

**WEATHER AND CLIMATE SERVICE DELIVERY
IN THE LAKE VICTORIA REGION**

WORLD BANK DEVELOPMENT GRANT FACILITY (DGF)

PROPOSAL SCOPING DOCUMENT

***TOWARDS A REGIONAL FRAMEWORK FOR
WEATHER AND CLIMATE SERVICES
FOR FOOD AID, FOOD SECURITY, MARITIME TRANSPORT SAFETY
CONTRIBUTING TO DISASTER RISK REDUCTION
IN LAKE VICTORIA REGION***

1. Executive Summary

Weather, climate and extreme weather events have a significant influence on the lives and livelihoods of people in Africa. All economic sectors including subsistence and commercial agriculture and fisheries, maritime (including great lakes) and air transport services, water resources, energy production and consumption, tourism, infrastructure and cultural activities are all greatly influenced and impacted. Accurate and timely information and related services on the nature and timing of weather and climate and extreme events are therefore vital. Such weather, climate and water related information services are critical part of early warning services, preparing communities and nations for weather related disasters, or more chronic events such as floods and drought or adapting to slow onset climate change.

The Heads of States and Governments, Ministers and Heads of Delegations present at the World Climate Conference-3 (WCCC-3), held from 31 August to 4 September 2009 in Geneva, through the Conference Declaration called for the development of a Global Framework for Climate Services. The Framework is expected to help the global community better adapt to the challenges of climate variability and change and bridge the gap between the climate information being developed by climate scientists and service providers on one hand and the practical needs of information users in many climate sensitive sectors¹ of society on the other.

In the past, ‘climate services’ that embrace past, present and future climate information, assessment and advice on climate-related issues have somewhat developed as an extension of weather services which extend from monitoring, analysis, and seamless prediction from long range weather forecasting to season, inter-annual, and future climate projections. Most of these have largely remained at the global or at best regional level. Only a few sub-regions and countries at present implement effective climate services at the national level.

Additionally, Hydro-meteorological events cause major loss of life and economic losses in Sub Saharan Africa. These include floods, droughts, tropical cyclones and strong winds, storm surges, extreme temperatures, forest fires, sand or dust storms, and landslides. Africa has the highest mortality-related vulnerability coefficients for droughts and very high coefficients for cyclones and volcanoes. Drought and floods account for 80 percent of loss of life and 70 percent of economic losses linked to natural hazards in Sub-Saharan Africa.

The purpose of this activity is to support development of a regional framework for weather and climate services, and the application of related products and services in support food aid, food security, health and maritime (Lake Vic.) transport safety for the Lake Victoria Region and to pilot new and / improved weather and climate products and applications in these sectors and evaluate their impact.

2. Background

The 4th Assessment Report of the Intergovernmental Panel on Climate Change (IPCC 2007) concluded that the climate trend for Africa is pointing to more intense extreme weather and climate events, such as storms, drought and floods. These extreme weathers events threaten

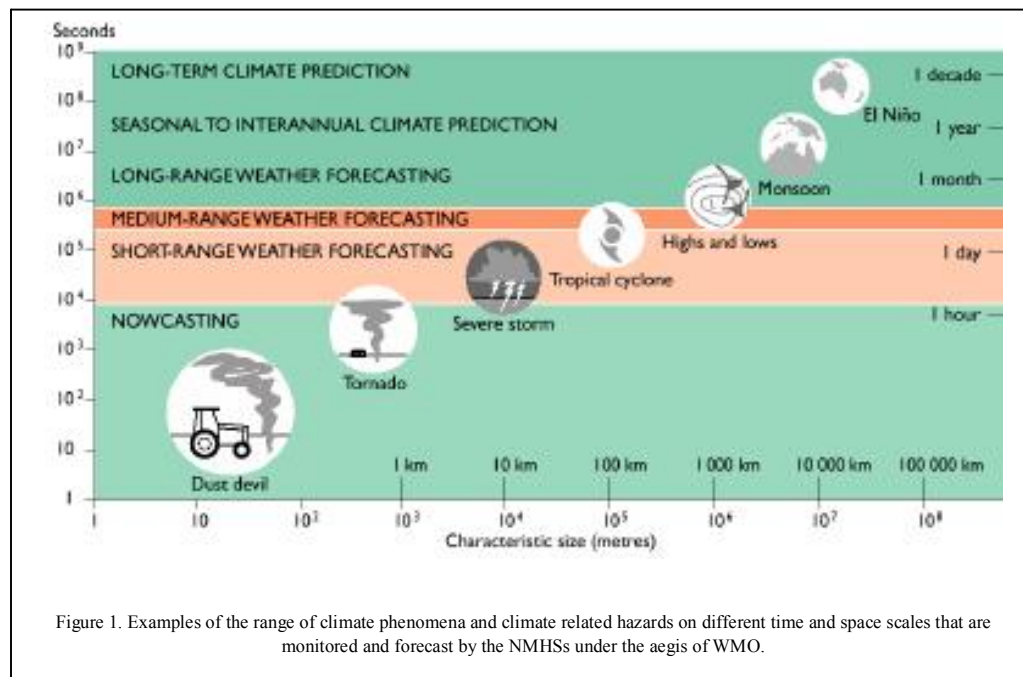
¹ The focus is on sectoral groups; agriculture, fisheries, forestry, urban development, transport, tourism, energy, and health, that are highly dependent upon science-based climate information and products.

safety and security, reduce food security, greatly limit availability of freshwater, destroy homes and public infrastructure, and ultimately reverse hard-won social and economic gains.

