Workshop Report
Extreme weather, climate change and loss and damage

24th February 2016

Dakar, Senegal

Scientific background

Extreme weather events can cause large impacts. When such events occur, many people are interested in how climate change has impacted particular events. There is substantial evidence attributing global mean temperature increase to anthropogenic climate change, but investigating the influence on individual events is more challenging. This is because extreme events are rare and so there is often little observational data of them, and their occurrence is dominated by chance as they are affected by many different weather and climate processes.

The science of Probabilistic Event Attribution (PEA) has been developing over the last decade. This science aims to assess whether the probability of an extreme event has changed due to climate change. For a particular extreme event that has occurred, large numbers of climate model simulations are used to work out how climate change has affected the probability of the event by comparing simulations of the world at the time of the event with those of the world as it might have been if greenhouse gases had not been emitted. This methodology has been used to assess the impact of climate change on extreme events across the world, including some in Africa.

ACE-Africa is a NERC-funded project involving researchers from the University of Reading, University of Oxford and the UK Met Office. The project has been working on the development of PEA science over Africa and also investigating potential applications for the results. PEA results may have uses in climate policy at different levels, where it is relevant to know how the probability of a particular event was affected by climate change. One of the focusses of this work is on PEA in the context of national climate adaptation policy in Senegal, looking at whether this science could be relevant here.

Workshop Aims

The ACE-Africa team co-organised this workshop on extreme weather, climate change and loss and damage with representatives from the Comité national sur les Changements Climatiques (COMNACC) in Senegal to be held in Dakar to focus on the science of PEA in the context of Senegal. The aim of the workshop was for scientists and stakeholders to learn about, and discuss the relevance of, the science of PEA. The focus was on extreme precipitation events, specifically considering 2012 when there was heavy rain leading to flooding.

The objectives of the workshop were as follows:

- Improve understanding of the stakeholders involved in adaptation to extreme precipitation events, the networks, and the climate information used in making decisions, including if more information is required

- Improve understanding among stakeholders of PEA and what it can provide to inform adaptation decisions in Senegal

- Provide the opportunity for stakeholders and scientists to consider whether there are uses for PEA in the context of adaptation to high precipitation events

- Provide the opportunity to discuss how to make PEA studies more relevant for the decisions that need to be made with regard to adaptation

Summary of the workshop

The workshop was attended by 40 people, from various areas of government, research institutions including UCAD and other NGOs (a full participant list can be found in Appendix A).

The agenda for the workshop day can be found in Appendix B.

Introductions

The workshop was opened by introductions from Madeleine Diouf Sarr (DEEC/DCC), Amadou Thierno Gaye (ESP/UCAD) and Rosalind Cornforth (Walker Institute, University of Reading). Participants then introduced themselves and what they were hoping to get out of the workshop. Many of the participants were involved in managing flooding, especially in Dakar and other urban areas. There was interest in the influence of climate change on flooding and other extreme events in order to deal with the impacts, reduce risks and loss and damage, and get funding from donors. There was also interest in the impacts of climate change for coastal management and on air quality. It was mentioned that Senegal is about to begin the second generation of the NAPA and so PEA could be used to deal with loss and damage within programmes. Furthermore, the important question about how extreme events are defined was raised.

Presentation on PEA

A presentation was given by Hannah Parker (University of Reading) which gave an introduction to the science of PEA. This presented examples of event attribution studies which have been carried out on African events in the past few years, as well as results of a study of precipitation in the West Sahel in 2012. This study found, using different climate models, that the probability of heavy precipitation in that year was likely decreased due to climate change, compared to a world without greenhouse gases.

CAULDRON game

Participants all took part in the CAULDRON game, which is a participatory game designed as part of the ACE-Africa project. CAULDRON aims to facilitate discussion about the science of event attribution by giving players a chance to experience making decisions under changing risks of events and working together to address the impacts. The game consists of three phases: players begin as farmers making planting decisions to avoid losses when droughts occur, uncertain of the impact of climate change on drought, which is simulated using dice; they then act as scientists to estimate the effect of climate change on drought in their country; finally they must negotiate on behalf of their country with others to address the impacts of climate change.


