International Scientific Conference

ABSTRACT BOOK

7-10 July 2015 • Paris, France

This Abstract book is based on a compilation of all abstracts selected for oral and poster presentations, as of 15 May 2015.

Due to the inability of some authors to attend, some of those works will therefore not be presented during the conference.

OUR UNDER
COMMON CLIMATE
FUTURE CHANGE

Welcome to the Conference

Welcome to Paris, welcome to 'Our Common Future under Climate Change'!

On behalf of the High Level Board, the Organizing Committee and the Scientific Committee, it is our pleasure to welcome you to Paris to the largest forum for the scientific community to come together ahead of COP21, hosted by France in December 2015 ("Paris Climat 2015").

Building on the results of the IPCC 5th Assessment Report (AR5), this four-day conference will address key issues concerning climate change in the broader context of global change. It will offer an opportunity to discuss solutions for both mitigation and adaptation issues. The Conference also aims to contribute to a science-society dialogue, notably thanks to specific sessions with stakeholders during the event and through nearly 80 accredited side events taking place all around the world from June 1st to July 15th.

When putting together this event over the past months, we were greatly encouraged by the huge interest from the global scientific community, with more than 400 parallel sessions and 2200 abstracts submitted, eventually leading to the organization of 140 parallel sessions.

Strong support was also received from many public French, European and international institutions and organizations, allowing us to invite many keynote speakers and fund the participation of more than 120 young researchers from developing countries. Let us warmly thank all those who made this possible.

The International Scientific Committee deserves warm thanks for designing plenary and large parallel sessions as well as supervising the call for contributions and the call for sessions, as well as the merging process of more than 400 parallel sessions into 140 parallel sessions. The Organizing Committee did its best to ensure that the overall organization for the conference was relevant to the objectives and scope. The High Level Board raised the funds, engaged the scientific community to contribute and accredited side events. The Conference Secretariat worked hard to make this event happening. The Communication Advisory Board was instrumental in launching and framing our communication activities on different media. We are very grateful to all.

We very much hope that you will enjoy your stay in Paris and benefit from exciting scientific

interactions, contributing to the future scientific agenda. We also hope that the conference will facilitate, encourage and develop connections between scientists and stakeholders, allowing to draw new avenues in the research agenda engaging the scientific community to elaborate, asses and monitor solutions to tackle climate change together with other major global challenges, including sustainable development goals.

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Analysis of historical events using Ethiopia ENACTS products

The National Meteorology Agency (NMA) and the IRI have been collaborating on improving climate service since 2008. The most prominent of these activities has been the implementation of the ENACTS (Enhancing National Climate Service) initiative, which was first started in Ethiopia. In order to accurately assess the influence of climate variables and malaria morbidity data at district level. In order to accurately assess the influence of climate variables and phenomenon on malaria data, charts and maps from Ethiopian climate series, epidemics at the district levels, and the IRI Data Library, NMA Ethiopian Map Room were used in this analysis. Thus, mean annual rainfall and temperature across Ethiopia displays a normal interannual decadal fluctuation but overall shows a slightly positive trend. The region has been receiving more rainfall and becoming 'wetter' but temperature has been warming and becoming 'hotter'.

An El Nino event in Ethiopia is typically associated with enhanced and increased probabilities of above normal rainfall during the secondary Belg rain season (March-May). However, El Nino rainfall during the primary Kiremt rain season (June-September/October) is more varied and subject to other climatological factors.

To determine whether an El Nino event, subsequent rainfall and temperatures were associated with the below malaria epidemics of the district "hotspots" we assessed these climatic factors in certain three month groups prior to and during the actual epidemic.

Temperatures and relative humidity within the districts were usually already at an acceptable level to encourage malaria transmission. From our prior research, we found that El Nino events in Ethiopia were typically associated with enhanced and increased probabilities of above average rainfall during the secondary Belg rain season. However, this was not substantial in our analysis. Probabilities of a wet El Nino (rainfall) or a hot El Nino (temperatures) deviated from the actual observations. Although the sections in these tools were very insightful in the study of climatic conditions that encourage the probability of malaria transmission, it fails to properly demonstrate the probability of transmission based on ENSO state without a high level of uncertainty. It also does not indicate the strength of the ENSO state, which could be helpful in the future analysis. Monitoring and use of climate information for public health decision requires strong collaboration and sustainable collaboration between the health sector and climate community. In the last decades, both MOH and NMA have moved towards preparing capacity building and strategic documents. The health sector should benefit better through the recent advancement of climate information services from NMA's ENACTS.