The AR4 also highlighted two important aspects of relevance in the present context. First, some aspects of climate change are inevitable and society has no option but to devise appropriate adaptation strategies to cope with them. People need to adapt to climate change, as well as manage the risks brought about by climate variability and change. Second, while we have achieved a relatively greater confidence in the global and continental scale aspects of climate change, we have still a long way to go in providing reliable regional details.

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Technological advances in computers, communication systems and instruments, coupled with accumulated scientific knowledge about physical processes, have extended the range of weather and climate science (Figure 1). Providers of these climate services are largely the Members of the World Meteorological Organization (WMO) and their National Meteorological and Hydrological Services (NMHSs), governments, academia, and associated entities.



It is important to recognize that it is at the regional/national scales that the socio-economic consequences of climate variability and change are most acutely felt. This consideration of scale underscores the critical need for scale-relevant climate information and prediction products to be developed in a regionally and globally consistent manner but available at the local scale. At the same time it is recognised that there is an urgent need for an ongoing exchange between providers

and users of climate information. Hydro-meteorological events cause significant loss of life and economic losses in Sub Saharan Africa. These include floods, droughts, tropical cyclones and strong winds, storm surges, extreme temperatures, forest fires, sand or dust storms, and landslides (see Figure 2). Africa has the highest mortality-related vulnerability coefficients for droughts and very high coefficients for cyclones and volcanoes. Drought and floods account for 80 percent of loss of life and 70 percent of economic losses linked to natural hazards in Sub-Saharan Africa.

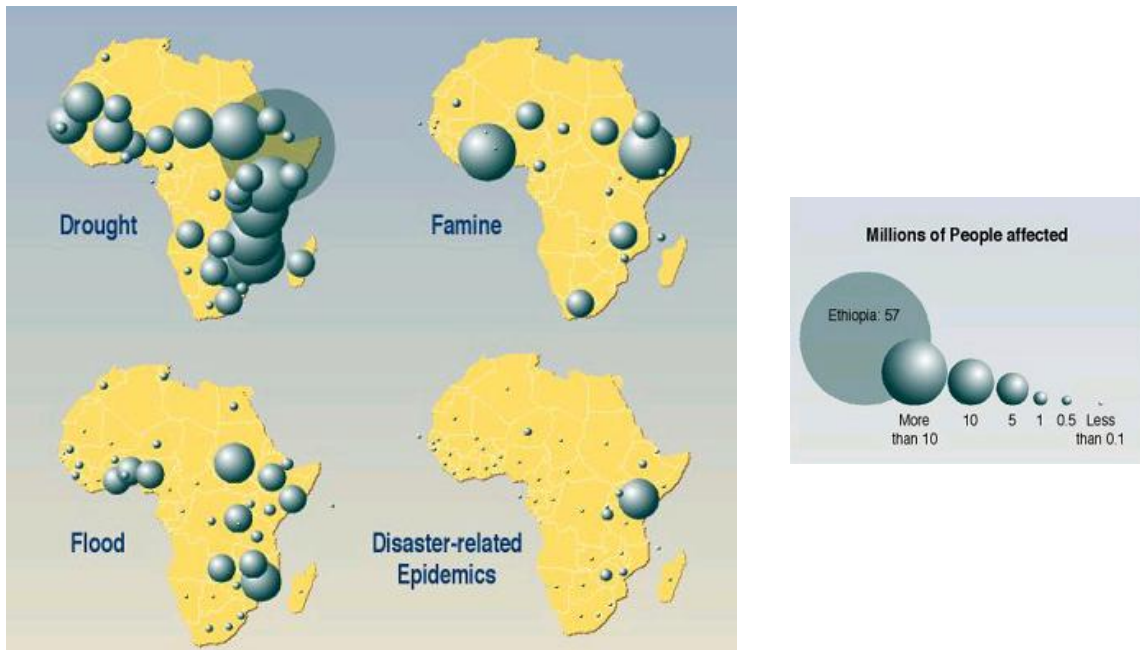


Figure 2. People Affected by Natural Disasters between 1971-2000 (Source: The office of U.S. Foreign Disaster Assistance (OFDA). The Centre for Research on the Epidemiology of Disasters (CRED). International Disaster Database, www.cred.be/emdat, Université Catholique de Louvain, Brussels, Belgium).

Additionally, Lake Victoria, the second largest lake in the world supports nearly 200,000 fishermen directly, with 35 million people living along its shores and a fishing fleet of more than 70,000 boats. This armada of boats, powered by paddling or small engines, is operated with poor safety and security as weather conditions can change suddenly and strong winds can occur with little lead time. Boats are often overloaded, most of the people can't swim and buoyancy or life saving equipment is not easily available. As a result many lives are lost due to drowning in the lake (estimated 5,000 deaths per year). Improving the quality, accuracy and availability of warnings of severe weather events on the Lake could significantly reduce the scale of fatalities amongst the Lake's fishing communities.