After playing the game, participants reflected on high and low points of learning. Key points raised were:

- Climate change is a reality and the dice in the game helped highlight this
- Models can have different results to reality and so need to be used in the best way
- Need to use models alongside observations
- Need to learn to implement the approach at national and local levels
- Want greater equality between countries when crisis strikes
- Need a guidance document with game [This was followed by a comment from Rosalind Cornforth that none of us has all the information we need to make decisions in real life, which is why there is a need to work together at local, national and international levels, and the game mimics this.]
- The timescale for observations in the game is too short to know whether you are seeing climate variability or change
- Do not have much information on when there will be a drought

Group discussions

In the afternoon, participants worked in groups to discuss some of the key questions the workshop was addressing. Of the answers from all the groups, they then picked the key point for each question. Their responses are summarised below:

Identifying and mapping key actors (including actors involved in adaptation policy and users of scientific information)
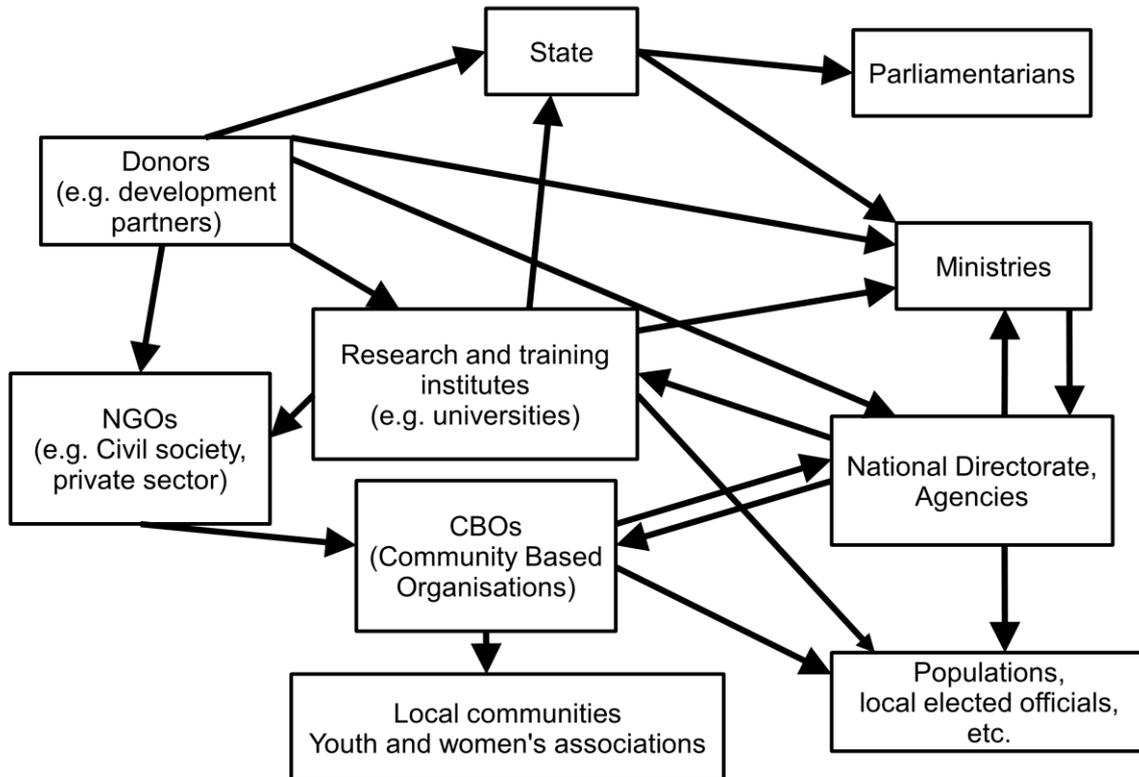
The key point taken from this exercise was the importance of a participatory approach for identifying stakeholders.

