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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We also investigate key uncertainties in the malaria model, by introducing variability in parts of the model formulation. Results are visualized as location specific impact surfaces: easily integrated with ensemble seasonal climate forecasts. Using the LRVF, which is based on but much more complex than LMM, having two dynamic vector models and a dynamic age stratified host model. One main task in its development was parameterising the two different behaviours of the two vectors correctly in the model. In that, Culex spp. mosquitoes are the amplifying vector that, in the model, and only show significant spikes in population dynamics and EIR following flooding and a sizable Culex spp. population. The Culex spp. were infected from a substantial number of infectious hosts in the model simulation. These host infections came from Aedes spp. mosquitoes whose relationship with rainfall is more complex and gain infection through vertical transmission.

P-3330-58

How farmers permanently adapt to climate evolution by testing new options and caring for food security: case of long-cycle sanyo millet comeback in Serer area in Senegal

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During the last decade, Serer farmers of the Sine region in the central and western part of Senegal have started to grow again the sanyo millet (Pennisetum glaucum), a long-cycle (110-140 days) and photoperiodic traditional variety that had disappeared for 30 years from this region due to the rainfall decrease which has affected the Sahelian and Sudano-Sahelian zones starting from 1970, leaving only the short-cycle (90 days) souna millet in the fields. We made the assumption that the reintroduction of the sanyo millet could be an agronomic "marker" of the increase in rainfall observed in Senegal since the mid-1990s (Salack and al., 2011) attesting to the capacity of farmers to adapt to the evolution of their environment. We wanted to check, however, whether this necessary climatic opportunity was sufficient to explain farmers choices.

We investigated how important was the sanyo comeback in local farming systems, its geographical diffusion, and its biophysical, economic, social and cultural drivers. We carried out (a) simulations of souna and sanyo annual development during the 1950-2013 period using the SarraH©Cirad model; (b) several Focus Group Discussions with farmers; (c) a large survey by questionnaire on farming systems among 1,061 farms in the 30 villages of the IRD human and health observatory zone of Niakhar (monitored since 50 years); and (d) a rapid survey in 240 villages of the region located between Bambey and Diourbel in the North and Fatick in the South (about 1000 km2) on whether the sanyo millet was grown and its date of reintroduction. The SarraH©Cirad crop model was parametered according to previous works. Survey data were carefully analysed using relevant statistics to assess the factors underlying sanyo reintroduction.

Crop model simulations confirmed that sanyo reappearance is due to the recent rainfall improvement which now allows getting again grains with this variety whereas since 1970 grains production was only possible with souna. But simulations also show that sanyo yields remain very risky due to the rainfall interannual variability whereas souna yields are higher and surer. They also show that sanyo provides important biomass (stalks and straw). Farmers comments and surveys data analysis complement and confirm the results of the simulations. First, peasants report that they prefer the taste of sanyo and above all the quality of its stems rather than those of souna. In addition, adopting sanyo does not require any specific know-how or investment as it is grown like souna. Its qualities explain why it has quickly spread throughout the area. Sanyo was present in 61% of the sites surveyed in 2013 compared with 23% in 2000. But farmers stress that it is a risky cultivation and that they will not endanger their food security by substituting souna with sanyo. Souna and groundnuts still remain their main staple and cash crops, respectively. They also deplore that sanyo (similarly to souna) cannot provide cash, unlike groundnuts or watermelon that has also expanded in recent years. Statistical analyses highlight some social and family influences since farmers belonging to the "warrior caste" and those whose fathers formerly cultivated sanyo are more likely to cultivate it. But "land resources" appear to be the key factor. Yet, farmers explain they would plant fields dedicated to sanyo only if they were sure to produce enough souna. This is why sanyo is mainly cropped in association with souna, in an average proportion of 1 line of sanyo for 4-5 lines of souna. Moreover farmers point out that they would easily stop sanyo if they had other opportunities, particularly if they provide cash. Thus, despite its spectacular diffusion, sanyo cover very little surfaces: in the zone of Niakhar it was present in 2013 on 2.8% of the cropped areas and on 7.3% of millet areas.

Sanyo reappearance and its important and rapid diffusion is clearly an agronomic "marker" of the recent climate evolution (rainfall increase) observed in Senegal. It attests to the adaptive capacity of farmers to quickly and autonomously adapt to the evolution of their environment by permanently looking and trying new options, but underlines how cautious they are to not endanger their food security, and confirms that a climatic opportunity is not sufficient to account for farmers' choices. Comparisons can be made with recent watermelon emergence in the same area and developments of maize and rainfed rice areas in the southern areas of Senegal, which have been enabled by the rainfall evolution but benefit of solid economical drivers.

P-3330-59

Economic futures of African family farms in the face of climate change: addressing three big questions through integrated assessment with a Tanzanian case

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Family farms have sustained the livelihood and development of most Sub-Saharan African countries and will continue to do so for a foreseeable future. Much of the development literature has widely addressed the economic futures of African family farms in the perspective of regional and global economic trends and trajectories -with limited attempts of scoping these futures in the context of climate change. Where such attempts have been made, the assessments overly fall short of an integrated approach that utilizes recent advances of interfaced biophysical and economic modeling. Based on a sample of 168 family farms in the semi-arid and sub-humid farming systems of Wami-Ruvu Basin in Tanzania, the paper applies an integrated climate change assessment to address the following three big questions: How the African family farms will be impacted by climate change if they continue with business as usual? What will be the impacts with foreseen development pathways without adaptation? What will be the impacts with foreseen development pathways with adaptation?

P-3330-60

Trends in daily extreme precipitation and temperature indices over Ghana from 1980 to 2011

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In this study, the spatial and temporal patterns of the variabilities in the indices of precipitation extremes, on the basis of daily data and it association with climate change at twenty synoptic stations in Ghana over the period 1980-2011 were analyzed. Daily temperature (maximum and minimum) and precipitation data over the period of 1980 to 2011 were used. Data were quality controlled, and processed into indices of climate extremes, and the indices were calculated using RClimDex which is based on R software and is developed and maintained by the Climate Research Branch of Meteorological Service of Canada. From 1980 to 2011 hot days and nights have increased, leading to a decrease in cold days and nights. Except simple daily intensity (SDII) index station, other precipitation indices