, P.O. Box 11728 Cairo Telephone: (20-2) 2524-6162;	heshameissa.cccu@yahoo.com
West Africa	Equatorial Guinea	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on measures of adaptation to climate change impacts especially in developing countries	UNFCCC	Nacional de Cambio Climatico y PF UNFCCC Ministerio de Pesca y Medio Ambiente	https://www.guineaequatorialpress.com/noticia.php	Sr. Nicanor Ona Nze Auguan, Coordinator, Address: Norte, Su Malabo; Telephone: 00240 222 273013;	nicaron@gmail.com

Eastern Africa	Eritrea	The UNFCCC, apart from addressing issues related to limiting greenhouse gases emissions, is also focusing on measures of adaptation to climate change impacts especially in developing countries	UNFCCC	Ministry of Land, Water and Environment	https://info.undp.org/docs/pdc/Documents/ERI/	H.E. Mr Tesfal Ghebresellasie Sebhatu, minister, Address: P.O. Box 976 Asmara; Telephone: (291-1) 12-0112;	tesfaigs@gmail.com
Eastern Africa	Ethiopia	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on res of adaptation to climate change impacts especially in developing countries	UNFCCC	Ministry of Environment, Forestry and Climate Change	https://www.forestcarbonpartner-ship.org/	H.E. Mr Shiferaw Telelemariam Menbacho, minister. Address: Addis Ababa; Telephone: (251) 11558 0552	esid@ethionet.et , mefc.ethiopia@gmail.com
Central Africa	Gabon	The UNFCCC, apart from addressing issues related to limiting greenhouse gases emissions, is also focusing	UNFCCC	Conseil National Climat President de la République		M. Tanguy Gahouma Bekale, Secrétaire Permanent Address: BP 546 Libreville;	conseliclimatdugabon@yahoo.fr

		on measures of adaptation to climate change impacts, especially in developing countries				Telephone: (241) 0300 6471;	
Western Africa	Gambia	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing measures of adaptation to climate change impacts, especially in developing countries	UNFCCC	Ministry of Environment, Climate Change, Water and Wildlife	https://www.moeccww.gov.gm/Climate-Change-Of-The-Gambia/	Mr Alpha A. K. Jallow, meteorologist. Address: 6 Marina Parade, Banjul; Telephone: ??;	info@mofwrmam.gov.gm, a_jallow2010@yahoo.com
Western Africa	Ghana	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on measures of adaptation to climate change impacts especially in developing countries	UNFCCC	Environmental Protection Agency	https://www.epa.gov.gh/	Mr Kyekyeku Yaw Oppong-Boadl, director and national focal point Address: P. O. Box M326 Accra; Telephone: (233-302) 66 4697/98;	oboardl@epaghana.org, koppong-boadl@gmail.com

Western Africa	Guinea	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on measures of adaptation to climate change impacts, especially in developing countries	UNFCCC	Division Prevention des pollutions et nuisances/Point focal changement climatique, Ministère de l'Environnement des Eaux et Forêts		Mr Joseph Sylla, chief. Address: B.P.3118 Conakry; Telephone: (224) 6844 3888/6284-43888;	joesylla2002@gmail.com
Western Africa	Guinea-Bissau	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on measures of adaptation to climate change impacts, especially in developing countries	UNFCCC	Mr Seco Casama, UNFCCC focal point, Government		Address: Avenida combatentes da Liberdade da Patria Palacio do Governo, Bissau; Telephone: (249) 6912007/5908287;	secobas-sama@gmail.com
Eastern Africa	Kenya	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on	UNFCCC	Ministry of Environment, Water and Natural Resources	https://www.environment.go.ke/	H.E. Judi Wangalwa Wakhungu, cabinet secretary (minister),	juwangwakh@yahoo.com

		measures of adaptation to climate change impacts, especially in developing countries				Address: P.O. Box 30126-00100 Nairobi; Telephone: (254) 20 271 0120, (254-20) 2716103;	
Southern Africa	Lesotho	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on measures of adaptation to climate change impacts, especially in developing countries	UNFCCC	Ministry of Energy and Meteorology	http://www.lesmet.org.ls/	Ms Mabafokeng Felesiah Mahahabisa, director. Address: P.O. Box 14515 Maseru; Telephone: (266) 2231-7520;	mahahabisa@lesmet.org.ls, mahahabisa@gmail.com
Western Africa	Liberia	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on measures of ad-	UNFCCC	Environmental Protection Agency of Liberia	http://epaliberia.org/	Mr Benjamin S Karmorh Jr, coordinator, Address: 4th Street, Sinkor, P.O. Box 4024,	benkarmorh@yahoo.com

