



Regional Research Call – Africa

[START](#) will commission and manage research on the theme of

“Climate Change, Agriculture and Food Security”

with an emphasis on the sustainability of ecosystem services in Africa. Objectives of this call are to commission high quality, independent, policy-relevant and credible research to support policy making for sustainable development in the region, to build the capacities of regional research partners to conduct high level research and to create a platform for knowledge sharing at the regional level.

Co-financing for the call is secured from the [US National Science Foundation](#) and the [Climate Change, Agriculture and Food Security \(CCAFS\)](#) programme.

CDKN identified an opportunity to build on this and fund further viable, high quality projects through this existing process and is supporting 16 awards on the implications of global environmental change for agriculture and food security in Africa to a total value of £300,000. In addition to the research funding, CDKN provides an additional £150,000 to support of hosting a regional learning forum and STARTS management costs.

Please see below for detailed information on the projects awarded funding under this call.

Project Title:

Management of Ecosystems Services of the Forests of Southwest Nigeria in Support of Rural Livelihoods and Food Security

Principal Investigator:

Dr. ADEKUNLE, Victor Jimoh Ajibola, Federal University of Technology, NIGERIA,

Co-Investigators:

Dr. OKUNLOLA, James Olaniyi, Federal University of Technology, NIGERIA,

Dr. OKE, David Olarewaju, Federal University of Technology, NIGERIA,

Scope and Rationale:

The forests of Southwest Nigeria provide important ecosystem services for a large rural population. However, degradation of forest ecosystems threatens the long-term sustainability of these ecosystem services, in addition to forest degradation being an important driver of regional climate change. This project will examine the present

quantity and quality of ecosystem services and the level of dependence by rural communities on the forest, particularly the link with ecosystem services and food security. The results will serve as a baseline study for subsequent monitoring of these services and the communities that depend on them. This project will engage local communities as well as policy makers to expand climate change awareness and identify adaptation options among the rural people of the region. Policy options will be reviewed to determine how to promote tree planting, the judicious use of forest resources, and the retention of trees on farmland. The project will provide a database for management decisions and policy formulation to mitigate the impact of human activities that drive forest degradation and that impact food production and the rural economy.

Project Title:

Reducing Tropical Deforestation and the Protection of Ecosystem Services to Support Food Security in Southwest Cameroon

Principal Investigator:

Dr. AJONINA, Gordon Nwutih, Cameroon Wildlife Conservation Society (CWCS), CAMEROON,

Co-Investigators:

Dr. CHUYONG, George Bindeh, University of Buea, CAMEROON,
Ms. USONGO, Patience Abaufei, University of Buea, CAMEROON,

Scope and rationale:

The coastal forests of Cameroon are being rapidly degraded, in large part by shifting (“slash and burn”) cultivation. Such land-use change is an important driver of regional climate change in the Congo River Basin of Central Africa. Financial incentives to reduce emissions from deforestation and forest degradation (REDD) in such carbon rich ecosystems are being promoted to stem deforestation. However, REDD faces several political and technical challenges, including concerns over national sovereignty and land rights of forest users; the establishment of appropriate deforestation baselines; and negotiating the myriad tradeoffs between maintaining terrestrial carbon sinks, achieving food security through traditional food production practices, and the provision of ecosystem services for sustainable livelihoods. This project will examine such tradeoffs in degraded agro-forests adjacent to the protected coastal forests of Douala-Edea National Park and Korup National Park where there are ongoing attempts to reduce carbon emissions from deforestation and forest degradation (REDD). This project will provide links to other REDD and climate change mitigation and adaptation projects within the Congo Basin with a distinctive emphasis on food production and the protection of ecosystem services.

Project Title:

Sustainable Farmland Management in the Context of Climate Change in Inland Valleys of Southern Benin

Principal Investigator:

Dr. AKPONIKPE, P. B. Irénikatché, Université de Parakou, BENIN,

Co-Investigators:

Dr. AGBOSSOU, K. Euloge, Université d'Abomey Calavi, BENIN,
Dr. BACO, Mohammed Nasser, Université de Parakou, BENIN,

Scope and rationale:

Inland valleys constitute an important but underutilized land type for food production in West Africa. In southern Benin, production in these valleys is limited by lack of appropriate water management and limited access to input and output markets. This lack of appropriate water management has been exacerbated by recent climate change manifested through more frequent floods and below average rainfall years that increase the frequency of crop failure that in turn diminishes the contribution of inland valleys to food security in West Africa and Benin in particular. This project seeks to expand knowledge of how to better manage inland valleys in Southern Benin for improved food security in the context of climate change through 1) evaluating the suitability of current inland valleys water management schemes for hydraulic/hydrologic functioning in the context of climate change; 2) assessing farmers vulnerability to climate change and effective adaptation strategies in inland valleys; and 3) informing relevant stakeholders about the most appropriate inland valley management options.

