

Proposed Work Plan for Programme of Cooperation for Climate Change Adaptation in West Africa

Burkina Faso, Mali, Niger, Chad, South Sudan and Sudan
V4.0



Government of Greece

**World Meteorological Organization
(WMO)**

**Geneva, September 2009
Revised January 2012**

“The impact of climate change is already being felt in Africa and is posited to continue to be a serious challenge in the future. It is therefore vital for African governments to build resiliency into their infrastructure, agriculture, health and education sector developments, to be able to adapt to and combat climate change impacts seeking ways to collaborate with partners to build climate resiliency building by developing and mainstreaming climate risk assessment and climate information tools at macro and micro levels to influence development plans, policies and project designs”.

Extract, page 52, from the African Development Report 2007 on: Natural Resources for Sustainable Development in Africa, African Development Bank, 220 pages, Oxford University Press, November 2007.

The Government of Greece has established a Trust Fund in collaboration with the World Meteorological Organization (WMO) to support Climate Change Adaptation in East and Central Africa (Burkina Faso, Chad, Mali, Niger, Sudan and Uganda) through improvement of climate and weather monitoring networks and enhancement of capacity for development and dissemination of climate information services to support adaptation across economic sectors, especially agriculture, water and health. The initial Intervention Phase is covers the period January 2010 to December 2011. This document describes the actions and investments to be supported by the Trust Fund.

Executive Summary

Climate variability lies behind much prevailing poverty, food insecurity, and weak economic growth in Africa. Poor rural people with limited choices, least access to resources, and climate sensitive livelihoods, are most at risk from climate uncertainty. Some 200 million of the poorest people in Africa are food insecure, many through their dependence on climate sensitive livelihoods and resources – predominantly wild crops, rain-fed agriculture and natural water sources. Similarly, the national economies based on rain-fed agricultural production, and those employed by or supported by related or downstream sectors, are highly vulnerable to seasonal climatic fluctuations and variability. Hydro-power production, irrigation resources, fisheries, pastoralism, post-harvest industries, inhabitants of settlements liable to flood (and many more), are all 'at risk' from a variable climate.

The value of accurate climate and weather information today is clear: seasonal, monthly and shorter term weather predictions are a crucial early warning tool capable of averting disaster and saving lives and livelihoods. While improving the quality and availability of weather-related information promotes development by facilitating agricultural decision-making, the supply of insurance, as well as commercial operations in a number of business sectors, such as energy and transport. Moreover, better local knowledge of the changing climate also enables more effective adaptation to that change.

Yet reliable climate and weather data and forecasts are simply not available for many of the world's poorest and most vulnerable communities. Despite the existence of sophisticated satellite imagery, standard meteorological data collected on the ground still forms the basis of weather forecasting and climate prediction. And developing countries – those who suffer the brunt of climate change – have the least number of ground-level weather data collection stations to form this basis, with some 8,000 basic stations lacking on the African continent alone. While on the delivery side, many remote communities or, for example, fishermen are not receiving existing weather forecasts and warnings in good time, if at all.

Through the greatly improved provision of accurate weather forecasts and early warnings, this initiative aims to help improve crop planning and increase agricultural productivity, limit the spread of climate sensitive diseases and epidemics, and reduce the socioeconomic impact of extreme climatic events. This will be achieved through reinforcing the capacity of national meteorological and hydrological services, empowering them to deliver more accurate weather predictions in the long term and demonstrating the positive impact of improved climate and weather services on the social and economic lives of rural people in Africa.

This initiative will be a major contribution towards implementation of the Global Framework for Climate Services endorsed by governments at the World Climate Conference 3 in Geneva in September 2009.

Glossary of Abbreviations

ACMAD	African Centre of Meteorological Application for Development
AGRHYMET	Agro-Hydro-Météorologie Régional Centre
AU	African Union
AWS	Automatic Weather Station
CC	Climate Change
CCAA	Climate Change Adaptation in Africa
CLACC	Capacity strengthening of the Least Developed Countries for Adaptation to CC
CILSS	Permanent Interstates Committee to control Drought Control in the Sahel
CRM	Climate Risk Management
CBD	Convention on Biological Diversity
CCD	Convention to Combat Desertification
DRM	Disaster Risk Management
DFID	Department for International Development, United Kingdom
DMCN	Drought Monitoring Centre
ENSO	El Niño Southern Oscillation
FAO	Food and Agriculture Organization
FCCC	Framework Convention on Climate Change
GAW	Global Atmospheric Watch
GCOS	Global Climate Observation System
GEF	Global Environment Facility
GIS	Geographic Information System
ICPAC	IGAD Climate Prediction and Applications Centre
IGAD	Intergovernmental Authority on Development in Eastern Africa
IFAD	International Fund for Agricultural Development
IPCC	Intergovernmental Panel on Climate Change
LDC	Least Developed Country
NEPAD	New Partnership for Africa's Development
NMHS	National Meteorological and Hydrological Service
NMS	National Meteorological Service
NOAA	National Oceanic and Atmospheric Administration
OSS	Observatoire du Sahel et du Sahara / Sahara and Sahel Observa tory
PRESAO	Prévision Saisonnière en Afrique de l'Ouest / Seasonal Forecast for W Africa
RCOF	Regional Climate Outlook Forum
UN	United Nations
UNDP	United Nations Development Programme
UNECA	United Nations Economic Commission for Africa
UNFCCC	United Nations Framework Convention on Climate Change
UNDP	United Nations Development Program
UNEP	United Nation Environment Program
WHO	World Health Organization
WMO	World Meteorological Organization

1. Introduction

Africa is one of the most vulnerable continents already critically exposed to the adverse impacts of climate variability, and it is anticipated that this situation will be even more aggravated by climate change. The IPCC Fourth Assessment (AR4) and other reports such as the 2006 Stern Review highlighted the potential sectoral impacts of Climate Change in Africa. IPCC has reported widespread warming in Africa, with accelerated trends in the recent decades, especially over northern and western Africa and particularly the Sahel. IPCC has projected further increase in temperatures towards the end of the 21st century, and decreased precipitation over large parts of Africa. Extreme climate and climate induced events such as floods, droughts, desertification, sand and dust storms, desert locust plagues and water shortages will increase in frequency and severity.

Most likely impacted sectors include agriculture and food security, water resources (for drinking, industry, agriculture and transport), public health and infrastructure. In Africa's agriculture sector, the continent's poorest people will be most at risk, particularly those in marginal areas such as sub-Saharan Africa¹ (reference with generally low agricultural productivity dependent on sparse and variable seasonal rainfall). The projected climate changes will affect crop yields, livestock management and location of production with important risks for food security, farm income and land abandonment. Food production risks could become an increasingly significant issue as heat waves, droughts and pests are likely to increase the incidence of crop failures. As yield variability increases, the global food supply will be at increasing risk.

Climate change is expected to intensify Africa's increasingly critical water situation. According to UNEP, 14 African countries currently experience water stress and water scarcity, a further 11 countries will join them in the next 25 years. More than half of African countries and some 460 million people (32% of the population) will be affected. In the health sector, many sub-regions, including the Sahel, Southern and Eastern Africa, will experience increased outbreaks and severity of vector borne diseases such as malaria, cholera, yellow fever, trypanosomiasis and rift valley fever. Increased incidence of extreme weather events (droughts and floods) will increase the risk of social displacement and migration, and its associated morbidity and mortality. Food and water shortages will also exacerbate disease. Conflicts for access to and control of key livelihood resources such as land and water may increase (as is currently experienced in Darfur, northern Kenya and Sahelian part of the continent). Sahelian pastoralists are increasingly moving southward for grazing of their animals, leading to crop destruction and the consequent conflicts.

The four scientific assessments by the Intergovernmental Panel on Climate Change (IPCC) in the past 20 years have highlighted to the world the fact that there have been significant advances in our knowledge of global and continental scale climate and climate change in the past decade. However, the reports also recognized the large gaps that exist in provision of information at national and regional scales, which impedes robust assessments of regional and local scale impacts of climate change.

Considering that the adaptation strategies to deal with the adverse impacts of climate change are developed, and actions taken at the regional and local scales, it is imperative that this gap in resolution of information be addressed as a matter of priority to integrate climate risks into decision making. As the climate change processes span global to local scales over a wide range of time scales, it is important to put in place a mechanism to generate and deliver climate change information across all relevant spatial and temporal scales in an efficient manner.

The lack of appropriate climate information at relevant scales is often cited as a major obstacle to addressing the challenges of climate variability and change in Africa. Many current intervention efforts seek to implement on-the-ground adaptation projects, while neglecting the enhancement of climate institutions to generate appropriate information that will support development and adaptation efforts. This has led to calls by African policy makers and development partners for urgent improvement in the provision of appropriate climate (and weather) information to support economic development, improve resilience to weather and climate variability and support adaptation to climate change. The Assembly of the African Union's Decision on Climate Change and Development (2007) "calls upon African cooperating partners to support the Member States and Regional Economic Commissions to effectively integrate adaptation and mitigation measures into their development plans and implement them".

¹ UNCCD report <http://en.ird.fr/all-the-current-events/news/press-releases/declaration-of-niamey>

2. The Problem to be addressed

Climate variability and climate change and essential economic development in Africa present a complex suite of problems and opportunities that need to be addressed urgently, coherently and at appropriate scales.

Climate variability lies behind much prevailing poverty, food insecurity, and weak economic growth in Africa. Poor rural people with limited choices, least access to resources, and climate sensitive livelihoods, are most at risk from climate uncertainty. Some 200 million of the poorest people in Africa are food insecure¹, many through their dependence on climate sensitive livelihoods and resources – predominantly wild crops, rain-fed agriculture and natural water sources. Similarly, the national economies based on rain-fed agricultural production, and those employed by or supported by related or downstream sectors, are highly vulnerable to seasonal climatic fluctuations and variability. Hydro-power production, irrigation resources, fisheries, pastoralism, post-harvest industries, inhabitants of settlements liable to flood (and many more), are all 'at risk' from a variable climate.