National Meteorological and Hydrological Services (NMHSs), with the support of international and regional agencies are tasked with the observing and monitoring of weather, climate and water for delivering related information and services to their governments and populations. Their primary functions are to manage and maintain the observation platforms, collect and analyse data, and provide weather, climate, water and extreme events information and warnings to the end users including decision makers, the public, and all economic sectors. These services also

support the regional and global effort to monitor trends in climate, oceans, and hydrology, and related phenomena.

It is clear that unless these services can be effectively maintained on a 24 hour–seven days week basis, livelihoods, safety of lives and efficiency of travel by air, sea, and land and protection of property are under serious jeopardy.

Alarming, many of the NMHS in the Africa, including those in the Lake Victoria region are struggling to maintain such services, and often failing to provide the basic services needed in the region. This is largely due, among other factors, to lack of staffing especially in areas such as forecasting; poor and or aged infrastructure; poor fiscal allocations in national budgeting processes; and limited contingency arrangements in the event of interruption of the already stressed services. One of the key constraints to service delivery is the current lack of value adding and creating demands for services of NMS. Clearly a more user oriented business model would address this issue.

Additionally, data-gathering capacity and data quality is a major issue; data-sharing and the legal and institutional basis for data sharing arrangements is also inadequate to non-existent. These constraints have emerged against a global background of improving longer-lead-time forecast modelling; dependent, however, on improvements in data gathering and data sharing over a correspondingly larger region.

The same constraints are evident also in relation with climate data. Climate-trend analysis is an increasingly important function to help address concerns of the Governments about human-induced climate change and climate variability.

3. Goal and objectives

Recognizing the limitations of the NMHSs in the Lake Victoria Region to provide meteorological and climatological services to the various socio-economic sectors, and the growing demand for these services, including amongst critical end users such as local fishing and farming communities, humanitarian and food relief agencies, lake transport sector and disaster management there is an urgent need for a strategy for an optimal “end-to-end” climate (and weather) service for the region. This would cover identification of gaps, engagement of end user sectors and identification of their needs for enhancement of NMS operational capacity through human resource development and improvement of surface observational networks and systems for improved product development and most importantly service delivery to these key sectors.

The **Goal** of this project is therefore to enhance the security of the livelihoods of farmers and fishermen in and around Lake Victoria.

The overall **Objective** of this Programme is therefore to consider the status of the NMHSs of Tanzania, Uganda and Kenya in terms of their capacity to deliver climate and weather services. In this context as a demonstration project, the activities proposed here will focus on development / enhancement of applications to improve delivery of products and services with a focus on i) **agricultural food security, food aid** and ii) **safety of fishing and transport on the Lake**. In effect, to develop the Conceptual Framework for effective Climate and Weather Services in the region and demonstrate the impact of improved services in the above mentioned sectors.

A root cause of the under-financing of hydrometeorological services is that the benefits of accurate weather and flood forecasting are not well understood among senior government staff. Quality

forecasting of weather, drought and flooding is important to saving lives and reducing the economic impact of natural disasters. Furthermore, good weather forecasting, as well as climate expertise, are important for many sectors in the economy, including development and implementation of crop, drought and flood insurance, maximizing the efficiency of power generations including hydropower stations. By demonstrating the impact of improved climate and weather information and related applications in the critical sectors of food security, food aid and safety of fishing and transport on the Lake, we will hopefully improve awareness of the potential socio-economic value of hydromet services on the part of national governments and users.

4. Regional Profile

Lake Victoria is the largest fresh water lake in Africa and it supports the livelihood of over 35 million people living along its shores. Lake Victoria is a critical asset for its contiguous countries Uganda, Tanzania and Kenya. The second largest lake in the world, it supports nearly 200,000 fishermen directly, with a fishing fleet of more than 70,000 boats. Furthermore, millions of people depend on the Lake and its resources, as it provides a means of transport and an important source of economic activity in the East African Region. With this dependency growing, the need for accurate weather forecasts and extreme weather warnings for ships to navigate safely is critical. The Lake's unique weather dynamics - strong winds, high occurrence of hailstorms and thunderstorms – has led to loss of life and property and threatens the safety of marine and air navigation over the lake and its basin.

4.1 Uganda: Climate change threatens to reverse hard-won development gains and jeopardize the Government's economic development and poverty eradication goals. A recent report labelled Uganda one of the most unprepared and vulnerable countries in the world.²

Agricultural dependency on weather events -- The case of Uganda

Over 80% of Uganda's population of 31 million rely on rain-fed subsistence farming, and agriculture accounted for over 33% of national GDP in 2002-2003.ⁱ According to the UN World Food Programme, Uganda is on the edge of a humanitarian catastrophe as drought reduced agricultural output by as much as 30% in some areas in 2008.ⁱⁱ

Average temperatures in Uganda are likely to increase by up to 1.5 °C in the next 20 years and by up to 4.3 °C by the 2080s. Mount Speke – once one of the Rwenzori Mountains' highest snow-capped peaks, with 563 acres of ice coverage – has been reduced to 46 acres. The National Environmental Management Authority (NEMA) predicts the ice will be gone by 2023 if melting continues at the current rate, which would change the entire ecosystem of western Uganda and could have a severe impact upon tourism in the region.³

Rainfall patterns are becoming more irregular and interfering with the traditional livelihoods of Uganda's predominantly rural population.⁴ In Karamoja, agricultural activity has been plagued by three successive years of irregular rainfall, which has reduced yields to 30% in some districts.