		aptation to climate change impacts, especially in developing countries				Monrovia; Telephone: (231) 777518928;	
Northern Africa	Libya	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on measures of adaptation to climate change impacts, especially in developing countries	UNFCCC	Mr Mohamed Brahim Char-gawi, president		Address: AL Bayda; Telephone: (21) 8925 142358;	char-gawi@gmail.com
Small Island State	Madagascar	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on measures of adaptation to climate change impacts especially in developing countries	UNFCCC	Ministere de l'Environnement de l'Ecologie et des Forêts	http://theredddesk.org/countries/actors/ministry-environment-forests-and-tourism-republic-madagascar/	M. Michel Omar Laivao, Point Focal National, Address: BP 571 Antananarivo; Telephone: (261-33) 121-8700;	omer.lai-vao@meeft.gov.mg, lai-vao2002@yahoo.fr

Southern Africa	Malawi	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on measures of adaptation to climate change impacts, especially in developing countries	UNFCCC	Mr Evans Davie Njewa, principal environmental officer & UNFCCC focal point	https://www.malawi.gov.mw/index.php	Address: Lingadzi House, City Centre P/Bag 394 Lilongwe 3; Telephone: (265-1) 77-1111;	evans-njewa@gmail.com
Western Africa	Mali	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on measures of adaptation to climate change impacts especially in developing countries	UNFCCC	M. Modibo Sacko, Point Focal National UNFCCC, Etat		Address: BP 1634 Bamako; Telephone: 223) 20 29 38 04;	ozone@afribone-mali.net
West Africa	Mauritania	The UNFCCC, apart from addressing issues	UNFCCC	la Convention Cadre sur le		A M. Sidi Mohamed El Wavi,	idjibril@yahoo.fr

		related to limiting greenhouse gas emissions, is also focusing on measures of adaptation to climate change impacts, especially in developing countries		Changement Climatique		Charge de Mission/ Point Focal National address: B.P. 170, Rue 21-185 No 834 Ksar Nouakchott; Telephone: (222) 524;	
Small Island State	Mauritius	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on measures of adaptation to climate change impacts, especially in developing countries	UNFCCC	Ministry of Environment, Sustainable Development, Disaster and Beach Management	http://environment.govmu.org/English/Pages/default.aspx	Mr Oomaduth Jadoo, permanent secretary, Address: Ken Lee Tower, Barracks Street, Port Louis; Telephone: (230) 212-7175;	ojadoo@govmu.org
Eastern Africa	Rwanda	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on measures of ad-	UNFCCC	Rwanda Environment Management Authority	http://www.rema.gov.rw/	Ms Coletha Uwineza Ruhamy, deputy director general. Address: B.P.7436 Kigali; Telephone: (250) 0851-	RwandaDNA@gmail.com, cruhamya@rema.gov.rw

		aptation to climate change impacts especially in developing countries				7589/0510-8082;	
West Africa	Sao Tome e Principe	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on measures of adaptation to climate change impacts, especially in developing countries	UNFCCC	Ministry of Infrastructures, Natural Resources and Environment		Mr Aderito Manuel Fernandes Santana; Meteorologist;	pofomucli@cstome.net, aderitosantana@hotmail.com
						Address: Aeroporto Sao Tome P.O. Box 670 Aeroporto; Telephone: (239)222-6017;	
West Africa	Sierra Leone	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on measures of adaptation to climate change impacts, especially	UNFCCC	UNFCCC national focal point for Sierra Leone	http://www.adaptation-undp.org/partners/ministry-lands-country-planning-and-environmentgovernment-sierra-leone/	Mr Alpha Bockari, director.	Address: F.18 Charlotte Street, Freetown; Telephone:

		in developing countries					
Eastern Africa	Somalia	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on measures of adaptation to climate change impacts, especially in developing countries	UNFCCC	Minister of State for Environment, Office of the Prime Minister		HE Mr Buri Mohamed Hamza, Address: Office of the Prime Minister; Telephone: (252-61) 5936903;	bhamza@hotmail.com
Southern Africa	South Africa	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on measures of adaptation to climate change impacts especially in developing countries	UNFCCC	International Climate Change relations & Negotiations, Department of Environmental Affairs	https://www.environment.gov.za/branches/climatechange_air_quality/	Mr Maesela John Kekana, chief director, Address: Private Bag X447 Pretoria; Telephone: (27-12)320-1421	mjkekana@environment.gov.za
Eastern Africa	South Sudan	The UNFCCC, apart from addressing issues	UNFCCC	Inspector for Multilateral Environmental		Mr Payai Manyok John,	john_manyok@yahoo.com

		related to limiting greenhouse gas emissions, is also focusing on measures of adaptation to climate change impacts, especially in developing countries		Agreements, Ministry of Environment		Address: Juba; Telephone: (211) 955 66 5017 Email:	
Northern Africa	Sudan	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on measures of adaptation to climate change impacts, especially in developing countries	UNFCCC	Higher Council for Environment and Natural Resources	https://www.wadapt.org/organisation/hcenr	Mr Omer Mohamed Eltom Elshami, secretary general Address: P.O. Box 10488 Khartoum; Telephone: (249-183) 78-4279;	hcenr2005@yahoo.com
Southern Africa	Swaziland	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on measures of adaptation to cli-	UNFCCC	Ministry of Tourism and Environmental Affairs	http://www.gov.sz/	Mr Emanuel Dumisani Dlamini, principal secretary	ed_dlamini@swazimet.gov.sz , fasi-dlamini@gmail.com

		mate change impacts, especially in developing countries				Address: Meteorology Department; Telephone: (268) 2404-6162;	
Eastern Africa	Tanzania	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing measures of adaptation to climate change impacts, especially in developing countries	UNFCCC	Vice Presidents Office	http://www.vpo.go.tz/environment/utawala.hph	Mr Richard Stanislaus Muyungi, assistant director of environmental as-assessment and focal point of climate change,	tanzania37@gmail.com
West Africa	Togo	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on measures of adaptation to climate change impacts, especially in developing countries	UNFCCC	de la CCNUCC, Direction de l'Environnement	http://www.unfccc.int/resource/docs/napa/tgo01f.pdf	Mr Komla Anzankpo Juriste, Point Focal National Address: 247, Rue des Nimes, B.P. 4825 Lomé; Telephone: (228) 221-3321/5197;	julesa-zakpo7@gmail.com, julesazakpo@yahoo.fr

Northern Africa	Tunisia	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on measures of adaptation to climate change impacts, especially in developing countries	UNFCCC	Ministry of Environment and Sustainable Development	http://www.environment.gov.tn/	Mr Mohamed Zmerli, head of section, Address: Centre Urbain Nord, Boulevard de la Terre, Tunis Telephone: (216-70) 72-8644/79 Email:	dgeqv@mineat.gov.tn , zmerli_mohamed@yahoo.com
Eastern Africa	Uganda	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on measures of adaptation to climate change impacts especially in developing countries	UNFCCC	Ministry of Water and Environment,	http://www.mwe.go.ug/	Mr Maikut Chebet, acting commissioner, Address: P.O. Box 28119 Kampala; Telephone: (256-41) 34-2931/33;	mwe@mwe.gov.ug , chmaikut@gmail.com
Southern Africa	Zambia	The UNFCCC apart from addressing issues related to limiting greenhouse gases emissions,	UNFCCC	Ministry of Lands, Natural Resources and Environmental Protection	http://thereddesk.org/countries/actors/industry-lands-natural-resources-	Mr Richard Mfumu Lungu, chief environment management officer,	mfumurichard@yahoo.co.uk

		is also focusing on measures of adaptation to climate change impacts especially in developing countries			<u>and-environmental-protection-zambia</u>	Address: Kwa-cha House, Cairo road, Box No. 30575, Lusaka; Telephone: (260-1) 22-9417;	
Southern Africa	Zimbabwe	The UNFCCC, apart from addressing issues related to limiting greenhouse gas emissions, is also focusing on measures of adaptation to climate change impacts especially in developing countries	UNFCCC	Ministry of Environment, Water and Climate	<u>http://www.environment.gov.zw</u>	Mr Washington Zhakata, director, Address: Private Bag 7753, Causeway, Harare; Telephone: (263-4) 70-1681/3;	washingtonzhakata@gmail.com, climatechange@environment.gov.zw

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