Increased Climate Variability: The impact of climate on the livelihoods of many people is expected to increase with climate change due to anticipated increases in climate variability. For example droughts and/or floods are expected to increase in frequency and duration. This will have impact on crop production, seasonal water resources, malaria prevalence and other climate sensitive aspects of people's livelihoods. Recently, weather and climate related disasters have been perceived as more common than before, and with increased impact.

Impact: Africa is projected to experience a disproportionately large impact from global warming, especially in comparison to its role in generating the problem (Figure 1).

Climate Services, Information and Data: Most agencies responsible for the delivery of Climate Information and Services in Africa, a role usually played by the National Meteorological Services (NMS), need assistance to address these issues. At present climate data and related information is little used in development processes in Africa because of weaknesses in all elements of the climate service chain: climate observation networks are in decline; investment in climate services is weak; knowledge and skills capacity is very poor and there is little awareness of the socio-economic benefits of improved decision making based on high quality information and services. As a result, development institutions working in climate-sensitive sectors are seldom oriented to managing climate risks.

Climate Risk Management (CRM): At present 'best practices' in CRM are usually found in disaster risk response and food security management. Food relief is a large and growing problem. More needs to be done to reduce food relief demands through (e.g.) more productive smallholder agricultural practices. There is great need to assist institutions in Africa to strengthen and build on (Climate) Risk Reduction practices in food security, and use this expertise to develop and deliver benefits in all climate sensitive sectors, particularly those like agriculture that are directly related to poverty reduction and economic growth.

Broader information needs: One of the key problems related to provision of timely food relief (and responses throughout the whole range of climate sensitive aspects of livelihoods and economies) is lack of confidence in currently available information as to the magnitude and extent of (e.g.) a developing problem and impending food crisis. To be effective, interventions must address this continental set of problems with strengthened

- a) observation networks (weather, climate, hydrology and environment)
- b) climate and environmental products and services,
- c) CRM decision making practices in all climate sensitive sectors,
- d) forward-looking policies incorporating climate risk adequate communication and networking to ensure all stakeholders have access to the best available information in relation to their decision needs.

¹⁾ uneca.org/eca_programmes/sdd/events/climate/climdev.pdf

e) Unfortunately, there is very little existing capacity in African countries to generate regional/national scale climate change information of appropriate resolution to meet adaptation needs. Climate monitoring networks are generally sparse and inadequate for the task. The capacity of the National Meteorological Services (NMS) to generate useful information that enables the development and implementation of effective policies to combat the threats of climate change is weak. Significant investment is needed in expanding as well as upgrading the currently available observations and information systems. Accordingly, human capacity to provide useful sector-specific climate data and information has to be provided.

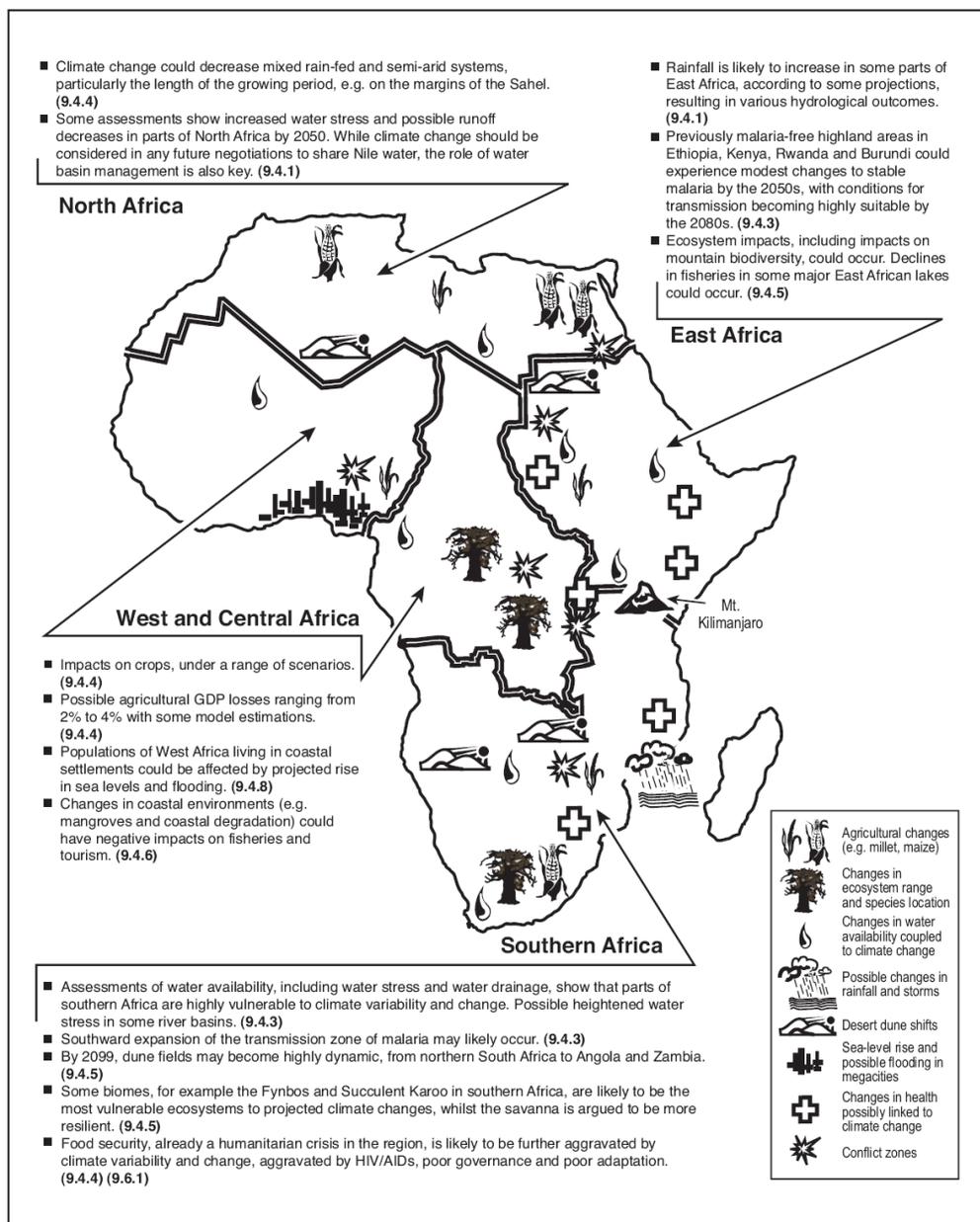


Figure 1. Examples of current and possible future impacts and vulnerabilities associated with climate variability and climate change for Africa (for details see sections highlighted in bold). (Source: IPCC AR4 Working Group 2 Report, 2007).

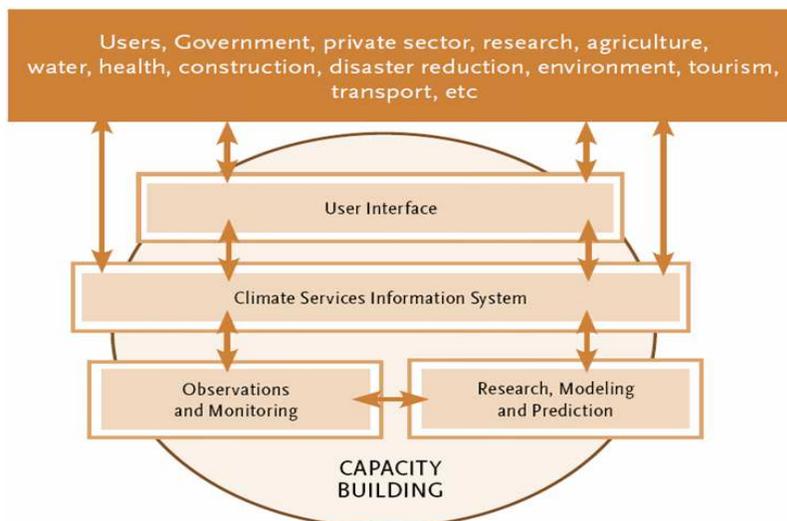
3. The suggested solution by the global community – the Global Framework for Climate Services

The Global Framework for Climate Services (GFCS) was endorsed by Heads of States and Governments, Ministers and Heads of Delegation representing more than 150 countries, 34 United Nations Organizations and 36 Governmental and non-Governmental international organizations at the Third World Climate Conference (WCC – 3) where they unanimously adopted a Declaration establishing the GFCS to strengthen the production, availability, delivery and application of science-based climate prediction and services. The Sixteenth Session of the World Meteorological Congress (May 2011) endorsed the decision and set in motion a process to develop an implementation plan for GFCS

The Global Framework for Climate Services is envisaged as a set of international arrangements that will coordinate global activities and build on existing efforts in order to provide climate services that are truly focused on meeting user needs, are available to those who need them and that provide the greatest benefits possible from knowledge about the climate. The Framework is intended to provide widespread social, economic and environmental benefits through more effective climate and disaster risk management. In particular, it will support the implementation of climate change adaptation measures, many of which will require climate services that are not currently available. The Framework is expected to bridge the gap between the climate information being developed by scientists and service providers and the practical needs of users. It would ensure that every country is better equipped to meet the challenges of climate variability and change.

Essential parts to the implementation of the GFCS are Regional and National Frameworks for Climate Services. These are binding legal agreements which are endorsed by all involved national stakeholders and which effectively combine the 5 pillars of the global framework:

1. **The User Interface Platform** will provide a means for users, climate researchers and climate service providers to interact, thereby maximising the usefulness of climate services and helping develop new and improved applications of climate information.
2. **The Climate Services Information System** is the system needed to protect and distribute climate data and information according to the needs of users and according to the procedures agreed by governments and other data providers.
3. **The Observations and Monitoring** component will ensure that the climate observations necessary to meet the needs of climate services are generated.
4. **The Research, Modelling and Prediction** component will assess and promote the needs of climate services within research agendas.
5. **The Capacity Building** component will support systematic development of the necessary institutions, infrastructure and human resources to provide effective climate services.



