



# Interlink

International Cooperation in Environment

## AMMA - Better predictions of variations in the West African monsoon and their socio-economic consequences

<b>Geographic area:</b>	West Africa
<b>Period:</b>	60 months: Jan. 2005 to Dec. 2009
<b>Environmental issues addressed:</b>	atmospheric pollutants ; climate change ; coastal fishing ; agricultural resources ; water resources
<b>FP7 R&amp;D Axis:</b>	Activity 6.1 Climate Change, pollution and risks ; Sub-Activity 6.1.1 Pressures on environment and climate
<b>Website:</b>	Cordis project description: <a href="http://cordis.europa.eu/fetch?CALLER=FP6_PROJ&amp;ACTION=D&amp;DOC=1&amp;CAT=PROJ&amp;QUERY=01193c6ee27c:7ecd:4ebf4d7b&amp;RCN=85507">http://cordis.europa.eu/fetch?CALLER=FP6_PROJ&amp;ACTION=D&amp;DOC=1&amp;CAT=PROJ&amp;QUERY=01193c6ee27c:7ecd:4ebf4d7b&amp;RCN=85507</a> Project webpage: <a href="http://www.amma-eu.org">http://www.amma-eu.org</a>
<b>Cooperating countries:</b>	Benin, Burkina Faso, Ghana, Guinea, Mali, Niger, Nigeria, Senegal

### Partners:

<b>Centre National de la Recherche Scientifique (Coordinator)</b>	Research organization	France
<b>Météo France</b>	Research organization	France
<b>Université Paul Sabatier</b>	Research organization	France
<b>Centre de coopération Internationale en Recherche Agronomique pour le Développement</b>	Research organization	France
<b>Institut de Recherche pour le Développement</b>	Research organization	France
<b>University of Burgundy</b>	Research organization	France
<b>Université Paris 12 – Val de Marne</b>	Research organization	France
<b>MEDIAS-France</b>	Research organization	France
<b>OCEAN SCIENTIFIC INTERNATIONAL Ltd</b>	SME	United Kingdom
<b>Centre for Ecology and Hydrology</b>	Research organization	United Kingdom
<b>Chancellor, Masters and Scholars of University of Cambridge</b>	Research organization	United Kingdom



# Interlink

International Cooperation in Environment

<b>University of East Anglia</b>	Research organization	United Kingdom
<b>University of Liverpool</b>	Research organization	United Kingdom
<b>University of York</b>	Research organization	United Kingdom
<b>University of Leicester</b>	Research organization	United Kingdom
<b>University of Manchester</b>	Research organization	United Kingdom
<b>University of Leeds</b>	Research organization	United Kingdom
<b>European Centre for Medium-range Weather Forecasts</b>	Research organization	United Kingdom
<b>University of Bremen</b>	Research organization	Germany
<b>Forschungszentrum Karlsruhe</b>	Research organization	Germany
<b>Kalsrhue University</b>	Research organization	Germany
<b>Leibniz-Institut für Meereswissenschaften</b>	Research organization	Germany
<b>Ludwig-Maximilians-Universitaet Muenchen</b>	Research organization	Germany
<b>Rheinische Friedrich-Wilhelms-Universität Bonn</b>	Research organization	Germany
<b>University of Cologne</b>	Research organization	Germany
<b>Deutsches Zentrum für Luft-und Raumfharte. V</b>	Research organization	Germany
<b>Consiglio Nazionale delle Ricerche - Institute of Atmospheric Sciences and Climate</b>	Research organization	Italy
<b>Universita' di Perugia</b>	Research organization	Italy
<b>Enea per Nuove Technologie, l'Energia e l'Ambiente</b>	Research organization	Italy
<b>Consiglio Nazionale delle Ricerche -Institute of Biometeorology – National Research Council</b>	Research organization	Italy
<b>Universidad de Castilla- La Mancha</b>	Research organization	Spain
<b>Universidad Complutense de Madrid</b>	Research organization	Spain
<b>Universidad Politécnica de Cartagena</b>	Research organization	Spain
<b>Université catholique de Louvain</b>	Research organization	Belgium
<b>Royal Netherlands Meteorological Institute</b>	Research organization	The Netherlands
<b>VAISALA OYJ</b>	SME	Finland
<b>University of Copenhagen</b>	Research organization	Danemark
<b>Ghana Meteorological Agency</b>	Research organization	Ghana
<b>Kwame Nkrumah University of Science and Technology</b>	Research organization	Ghana