P-3330-32

Policies to favour crop intensification and farm income under climatic risk in West Africa

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In West African countries, agricultural production per capita has decreased over the past half century. With continued population growth and the diminishing availability of marginal arable land, pressure on land is rapidly increasing and there is now a common view that crop yield must be increased in this region, especially as there is a wide gap between actual and potential yields. Although there are several factors which may explain this yield gap, the fact that agricultural production takes place in resource-constrained farm households exposed to risk is widely recognized as being important. Indeed, risk discourages the adoption of high-risk, high-return agricultural technologies, which in turn impedes the improvement of yields.

In order to assess how climatic risk constrains intensification strategy in West Africa, we built and calibrated a bioeconomic farm simulation model predicting the choice to intensify crops or livestock as depending on the availability of key policies in the economic environment of farms, for typical cases in the groundnut basin of Senegal. These cases include two regions contrasted in terms of rainfall (Sine and Saloum) and in each region two typical farms, representing poor and less poor farmers. The model features uncertainty in weather (hence yields) and crop prices, farmer's risk aversion, nine cropping systems representing millet, maize and groundnut with various intensification levels, and the main interactions between crop and livestock: draught animal power, the feeding of animals with suitable crop products (groundnut haulms, cereal straw) and the production of farm manure. Farmers are constraint by land, labour, cash and credit availability. 180 households were surveyed to build the socio-demographic and economic dataset used by the model, and agronomic data were collected from 206 fields.

These key policies analysed are (i) weather index insurances against drought impact on crop yields, either subsidised or not, (ii) subsidies to short term credit for purchasing farm inputs, (iii) subsidies to fertilizer, and (iv) direct payments to farmers. In our simulations, under the current climate and prices of agricultural products and inputs, all these policies appear favourable to the increase of farmers' expected utility for typical farms representing the vast majority of farms in the groundnut basin. Apart for insurance, all of them appear also favourable to intensification of coupled crop and livestock activities for those typical farms. Insurance appears favourable to this intensification strategy only for farms located in the northern part of the region studied, where climatic risk is higher. Among the scenario tested, for most typical farms, combining unsubsidized insurance with subsidized credit appeared as the best use of a given amount of public funds in support of crop intensification: subsidized credit allows the farmers to buy costly inputs while insurance reduces the risk that a drought prevents them from reimbursing the credit. Direct payments also rank high in this respect, because they efficiently mitigate the cash constraint. The amount of subsidies required to obtain a given increase of the value of farm production varies across farm types and subzones in the region, but is relatively reasonable. These results suggest that crop intensification is currently relatively close to becoming a relevant option for farmers and that public policies may favour it by improving the economic environment of farms.

P-3330-33

A study of flood intensification in Niamey based on satellite, gauge data and hydrological modeling

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One anticipated impact of climate change is a possible enhancement of the hydrological cycle and an intensification of extreme hydrological events, such as floods. Observing the present and past changes in hydro-systems is helpful to understand the causalities - and the respective roles of climate variability and land use changes, in the increase of floods. In many tropical basins, and notably in sub-saharian Africa there is a deficit of in situ observations. In these regions satellite data and modeling can help analyzing the hydrological behavior and the recent evolution.

Since the beginning of flows observations, in 1920's, Niamey (Niger) has suffered drastic hydrological changes. Several studies highlighted the hydrograph modification from one to two floods (around 1970's). This hydrological change has been attributed to increased runoff in the basins of the local tributaries (Gorouol, Dargol, Sirba), resulting from land clearing and soil crusting,;. In the last decade (2000's) a dramatic increase in the frequency and intensity of the first flood as been observed. Years 2010, 2012 and 2013 recorded the three highest water levels and peak discharge since the beginning of observations;