Project Title:

Changes in Tree Reproductive Phenology: Causes and Implications in and around Budongo Forest Reserve, Uganda

Principal Investigator:

Dr. BABWETEERA, Fred, Budongo Conservation Field Station, UGANDA,

Co-investigator:

Assoc Prof. NYEKO, Philip, Makerere University, UGANDA

Dr. AGEA, Jacob, Makerere University, UGANDA

Dr PLUMPTRE, Andrew, Wildlife Conservation Society, USA/UGANDA,

Scope and Rationale:

The Budongo Forest Reserve in Uganda is the largest remaining tropical rain forest in East Africa. The forest is an important source of non-timber forest products for communities living adjacent to the reserve. Long-term fruiting phenology records of trees in the reserve indicate that over the last fifteen years the proportion of fruiting trees has declined. The increase in minimum temperatures in Budongo in the 1990s may have had some effect on fruiting phenology, as has been documented in other ecosystems, though changes in pollinator populations could also be a factor. The observed reduction in proportion of fruiting trees is likely to have profound effects on the dynamics of the forests in relation to regeneration potential as well as intensifying human-wildlife conflict due to reduced food availability in the forest. This project will expand the scope of data collection on fruiting phenology of trees within the Budongo Forest Reserve to document the impact of fruit set on biodiversity and forest regeneration. Forest reserve managers, policy makers and local communities will be engaged in an effort to understand the challenges caused by changes in climate and reduced pollination services. This project will provide information to influence policy development to mitigate human-wildlife

conflict that has the potential to threaten food security and livelihoods of people living in areas adjacent to forest preserves.

Project Title:

Impact of Climate Change on Water Resources, Agriculture and Food Security in the Ethiopian Rift Valley: Risk Assessment and Adaptation Strategies for Sustainable Ecosystem Services

Principal Investigator:

Dr. Dagnachew Legesse BELACHEW, Addis Ababa University, ETHIOPIA,

Co-investigators:

Dr. Tewodros Rango GODEBO, Duke University, USA,

Dr. Behailu Atlaw TESHOME, Jimma University, ETHIOPIA

Dr. Tenalem Ayenew TESHAYE, Addis Ababa University ETHIOPIA,

Scope and rationale:

Water availability, human health, food production and economic livelihoods in the densely populated Upper Awash Basin and central Rift Valley of Ethiopia are intrinsically linked. Surface water resources in this area of central Ethiopia face intense competition between agricultural and non-agricultural uses, and groundwater resources in this region are of poor quality for both food production and human consumption (containing high levels of fluoride, arsenic and other toxic naturally-occurring contaminants). The increased prevalence of drought as a result of climate change has the potential to amplify risks to human health by shifting reliance from scarce surface water to groundwater, which could affect the long-term health impacts of rural communities exposed to elevated levels of toxic elements in groundwater. Moreover, crop production could suffer from increased reliance on marginal quality water for irrigation. The aim of this project is to investigate how changes in surface and groundwater resources brought about by population growth, development and climate change could affect human health and food production.

Project Title:

Improving Seasonal Forecast Information for Managing On-farm Decisions

Principal Investigator:

Dr. CRESPO, Olivier, Climate Systems Analysis Group (CSAG), University of Cape Town, SOUTH AFRICA,

Co-Investigators:

Prof. TADROSS, Mark, CSAG, University of Cape Town, SOUTH AFRICA,

Prof. JOHNSTON, Peter, CSAG, University of Cape Town, SOUTH AFRICA

Prof. WALKER, Sue, University of Free State, SOUTH AFRICA,

Scope and rationale:

More effectively managing seasonal climate risks for food production is a critical challenge in Southern Africa where highly variable rainfed environments and projected long-term aridification pose serious risks to the region's agriculture. Seasonal climate forecasts are an important tool for catalyzing anticipatory planning at the farm level that

can lead to better management of seasonal climate risks and instil processes for longer-term adaptation. However, at present, farmer access to existing seasonal forecasts is poor, and the ability of farmers to properly interpret such information to benefit farming operations is inadequate. This project examines how seasonal forecast development and delivery can be enhanced through testing downscaled climate forecasts for improving information from seasonal forecasts; testing the use of an optimization procedure to guide tactical decision making; and highlight where improvements in communicating seasonal forecast information may be achieved.