² International Climate Risk Report, Centre for International Governance Innovation (CIGI), 2007.

³ DSIP 2009; According to the Climate Change Unit at Uganda's Ministry of Water and Environment.

⁴ 87.5% of Ugandans live in rural areas; World Development Report 2008, The World Bank. The country received a total amount of rainfall of 1410.2 mm in 2001 and 1373.8 mm in 2006. The difference is small; however, in 2001 the rain fell over 136 days with an average of 10.36 mm per day; in 2006 it fell in 98 days with an average of 14 mm per day; "Turning Up the Heat: Climate change and poverty in Uganda." Oxfam GB, June 2008.

In 2007, the east of the country experienced the heaviest rainfall in 35 years, which resulted in widespread flooding and water-logging, and the destruction of harvests.⁵

Extreme weather exposes populations to harsh living conditions and outbreaks of waterborne diseases such as diarrhoea and cholera. Prolonged dry spells have resulted in respiratory disease, and rising temperatures are changing the geographical distribution of malaria and other disease vectors.⁶ The tsetse fly belt also appears to be expanding, resulting in the spread of cattle disease and the subversion of rural livelihoods.⁷ One of the most immediate effects of climate change is increasing hunger and under-nutrition.

Agriculture is the backbone of Uganda's economy. It constitutes about 42% of GDP, over 90% of export earnings and employs over 80% of the labour force. Thus far, the macro-economic impacts of environmental deterioration and associated losses have been estimated to amount to 4-12% of GDP.⁸ A temperature rise of 2 °C could wipe out most of Uganda's coffee production, and jeopardize US \$265.8 million or 40% of export revenue.⁹

The Uganda Department of Meteorology (DoM) is the institution mandated by the government of Uganda to monitor weather and climate. It is responsible for the issuance of forecasts, advisories and warnings for the protection of life and property. DoM maintains approximately 17 synoptic stations, 30 climatological stations and has records for up to 1000 rainfall stations across the country¹⁰. Data collected from these stations is sent into a central data bank and processed to produce various products necessary for various socio-economic sectors.

4.2 Kenya: Sixty percent (60%) of socio-economic activities in Kenya are weather and climate dependent. Severe weather and extreme climate events have been documented to have a high influence on the social and economic activities of the country.

Most of the agricultural production in Kenya is rain-fed. This makes it crucial that weather and climate information is factored in decision making for optimal agricultural production. In spite of this, climate and weather information is rarely integrated in decision-making processes to reduce the negative impacts and take advantage of the positive aspects. The links between food insecurity and poverty are clear. The capacity to cope and to reduce risks to agriculture is much more limited in poorer communities. It is necessary, therefore, that assessment and evaluation of the socio-economic benefits that accrue from use of weather information for agricultural production is undertaken to encourage farming households and decision makers to use weather information to scale up and combat famine and poverty.

In Kenya, sustainable development continues to be impeded by the negative impacts of weather-related disasters, which destroy infrastructure and livelihoods, endanger physical and food

⁵ Rapid Food Security and Livelihoods Assessment 2008, FAO Local Government; Uganda Climate Change

⁶ In South-Western Uganda, a correlation was observed between increased temperatures over the past decade – measured at 0.3 degrees – and increased prevalence of malaria; NAPA, 2007.

⁷ WHO 2004; Climate Change Book UNFCCC; Harrus and Baneth 2005.

⁸ Norad, Review of the Embassy's Development Assistance Portfolio: Environment and Climate Change, "Greening and Climate Proofing of the Portfolio," The Royal Norwegian Embassy, Kampala, Uganda, Jan 2009.

⁹ An estimated five million people rely directly or indirectly on coffee production; NAPA; UNFCCC 2007b; Oxfam, "Turning Up the Heat"; "Climate Change in Uganda: Understanding the implications and appraising the response." Scoping Mission for DFID Uganda, July 2008.

¹⁰ The coverage of meteorological stations is uneven throughout the country. There has been challenges in timely data acquisition and transmission due to budgetary and communication constraints. World Food Programme is currently providing assistance to the Department of Meteorology to expand its geographic coverage and timely delivery of meteorological services through the establishment of Automatic Weather Stations in Karamoja and adjacent priority districts.

security, hinder social and economic progress, and reverse cumulative gains in reducing poverty. One of the main causes of the limited use of meteorological information and services is lack of clarity on the value of integrating the information into decisions to manage the risks associated with climate.

The Kenya Meteorological Department (KMD) is mandated to perform systematic observation and monitoring of atmospheric and related environmental conditions and to provide scientifically based forecasting, warning and advisory services to enhance agricultural productivity and food security.

Preliminary results of the baseline survey reported in a recent study¹¹ revealed that majority of Kenyan farmers are willing to spend money on weather information, including value added products. The main source of household income for the three regions covered in the pilot project (Kakamega, Nakuru and Machakos) combined is crop farming (62%), confirming that crop farming is the mainstay of the economy of the three regions. The combination of good farming practices is crucial for maximizing yields. Farmers from the three regions use a variety of good farm practices. The study found that KMD should, therefore, work closely with other stakeholders to ensure the farmers adopt all the good farming practices including application of weather and climate information.

