

# Impact CASE STUDY

## CUSTOMERS & PARTNERS

Governments, researchers and planners in the UK and the Sahel

## DELIVERABLE

Data, tools and evidence to support climate change adaptation in Burkina Faso and Senegal, especially urban and agricultural planning

## OUTCOMES

National, city and local planning in Burkina Faso and Senegal are better informed by understanding climate-related risks



*The tools developed ... reinforce the ability to anticipate and the adaptation of Ouagadougou in the field of prevention of inundations, in addition to completing the City Risk Reduction Plan. [My technical teams] are ready to use, as far as possible, the tools developed in order to strengthen the resilience of Ouagadougou against floods."*

The Mayor of  
Ouagadougou

## Mitigating the impacts of climate change in West Africa

### The challenge

In the Sahel region of West Africa, monsoon rains are vital for agriculture and pastoralism, but they can also cause harm by flooding, particularly in urban areas. Climate change is predicted to affect the amounts, intensity, duration, timing and location of these rains.

It is important to understand what the effects of climate change might be so that the countries of West Africa can prepare and mitigate potential negative impacts within National Adaptation Plans and local and city planning. In order to understand what might change, we first need to understand what controls the monsoon rains.

### The research

Over the past twenty years, UKCEH has led research on soil moisture and land surface interactions with the atmosphere and how they affect rainfall. This work has shown that variations in soil moisture on length scales of tens of kilometres exert strong control on storm initiation and rainfall. Observational evidence showed that afternoon storms tend to develop over drier soils, whereas weather and climate models preferentially simulate rain over wetter surfaces.

Further research revealed that there has already been a remarkable tripling in the frequency of the most intense Sahelian storms since the 1980s, which can be linked to global warming. This suggests that the Sahel will experience particularly marked increases in extreme rain.

Work by UKCEH's partners has demonstrated that such climate changes have already led to a crop reduction of 5 to 20 per cent for one degree Celsius of warming between 2000 and 2009.





*It was very challenging for our project to get good data on climate change, specifically high quality of projection and impacts for a local level ... now AMMA's output has been used at national level: Senegalese National Adaptation Plan process, climate policies, and sectoral (coastal zone, agriculture, water resources) strategies or plans and at local level, integrated in local development plans."*

**Climate Analytics adaptation expert co-ordinating PAS-PNA in Senegal**



*[AMMA2050] has managed to achieve more understanding in one workshop than I have achieved in 20 years."*

**Local government representative from the Fatick region**

## The outcomes

In two pilot engagements in Senegal and Burkina Faso, the new climate science has sought to support specific in-country and regional decision-making processes.

### Urban infrastructural planning in Ouagadougou, Burkina Faso

UKCEH developed methodologies for mapping inundation across Ouagadougou from intense storms, taking account of changes in land use and climate scenarios. It is estimated that \$40m would be saved from the cost of a future flooding event by using the UKCEH flood maps. UKCEH developed 10-year and 100-year flood maps to inform urban planning, while our partners developed rainfall Intensity Duration Frequency (IDF) curves to inform road construction projects. In 2009, floods in Ouagadougou affected more than 150,000 people: the cost of this disruption has been put at \$400m.

### National Adaptation Plan and impact on agriculture in Senegal

This UKCEH-led research is recognised as the primary source of climate change information used to update the Scientific Support Project for Senegal's National Adaptation Plan (PAS-PNA). UKCEH developed metric atlases that were used to inform the PNA process. If this makes a one per cent saving in projected costs, then a potential \$140m could be saved in implementation costs. Data have been made available via a Geo Portal. Technical training has helped to develop sustainable in-country capacities to produce and use climate information that can support planning at different levels.

In addition, the framework of science and partnership led by UKCEH enabled other collaborations to develop. For instance, a practical guide was produced to support communicating climatic uncertainties to policymakers and also a manual on co-producing African weather and climate services at local, national and regional levels.



Flood effects in Ougadougou  
Photo by Fowe, T and Coulibaly, G., 2iE, 2016