4. Goal and Objectives

By 2015 the framework will establish:

1. A global system to routinely **generate** and electronically **exchange** an extensive set of defined climate data and data products
2. An initiative in developing countries to **upgrade the climate service capacities** and strategies of all vulnerable and low-capacity countries to a baseline level
3. An initial suite of **new knowledge products** – protocols, tools, products and services – developed through multiple initiatives on **user interfacing** and services development
4. An ongoing **governance mechanism** that drives the Framework's development, particularly by engaging and mobilizing stakeholders, user communities and new resources

The overall goal of the projects within this proposal is **to reduce vulnerability to climate variability and change and promote climate resilience in the agriculture, health, disaster risk reduction and water sectors in participating countries.**

The overarching objective is **to improve the availability, exchange, dissemination and use of climate information and related services in support of economic growth and achievement of the MDGs, working at local, national and regional levels in sub-saharan Africa.**

The main objectives are the following:

- To demonstrate the positive impact on lives and livelihoods of improved use of customised climate information products in the agricultural, health and water sectors through a series of pilot interventions that will have the potential for scaling up.
- To strengthen the capacity of national institutions and in particular the National Meteorological Services to provide better climate services to national governments, the business sector and local communities in general and in particular to the agriculture, water, disaster risk reduction and health sectors.
- To strengthen the regional support networks and regional institutional capacities of ACMAD, AGRHYMET and ICPAC by establishing a climate information and services framework and climate change adaptation strategy that will enable production of essential information products and services for various economic sectors based on state-of-the-art global products, and facilitate their application within the countries in particular to agriculture and food production, water, disaster risk reduction and health.

Outcomes

The expected results of the project, within the overarching aim of facilitating improved regional/national climate information for decision making in climate change adaptation, are:

- case studies or templates of examples of how National Frameworks for Climate Services can be developed. Early drafts of these will be available for the Extraordinary Congress on GFCS in October 2012;
- verified impact of the improved use of climate information in sectoral decision making in the context of climate change adaptation in the agricultural, health, disaster risk reduction and water sectors with associated impact on lives and livelihoods of rural communities (i.e. increased yield, less water use through more effective planning, reduced child mortality rate, etc. maybe guide ourselves by the indicators of the MDGs for some of this);
- provision of continuous, standardized data for all essential climate variables (ECVs), including rescued historic data, (<http://iedro.org/>) for different meteorological and climatological applications by using rehabilitated and upgraded observational networks;
- provision of appropriate and user friendly climate services as well as provision channels (i.e. user friendly webpage with easy to find and usable climate services) by enhancing the knowledge on modern meteorological and climatological methods and tools of climate experts in the NM(H)Ss ;

- improved contributions of the project countries to the Regional Climate Outlook Fora processes¹, and operational implementation of National Climate Outlook Forums (NCOFs) within the project countries as an integral component of national climate services;
- enhanced interaction between the NMHSs and the Health communities by setting up a Climate and Health working group in Burkina Faso and preparing further ones in the other two countries. From these groups will develop specific, health-related services that build on initial work in the field of meningitis and malaria.

¹ Regional Climate Outlook Fora RCOFs bring together national, regional and international climate experts, on an operational basis, to produce regional climate outlooks based on input from NMHSs, regional institutions, Regional Climate Centres (RCCs) and global producers of climate predictions. It has enhanced feedback from the users to climate scientists, and has catalyzed the development of many user specific products. RCOFs also review impediments to the use of climate information, experiences and successful lessons regarding applications of the past RCOF products, and enhance sector-specific applications. These RCOFs then lead to national forums to develop detailed national-scale climate outlooks and risk information including warnings for communication to decision-makers and the public.

5. Project Components

To address the broad range of climate-related issues that confront many parts of Africa, this proposal sets out in five components how activities should be developed under the Global Framework for Climate Services. In particular, it addresses the need to develop national and regional capacity in the participating African countries (Burkina Faso, Mali and Niger) to deliver climate information and services at national and regional level. The provision of services will be developed with a focus on four key sectors - agriculture, water, disaster risk reduction and health - by the National Meteorological and Hydrological Services (NMHSs). The projects will also help develop the capacity of the key intergovernmental institutions in Africa that focus on climate matters, Agro-Hydro-Météorologie Regional Centre (AGRHYMET) and the African Centre of Meteorological Application for Development (ACMAD), to provide required support and to provide climate information to meet societal needs.

In order to strengthen and make best use of knowledge of climate change this intervention will focus its efforts in four key areas:

1. **Knowledge (User Interface Platform):** Strengthen the links between science and policy by enhancing access to information and knowledge on how best to use it, including improving the national/local relevance of information and communication between climate information providers, policy makers; development practitioners and communities.
2. **Networks (Observations and Monitoring):** Improving the regional and national networks of climate data and information service providers in order to strengthen capacities, improve synergies, and support collaboration;
3. **Tools (Climate Information System):** Enhance tools to assess climate change vulnerability and impact, including impacts of extreme events;
4. **Capacity Building:** Strengthen national capacities to monitor, predict and evaluate climate hazards, risks and impacts, and to use information better in adaptive planning and disaster risk reduction

To achieve the objectives the project will include the following intervention components operating at both regional and national levels for improvement of climate services.

1. **Development of a framework of regional and national climate services**
2. **Rehabilitation and upgrading of the observation network**
3. **Training and capacity building for the agriculture sector**
4. **Upgrading of the climate data management systems including climate data rescue**
5. **Demonstration projects focused on development and use of customised climate information products e.g. in the health sector.**

Component 1: Establishing National and Regional Frameworks for Climate Services for Improved use of Climate Information and Services in Burkina Faso, Mali and Niger.

This component of the proposal addresses the need to develop regional capacity for west Africa and national capacity in the participating countries (Burkina Faso, Mali and Niger) to deliver climate information and services. This will be done through reinforcement of the National Meteorological and Services (NMSs) responsible either in part or wholly for developing and providing many of these services. The project will also help develop the capacity of the key intergovernmental institutions in Africa that focus on climate matters, African Centre of Meteorological Application for Development (ACMAD) to provide the required support and to provide climate information to meet societal needs.

Activities within this component are:

- a) At the regional level: to run one facilitated Early Warning > Early Action Workshops for the West Africa region. The event will use a novel - but tested - approach to bring together key cross-sector stakeholders including national disaster managers and climate service providers at the regional and global levels.
- b) At the national level: Early Warning > Early Action Workshops for Burkina Faso, Mali and Niger, using a novel - but tested - approach to bring together key cross-sector stakeholders (ag, water, DRR and health).
 - 4-day events run in each of the above named countries
 - Brings together **ALL** national stakeholders involved in for example disaster management, those from principle sectors (including health, water, DRR and agriculture), government ministries, NGO's as well as climate service providers.
 - These stakeholders are mapped and approached in person by the facilitator of the workshops before the actual workshop in order to ensure national buy-in (or something like that)
 - Events are run in a facilitated way that build to explicit GFCS-related outcomes.

The key aim is to test a methodology which shall facilitate the process towards the creation of a National Framework for Climate Services, a legal binding agreement that assigns key responsibilities to the involved partners in terms of the provision and use of climate services.

The three objectives for the Early Warning-Early Action workshops are to:

1. Introduce the different communities of practice (climate scientists and communities at risk), allowing them to realize and appreciate the gap separating them;
2. Build common ground, identifying areas of joint complementary work and overlapping interests as a basis for partnerships, and whet a thirst for further interactions;
3. Close the Gap, and identify way forward to sustain the bridge between participants for further climate information communication from scientists to community end-users and back.

Component 2: Rehabilitation and upgrading of the GCOS observation network in West Africa.

Information from climate and weather observation stations forms the basis for all meteorological and climatological activities, both nationally and regionally. This component includes the following activities:

- development plan for the rehabilitation and upgrading of the observation networks based on a survey on existing facilities and assessment of the needs of each country in coordination between WMO specialized personnel and the countries respective partner;
- rehabilitation of existing observing stations with special emphasis on the Global Climate Observing System (GCOS) stations and establishment of new stations with automatic data transmission as required to support agricultural, health, disaster risk reduction and water sectors;
- training of the maintenance personnel.

Commitment of the country to search for and apply the necessary funds to maintain the stations, networks, databases and maintenance personnel should be ensured.

Component 3: Capacity Building in the Agricultural Sector

Building capacity of national climate experts to make optimal use of the state-of-art climate products, tools and techniques available globally and regionally and also to develop user-focused products and services is a critical element of this support. The project aims to involve the user in the agricultural sectors in the capacity building activities to help them interpret and use climate information in a more efficient manner. Efforts are also needed to build awareness among the user sector about the relevant aspects of climate information and improve their capacity to use the information more efficiently.

The project has excellent support the activities ACMAD and AGRHYMET as regional centres for capacity building in climate services to provide more broad based and sustainable avenues for capacity building.

- training of the agricultural meteorologists of the NMSs
- Capacity building of user communities in agricultural sector in efficiently and effectively using the climate information for adaptation and risk management.

There are 3 streams of work under this component:

1. For Sudan & S Sudan – the funding will be kept on hold for a time. Until the WMO team who recently visited S Sudan report back.
2. For Chad – the Introduction to Roving Seminars is proposed. This is the foundation level work to establish the concept.
3. For B Faso, Mail and Niger – the more developed METAGRI-OPSs project is appropriate, following the work that has already been done in these countries with the roving seminars.

Component 4: Implementation of data rescue programs in Chad, Burkina Faso, Mali and Niger and producing national climatologies for B Faso.

1. There is a great deal of historic data, critical to assessment of climate trends, still in paper format and therefore vulnerable to damage or total loss. This component will see data rescue activities carried out in the project countries according to the procedures developed for the WMO DARE² Project
2. The meteorological and climate data management systems in many countries are out-dated or non existent. The introduction of modern data management and interpretation techniques with compatible and exchangeable data formats to developing countries will greatly facilitate and

² DARE – Climate Data Rescue and Digitization Program.

³ENACT - Enhanced National Climate Time-series

enhance data exchange and co-operation. One example is the ENACT³ work in Ethiopia to develop a national climatology, where combining cleaned-up observational data with satellite output to create a valuable and accessible resource for other sectors to use.