A simple majority (51%) of the respondents indicated that the seasonal forecast is used by most people, followed by the daily forecast at 32%. About 88% of the respondents make use of weather information. This suggests that easy access and timely provision of accurate weather and climate forecasts is essential and hence the need for awareness creation.

4.3 Tanzania

As with Kenya and Uganda, agriculture is the backbone of Tanzania's economy despite its strong tourism sector providing about 27% of GDP and 80% of employment. Cash crops, including coffee, tea, cotton, cashews, sisal, cloves, and pyrethrum account for the vast majority of export earnings. While the volume of major crops--both cash and goods marketed through official channels--have increased in recent years, large amounts of produce never reach the market due to a variety of factors including weather.

The fishery of Lake Victoria is also a key economic sector at both subsistence and market levels.

The Tanzania Meteorology Authority (TMA) is the institution mandated by the government of Uganda to monitor weather and climate. It is responsible for the issuance of forecasts, advisories and warnings for the protection of life and property.

5. Main Focus Areas

The Concept Note entitled; "Global Framework for Climate Services" developed for the WCC-3 envisaged the Global Framework to have four major components: Observation and monitoring; Research, modelling and prediction; a Climate Services Information System; and a User Interface Programme with a significant capacity development and user focus.

¹¹ Pilot Project: Socio-Economic Benefits of Meteorological Information and Services in Kenya in the Agriculture Sector. Mid-Term Report *June 2009*

For a regional framework it would be necessary that NMHSs continue to operate and strengthen the Observations and Monitoring component; contribute to and effectively engage in the Research and Modelling component; establish the operational elements of climate information production and delivery systems as part of the Climate Services Information System; and outreach to the users in support of the User Interface Program; and develop capacities in the NMHSs.

Some of these aspects such as strengthening the observations and monitoring¹², research and modelling and a Climate Services Information System¹³ are being partially or wholly dealt with under other projects currently underway. This project will focus on developing a clear progression of activities for **Climate Services** for which the key user application sectors will be agriculture (covering food security and food aid) and to a lesser extent health. A parallel element will look at improving the regional capacity for **severe weather forecasting and delivery of warnings** to the fishing community on Lake Victoria.

5.1 Component 1 – Improving the Climate Services

C1.1 Climate Services Review

- i) Determining requirements of User Sectors to identify additional weather and climate observation and monitoring products needed for agriculture (including crop insurance companies),, monitoring and projecting household food security, maritime transport and health sectors engaging users to identify the types of information they would need in order to plan for and adapt to climatic conditions.
- ii) Address human resources and skills as well as infrastructure that may include, for example, training, IT upgrade, telecoms with improvements focused on components required to meet the needs of various users; e.g., disaster management, farmers etc. This also includes a review of the adequacy of existing meteorological and hydrological stations in terms of geographic coverage as well as the functional status of these stations in order to make recommendations for expansion where coverage is limited and upgrade stations in order to ensure timely data acquisition and transmission. The review also includes an assessment of staff capacity/skills at NMHSs of the countries concerned.
- iii) Data Rescue and Management is critical for the preservation of the climatological records including transfer of historic data to digital media to create and maintain high quality climatological databases using modern Climate Database Management Systems. This is an ongoing process to preserve data from being lost and create easy access to data for various analyses. Ready access to data gives the ability to quickly carry out complex analyses of climate adaptation risk (some activities already underway in Kenya and Uganda which will be enhanced).

¹² Weather Info for All Project – GHF, WMO, Ericsson - improving spread of weather and climate monitoring stations for climate and agricultural services with a view to eventually focusing on the downstream issues but currently focused on the observing systems roll out (Tanzania, Kenya and Uganda at present): ClimDev Africa Programme: Regional Drought Monitoring Centre – Nairobi.

¹³ Climate Observations and Regional Modeling in Support of Climate Risk Management and Sustainable Development - WB GFDRR funded covering GHA IGAD Region - Burundi, Djibouti, Eritrea, Ethiopia, Kenya, Rwanda, Sudan, Somalia, Tanzania, and Uganda in association WMO, WCRP ICPAC : Regional Climate Framework in Eastern Africa – KOICA funded WMO-ICPAC . support to development of ICPAC as a Regional Climate Centre: USAID support to ICPAC related to capacity for the above and more generally: Regional Drought Monitoring Centre – Nairobi.