How do we define an extreme event?

- Definition parameters:
  - Duration
  - Frequency
  - Intensity
  - Amplitude/ Space
  - Impacts (Depends on the user)
- From what threshold can we say we are facing an extreme event?
- An exceptional climate hazard due to its extent/ intensity/ duration/irregular frequency in time and area of devastating impacts
- Recurrence of the phenomenon
- Definitions evolve

The key point from this discussion was that an exceptional climate hazard could be due to its extent/ intensity/ duration/irregular frequency in time and the area of devastating impacts.

How can extreme events be integrated into adaptation policy?

- Ownership and take charge
- frequency, distribution (location spatio-temporal), intensity
- impacts, capacity to respond (human and technology)
- define adaptation policy. Mobilisation of resources. Implementation e.g. multiple-risk warning systems, agricultural policy, insurance
- development policies- integrate risk, strengthen resilience
- tools for forecasting and planning
- take climate change into account
  - in the analysis of socio-economic data
  - in the mobilisation of resources
  - in the consideration of risks and in the evaluation of adaptation needs
  - in the definition of good practices

The key point from this discussion was that ownership and tailoring of tools to the context was important, as well as supporting stakeholders as part of strategic policies for adaptive measures and also documenting and creating inventories of extreme events.

How could the results of the study be useful for adaptation policies?

- Guide actors on the framework, the policies and strategies for adaptation measures
- tool to support decisions
- Database to have as reference: collect data, analyse, share information... leading to forecasts?
- know better the adaptation question
- improvement of the population's living environment
- promotion of good practices
- regional planning
- monitoring and evaluation of phenomena for planning
- adapt communication
- create channels of influence
- elaboration of policies
- inventories of events and documentation
- adapting tools and making them appropriate to our contexts

Here there were three areas emphasised: impacts (creating inventories of events), defining adaptive policies and guiding actors on adaptation measures, and implementation (adapting tools for the contexts).

Conclusions and Recommendations

The workshop concluded by making recommendations for the way forward. The key points were:

- Need for definition of extreme events. For example is it the amplitude, duration, or frequency? Also there can be large impacts from events which are not that intense or extreme and impacts are important.

- Need an inventory of events.

- Knowledge and responsibility for forecasting and warning systems. The weather agency is launching a national framework for climate services for other users and having a workshop to define needs.

- Need to interest parliamentarians in issues around extreme events. Could have a workshop at the national assembly.

- Climate models can have uncertainties but are impartial and can be used for insurance and to convince others and move forwards, and also the quality needs to be assessed.

- Tools need to be adapted to the context and made appropriate. Also need access to the tools and to information and studies to inform decisions and make sure decisions are sustainable. This requires reliable data sharing between organisations and institutions and research data to be accessible. The University of Reading is going to work with ANACIM and UCAD to train on event attribution science techniques.

- Need participatory, inclusive approaches for greater collaboration (e.g. participatory mapping of stakeholders, CAULDRON game) in adaptation policy which can help to break down barriers between people and make policies effective. Stakeholders need directing on the framework of adaptation policy and strategies.

- Strengthen on loss and damage, especially insurance against natural and other risks is a hot issue.