This part of the component is concerned with replicating this work in Burkina Faso.

Component 5. Demonstrating the social and economic benefits of improved access to climate information in the health sector in Burkina Faso, Mali and Niger.

The effects of climate on health are now well known. If the health sector expects to appropriately adapt to greater variability and longer term changes in the world's climate systems, then weather and climate information must be taken into greater consideration in health science, practice, and policymaking. To respond to such a significant sectoral need, wide-scale investments in new mechanisms and tools to generate and disseminate weather and climate information are being instituted. For such services to be developed in ways which respond to end-user needs and rendered effectively, extensive dialog between providers and users of climate information must occur.

Many parts of West Africa are affected by several climate-related diseases such as malaria and meningitis. In order to assist the health sector to cope with these diseases through better application of climate and weather information, it is proposed to use the approach already applied to some NMHSs in Africa, namely the establishment of "*Climate and Health Working Groups*" (CHWG).

In setting up a CHWG, the overall objective is to bring together experts and officials from the Met Service and the health sector to discuss the role and impact of weather and climate on the development of the two most important diseases in the region, namely malaria and meningitis, and to develop strategies for a system of surveillance and early warnings; how to apply weather and climate information in the prevention and treatment of those diseases. The final outcome would be the establishment of a CHWG.

The first step in the establishment of a CHWG is to organize a National Workshop with the participation of various stakeholders identified jointly by the Met Service and the health sector. This National Workshop has already been held in B Faso and the CHWG has been set up. Work is now needed to take the results of this workshop forward, and implement the plan prepared by the CHWG. In Mali and Niger, there is a need to hold the National Workshop and subsequently to establish the CHWG.

The Key expected outcomes of the CHWGs are:

- Improved service delivery (to the benefit of health services and the participating NMHS);
 - Enhanced capacity in NMHSs; and
 - Enhanced capacity to use weather and climate services in the health sector.
-

6. Overview of Financials

(more detail in Annexes on each component)

1. Component 1 – GFCS

- a. USD 150K to develop and improve the existing regional framework for development of climate services.
- b. USD 100K to assist in the development of national frameworks, running EW>EA workshops in B Faso, Mali and Niger.

2. Component 2 – GCOS

- a. USD 140K to improve data coverage of ground-based/upper air stations in the region.

3. Component 3 – MetAgri-Ops

- a. USD 260K to continue the operationalization of MetAgri-Ops in Burkina Faso, Niger, Mali (160K), introduce MetAgri work into Chad and Sudan (USD 100K)

4. Component 4 – Data Rescue and Strengthening of Climate Data Systems

- a. USD 35K to support the data rescue efforts in West Africa through the WADARE (West African Data Rescue Initiative).
- b. USD 200K to develop national climatologies and deliver an increased range of data through improved NMHS websites (using the proven ENACT method used in Ethiopia, to produce high quality, online databases for B Faso, Mali, Niger).

5. Component 5 – Improved access through demonstrations (Health and Climate)

- a. USD 200K to establish Climate and Health Working Groups in B Faso, Mali and Niger.

Miscellaneous

- a. Maintain funds for work in South Sudan once initial engagement has been quantified.
- b. Ad-hoc costs around whole project management.

Component	Countries	Funding (Euros)	Funding (USD)
1 - GFCS	B Faso, Mali and Niger	189K	250K
2 - GCOS	B Faso, Mali, Niger and Chad	106K	140K
3 - MetAgri-Ops	B Faso, Mali, Niger, Sudan and Chad	197K	260K
4 - Data Rescue	B Faso, Mali, Niger, Sudan and Chad	178K	235K
5 – Health and climate	B Faso, Niger and Mali	151K	200K
Miscellaneous		60K	78K
Overheads (13%)		115K	151K
Total		995K	1314K

Assuming 1 EUR = 1.31991 USD (31 Jan 2012)

Note: Miscellaneous line is partly for work to oversee the project as a whole, including liaison with stakeholders in the regions and countries concerned.

7. Implementation

7.1 Initial Phases of Project Plan

December 2011	Planning phase 1 – Generation of draft proposal and circulation to WMO programmes including technical areas and regional office.
January-February 2012	Planning phase 2 – Engagement with key delivery partners and focus countries.
February-March 2012	First Implementation Phase – in-country work to progress initial stages (this is country and project dependent – refer to annexes for more detail).

7.2 Institutional regional framework

A number of regional organizations have been working in the Sahelian Region in climate change and climate and weather services in collaboration with NMSs and will be engaged by the project activities to varying degrees.

ACMAD. African Centre of Meteorological Application for Development provides national, regional and continental meteorological information. www.acmad.ne/en/homepage.htm

AGRHYMET. The Regional Training Centre for Agrometeorology and Operational Hydrology, is a CILSS specialized institution with the mission of promoting information and training about food security, desertification control and the management of natural and water resources. Disseminating agrometeorological information to reduce vulnerability to current climate variability. Provide seasonal forecasts and information on current climate variability to farmers. www.agrhymet.ne/

CILSS. Comité Inter-Etats pour la Lutte contre la Sécheresse au Sahel deals with regional Food security issues in the Sahel and impacts of climate change, Improved use of water; solar powered pumping of groundwater, small-scale irrigation, and natural resources management. www.cilss.bf/

ECOWAS. Economic Community of West African States (ECOWAS), is a regional group of sixteen countries. Coordination of regional climate change activities. www.ecowas.net

ICPAC. IGAD Climate Prediction and Applications Centre deals with the regional dissemination of meteorological data such as seasonal forecasts, and assess vulnerability to current climate variability. Climate data helps adaptation to current variability. www.icpac.net

CCAA. Climate Change Adaptation in Africa (CCAA) Regional capacity strengthening for adaptation; projects all run by Africans, in Africa Projects vary but include developing tools for relaying meteorological information (Benin), communicating adaptation via plays (Nigeria), developing methods for increased smallholder production (Zambia and Zimbabwe). Scope is increasing in areas of climate change adaptation in Africa. www.idrc.ca/ccaa/

PIREM. Platform of Regional Institutions for the Environment and Meteorology. www.agrhymet.ne/PIREM/index.html

IDRC. International Development Research Centre implemented the project on Climate Change Adaptation in Africa (CCAA) with DFID, focusing on reducing agricultural vulnerability to present and future climate. Varied, for example: integrating data from CC scenarios into water planning, running a radio play about adaptation. www.idrc.ca

RANET. Radio and Internet for the Communication of Hydrometeorological Information for Rural Development Global Communicating information on current variability for climate risk management. Seasonal forecasts and current meteorological information helps adaptation to current variability. www.ranetproject.net/

WAMIS. World Agrometeorological Information Service provides data on current variability, and agrometeorological tools, to farmers and decision makers. Provides data and tools to help farmers manage current climate variability, e.g. regular agro-meteorological bulletins. <http://www.wamis.org/>

7.2 Ongoing Programmes, Projects and Initiatives in the project region

A number of programmes, projects and initiatives related to the subject of climate change and adaptation are underway in the region. The proposed project on climate change and adaptation will take these into account and where possible build on or collaborate with existing activities as appropriate to avoid duplication of efforts and to ensure synergy. A summary of relevant programmes and projects is given.

Programme of Cooperation for Development of NMHS of West African countries.

This programme supported by the Government of Spain began in 2008 and is executed jointly by WMO and AEMET (Spanish Meteorological Agency). The overall objective of the Programme is to enhance the capacity of the NMSs of West African countries and provide them with the relevant tools that will allow them to contribute to the sustainable development of their respective countries and enhance the delivery of products and services to the various socioeconomic sectors that are essential for them. Marine meteorology, agricultural meteorology and food security, training and capacity building of NMHS are among the topics covered by this Programme. Participating countries include Benin, Burkina Faso, Cape Vert, Côte d'Ivoire, Gambia, Ghana, Guinea Bissau, Guinea Conakry, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone and Togo.

West and Central African Network on Climate Change and Food Security.

WMO organized an International Workshop on Adaptation to Climate Change in West African Agriculture in Burkina Faso from 27-30 April 2009, co-sponsored by the Food Agriculture Organization (FAO), the State Agency for Meteorology of Spain (AEMET), the African Development Bank (AfDB), the Economic Community of West African States (ECOWAS), the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), the International Livestock Research Institute (ILRI) and the General Directorate of Civil Aviation and Meteorology of the Government of Burkina Faso. The workshop brought together over 70 experts and key decision-makers to discuss and recommend climate change adaptation options for the agriculture, livestock, forestry and fisheries sectors in West Africa.

Following are some relevant recommendations for the Climate Change and adaptation project:

- Put forward strongly the primordial role of weather and climate services and products in developing adaptation solutions to climate change in West African agriculture in the national development policies.
- Improve water resource management and focus it primarily on enhancing food security in the region.
- Establish, as part of the implementation of the ECOWAS Sub-regional Action Programme on Climate Change, a Technical Secretariat comprising of competent institutions at the national and regional level
- Request ECOWAS, as the lead institution, assisted by CILSS, to support the Technical Secretariat. At the national level, the Ministry of Agriculture, in coordination with the National Meteorological and Hydrological Services (NMHSs) should support the Technical Secretariat.

WMO, with support from the World Bank/Global Facility for Disaster Reduction and Recovery (GFDRR) is implementing **a project to demonstrate the key elements of an effective climate risk management strategy for the Greater Horn of Africa (GHA)**. Sudan is one of the ten countries targeted for this project. The project will develop practical climate information models and products for use in regional and national applications. The project will focus on the agriculture/food security and water resource sectors.

With support from Korea International Cooperation Agency (KOICA), WMO is also implementing **a project on developing a Regional Climate Framework in Eastern Africa**, through ICPAC. Sudan is on of the beneficiary.

8. Monitoring and Evaluation

8.1 Steering Committee

The project will establish a **Steering Committee** with participation of representatives of the Government of Greece, WMO, project countries and others as required. The Steering Committee is the highest executive body of the project. The Steering Committee will guide the activities of all project components and approve the detailed work plans and budget allocation.