C 1.2 Agricultural Applications

- iv) It is proposed that the outcomes of the March 2010 workshop on climate indicators be used (from the sister project “Climate Observations and Regional Modeling in Support of Climate Risk Management and Sustainable Development” a WB GFDRR funded project covering IGAD Region). Then several long-term weather stations will be selected to represent an important agricultural crop region and on a critical transportation area (land or along Lake Victoria) working with the Regional Drought Monitoring Centre and ICPAC. The completeness of the period of record will be assessed and the missing data will either be secured by rescuing climate data through reliable estimation techniques. Once the quality and completeness of the climate data is ensured, the data will be used for applications for the agricultural sector for which there can be two key potential applications:
 - a. Developing a drought index that can take into account historical occurrence of drought events. The outcome of the GFDRR Project workshop will be used as guidance in selecting a useful climate/drought indicator. An example of such a drought index is the Standardized Precipitation / Drought Index (SPI) which uses at least 30 years of climate data to rank the historical strength of drought at that weather station. The SPI standardizes weather data so that the index can be mapped across many stations. This could be developed into a product that could be incorporated into the existing agrometeorological bulletins of the countries for future predictions. Other, indices, more specific for agricultural production could also be considered.
 - b. The second agricultural application would be to use the quality controlled climate data in conjunction with seasonal climate forecasts to develop in-season crop yield forecasts for food security. The general methodology is to use the current weather data up to the forecast date and from then on use an ensemble approach based on the quality controlled historical climate data which would take into account the various scenarios from the seasonal climate forecast. These combined climate datasets with actual weather data are then run in a crop simulation model and the simulated crop yield outcomes are weighted to the probabilities based on the seasonal climate forecasts to develop a crop yield estimate for the season to serve both the agriculture and food aid sectors.
- v) Quarterly climate watch bulletins: advisories and statements to inform users about evolving or foreseen climate anomalies at the regional and national levels, including potential impacts on agriculture (crops), food aid distribution, maritime transport and health sectors.
- vi) Link the weather and climate watch system to the WIFA and Zain/Ericsson Communications Systems for delivery of daily weather forecasts and early warning of severe weather events and seasonal climate predictions to the Agricultural Extension Officers and to the farming communities.

5.2 Component 2 – Improving Severe Weather Forecasting and Warning Services

Development of a Severe Weather Forecasting System for Lake Victoria will be initiated. This process will mirror the process piloted and operationalized with great success in Southern Africa. There the process has led to critical improvements in the lead time and accuracy of forecasts for

extreme weather phenomena such as tropical cyclone, heavy rainfall, strong wind, and improved the prediction of hazards they triggered. This process, underpinned by the Global Data-Processing and Forecasting System and a regionalisation the approach, through improved access to and effective use of outputs of numerical weather prediction systems, and in collaboration with the Public Weather Services of participating countries is aimed to improve the delivery of warning services for severe weather events. It is a systematic and practical approach for building capacity and for transferring new knowledge and skills.

Additionally Mobile phone coverage across Africa's Lake Victoria has been expanded in a joint venture between Zain, and Ericsson, in an initiative coordinated by the GSM Association. The coverage will comprise the area of the lake where 80 percent of fishing activities take place, allowing communication and SMS exchange to and from phones. This enhancement could be capitalised on for delivery of weather information and especially severe weather warnings directly to lake residents and fishermen on the lake and potentially reduce the number of fishing-related deaths each year. This will be undertaken in association with the Weather Info for All Project¹⁴ (WIFA).

Quoting from a message from Sacrastra Nchengwa, the representative from Botswana's Department of Meteorological Services (DMS) on the severe Weather Forecasting Programme:

"... I would like to report to you that your (with your partners) dedication and tireless efforts in helping developing countries' NMSs to improve their capability to forecasts severe weather has not gone unnoticed. Recently, the DMS through its Weather forecast issued two press releases to the public through the media and the Disaster Management Office and true to the forecasts the expected conditions did occur. The press releases were first read over all the radios as part of the news bulletins. Though we have already entered into the winter season in Botswana, our confidence in the forecasts as issued by the modes was so high that we did not even hesitate to issue a press release (which contained advisories) at least 72 hours before the onset of the expected events. The feedback was massively positive and for the first time in a long time, DMS got commendations from a lot of customers including high profile figures in the society. Most feedback we got was through the telephone and during the week following the issue of the first press release our telephone lines were busy with more request for warnings and forecasts from a more appreciative public.

What took us by surprise was the huge interest and publicity generated by those press releases ... I can confidently and categorically state that the public's view about DMS has changed for the better and the DMS visibility has been enhanced as a result. Our participation in the SWFDP project surely played a huge part in the this recent achievement." (2 July 2009).

The project will also link to and benefit from the ongoing WFP and Rockefeller Foundation initiative that is developing the Africa Synthetic Risk (ASR) model that converts weather data into high-level food security response costs as WFP is a key partner to the project. The model considers weather indicators maps, vulnerability data and the operational cost per beneficiary

C 2.1 Improving severe weather forecasting across Lake Victoria

- vi) Review the existing capacity considering:
- institutional issues (cf., human resources) and infrastructure issues (monitoring network coverage and quality, equipment age and depreciation, telecoms, modelling expertise, IT):
 - skill of forecast outputs, using standard WMO measures, and coverage of the agency's forecasts (resolution, areas covered, forecasts supplied to emergency management, agro-meteorology, climate monitoring, seasonal forecasting)
 - potential to regionalise through a specialised regional centre.
- viii) Initiate a capacity and systems development plan for all three countries to improve all aspects of forecasting systems between all three countries for full coverage of Lake Victoria.

C 2.2 Improving delivery of Warnings for severe weather events

- ix) Link the forecasting system to Lake Victoria Rescue Service Communications Centre and WIFA and Zain/Ericsson Communications Systems for delivery of daily weather forecasts and early warning of severe weather events to the fishing and lakeside communities.

