

Protected Areas Resilient to Climate Change, PARCC West Africa



2012

Regional Workshop on Climate Information to Enhance Resilience of West African Protected Areas



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UNEP-WCMC
2012
ENGLISH

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‘Regional Workshop on Climate Information to Enhance Resilience of West African Protected Areas’, prepared by Andrew Hartley, Richard Jones and Elise Belle, with funding from Global Environment Facility (GEF) via UNEP.

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Citation:	UNEP-WCMC. 2012 . Regional Workshop on Climate Information to Enhance Resilience of West African Protected Areas.
Available From:	UNEP-World Conservation Monitoring Centre (UNEP-WCMC) 219 Huntingdon Road, Cambridge CB3 0DL, UK Tel: +44 1223 277314; Fax: +44 1223 277136 Email: protectedareas@unep-wcmc.org URL: http://www.unep-wcmc.org

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Executive Summary

The first regional climate workshop was held in Freetown on April 22nd – 25th 2012. The attendees were invited from all five project core countries, as well as the three associated countries and other West African countries. This included representatives from Sierra Leone, Gambia, Mali, Chad and Togo, in addition to Ghana, Burkina Faso, Cote d'Ivoire, Liberia, Guinea and Senegal. A representative from the Met services of each country was present, and several countries also provided representatives from ministries related to wildlife, forestry or environment. Participants were asked to make a summary presentation of historical data from their countries' meteorological observation network as well as any trends that they may have identified. Training consisted of lectures on climate change, regional downscaling of climate, and links between the climate and biodiversity. In the final discussion session, participants identified ways in which the national Met services communicate with the ones responsible for biodiversity within governments.

1. Workshop aims

The aim of the workshop was to provide training to representatives of the Met Services from project countries, as well as other West African countries, in basic methods of analysing climate data, and to promote the importance of weather and climate for biodiversity. A secondary aim was to explore mechanisms and identify best practice for the Met service of each country to enhance communication with protected area managers and ministries relating to wildlife, forestry or environment.

2. Presentations

On the first day, after a brief presentation of the project by UNEP-WCMC, presentations were given by each participant of National Met Services. This allowed the trainers to better understand the work of the Met Services of the West African countries represented, and provided a good basis for dialogue on subsequent days.

On the second day, several lectures were given by the Met Office Hadley Centre on the following topics:

- “Observed changes, models and attribution, predictions and projections”
- “Deriving high resolution regional climate information”
- “The importance of climate for biodiversity”

Observed changes, models and attribution, predictions and projections

Following on from the first day of presentations by the national Met services, Richard Jones presented an analysis of trends for West Africa undertaken recently at a workshop in the Gambia supported by the Met Office Hadley Centre, as well as an introduction to climate science, climate models and projections. Some example results presented included that for large parts of Sudanian West Africa, an increase in the number of consecutive dry days has been observed, in addition to some reductions in the number of days of heavy precipitation. It was noted that these trends may not be specifically related to climate change, since changes due to decadal variability in the current climate cannot be discounted. Such data are also useful for identifying gaps in internationally available records. For example, large parts of Mali, Niger, Ghana and Nigeria were missing from these analyses even though (as we heard during day 1) national met services have some of this information. It was made clear that by making available more observed data, countries will be able to better interpret and apply results from climate analyses.

The training session then provided an introduction into the fundamentals of the climate system, including how the greenhouse effect works. General circulation models (GCMs) were then introduced as a tool to understand the global climate system. It was shown, using an example from the IPCC 4th Report how anthropogenic sources have contributed to global and continental

temperature increases in the last century. Subsequently, results of future predictions were presented, both from the IPCC 4th Report, and from new results that will form the basis of the IPCC 5th Report. In West Africa, there are still large uncertainties in the signal of change in precipitation, with little change in the level of consensus amongst projections between the IPCC 4th and 5th reports.

It was also made clear the difference between projections and predictions. “Predictions” can be made for scenarios that we have a high confidence in (such as temperature change or sea level rise), whereas “projections” refer to those variables in which we have lower confidence (such as precipitation or tropical storms).

Deriving high resolution regional climate information

An introduction to regional climate modelling was given by Wilfran Moufouma-Okia. This involved a review of the various methods available for downscaling global projections of climate change to a scale that is more appropriate for regional planning. This talk started by discussing the determinants of global climate, and how external factors (such as the solar cycle or volcanic activity) may influence inter-annual or inter-decadal variability. It also explained in more detail the processes and generalisations that are included in GCMs.