Project Title:

Integrating Indigenous Knowledge and Scientific Methods for Flood Risk Analyses, Responses and Adaptation in Rural Coastal Communities in Nigeria

Principal Investigator:

Prof. FABIYI, Oluseyi O., Obafemi Awolowo University (Regional Center for Training in Aerospace Surveys), NIGERIA

Co-Investigators:

Dr. AKINBOLA, Gabriel, University of Ibadan. NIGERIA

Mr. OLOUKI, Joseph, Obafemi Awolowo University, NIGERIA, Ms OLUFUNMILAYO, Thontteh, Obafemi Awolowo University, NIGERIA

Scope and Rationale:

Coastal wetlands and ecosystems in the Niger Delta are increasingly threatened by increased flooding and associated degradation of the coastal environment. The increased intensity of coastal flooding affects thousands of rural communities in the creeks, lagoon, estuaries and freshwater banks in the delta, significantly impacting their food and livelihood security. Though some communities in the Niger Delta have used indigenous knowledge to forecast floods with some degree of accuracy, it has not been integrated with scientific methods for improved risk analysis, and contingency planning and post disaster management, especially related to flood disasters on agricultural production. The potential of the indigenous flood prediction mechanisms can be enhanced by scientific knowledge such as well-annotated flood risk maps, simple weather stations and flood gauges at the banks of the floodable rivers, which could be understood and applied by the local indigenous population. A proper blending of the indigenous predictive techniques combined with simplified scientific procedures would help communities mitigate flood disaster and adapt to environmental changes. This project will engage flood-affected communities, local government and civil society organizations.

Project Title:

Community-Based Management of Ecosystems and Natural Resources for the Improvement of Rural Livelihoods and Food Security in the Nigerian Savannah

Principal Investigator:

Dr. FASONA, Mayowa Johnson, University of Lagos, NIGERIA.

Co-Investigators:

Dr. ADENIJI, Grace, Lead University, NIGERIA.

Dr. OLURUNFEMI, Felix Bayode, Nigerian Institute of Social and Economic Research, NIGERIA.

Dr. ELIAS, Peter Omu, University of Lagos, NIGERIA.

Dr. ADEDAYO, Vide, University of Lagos, NIGERIA.

Scope and Rationale:

The fragile landscapes of the Nigerian savannah are impacted by climate extremes that vary from season to season and from decade to decade. Global climate models predict that the savannah will become drier with more fragile shrub and grassland areas. Because poor management of the fragile landscapes can exacerbate the impacts of climate change, it is crucial to identify and adopt appropriate land management techniques to provide sufficient food security and sustainable livelihoods to a growing human population. This project will provide opportunities for community participation in ecosystems management by small-scale farmers who rely on rain-fed agriculture. The farmers will receive training and will participate in the design and implementation of adaptation techniques for sustainable land and water use in the densely settled rural savannah in western Nigeria. Groups of community residents and opinion leaders will gain skills for implementation of adaptation techniques for the management of their fragile lands during times of climate change.

Project Title:

Engaging Farmers and Climatologists in Adaptation to Climate Variability and Change in the Okavango Delta of Botswana

Principal Investigator:

Dr. KOLAWOLE, Oluwatoyin Dare, Okavango Research Institute, BOTSWANA,

Co-Investigators:

Dr. WOLSKI, Piotr, Okavango Research Institute, BOTSWANA,

Ms. NGWENYA, Barbara Ntombi, Okavango Research Institute, BOTSWANA,

Dr. MMOPLELWA, G., Okavango Research Institute, BOTSWANA,

Scope and rationale:

Over the last few decades, some agricultural areas in the Okavango Delta have experienced reduced rainfall resulting in drying up of streambeds. These same areas have also been subjected to inundations from heavy rainfall events that occur upstream in the headwaters of the Limpopo and Okavango Rivers. This study will examine the link between climate variability, agricultural production and farmers' livelihoods, and it will identify opportunities for and hurdles to integrating local and traditional knowledge with scientific knowledge around the issue of seasonal climate forecasts and other measures to address adaptation needs. This project will generate data and establish a base to integrate knowledge of farmers and climatologists for weather forecasting and adaptation to climate change in the Ngamiland of northwestern Botswana. The goal is to build a farmer-scientist-extension working relationship to mitigate climate change risks to farmer livelihoods.