6. Project Implementation and Management

The project will be implemented by WMO in close collaboration with the beneficiaries: Kenya, Tanzania and Uganda; ICPAC, the Nairobi-based Drought Monitoring Centre various sectoral entities within the countries including the NMHSs, Disaster Management Agencies; and partner organizations.

The project will be linked to the ongoing development of the IPCAC Regional Climate Centre and the proposed East Africa Centre for Medium Range Forecasting¹⁵ and will require an iterative process of consultation with the different stakeholders and existing institutions in the region. The existing ongoing activities in the region such as Regional Climate Outlook Forum, the KOICA ICPAC Development Project, the Govt of Greece Climate Change Adaptation Project for East and Central Africa and the WIFA Project will be appropriately made use of.

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Goal	Enhance the security of the livelihoods of farmers and fishermen in and around Lake Victoria.		
Objective		Objective 1: Improve agricultural productivity in Africa	Objective 2: Reduce loss of life due to extreme weather and climatic events
Outcomes	•	<ul style="list-style-type: none"> • Increased access of weather information for agricultural decision making purposes 	<ul style="list-style-type: none"> • Increased reach of fishing community and farmers in case of extreme weather events and also climatic events (drought etc)
Indicators	•	<ul style="list-style-type: none"> • Number of farmers having access to the weather information • Number of agriculture specific weather information products and services • Feedback from agricultural research institutes on ability to use information for agricultural decision making • Feedback from farmers on use of weather information 	<ul style="list-style-type: none"> • Improved quality of weather information available (predicting extreme weather) • Penetration of population that can be reached with weather information • Reduced time required to provide warning to the population • Increased preparedness of communities for extreme weather events • Increased number of local partners engaged for dissemination of the information

There will be a strong focus on creating visibility around both the project and the donor.

7. Supporting Programmes / Activities

ClimDev Africa: Following the endorsement of the strategy, ‘Climate Information for Development Needs: An Action Plan for Africa’ by the African Union Heads of State in January 2007, the ClimDev Africa Programme addresses the needs for improved climate observations as

expressed in the GCOS Regional Action Plans, and the needs for climate services, climate risk management, and associated policy development and implementation.

RCOFs: Regional Climate Outlook Forums are convened annually by in the Greater Horn of Africa, in South Africa and in West Africa, to elaborate and ensure appropriate dissemination of consensual regional outlooks, bulletins and products about the next rainy season. These outlooks are directed towards the needs of users from agriculture, health, water management and energy, based upon their input and feedback.

MALOFs: Malaria Outlook Forum initiated in the South Africa in 2004, are operational in the Greater Horn of Africa since March 2007. In close relation with Regional Climate Outlook Forums, those forums facilitate modelling and analysis by experts in the climate and health communities in close coordination, to produce useful outlooks and advices, up to three to four months ahead, of areas potentially at risk of malaria outbreaks.

ICPAC: Inter-Governmental Authority on Development (IGAD) Climate Prediction and Application Center with the World Meteorological Organization, ICPAC has implemented a regional seasonal climate prediction system and applications in various sectors in order to reduce the vulnerabilities associated with climate variability. In the ten Greater Horn of Africa countries, the project has improved climate monitoring, prediction, and applications, as well as early warning of climate-induced disasters.

DMC: Drought Monitoring for Eastern and Southern Africa. To support drought monitoring two operational centres in Nairobi and Harare (under the guidance of ICPAC) are charged with timely monitoring of drought intensity, geographical extent, duration and impact on agricultural production, and issuing early warnings. The proposal recognizes that there already are ongoing attempts to provide scale-relevant (national/sub-national/seasonal) climate services such as seasonal outlooks, crop forecasts by DMC-Nairobi, NMHSs, USGS/FEWSNET, etc.

RANET: Developed by USAID/OFDA, NOAA, and NGO partners, RANET provides access to and strengthens the use of hydro-meteorological information by communities in day-to-day decision-making to reduce vulnerability to natural hazards. Since its inception in 2000, RANET has expanded to 16 African countries.

ACMAD: The Africa Centre of Meteorological Applications for Development with continental mandate, based in Niamey, Niger;

CILSS/AGRHYMET: which works with the environment related to agriculture, land and water management; also based in Niamey.