8.2 Project Management and Risk Assessment

The project will be implemented by WMO as Executing Agency in collaboration with the NMHSs of project countries of Burkina Faso, Mali and Niger. Individual agreements between WMO and individual project countries will be signed reflecting the mutual commitment to implement the project activities specific to each country and achieve expected outcomes as defined.

WMO will:

- be responsible for the recruitment of any experts and consultants, in accordance with WMO Regulations and Rules. The selection of experts shall be made in collaboration with the participating countries.
- be responsible for all administrative and legal arrangements with the Governments of the recipient countries in respect of the personnel of the programmes and projects as well as all other aspects connected with the implementation of the training programmes.
- provide the Government of Greece with appropriate progress reports as well as copies of other reports prepared under the Project.
- transfer the equipment procured through the Programme/Project to the National Meteorological Services of the recipient countries or to the designated regional institutions.
- facilitate the participation of the official or designated representatives of Greece in any review, evaluation of other meetings or mission concerning the implementation of the project.
- specifically state that the Government of Greece has made available the financial resources in all its publications and reports concerning the activities under the project.

The progress effectiveness, efficiency, impacts and sustainability of the project will be planned and monitored by the Project Organisation and the Competent Authorities through regular planning and reporting system which will include the following reports:

- annual work plans;
- annual financial and progress reports (the last six-month reports cover the whole year and are included in the annual monitoring reports)
- an appropriate risk assessment process will be established around the project.

The above plans and reports shall meet the requirements of the Guidelines given by the Government of Greece.

The meteorological support program implementation work plan will schedule project activities and set deadlines when program key milestones are to be achieved. The progress of the program will be evaluated in regular meetings where the achievements and constraints are reported. The meetings will constitute an important internal indicator on assessing the effectiveness of implementation activities. External monitoring will be by production of progress reports on a regular basis.

A final evaluation will be carried out at the end of the external support phase. Financial reports will be presented every six months. Towards the end of the program an evaluation will be done. The evaluation will include a seminar in which all the parties including a representative of the donor and an external consult will participate. The evaluation procedure should follow the approach presented in the Guidelines given by the Government of Greece.

Risk Assessment and Monitoring

Key risks will be identified through the early stages of implementation such as financial, political and resource constraints. These will be mitigated wherever possible to an appropriate level.

Country-Specific Investment through this Proposal

Burkina Faso

Component and Title	Funding (USD)	Remarks
1 - Establishing National and Regional Frameworks for Climate Services	Proportion of 250,000	Split across 3 countries
2 - Upgrading of GCOS stations	Proportion of 140,000	Dependant on needs assessment
3 - Extending MetAgri-Ops	Proportion of 160,000	Split across 3 countries - dependant on actual work activities to be planned
4 - Creation of National Climatology plus Data Rescue	200,000 plus a proportion of 35,000	- Split across countries involved with WADARE
5 - Establishing a Climate and Health Working Group.	Proportion of 200,000	-

Mali

Component and Title	Funding (USD)	Remarks
1 - Establishing National and Regional Frameworks for Climate Services	Proportion of 250,000	Split across 3 countries
2 - Upgrading of GCOS stations	Proportion of 140,000	Dependant on needs assessment
3 - Extending MetAgri-Ops	Proportion of 160,000	Split across 3 countries - dependant on actual work activities to be planned
4 - Data Rescue	Proportion of 35,000	Split across countries involved with WADARE
5 - Establishing a Climate and Health Working Group.	Proportion of 200,000	-

Niger

Component and Title	Funding (USD)	Remarks
1 - Establishing National and Regional Frameworks for Climate Services	Proportion of 250,000	Split across 3 countries
2 - Upgrading of GCOS stations	Proportion of 140,000	Dependant on needs assessment
3 - Extending MetAgri-Ops	Proportion of 160,000	Split across 3 countries - dependant on actual work activities to be planned
4 - Data Rescue	Proportion of 35,000	Split across countries involved with WADARE
5 - Establishing a Climate and Health Working Group.	Proportion of 200,000	-

Chad

Component and Title	Funding (USD)	Remarks
2 - Upgrading of GCOS stations	Proportion of 140,000	Dependant on needs assessment
3 - Introduction to MetAgri project	Proportion of 100,000	Split across 2 countries - dependant on actual work activities to be planned
4 - Data Rescue	Proportion of 35,000	Split across countries involved with WADARE

Sudan

Component and Title	Funding (USD)	Remarks
3 - Introduction to MetAgri project	Proportion of 100,000	Split across 2 countries - dependant on actual work activities to be planned

South Sudan

Reserve fund of **USD40K** in readiness post-WMO mission and FMI feasibility study.

Notes: 1) 30K is to come from Norwegian funding to support the WADARE project.

2) MetAgri projects also being funded from Norway for 15 countries in Africa including Mali, Niger and B Faso.

ANNEX A

Project Outline: *UNISDR-WMO collaboration proposal:*

Establishing National Frameworks for Climate Services for Improved use of Climate Information and Services

- a) Developing a Regional Framework for West Africa**
- b) Developing Early Warning > Early Action for Burkina Faso, Mali and Niger**

1. Introduction

Bridging the Gap between Climate Scientists & Communities at Risk: Up-scaling community Early Warning - Early Action workshops in Africa

Climate variability lies behind much prevailing poverty, food insecurity, and weak economic growth in Africa. Poor rural people with limited choices, least access to resources, and climate sensitive livelihoods, are most at risk from climate uncertainty. Some 200 million of the poorest people in Africa are food insecure, many through their dependence on climate sensitive livelihoods and resources – predominantly wild crops, rain-fed agriculture and natural water sources. Similarly, the health of people and the resilience of healthcare systems are highly vulnerable to seasonal climatic fluctuations and variability.

The value of accurate climate and weather information today is clear: from short-term weather forecasts through to climate predictions at the monthly to seasonal timescales, this information can often be a crucial early warning tool capable of averting disaster, saving lives and livelihoods and helping keep people well. Improving the quality and availability of weather and climate-related information promotes development by facilitating sector specific and inter-disciplinary decision-making. Moreover, better local knowledge of the changing climate also enables more effective adaptation to climate change. Despite this, reliable climate and weather data and forecasts are simply not available for many individuals and organizations that are best placed to support vulnerable communities through the provision of services to aid decision making.

Making climate information useful for vulnerable communities in Africa, the potentially largest beneficiaries of climate information, remains a significant challenge. The capacity of end-users, including national disaster managers, public health planners, agricultural extension workers, development NGOs and communities at risk to understand and respond to seasonal climate forecast information is low. Climate forecasts currently provided are too technical and non-salient to the information needs and decision-making timelines of end-users at the community-level. Most important, the absence of dialogue between providers of climate services and vulnerable communities in the region is a major barrier to the use of forecasts for climate change adaptation.

The Global Framework for Climate Services, endorsed by Heads of States and Governments, Ministers and Heads of Delegation representing more than 150 countries, 34 United Nations Organizations and 36 Governmental and non-Governmental international organizations at the Third World Climate Conference (WCC – 3), is envisaged as a set of international arrangements that will coordinate global activities related to climate services. It shall build on existing efforts to provide climate services that are truly focused on meeting user needs, are available to those who need them and that provide the greatest benefits possible from knowledge about the climate. The Framework is intended to provide widespread social, economic and environmental benefits through more effective climate and disaster risk management. In particular, it will support the implementation of climate change adaptation measures, many of which will require climate services that are not currently available. One of the main objectives of the Framework is to bridge the gap between the climate information being developed by scientists and service providers and the practical needs of users. This shall be obtained through the introduction of frameworks on the national as well as on the regional level.

The process of obtaining the frameworks on the national levels for each of the three countries as well as on a regional level in West Africa shall be guided by a series of Early Warning > Early Action workshops. These offer a novel process to enable final end-users to access, understand and use climate services. Pilot EW>EA workshop experiments across Africa successfully brought together national climate information providers and vulnerable communities in seven countries to foster interaction between them around the needs of community end-users. This approach of face-to-face interaction between providers of climate services and communities most at risk from climate hazards is a desirable add-on to already operational regional climate outlook forums.

This initiative will be a useful contribution towards implementation of the Global Framework for Climate Services (GFCS) by developing templates for how national and regional frameworks can be achieved. The national templates are expected to be presented at the Extraordinary Congress in October 2012.

2. Proposal

Using a novel - but tested – approach, bring together key cross-sector stakeholders at the regional and national levels to bring the gap separating providers and final end-users of climate services.

We propose:

- Running 3 country-level workshops in Burkina Faso, Mali and Niger ahead of the Extraordinary Congress in Oct 2012.
- Running a regional workshop after the Congress, follow-up on the experiences from the three pilot NFCSs and scaling up region-wide

1 x Regional Workshop:

- Brings together national disaster managers and climate service providers at the regional, national and global levels
- Precise design of this workshop to be developed in light of GFCS implementation planning

Would come after the Extraordinary Congress in Oct 2012 and dovetail with the National events below.

3 x National Workshops - one in each West African target country:

Process for National Workshops

- Mapping Process
 - lead by consultant with ISDR and WMO assistance
 - a vital part of the process to correctly identify key actors who can interact and contribute to the development of the work
- 4-day events run in each of the above named countries
- Brings together **ALL** national stakeholders involved in for example disaster management, those from principle sectors (including health and agriculture), government ministries, NGO's as well as climate service providers.
- Events are run in a facilitated way that build to explicit outcomes
- Ends in a field trip and managed development of further actions required.

Aims and Objectives

This proposal will improve the availability, exchange, communication and use of salient/tailored climate information and related services in support of economic growth and achievement of the MDGs, working at local, national and regional levels in sub-Saharan Africa. It addresses the need to develop national and regional capacity in the participating African countries (Burkina Faso, Mali and Niger) to

deliver climate information and services at national and regional level through reinforcement of their National Meteorological and Services. The project will also help develop the capacity of the key intergovernmental institutions in Africa that focus on climate matters, ACMAD, to provide the required support and to provide climate information to meet societal needs.