# Interlink

International Cooperation in Environment

<b>Université Abomey Calavi de Cotonou</b>	Research organization	Benin
<b>Institut d'Economie Rurale</b>	Institution	Mali
<b>Université de Bamako</b>	Research organization	Mali
<b>Direction de la Météorologie du Niger</b>	Institution	Niger
<b>Université Abdou Moumouni de Niamey</b>	Research organization	Niger
<b>Centre Régional AGRHYMET</b>	Research organization	Niger
<b>Centre de Recherche Médicale et Sanitaire</b>	Research organization	Niger
<b>African Centre of Meteorological Application for development</b>	Research organization	Niger
<b>University of Jos</b>	Research organization	Nigeria
<b>Ecole Inter-Etats d'Ingénieurs de l'Equipement Rural</b>	Research organization	Burkina-Faso
<b>Institut de l'environnement et de Recherches Agricoles</b>	Research organization	Burkina-Faso
<b>Université de Ouagadougou</b>	Research organization	Burkina-Faso
<b>Direction de la Météorologie de Guinée</b>	Institution	Guinea
<b>Agence pour la Sécurité de la Navigation Aérienne en Afrique et à Madagascar</b>	Institution	Senegal
<b>Direction de la Météorologie du Sénégal</b>	Institution	Senegal
<b>Centre d'études Régional pour l'Amélioration de l'Adaptation à la Sécheresse</b>	Research organization	Senegal
<b>Centre de Suivi Ecologique</b>	Research organization	Senegal
<b>Institut Sénégalais de Recherches Agricoles</b>	Research organization	Senegal
<b>Université Cheikh Anta Diop de Dakar</b>	Research organization	Senegal

## Abstract

FP6 project started in 2005 with 59 partners, most of which from West Africa, AMMA aims to improve assessment of rainfall changes in the West African Monsoon at seasonal, inter-annual and decadal timescales. Rainfall forecasts are being set up thanks to multi-disciplinary analysis of interactions between land-surface, ocean and the atmosphere. Impacts on water resources, agriculture and health are also being studied so that mitigation measures can be devised. The data collected is now ready to be used, namely to set up forecasting tools and predict crop yields.

## Context and objectives

FP6 Block 1: Focusing and Integrating European Research 3. Sustainable development, global change and ecosystems 3.1 Global change and ecosystems SUSTDEV-3.1.3 Climate dynamics and variability, SUSTDEV-2004-3.1.3.a Hot spots in the earth system



Due to the decrease of the West African Monsoon's watershed volume, water resources and agricultural yields, on which depends the area's economy, were reduced. Existing rainfall forecast models have some fundamental weaknesses when applied to West Africa, because of complex and poorly understood interactions between the ocean, the land-surface and the atmosphere. So the objectives of AMMA were:

- ✓ Achieve a better understanding of the interactions between the ocean, the land-surface and the atmosphere;
- ✓ Improve the assessment of rainfall changes at seasonal, inter-annual and decadal timescale;
- ✓ Analyze impact on water resources, agriculture and health;
- ✓ Develop measures to mitigate risks and adapt agriculture practices to current and future predictable conditions;
- ✓ Train and provide the necessary means for scientists in Africa to follow up once the project has ended.

## **Close cooperation can overcome material difficulties and misconceptions**

With 59 partners and so many of them being non-European, one can expect some difficulties, whether in communication or in administrative procedures. Yet AMMA did really good. The first action undertaken by the coordinator was to organize a meeting in Africa with all African partners, with the objective to train them on FP project method and procedures. Concerns like how to finance unforeseen costs by African partners were addressed. These were also reassured on their fear that the EC would delay payments, or not pay at all.

As far as communication goes, the whole consortium had to adapt to the lack of ICT equipment of some African partners. For example, they could send a text message to warn an African partner who didn't have Internet at his office of an important incoming email. Paradoxically, the number of partners, their diversity and their multidisciplinary nature was a bonus: it actually broke the regional privileged relationships patterns already in place, and facilitated communication, one partner being always able to translate for others. Surprisingly, the last difficulty came from Europe: the divergence of objectives between public and private partners was unforeseen and jeopardized one of the achievements of the project.

## **The findings are used for applications in climatology and to improve local agriculture**

After over three years of collaboration, some significant achievements stand out. First of all, knowledge of regional climatology has been reinforced, partly with the 2006 seasonal observation campaigns which enabled to collect a unique set of observations in the air, on the sea and on the land. Studies of these observations and of previous collected data generated knowledge which can now be used by the international scientific community. Weather forecast models were adjusted and used by AMMA agronomists to help predict crop yields. In order to further benefit local agriculture, West African crop growers were taught specific plowing methods to optimize humidity in the soil. Furthermore, the West African radiosounding balloon network was put back up to standard, by renewing and reinforcing its equipment. The rate of data successfully arriving to Redding consequently jumped from 50% to 80%. Finally, technical equipment acquired on AMMA-EU funding will stay on site, further benefiting West African research capacity. Post-project activities may include setting up university programs in West Africa, training experts through EU-Africa joint thesis or using AMMA results to



# Interlink

International Cooperation in Environment

eventually set up a model which could predict natural disasters.

## Key data

- ✓ 60 articles published in 2007
- ✓ 6000 sounding balloons sent off
- ✓ Success rate of the sounding balloon network in West Africa jumped from 50% to 80%
- ✓ Survey on perception of climate change effects submitted to 800 West Africans in 500 villages
- ✓ Project total cost: over 40 million euros
- ✓ EU contribution: over 13 million euros
- ✓ Funding allocated to African partners: over 3 million euros