8. Budget and Work plan

Attached at Appendix 1

Overall Budget ACTIVITY DESCRIPTION	COST ESTIMATES (US\$,000)			
	DFA Grant	OTHER	DFA Grant	DFA Grant
	Year 1 2010		Year 2 2011	Year 3 2012
C1.1 Climate Services Review	50,000	405,000	30,000	40,000
i) <i>Determining requirements of User Sectors to identify additional weather and climate observation and monitoring products needed for agriculture (including crop insurance companies), food aid distribution, and health sectors.</i>				
<ul style="list-style-type: none"> Regional Workshop Multi-Sectoral Engagement March 2010 and related Climate Modelling activities[1] 	10,000	375,000		
<ul style="list-style-type: none"> 3 in Country Consultations on Weather Information needs in Agriculture and food aid distribution, and health sectors. 	40,000			
ii) <i>Climate Data Rescue and Management</i>		30,000	30,000	40,000
C 1.2 Agricultural Applications	115,000	1,800,000	30,000	25,000
iii) <i>Crop Specific Seasonal Predictions & Drought Management</i>				
<ul style="list-style-type: none"> Regional Workshop Multi-Sectoral Engagement March 2010 (see footnote 1) 				
<ul style="list-style-type: none"> Development of drought index that can take into account historical occurrence of drought events. 	40,000			
<ul style="list-style-type: none"> Development of in-season crop yield forecasts for food security and food aid. 	30,000			
<ul style="list-style-type: none"> Regional Workshop Climate Change and Agriculture (4th qtr 2010)[2] and related Greece Programme of Cooperation Activities. 		1,000,000		
iv) <i>Quarterly climate watch bulletins:</i>				
<ul style="list-style-type: none"> Qtrly advisories and statements to inform users about evolving or foreseen climate anomalies at the regional and national levels in association with ICPAC including potential impacts on agriculture (crops), food aid distribution, maritime transport and health sectors etc. [3] and KOICA project related activities 		600,000	30,000	25,000
(v) <i>Linking the weather and climate watch system to the WIFA efforts and Zain/Ericsson Communications System.</i>		200,000		
<ul style="list-style-type: none"> Development of Agricultural Applications for SMS Platforms for farmers and food aid agencies. 	45,000			

Overall Budget ACTIVITY DESCRIPTION	COST ESTIMATES (US\$,000)			
	DFA Grant	OTHER	DFA Grant	DFA Grant
	Year 1 2010		Year 2 2011	Year 3 2012
C 2.1 Improving severe weather forecasting for maritime sector across Lake Victoria	37,500		142500	137000
<i>vi) Review the existing capacity and coverage of the 3 NMS agency's forecasts over Lake Victoria (resolution, areas covered, forecasts supplied to emergency management, agro-meteorology, climate monitoring, seasonal forecasting).</i>				
<ul style="list-style-type: none"> Expert Missions PWS to each country. 	37,500			
<ul style="list-style-type: none"> Explore potential for East Africa Centre for Medium Range Weather Forecasting under umbrella of EAC in conjunction with activities already occurring on this area[4] 				
<ul style="list-style-type: none"> Joint Workshop to agree on products 			32,500	
<i>vii) Initiate a capacity and systems development plan for all three countries to improve all aspects of forecasting systems between all three countries for full coverage of Lake Victoria.</i>				
<ul style="list-style-type: none"> Training and Infrastructure (IT) Upgrades 			50,000	50,000
<ul style="list-style-type: none"> Infrastructure (IT and Communications) Upgrades 			60,000	87,500
C 2.2 Improving Warning Systems for severe weather events				
<i>vii) Link the forecasting system to Lake Victoria Rescue Service Communications Centre and WIFA and Zain/Ericsson Communications Systems for delivery of daily weather forecasts and early warning of severe weather events to the fishing and lakeside communities.</i>				
C 3 Project Management Over Head Costs (10% avg)	22,500		22,500	22,500
Total	225,000	2,205,000	225,000	225,000
Footnotes : [1] Funded under "Climate Observations and Regional Modelling in Support of Climate Risk Management and Sustainable Development " - WB GFDRR funded covering GHA IGAD Region - Burundi, Djibouti, Eritrea, Ethiopia, Kenya, Rwanda, Sudan, Somalia, Tanzania, and Uganda in association WMO, WCRP ICPAC				375,000
[2] Funded under Climate Change Adaptation in Sub-Saharan Africa (Greece)				1,000,000

Overall Budget ACTIVITY DESCRIPTION	COST ESTIMATES (US\$,000)			
	DFA Grant	OTHER	DFA Grant	DFA Grant
	Year 1 2010		Year 2 2011	Year 3 2012
[3] Funded under KOICA Climate Framework for East Africa Project				600,000
[4] Process already initiated by EAC and EAC Country Directors of Meteorological Agencies				

GFDRR Funding (Complimentary Proposal to be developed)	Year 1	Year 2	Year 3
Upgrade of observation systems (links to WIFA implementation)			
Review of the adequacy of existing meteorological and hydrological observation stations network in terms of geographic coverage as well as the functional status of these stations in order to make recommendations for expansion where coverage is limited and	40,000		
Update Assessment of staff capacity/skills / infrastructure at NMHSs of the countries concerned.	10,000		
Training of staff		50,000	50,000
Installation of Weather Observation Systems on Lake and surrounding shores as required including upgrade of communications and data handling infrastructure	200,000	500,000	500,000
Total	250,000	550,000	550,000

ⁱ WWAP. (2005): "National water development report: Uganda." *World Water Assessment Programme and Directorate of Water Development*, Prepared for 2nd UN World Water Development Report, p.116. http://www.unesco.org/water/wwap/wwdr/wwdr2/case_studies/uganda/index.shtml.

ⁱⁱ All Africa. (2009): "Uganda: Rising Temperatures Threatening Livelihoods." *All Africa and IRIN*, March 3. <http://www.wfp.org/news/hunger-in-the-news?tid=332>.

Relief Web. (2009): "Uganda: Rising temperatures threatening livelihoods." *ReliefWeb*, March 3. <http://www.reliefweb.int/rw/rwb.nsf/db900SID/JBRN-7PSK45?OpenDocument>.