Moving on to regional climate, the three different methods of downscaling GCM projections were discussed: Statistical, Dynamical, and Statistical-Dynamical. In statistical downscaling, statistical relations between observed large-scale atmospheric variables and observed surface climate variables are applied to GCM projections to statistically infer changes in surface climate at the locations of these surface observations. In dynamical downscaling, a high resolution regional climate model is used to simulate regional scale processes, some of which are not included in the GCM, over a limited geographic area. Regional climate models are driven by lateral boundary conditions derived from GCMs and provide high resolution climate changes consistent with their driving GCMs over their region of application. The validation and benefit of such approaches was also discussed.

Results from regional climate models for West Africa were then presented using outputs from the West African Monsoon Modelling and Evaluation project and from the EU ENSEMBLES and AMMA projects. This also provided an opportunity to discuss issues regarding uncertainty in ensembles of climate projections. Also, the World Climate Research Programme (WCRP) CORDEX (Coordinated Regional Downscaling Experiment) programme was introduced, from which downscaled multi-model ensemble projections will become available during the project. Outputs from these would likely be relevant to later stages of protected area planning in the project.

Finally, Wilfran Moufouma-Okia from the Met Office Hadley Centre lead the participants through a series of practical exercises to familiarise them with the outputs from some of these models and to demonstrate how to analyse them to obtain information on projected changes in climate indices for areas within West Africa simulated by the models. This provided an introduction to some of the climate projection analyses that will be required to derive information on changes in climate relevant to the West African protected areas.

The importance of climate for biodiversity

The next talk aimed to provide a link between climate and biodiversity. Firstly, the importance of biodiversity and ecosystem services in maintaining the natural environment was highlighted. Ways in which climate can influence biodiversity was then discussed, including the factors that may cause a species' population to either grow or decline.

This was followed by a practical session where participants were split in groups and asked to think about how climate is affecting some particular species in their countries. In the afternoon, a field trip was organised to the Western Area Freetown Peninsula protected area.

Further training was provided by the Met Office Hadley Centre on the third day on the following topics:

- “Relevant observed past and projected future changes for biodiversity”
- “Integrating climate science into adaptation actions”
- “Application of climate information for assessing adaptation”

Relevant observed past and projected future changes for biodiversity

This training module followed on directly from the previous morning, and benefited from the field trip to the Peninsula protected area. This talk highlighted evidence that climate has affected species in the past, including examples (mostly from Europe and North America) of how observed changes in the climate have affected the phenology of species. Participants were also given a review of the 3 different approaches for assessing the impacts of climate change on biodiversity and ecosystems: bioclimatic envelope models (BEMs), threshold analysis, and dynamic vegetation models. Examples of each approach were given, for West Africa where possible, in addition to the limitations of each approach.

Integrating climate science into adaptation actions

Following directly from the previous session, a review was provided on how the three methods of biodiversity assessment can be used to inform climate change adaptation decisions. The main output from this training module was that improved understanding of species' and ecosystems' sensitivities to climate variability is necessary. This can be enhanced and promoted by monitoring of the state of ecosystems, in addition to the use of seasonal forecasting in park management decisions. Further examples were given of how land use may affect local precipitation patterns in West Africa, and how results from BEMs can be used to plan climate change adaptation strategies in Africa Important Bird Areas.

A practical session followed on processing observations to extract indices and trends. A short presentation was also given by Aida Cuni (RSPB, Gola Forest Programme) on protected areas in Sierra Leone. Finally, the links and collaborations between climate and wildlife experts were explored during a final discussion.

3. Summary of discussions

Group session to identify species that might be sensitive to climate in different climate zones of West Africa

Participants were divided into 4 groups (depending on their country of origin and bioclimatic region, and preferred language), and asked to identify approximately five species in their countries that were sensitive to weather or climate. The session was very productive, and encouraged participants to think about biodiversity in their own country. Everyone showed a good understanding of the issues. Some of the species identified by participants (by group) are:

- i. Sierra Leone, Liberia, and Ghana: The catfish is found in freshwater rivers, but migrates to the sea to reproduce, but in periods when rivers run dry, they cannot make it to the sea and therefore cannot reproduce.
- ii. Mali, Chad, Burkina Faso: The elephant and hippo as sensitive to variations in rainfall. In particular, the elephants leave their countries when conditions are not favourable, possibly having impacts on tourism; in general, water availability is a major issue, as are weather related diseases.
- iii. Cote d'Ivoire, Togo, Guinea. Climate impacts on the vegetation have subsequent impacts on animals further up the food chain.
- iv. Senegal and Gambia. Aquaculture in mangrove ecosystems can be affected by increased saltwater intrusion related to sea level rise. Migratory birds (such as the Cattle Egret and Common Heron) may be sensitive to changing seasons both in Europe and Africa.