Project Title:

The Role of Urban and Peri-Urban Agriculture in Enhancing Food Security and Climate Change Resilience in East and West African Cities

Principal Investigator:

Dr. LWASA, Shuaib, Makerere University, UGANDA

Co-Investigators: Dr. WAHAB, Bolanle, University of Ibadan, NIGERIA,

Dr. MUGAGGA, Frank, Makerere University, UGANDA, ,

Prof SIMON, David, Royal Holloway University of London, UK,

Dr. FRAGKIAS, Michail, UGEC International Project Office, Arizona State University, USA,

Scope and Rationale:

Food security in urban and peri-urban areas of Africa is a significant challenge because of high sensitivity by the urban poor and middle class to food price spikes, which are linked to global factors including extreme climate events in important cereal producing regions of the world. This research will perform a meta-analysis to evaluate the role that urban and peri-urban agriculture (UPA) plays in enhancing urban food security in East African and West African cities, and how the provision of food within peri-urban and urban areas affects, and is affected by, climate change. The meta-analysis will also examine the environmental impacts of and environmental services provided by UPA in the context of building more resilient cities. This research effort will help to address the significant knowledge gaps that exist in the global south around urban agriculture's role in and contribution to food and livelihood security.

Project Title:

The Application of Earth Observation Methods for Monitoring and Assessment of Agro-forestry in Senegal and Ghana

Principal Investigator:

Dr. MBOW, Cheikh, Université Cheikh Anta Diop, SENEGAL,

Co-Investigators: Dr. SKOLE, David, Michigan State University, USA

Dr. VON VORDZOGBE, Vincent, University of Legon, GHANA

Dr. ALLOTEV, Emmanuel Morgan, University of Legon, GHANA

Dr. NDOUR, Ngor, Université de Ziguinchor, SENEGAL

Scope and Rationale:

Food production in the Sahel and short-grass Savannah zones of West Africa faces significant pressures from land degradation, declining agro-biodiversity, and high inter-annual climate variability and drought. Shortfalls in food production have led to increased dependency on imports to meet basic food needs, and the long-term outlook for the region's food security is poor given increased risks from climate change. Mixed agroforestry systems in these dryland areas are increasingly recognized as a critical factor for building more resilient farming systems to address climate change and other risks. Smallholder farmers depend on tree products such as wood fuel, forage, and fruits

for their livelihoods, and key agroforestry species in this zone contribute positively to net nitrogen input in degraded soils. Recent advances in the deployment and use of remote sensing and geographic information systems, combined with participatory methods have created opportunities to provide integrated information to rural communities for managing dryland agroforestry systems. This project will use these tools to develop an ecosystem service-based model to link land management and natural resource conservation with market incentives and access to basic resources needs. The team will develop standards and protocols for this model and field-test them in two agroforestry systems in Senegal.

Project Title:

Climate Change Adaptation for Rural Communities Dependent on Agriculture and Tourism in Marginal Farming Areas of the Hwange District, Zimbabwe

Principal Investigator:

Dr. NHEMACHENA, Charles, Council for Scientific & Industrial Research (CSIR), SOUTH AFRICA,

Co-Investigators: Dr. MANO, Reneth, University of Zimbabwe, ZIMBABWE, Mr. MUDOMBI, Shakespear, Tshwane University of Technology, SOUTH AFRICA,

Scope and Rationale:

Rural communities in northwest Zimbabwe derive their livelihoods from rainfed agriculture and from tourism associated with Victoria Falls and the adjacent Hwange National Park. The region's climate is characterised by high temperatures and low and highly variable rainfall. Current climate and future climate change thus pose significant risks to maize-based food production in this region. Given future projections of climate change for this region, and for southern Africa more generally, farming systems are expected to undergo profound changes in order to adapt. The project will consider adaptation in marginal farming areas that are co-dependent on agriculture and the tourism industry, and how these two key livelihood resources could interact under future climate change. Potential adaptation strategies will be considered as a means to strengthen and supplement local livelihoods based on production of both food crops and sales of non-farm forest products to tourists and the tourist support industry in the areas near Victoria Falls and Hwange National Park.

Project Title:

Assessing Adaptation Responses by Smallholder Farmers in Northern Ghana to Climate Change and Biodiversity Loss

Principal Investigator:

Dr. OSEI-OWUSU, Yaw, Conservation Alliance International, GHANA

Co-Investigators:

Prof. AL-HASSAN, Ramatu, University of Ghana, GHANA

Ms. DOKU-MARFO, Ernestina, Conservation Alliance International, GHANA

Scope and Rationale:

Northern Ghana has good potential for agricultural growth, particularly in the fertile lowland and inland valleys, which are currently under-exploited for agriculture. However, this region is highly exposed to extreme events, has limited opportunities for off-farm and nonfarm employment, and has experienced a weakening of traditional social safety nets, which in turn has amplified risks from climate variability and change. Moreover, the limited investment in the construction of dams, dugouts and the judicious management of watersheds is negatively impacting the ability of the north to produce food and has increased vulnerabilities spawned by droughts and floods, which are expected to increase with climate change. This research will examine adaptation strategies for smallholder farmers in northern Ghana, and will be linked to issues of production, water management and the policy environment. Farmers and national policy makers will be involved as part of a dynamic collaboration among governments and NGO institutions in Ghana.