The key aim is to contribute to the process of developing a User Interface Platform to link climate service providers and users with a view to building the capacity of users to make better use of climate services, collecting user requirements, assisting in the monitoring and evaluation of the Framework and promoting a global understanding of the Framework.

The three objectives for the Early Warning-Early Action workshops are to:

- 1) Introduce the two communities of practice (climate scientists and communities at risk), helping them realize, challenge and appreciate the gap separating them;
- 2) Build common ground, identifying areas of joint complementary work and overlapping interests as a basis for partnerships, and whet a thirst for further interactions;
- 3) Narrow the Gap, and identify ways forward to sustain the bridge between participants for further climate information communication from scientists to community end-users and back.

From 2009 to 2011, seven EW>EA workshop experiments were conducted in Senegal, Kenya, Uganda and Ethiopia to initiate a dialogue and bridge the wide gap between national climate forecasters and end-users of climate services at community-level. The workshops adopted a similar format of a three-day mediated dialogue between the two communities of practice. On one side of the dialogue table were climate scientists – forecasters from national hydro-meteorological services (NHMSs), climate modellers from university climate research centres, hydrologists, remote sensing experts and agro-meteorologists – while on the other sat spokespeople from communities affected by hydro-meteorological disasters, as well as national and sub-national government disaster managers and representatives from Community-based organizations (CBOs) and Non-Governmental Organizations working at community-level (Red Cross, Care, Save the Children, Oxfam), actors in the national landscape on disaster prevention and climate change adaptation. Different stakeholders were invited at the seven workshops, however all fell under three broad categories: providers of climate services; representatives of communities at risk, the potential final end-users of climate information; and national disaster managers, planners and boundary organizations able to serve as relays of available climate information down to the community level.

Workshop Outputs

- Endorsement of terms of reference for the NFCS;
- Mechanism for clarifying the mandate for climate services production and communication at the national level;
- Mechanisms for clarifying the process for coordinating action based on climate information;
- Agreement on the information to be delivered by NMHS to specific users in useful formats and the dissemination mechanism to ensure local level users have access;
- Agreement on dissemination of early warning for fast and slow-onset hazards;
- Agreement on monitoring mechanism for the framework

3. Budget

Regional Workshop

Event and number	Delegate numbers	Activities or items requiring funding	Outline cost
Regional Workshop	40 max (up to 50 is manageable) (To be decided from further consultation) (Two thirds from end-user/policy community, a third from climate science)	<ul style="list-style-type: none"> ▪ Venue costs and rooms for delegates ▪ Transport and drivers ▪ Stationary ▪ Closing field visit in host country 	Total = USD 12,000

	community)	
Consultant		USD 35,000
Travel and DSA	TBD	USD 45,000
WMO Secretariat	Project management coordination and Regional Office support from WMO Geneva	USD 44,000
Total		USD 136,000
Overheads (10%)		USD 14,000
Grand Total		USD 150,000

National Workshops

Event and number	Delegate numbers	Activities or items requiring funding	Outline cost
National Workshops X3	30 max (20 end-users from national/community levels + 10 national climate/weather forecasters)	<ul style="list-style-type: none"> ▪ Venue costs and rooms for delegates (USD3000) ▪ Transport and drivers (USD800) ▪ Stationary (USD200) ▪ Closing field visit (USD500) 	<p>USD 4,500 x 3</p> <p>Total = USD 13,500</p>
Consultant from Johns Hopkins University	<p><u>15 days Feb – June 2012</u></p> <ul style="list-style-type: none"> - Development of workshops - Outreach to national climate service provider & mapping of stakeholders to invite to workshop - Outreach to national and regional disaster management community, sector-specific experts (agriculture, health and water) and NGOs. - Workshop preparation working with WMO Depts such as Regional Office, DRR and RMO, as well as ISDR <p><u>15 days June 2012</u></p> <ul style="list-style-type: none"> - 12 days facilitation of national workshops (3x5 days) 		<p>USD 500/per day</p> <p>500x30 =</p> <p>Total = USD15,000</p>
Travel and DSA	<p>Local participant DSA: average USD100/night</p> <p>Non-local participant DSA: Average USD 300/night</p> <p>Airfares: using an average of USD1000 per trip (Assuming 20 local and 10 non-local participants)</p>		<p>3 x 2,000 = USD 6,000</p> <p>300x30 = USD 9,000</p> <p>20x1000 = USD 20,000</p> <p>Total = USD 35,000</p>
WMO Secretariat	Project management coordination and Regional Office support from WMO Geneva		USD 27,500
Total			USD 91,000
Overheads (10%)			USD 9,000
Grand Total			USD 100,000

4. Plan of Action for National Workshops

Hosting the National Workshops for EW>EA will require both an exhaustive preparation phase and an implementation phase.

3.1 Preparation of National Workshops

- Coordination (**to be set up January 2012**)
 - led by consultant from Johns Hopkins University, with ISDR and WMO assistance
 - Focal points at WMO Depts such as Regional Office, DRR and RMO, as well as ISDR, to be designated for this project
 - An administrative focal point to be also designated at WMO for this project to support travel booking, logistics and all workshop preparation activities
 - Finally, national host for NFCS to be appointed by WMO (NHMS? Office of the Prime Minister?)

- Country visits to Mali, Niger and Burkina Faso & stakeholders (**March 2012**)
 - a vital part of the process to correctly identify key actors who can interact and contribute to the development of the NFCS
 - Meeting with all relevant national stakeholders and institutions involved in the production, diffusion and use of climate services at national-level
 - Agreement on date to host the National EW>EA Workshop (in June 2012)
 - Identification of hydro-meteorological disaster hotspots in country and selection of target community to be visited during workshop closing field visit
 - Pre-workshop visit of target community and

- Mapping Process (**end March – April 2012**)
 - Identification of baseline activities in the production, transmission and use of climate services nationally
 - Consensual mapping with local host, WMO and ISDR of key stakeholders to invite to National Workshop

- Workshop logistical preparation (**May 2012**)
 - Coordinated by local institutional host for NFCS (TBD), in coordination with WMO focal points
 - Issuance of Invitation letters
 - Booking of venue and travel for participants
 - Preparation of participant DSA
 - Organization of closing field visit

3.2 Implementation of National Workshops

- 4-day events run in each of the above named countries (date TBD after country visits)
- Brings together **ALL** national stakeholders involved in for example disaster management, those from principle sectors (including health and agriculture), government ministries, NGO's as well as climate service providers.
- Events are run in a facilitated way that build to explicit outcomes, as outlined in Annex A.
- Ends in a field trip and managed development of further actions required.
- Workshop reporting to be conducted by WMO envoy to workshops.

5. Timeline of Activities & Schedule of National EW>EA Workshops

Activity	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Coordination setup	■											
Country visit: Mali			■									
Country visit: Burkina			■									
Country visit: Niger			■									
Mapping exercise				■								
Workshop logistical preparation				■	■							
Nat. WS: Mali						■						
Nat. WS: Burkina						■						
Nat. WS: Niger						■						
Workshop reporting by WMO							■	■				
GFCs Congress										■		
Regional Workshop											TBD	TBD

ANNEX B

Project Outline

a) Rehabilitation and upgrading of the GCOS observation network in West Africa.

Mali, Burkina Faso, Niger, and Chad have observing stations in the GCOS Surface Network (GSN). At the present time only Niger (Niamey) has a station in the GCOS Upper Air Network (GUAN). The GSN stations from Burkina Faso and Niger appear to be working reasonably well while one GSN station from Mali is not reporting. Several of the stations in Chad are not reporting. The upper air station at Niamey is working well. There are other upper air stations within the 4 countries and some should be considered for inclusion into the GUAN.

It is very important for day to day meteorological purposes as well as for climate analysis purposes that all of the stations, both surface and upper air stations operate properly. These observations are sent via the Global Telecommunications System to the numerical forecasting centers where they serve as input to weather forecasts used by the respective country. Without the direct observations, the forecasts are substantially less accurate. Further the observations are also used in the analysis of climate changes which will impact the population of the countries in the years ahead.

So it is clear that a robust observing program is important for these countries. Some progress has already been made through direct contact and assistance. For example GCOS was able to provide a replacement hydrogen generator to restore the upper air operation at Niamey and the operations staff received training in upper air observing techniques in a workshop organized by GCOS. But more is needed to bring these Meteorological Services up to the needed level.

It is not clear that any of the stations GSN or GUAN which are currently operating are in fact operating up to GCOS and WMO standards. The first step that is needed is a technical mission to determine the exact status of the stations. This is an important first step otherwise funds cannot be used effectively.

The GCOS Implementation Project Manager will conduct a mission to all 4 of the member countries to assess the current technical situation and to develop priorities and project plans for the actual remedial actions. This mission does not need to actually visit every observatory but must include sufficient visit to determine the extent of the needs. A primary objective of this mission is to obtain the concurrence and agreement of the respective Met Service that the projects represent the real need and that if funded will indeed increase the capability of the service.

Activities

Following this technical assessment, specific projects will be defined and conducted. These include the following aspects:

- It appears likely that at least one surface observing station will require renovation and likely one of the upper air stations will require remedial action.
- The project manager will manage the requisition of all equipment and supplies required through the WMO procurement process which ensures open competition
- Equipment will be delivered through the local UNDP offices to ensure minimal customs issues are encountered.
- Specific projects will be defined and member state and donor representative, with assistance from WMO will be able to choose which projects will be addressed and in what order.

Budget - preliminary cost estimates are:

Mission to assess specific needs	USD 15K
Renovation of one surface observing station	USD 40K
Hydrogen generator repairs needed to restore upper air operation	USD 60K
Mission to deliver staff training	USD 25K
Total	USD 140K

Depending on the specific needs of the defined projects, installation will normally be the responsibility of the company providing the equipment.