Interactive session to explore links between Met services and wildlife divisions, and suggest a format for national climate workshops

The aim of this session was to explore the links between the national Met services and Wildlife divisions (or equivalent) by identifying examples of good practice, how different countries work, and if lessons can be learned. It is hoped that these identified mechanisms linking the different ministerial divisions can be encouraged within the PARCC project, and assist in the successful implementation of climate change adaptation strategies.

After comments from each country, it appears that the communications between the Met services and Wildlife are more active in some countries than others. The countries that suggested these links could be improved (Sierra Leone, Mali, Chad and Ghana) tend to communicate solely on an ad-hoc basis, when data requests were made by the wildlife divisions. These requests seemed to be mostly for either site-based climatology for the purpose of project proposals (e.g. road construction) or forecasts for important meetings. Rarely (if ever) were requests made for meteorological data for the purposes of protected area management.

The countries that reported good links between the Met services and Wildlife (Liberia, Gambia, Cote d'Ivoire, Burkina Faso, Senegal and Togo) all have various national fora that bring together different government departments either at the ministerial level or at the technical level. Three examples of these were presented:

- National Communications on Climate Change: a reporting requirement under the UN Framework Convention on Climate Change (UNFCCC), which generally brings together multi-disciplinary parties including government departments for the environment,

meteorology, and other divisions, as well as NGOs and FAO. Senegal and Gambia both gave examples of this activity.

- Seasonal forecasts, or alerts at shorter time horizons depending on the season; strongest form of communication because linked to direct actions (however no evidence was provided about direct links to protected area management). Each Met service has a legal mandate to protect the citizens of its respective country, so these forecasts tend to be more relevant for people and infrastructure (than for biodiversity).
- Monitoring using the new AMESD system (African Monitoring for Environment and Sustainability – EU funded project). Satellite-based system to disseminate earth observation data on many aspects of the land surface at 10 day time steps. This system can provide important information on the evolution of seasons, recent fire activity, comparison of current observations to seasonal norms, and forest monitoring. Receiving stations are currently installed in the Met services of Ghana and Sierra Leone, but each African Met service will get one.

All agreed that the seasonal forecasting fora and alert systems were important, but there is also considerable interest in the EU programme AMESD for other national Met services. It was agreed that we will look into using these existing frameworks as a basis for building better links between Met services and Wildlife Divisions.

Annex 1. Agenda

Monday 23 April

- 9:00 Welcome and introduction to PARCC West Africa – Kolleh Bangura, Bora Masumbuko, and Elise Belle
- 9:30 Brief overview of Climate Information Workshop agenda – Richard Jones
- 10:00 *Coffee break*
- 10:30 Short presentations by participants of Met Services:
- Overview of climate trends in their country,
 - List of climate records available (noting any in, or adjacent to, protected areas) and conditions for access to these data, or indices derived from them.
- 12:30 *Lunch*
- 14:00 Short presentations by participants of Met Services (continued)

Tuesday 24 April

- 8:30 Introduction to climate change – observed changes, models and attribution, predictions and projections – Richard Jones
- 9:30 Presentation on deriving high resolution regional climate information – Wilfran Moufouma-Okia
- 10:30 *Coffee break*
- 11:00 Presentation on importance of climate for biodiversity, relevant observed past and projected future changes – Andy Hartley
- 12:00 *Lunch*
- 13:30 *Site Visit: Western Peninsula Protected Area*

Wednesday 25 April

- 8:30 Presentation on importance of climate for biodiversity, relevant observed past and projected future changes (continued) – Andy Hartley
- 9:00 Presentation on integrating climate science into adaptation actions – Andy Hartley, and discussion
- 9:30 Presentation on application of climate information for assessing adaptation – Richard Jones

10:30 Coffee break

11:00 Practical session on processing observations to extract indices and trends – Wilfran Moufouma-Okia

12:30 Lunch

14:00 Interactive session:

- Linking observed climate and ecosystem responses
- Defining aims of national meetings

16:00 Closure of the meeting

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