Appendix A

List of workshop participants

Name	Organisation	Email address
Organisers		
Rosalind CORNFORTH	Walker Institute, University of Reading	r.j.cornforth@reading.ac.uk
Amadou Thierno GAYE	ESP/UCAD	atgaye@ucad.edu.sn
Dann MITCHELL	University of Oxford	daniel.mitchell@physics.ox.ac.uk
Hannah PARKER	University of Reading	h.r.parker@pgr.reading.ac.uk
Madeleine Diouf SARR	DEEC/DCC	rosemadiouf@gmail.com
Participants		
Dior Alioune SIDIBE	DEEC/DGL	diorsidibe@yahoo.fr
Ahmadou Tidiane BARRY	DEEC/DCC	barryat82@gmail.com
Aime BOISSY	ANAT	boissy.aime@gmail.com; a_boissy@yahoo.fr
Abdou Aziz CISSÉ	DEEC/DGL	azizdabah@yahoo.fr
Seynabou CISSE FAYE	UCAD	seynaboucissefay@gmail.com
Moussa DIAKHATE	LPAOSF/UCAD	moussa1.diakhate@ucad.edu.sn
Adja DIAW	DEEC/DCC	adiadiao@yahoo.fr
Amadou Chimere DIALLO	PCLSLIB/MRUHCV	chimeredia@yahoo.fr
Maimouna Dione DIARRA	Direction de l'Assainissement	maidione2001@yahoo.fr
Mohamed DIEDHIOU	REPES	diedhioumoha@hotmail.com
Marian DIOP KANE	ANACIM	mariane.diopkane@gmail.com
Bouny Angelique DIOUF	DEEC/DGL	bounyange@gmail.com
Ibrahima DIOUF	LPAOSF/ESP/UCAD	ivedioufpc@yahoo.fr
Papa Lamine DIOUF	DEEC	pipodiouf2@yahoo.fr
Aby DRAME	Enda Tiers Monde	byba27@hotmail.com; enda.energie@orange.com
Ismaila FALL	Direction Protection Civile	samory83@hotmail.fr
Mamadou FAYE	ANSD	fayecons@yahoo.fr
Kykey GANYO	ISRA/GERAA	desireganyo@gmail.com
Veronique FAYE KOMACLO	PGIRE/OMVS	faye042@gmail.com
Mamadou Lamine GASSAMA	DGPRE	mala2.gass@yahoo.fr
Adama GUEYE	ADM	adamsgueye@orange.sn; adamsgueye@gmail.com
Abdulai JALLOH	CORAF	abdulai.jalloh@coraf.org
Hamidou KONATE	DARZI	konate.hamidou@hotmail.fr
Ousmane MBODJI	FDV	ousmane_mbodji@yahoo.fr

Aminata MBOW DIOKHANE	DEEC/CGQA	amimbow@gmail.com
Bertrand MULLER	CIRAD/ISRA	bertrand.muller@cirad.fr
Gabriele NDIAYE	DEEC/DCC	contractor17@gmail.com
Ousseynou NDIONE	DEEC/DCC	ousseynou411@gmail.com
Pascal SAGNA	UCAD	pascalsagna@hotmail.com
Amadou SALL	CSE	amadou.sall@cse.sn
Fatimentou SALL	Institut African de Gestion Urbaine	fatimasall@iagu.org
Ousmane Diouf SANE	Freelance	saneousmanediouf@gmail.com
Emmanuel SECK	ENDA Energie	ssombel@yahoo.fr
Fama SOW DIOP	ANRSA	sowfama@yahoo.fr
Penda Kante THIAM	DEEC/DCC	kantenandy@gmail.com

Appendix B

Workshop Agenda

Date: Wednesday 24th February 2016

Location: Salle de Conférence, Direction Environnement et Etablissements Classés, 106 Rue Carnot, Dakar

Agenda:

Please arrive from 9am for coffee, ready for the workshop to begin at 9.30am. Tea and coffee and lunch will be provided. The workshop will finish by 5pm.

9am Arrival and Registration

9.30am Welcome and Introduction (Rosalind Cornforth, Amadou Gaye, Madeleine Sarr)

10am Presentation on event attribution science (Hannah Parker)

10.30am Break

11am CAULDRON game: a participatory game exploring the science of event attribution and how it can be used in adaptation policy

1pm Lunch

2pm Group discussions: Mapping relevant stakeholder networks and key adaptation decisions and necessary scientific information

3pm Break

3.30pm Group discussions: How could event attribution study results be useful for adaptation policy?

4.30pm Conclusions and future directions for work

5pm Finish