Project Title:

The Impact of Climate Change on Food Security Among Coastal Communities of Keiskamma, in the Eastern Cape, South Africa

Principal Investigator:

Dr. RIBBINK, A. J., Sustainable Seas Trust, SOUTH AFRICA

Co-Investigators:

Prof. RAATS, J.G., University of Fort Hare, SOUTH AFRICA

Prof. deWET, C. J., Rhodes University, SOUTH AFRICA

Prof. ADAMS, J. G., Nelson Mandela Metropolitan University, SOUTH AFRICA

Scope and rationale:

Pressure on coastal biodiversity in South Africa's Eastern Cape brought about by excessive harvesting of marine and estuarine fish and invertebrates can be linked to poor agricultural production and tenuous food security in the Eastern Cape, South Africa's most economically impoverished province. In recent decades, agricultural production in the Eastern Cape has become increasingly challenging due to increasing periods of dry, hot weather and socio-economic conditions that contribute to land degradation and a loss of ecosystem services. This project will examine the relationship between agriculture, biodiversity harvesting and the ability to purchase food in the face of climate change and declining ecosystem services, through an evaluation of food security in the Keiskamma catchment of the Eastern Cape. The project is designed to help coastal communities identify options for improving farming methods in the face of increasing climate risks, maintaining livelihoods sustainability, and restoring damaged ecosystems.

Project Title:

Sensitivity of Coastal Lagoon Ecosystems to Climate and Related Global Changes: Developing a North African Lagoons Network

Principal Investigator:

Prof. SNOUSSI, Maria, University Mohamed V, MOROCCO

Co-Investigators: Prof. KARA, Hichem, University of Annaba, ALGERIA
Dr. TRIGUI EL MENIF, Université 7 novembre à Carthage, TUNISIA
Dr. MAHE, Gil, IRD/HydroSciences Montpellier, FRANCE

Scope and Rationale:

Lagoon ecosystems in the coastal zone of North Africa represent an important source of fish and shellfish, which provide a critical economic resource for the Mediterranean region. Expected warming in the Mediterranean Sea and changes in freshwater and sediment flows as a result of coastal storms, which alter bottom sediment dynamics, salinity and oxygen levels, and nutrients, could disrupt the productivity of the trophic chain and potentially jeopardize food security and livelihoods in coastal communities that depend on these fisheries. Despite their high ecological and economic value, North African lagoons have received relatively little attention, especially with regard to environmental conditions and risks. This project will provide a quantitative assessment of the biogeochemical budgets of the North African coastal lagoons and a qualitative assessment of their sensitivity and adaptability to climate change. In doing so, the project will enhance local stakeholders' awareness of the potential impacts of climate change on these environments and of potential adaptation strategies.

Project Title:

Targeting Crop Yield Increases Under Future Climate for Greater Food Security in the Upstream Catchment of Lake Victoria Basin

Principal Investigator:

Mr. Wasige, John Ejiet, Faculty of Agriculture, Makerere University, UGANDA

Co-Investigators:

Dr. BEMIGISHA, Jane, International Foundation for Science (IFS), UGANDA
Dr. EILU Gerarld, Faculty of Agriculture, Makerere University, UGANDA
Mr. LUBANGA, Timothy, Ministry of Disaster Preparedness, UGANDA,
Mukashema, Adrie, National University of Rwanda, RWANDA,
MBAZUMATIMA, Jean-Berchmans, Institut Geographique du Burundi (IGEBU),
BURUNDI,
Mr. KYARUZI, Ladislaus, Division of Environment, Vice President's Office, TANZANIA,

Scope and Rationale:

Climate change models for the Lake Victoria Basin region of East Africa indicate the potential for a wide range of changes. Relatively high rainfall areas are projected to experience increases in annual rainfall, while dry areas could experience decreased rainfall. Despite these potential mean changes, all areas in this region are projected to experience increased temperatures, and greater frequency of extreme weather events. The growing season for annual crops is expected to become shorter both due to higher temperatures and the aggregation of seasonal rainfall into shorter and more intense events, which could exacerbate the existing risks of soil erosion and runoff. This project aims to assess historical and projected climate change impacts and to identify a range of appropriate adaptation practices. The project will characterize farmers' livelihood strategies with respect to managing progressive climate risks, and evaluate the impact of climate variability and climate change on crop yields.