ANNEX D (a)

a) Project Outline - WMO-ACMAD Workshop on Rescue and Digitization of Climate Records in the West and Central African region



Venue: Conakry, Guinea

Tentative dates: 12 -16 November 2012

Rational

Major gaps and needs for implementing modern climate service have been identified by the high level task force of the Global Framework for Climate Services (HLTF-GFCS). In fact one of the major impediments to achieve accurate and reliable climate information for supporting local climate services and climate change adaptation at national level is the existing gaps in the availability of and/or accessibility to long term high quality instrumental climate data sets. Recovering and digitizing old records have been a focus of World Climate Programme (WCP) since its initiation in 1979, but up until this time most of the effort has been directed towards recovering and digitising records from 1961 onwards. Therefore, many invaluable climate records, particularly prior to 1960, are still in the form of paper records and face the risk of degradation and loss. Furthermore the digitization efforts have focused on some archives and not others - for example there is still a huge amount of strip charts to be digitized- and important amounts of digital data are still being held in obsolete media such as microfiches, punch cards, magnetic tapes and old floppy disks. There is therefore a need for accelerating data recovery worldwide and develop regional and international initiatives to undertake modern Data rescue and Data digitization.

Recognizing the need for high quality climate data for the new and evolving climate services, the WMO Congress during its sixteenth session issued a Resolution on the Requirement for Climate Data (Res 3.5/1) in which the priority was given inter-alia to Accelerating Rescue and Digitization of climate records and promoting global and regional initiatives to collaborate on Data Rescue (DARE) and exchange of related scientific knowledge and technological advances; and Modernizing climate data management and related services, including archival, discovery, access and retrieval as part of the evolving implementation of the WMO Information System (WIS) and ensuring interoperability amongst various program data as well as with sector application data.

The WMO commission for Climatology decided to establish an international Data Rescue Initiative (I-DARE) building on existing sub-regional initiatives, such as the European Climate Assessment and Data (ECA&D), <http://eca.knmi.nl/> and the Mediterranean Data Rescue Initiative (MEDARE) www.omm.urv.cat/MEDARE/ and develop new ones worldwide.

Setting up of the West Africa Data Rescue initiatives: WADARE

The West African region has long history in observing and monitoring the atmosphere, going back in time to the mid 20th century. However, despite the efforts undertaken by the National Meteorological and Hydrological Services (NMHSs) in Data Rescue activities (DARE) and the WMO and Belgium Data Rescue project aimed at transferring historical long-term climate records from fragile media (paper forms) to microfilms and nowadays to new electronic digital media, accessible digital climate data is still a problem in most of these countries, preventing the region from developing more accurate

assessments of climate variability and change. Informed decisions on climate change adaptation based on sound regional and local assessment and projection are therefore difficult to implement in the lack of availability and accessibility of high quality long term climate records

In line with the CG-XVI-Resolution and the decisions by the Commission for Climatology both addressing the data gaps identified by the HLTF-GFCS, the World Meteorological Organization (**WMO**) in collaboration with the African Centre of Meteorological Application for Development (**ACMAD**) will organize in Conakry, Guinea, an international Workshop on Data Rescue and Digitization of Climate Records for 15 countries in West Africa mainly to kick the start of this new sub-regional initiative on Data Rescue initiatives (**WADARE**). This initiatives will involve the participation of the following West African nations (see map): Burkina Faso, Mali, Niger, Cape Verde, Senegal, Mauritania, The Gambia, Guinea (Conakry), Guinea Bissau, Sierra Leone, Liberia, Cote d'Ivoire, Ghana, Togo, Benin, Nigeria



OBJECTIVES OF WADARE:

In the last 10 years, substantial efforts have been deployed by NMHSs in West Africa to digitize their data. Through the Agrhymet Programme in Niger and the technical support of WMO, 11 countries were equipped with computers and Climatological Database Management Systems (CDMSs) and their experts were trained. Most of NMHSs in the region have developed well organized databases particularly for synoptic

stations. However, there is still a huge amount of non recovered or non digitized data including those collected at climatological and agrometeorological stations and raingauges. Therefore DARE and Digitization need to be accelerated and conducted with all sources of records and parameters. WADARE long term Objectives include:

- (a) Undertaking a gap analysis in the rescue of climatological data in West Africa to identify the remaining non-recovered and/or non-digitized data and which parameters need to be prioritized with consideration of national needs and international requirements (e.g. GFCS);
- (b) Establishing a regional based inventory of the longest climate records available within NMHSs as well as other old valuable sources of weather and climate records available in the archives of various centres and organizations. This inventory will guide on strategies for accelerating data recovery and digitization;
- (c) Developing comprehensive, long and high-quality surface climate datasets for the sub-region of West Africa with a focus on the GCOS Essential Climate Variables (ECVs) to support national climate services in the context of the GFCS as well as providing inputs to the work of the IPCC and UNFCCC;
- (d) Assisting the countries by providing expertise to the National Meteorological and Hydrological Services (NMHSs) and other data archiving centers, in the recovery, organization and archiving of their historical heritage of meteorological observations, based on the WMO general guidelines and the international scientific and technological expertise in the field;
- (e) Collaboration with the priority sectors in the region including agriculture, water, health and DRR to demonstrate the real and potential socio-economic benefits which can be gained by investing in Data Rescue (DARE) and modern data archiving systems;
- (f) Mainstreaming DARE national efforts into regional scale initiatives to draw international interest amongst research communities and other stakeholders for supporting project proposals aimed at large scale accelerated DARE efforts. It is expected that user communities from Sector applications be invited to the Workshop and that ACMAD will have to play a key role in coordinating the post workshop activities including technical coordination of the working groups that will be established during this workshop

The workshop will provide an opportunity for experts from the sub-region side by side with international experts and key sector applications representatives to discuss and make proposals on how to deliver the most immediate necessary steps for WADARE including:

1. Establishment of national inventories of what is digitized, what needs to be digitized at country level,
2. Provision of guidance for the NMHSs in West Africa on best practices and modern technologies and procedures in data and metadata recovery, digitization, formatting, archiving and homogenization of long-term climate records;
3. Set-up of a regional data base describing the currently available long-term climate records in digital form and the longest and key climate records to be recovered, along with their associated metadata;
4. Identification of the socio-economic benefits of climate data and its direct applications and its use as input into the decision making processes in the key sector applications in the region and assess the existing opportunities, resources to be mobilized at the national and regional scales, and beneficiaries of implementing a DARE projects;
5. Proposal on a mechanisms for facilitating access and use of climate time series which will be generated through DARE projects by the international scientific community and the decision makers in the key sector applications.

The participants to the first WADARE workshop will discuss and agree on a long term working structure of the WADARE initiative based on thematic working groups to achieve the objectives described above. These working groups will address immediate tasks including:

- Inventorying, assessing and locating old data record sources and locate the existing holders inside and outside of the NMHSs;
- Review DARE techniques and procedures for implementation in West Africa;
- Assess scientific approaches and methods that can be suitable for implementation in the region with regards to quality control, quality assurance and homogenization of climate data
- Make proposal on setting up common and safe repositories in West Africa for archiving duplicate climate records (in digital forms) to avoid damage and loss due natural hazards and conflicts;
- Work on the development of a regional DARE web portal as a mechanism for supporting regional and international collaboration on climate data applications including access to high quality climate time series , climate indices and statistics on climate extremes.

ACMAD will play a technical coordination role of these WGs with the assistance of the WMO secretariat.

Annex D (b)

Project Outline: Improving Availability, Access and Use of Climate Information for an NMS

I. Problem description

The number and quality of weather stations in many part of Africa, however, has been declining. The available stations are unevenly distributed with most of the stations located along the main roads. This imposes severe limitations to the availability of climate information and services particularly to rural communities where these services are needed most. Where records exist, they frequently suffer from data gaps and poor quality and often are not easily accessible. As a result, lack of climate information has been one of the major constraints for integrating climate into development planning and practice in Africa. The problem of data availability could be improved significantly by combining station observations with globally available products such as satellite proxies and model reanalysis data. The main advantage of the global products is the excellent spatial converge: these data are available over most parts of the world at increasingly improved spatial and temporal resolutions. Satellite rainfall estimates now go back thirty years. Combining ground-based observations with satellite and/or model information will help to overcome the spatial and temporal gaps in station data while improving the accuracy of the global products. Data availability does not necessarily mean data access and use. Access to the data and its proper use should also be facilitated. This could be accomplished, at least partly, by making information, tools, and targeted products available through the Internet. This three-track approach of simultaneously improving data availability, access and use has been implemented in Ethiopia. This concept note provides a roadmap for implementing this in another country.

II. Methodology

The main idea behind the methodology is combining point measurements at station locations with spatial information from global products. The global products may include satellite proxies and model reanalysis data. Satellite rainfall estimates will be used for rainfall, while MODIS land surface temperature (LST) and/or model reanalysis data would be used for temperature (T_{max}, T_{min}). Regression Kriging, or similar approaches, will be used to combine the global products with station measurements. Methods used may vary from country to country depending on station distribution and topography.

III. Main activities

1. Onsite training of the NMS staff on different aspects of the work;
2. Organization and quality control of station data;
3. Calibration of satellite rainfall estimation algorithm for the country;
4. Generating merged station-satellite climate time series at ten-daily (decadal) time scale and for 5km grids;
5. Adopting the IRI Data Library tools for the individual country; and
6. Generating products, creating relevant map rooms and transferring them to the NMA.

IV. Outputs

- Trained NMS staff;
- Quality controlled station data;
- 30-year time series of rainfall and temperature from combined station and global proxies;
- Climate products for specific applications;
- Web-based Maprooms for sharing products and tools with users; and
- IRI Data Library tools for further data analyses and creating new products

V. Budget

Item	Cost
Travel of three IRI staff (initial discussion, training, installation)	\$20,000
Time of four IRI staff	\$60,000
Time and travel of two experts from the University of Reading*	\$30,000
Creating/Improving NMS webpage	\$10,000
Training of users	\$18,000
Estimate of local cost for training NMS staff (training facility, lunch, coffee-tea)	\$20,000

Sub Total	\$158,000
Columbia overhead (15%)	\$23,700
WMO Overheads (10%)	\$18,170
Total	\$199,870

Estimated cost of the IRI DL software: \$50,000

(IRI will be provide this free)

*The TAMSAT Group at the University of Reading, UK, has already calibrated its algorithm over Africa, but with limited stations. The calibration is good enough for many places where topography does not play a big role. In such cases this step could be skipped.

A model for improving climate services in Africa

TEASER: Ethiopia' National Meteorology Agency has launched a new online climate service based on 30 years of rainfall and temperature data for the entire country, which can be accessed at the click of a button. This is unprecedented in terms of scale and accessibility anywhere in Africa. IRI scientists who worked on the project say that the Ethiopian experience is a template for providing customizable data for agriculture, water, health and other sectors across the continent.

In developed countries, we are accustomed to having access to long detailed records on weather and climate conditions, demographics, disease incidence and many other data sets. Decision makers use this information for a variety of societal benefits: they spot trends, fine-tune public health systems and optimize crop yields, for example. Researchers use the data to test hypotheses, make forecasts and tweak projections from computer models. What's more, much of these data are just a mouse click away, for anyone to access, for free.

Across much of Africa, however, it's a different story. By most measures, Africa is the most "data poor" region in the world. Wars and revolutions, natural and manmade disasters, extreme poverty and unmaintained infrastructure, have left massive gaps in socioeconomic and environmental data sets. Reliable records of temperature, rainfall and other climate variables are scarce or nonexistent. If the data do exist, they're usually deemed as proprietary and users must pay to get access. This is not an inconsequential matter. Without readily available, reliable data, policy makers' ability to make smart, well-informed decisions is hobbled.

The problem of data access persisted even in Ethiopia, regarded as having one of the better meteorological services on the continent. Thanks to the recent efforts of Tufa Dinku, a climate scientist at the [International Research Institute for Climate and Society](#), the situation has improved considerably.

"It used to be that in order to get data for a given place, you'd have to submit a written request to the National Meteorological Agency and then pay according to how much you needed. The process would take at least three days," says Dinku. "Now it takes three seconds."

Tufa and members of IRI's Data Library team worked with his former colleagues at Ethiopia's NMA to develop a groundbreaking set of online climate data maps. The [new maps](#) allow any one to access 30 years of temperature and rainfall data for any spot in the entire country, down to a 10-km square. This kind of resolution has never existed before in Ethiopia.

"The information could be used in a number of applications, including long term investment and developmental studies, tourist information, disaster reduction and preparedness planning and more," said Dula Shanko, the NMA's Deputy Director-General, during the official public launch of the maps in December 2011. "With this new service, NMA is shifting from one-desk service to one-click service," he said, referring to how easy accessing the data will be now by anyone with an internet connection.

The project was funded by the U.S. National Oceanic and Atmospheric Administration and [in large part by Google.org](#), the philanthropic arm of the technology company, which has been interested in improving the prediction and prevention of infectious-disease outbreaks in East Africa.

"The outputs of this project are a practical means of maximizing data to produce routine information," says Stephen Connor, the project's principle investigator, who is currently a fellow at the University of Liverpool. "While this effort was motivated by a health project, but the resulting information products are of critical value to a number of climate sensitive development sectors in Ethiopia and elsewhere."

For example, IRI's Dan Osgood uses the hybrid data to develop [index insurance](#) contracts that help Ethiopian farmers lower their vulnerability to crop loss from droughts. "Perhaps most groundbreaking here is that the NMA and IRI figured out a new way for climate data to be shared so that it does the greatest public good. This is something that sectors can actually use, not just about producing more data and improving it. It's starting off from the sector's needs."

In a paper published February 2012 in the World Meteorological Organization's *WMO Bulletin*, Dinku and his coauthors detail the process that lead to the collaboration with NMA and to the development of the new maps. He wrote the paper with NMA's Kinfe Hilemariam, the University of Reading's David Grimes, and Connor, currently a fellow at the University of Liverpool.

The authors contend that by overcoming the problems of data availability, access and use they have been able further the "effective and efficient use of climate information in Ethiopia." What's more, they argue that their experience in Ethiopia is a model which can be used to improve climate services throughout Africa.

The map rooms are the culmination of [years of work by Dinku](#) to combine satellite rainfall and temperature estimates with on-the-ground station data. The hybrid data sets allowed Dinku to generate historical data for the whole country, not just where rain and temperature gauges happened to be--near highways and urban areas.

"This alleviates the inadequacy of climate data particularly for rural Ethiopia, where such data is most needed and people are most vulnerable to climate variability," Dinku says.

Members of the IRI's [Data Library](#) group visited the NMA offices numerous times over the course of the project to help implement the new products. Rémi Cousin developed the maprooms and then trained the NMA's staff to use IRI's technology to disseminate the agency's climate information in a way that best met users' needs. John del Corral helped to port the existing mapping and visualization platform used by the Data Library to the agency's servers, and later helped design the new web site to hosts the climate maps.

ANNEX E

Project Outline

Establishing Climate and Health Working Groups in West Africa

Background

The In order to address the specific needs of the health sector, as a user of climate and weather information, products and services of NMHSs, it is proposed to use the approach already applied to some NMHSs in Africa, namely the establishment of “*Climate and Health Working Groups*”.

The Climate and Health Working Groups work by developing capacity through the following process:

- Identifying the weather and climate data, information and service needs of the health sector; gaps in current data, information and service delivery; and recommendations for filling these gaps, including enhanced observing networks, decision support tools.
- Identifying gaps and problems which constrain the routine use of weather and climate information by the health sector, and identifying and pursuing the means to overcome them.
- Formulating institutional data sharing among the sectors.
- Identifying research needs on climate and health.
- Identifying education and training needs across the sectors.
- Facilitating access to tools of climate and weather for the health sector
- Enhancing the use of early warning systems for climate-sensitive diseases such as malaria and plague
- Building the capacity of national, local and community based organizations to widen and strengthen their services in this area.
- Organizing and presenting to decision-makers scientific evidence on the impact of climate variability and climate change on health.
- Organizing annual workshops on weather/climate and health issues.
- Collaborating with similar entities throughout the region to share experiences and building on each other's skills

The Key expected outcomes of the CHWGs are:

- Improved service delivery (to the benefit of health services and the participating NMHS);
- Enhanced capacity in NMHSs; and
- Enhanced capacity to use weather and climate services in the health sector.

Burkina Faso

A national workshop for the establishment of the Climate and Health Working Group (CHWG) in Burkina Faso, as approved by the Conference of the Directors of the West African National Meteorological and Hydrological Services (NMHSs) (Banjul, Gambia 2010), under the Banjul Action Plan, was organized at the Burkina Faso Meteorological Service in Ouagadougou (15-16 December 2011) with the participation of the regional directors of the public health, animal health, representatives of a number of hospitals, the Red Cross, as well as Non-Governmental Organization (NGO) representatives, as well as the representatives of WMO, WHO, and the Spanish Meteorological Service (AEMET).

The overall objective of the workshop was to bring together experts and officials from the Met Service and the health sector to discuss the role and impact of weather and climate on the development of the two most important diseases in the country, namely malaria and meningitis; to develop strategies for a system of surveillance and early warnings; how to apply weather and climate information in the prevention and treatment of those diseases; and finally to establish a CHWG.

The recommendations of the workshop are below:

- Formalize by inter-ministerial decree the CHWG of Burkina Faso;
- Establish an integrated data base for climate and health;
- Establish a system for communicating information;
- Develop an Action Plan for 2011-2012;
- Prepare a Long-Term Strategic Plan for 2012-2014;

- Popularize the use met/climate information through the media and organization of seminars;
- Strengthen the capacities of the Met Service and the health sector so that they can utilize relevant met information produced in an understandable language;
- Organize periodic meetings between different users of the met information;
- Promote research in the area of health/climate and weather;
- Integrate the Met Service specialists into the national committee for management of epidemics, and vice-versa;
- Designate Focal Points in each of the partnering organizations and institutions of the CHWG;
- Undertake resource mobilization activities with donors.

The workshop plan of action for 2011-2012 is shown below:

Activities and tasks	2011	2012													
	Dec	January	February	March	April	May	June	July	A	S	O	N	D		
The formal and legal creation of the CHWG in Burkina Faso															
Inventory of the health and met/climate data, and identification of actors in the two sectors	X	X	X												
Develop research projects															
Prepare funding requirements		X	X	X											
Resource mobilization		X	X	X	X	X	X	X	X	X	X	X	X	X	
Division of tasks			X												
Acquiring the necessary tools					X	X	X	X	X	X	X	X	X	X	
Training					X	X	X	X	X	X	X	X	X	X	
Data collection							X	X							
Data analysis									X	X					
Research and publication of results											X	X	X		

Having taken the first step in starting a dialogue between the Met Service and the health sector, the next step will be to fine tune the Action Plan, clearly define the exact steps for each of the Actions and provide funding for the tasks in order of priority. (I am waiting for Pascal to come back with this, hopefully soon)

Mali and Niger

The first step, the organization of a kick off national workshop will be needed. According to the past experience the cost is approximately 14000 Euros per workshop, for the participation of various national representatives within the health sector. It is expected that the two day workshops will follow a similar pattern of identification of the most important two or three diseases in each country, will set up tasks based on objectives similar to the Burkina case and a set of actions for accomplishing the tasks.

The division of funds between the three countries after the costs of the initial workshops could be made based on the most critical needs in order to sustain the CHWG in each country.

As an example of costs, a total of approximately 110,000 CHF was spent in Madagascar over 4 years. These supported the initial national workshop, training of the head of anti-malaria office at the IRI Summer Institute, two national training workshops for the health community with the participation of two IRI resource persons, establishment of 6 observing stations at the sentinel health sites, purchase of a vehicle to allow access to the new observing sites in different parts of the country, mission by one of the two coordinators to ACMAD to be better familiarized with the work carried out there in the health area, and a final evaluation and review workshop to close the demonstration phase of the project.

It is suggested to organize the two national workshops as soon as possible in consultation with the host countries to allow for funds to be allocated to the post-workshop activities.