OUR COMMON FUTURE UNDER CLIMATE CHANGE

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.

Christopher Field, *Chair, CFCC15 Scientific Committee*
Jean Jouzel, *Chair, CFCC15 High Level Board*
Hervé Le Treut, *Chair, CFCC15 Organizational Committee*

Committees

Scientific committee

- Chris FIELD *(IPCC, USA) - Chair*
- Philippe CIAIS *(LSCE, France)*
- Wolfgang CRAMER *(IMBE, France)*
- Purnamita DASGUPTA *(IEG, India)*
- Ruth DEFRIES *(Colombia University, USA)*
- Navroz DUBASH *(CPR, India)*
- Ottmar EDENHOFER *(PIK, Germany / IPCC, USA)*
- Michael GRUBB *(University College London, UK)*
- Jean-Charles HOURCADE *(CNRS- France)*
- Sheila JASANOFF *(Harvard Kenny School of Government, USA)*
- Kejun JIANG *(Nanyang Technological Univerisity, China)*
- Vladimir KATTSO *(MGO, Russia)*
- Hervé LE TREUT, France *(CNRS-UPMC/France)*
- Emilio LEBRE LA ROVERE *(National University, Brazil)*
- Valérie MASSON-DELMOTTE *(LSCE/IPSL, France)*
- Cheik MBOW *(ICRAF, Kenya)*
- Isabelle NIANG-DIOP *(IRD, Senegal)*
- Carlos NOBRE *(SEPED/MCTI, Brazil)*
- Karen O'BRIEN *(Universty of Oslo, Norway)*
- Joe JACQUELINE PEREIRA *(University Kebangsaan, Malaysia)*
- Shilong PIAO *(Peking University, China)*
- Hans OTTO PÖRTNER *(Alfred Wegener Institute, Germany)*
- Monika RHEIN *(University of Bremen, Germany)*
- Johan ROCKSTRÖM *(Stockhom University, Sweden)*
- Hans Joachim SCHELLNHUBER *(PIK, Germany)*
- Robert SCHOLES *(University of Witwatersrand, South Africa)*
- Pete SMITH (University of Aberdeen, UK)
- Youba SOKONA *(The South Centre, Switzerland)*
- Jean-François SOUSSANA *(INRA, France)*
- Mark STAFFORD-SMITH *(Future Earth, Australia)*
- Thomas STOCKER *(University of Bern, Switzerland)*
- Laurence TUBIANA *(IDDRI, France)*
- Diana ÜRGE-VORSATZ *(Central European University, Hungary)*
- Penny URQUHART *(Independent analyst, South Africa)*
- Carolina VERA *(University of Buenos Aires, Argentina)*
- Alistair WOODWARD *(University of Aukland, New Zealand)*

Organizing committee

Chair:

- Hervé Le Treut *(CNRS-UPMC)*

Members:

- Wolfgang Cramer *(CNRS/Future Earth)*
- Pascale Delecluse *(CNRS)*
- Robert Kandel *(CNRS/Ecole polytechnique)*
- Frank Lecocq *(AgroParis Tech/CIRED)*
- Lucilla Spini *(ICSU)*
- Jean–François Soussana *(INRA)*
- Marie–Ange Theobald *(UNESCO)*
- Stéphanie Thiébault *(CNRS)*
- Sébastien Treyer *(IDDRI)*

Conference Secretariat:

- Claire Weill, Head *(INRA)*
- Géraldine Chouteau *(Météo-France)*
- Aglaé Jézéquel *(INRA)*
- Gaëlle Jotham *(INRA)*
- Ingrid Le Ru *(IDDRI)*
- Benoît Martimort–Asso *(IRD)*
- Nadia Mersali *(IDDRI)*
- Catherine Michaut *(CNRS-UVSQ/IPSL)*
- Aline Nehmé *(INRA)*
- Jeremy Zuber *(INRA)*
- Aimie Eliot *(INRA)*
- Eve Le Dem *(INRA)*

Communication Advisory Board:

- Richard Black, *Energy and Climate Intelligence Unit*
- Hunter Cutting, *Climate Nexus*
- Owen Gaffney, *Future Earth/Stockholm Resilience Centre*
- Kalee Kreider, *United Nations Foundation*
- Michelle Kovacevic, *Communications consultant*
- Jonathan Lynn, *IPCC*
- Kim Nicholas, *Lund University*
- Tim Nuthall, *European Climate Foundation*
- Nicholas Nuttall, *UNFCC*
- Roz Pidcock, *Carbon Brief*
- Charlotte Smith, *Communications INC*
- Sue Williams, *UNESCO*
- Denise Young, *ICSU*
- Jeremy Zuber *(INRA)*

are no criteria developed to quantify the status, need and outreach of diversification.

Objectives: We identified with community representatives and other local stakeholders in two contrasting coffee zones in Nicaragua (dry and humid): 1) the role of on-farm diversification in farmer strategies in climate change adaptation; 2) different dimensions of on-farm diversification; and 3) the need for specific measures to make use of the potential of diversification.

Methods: We carried out a literature review highlighting the different dimensions of diversification, and for each dimension, the benefits and drawbacks of diversification for smallholders of coffee landscapes. We consulted institutions and focal groups from ten communities in two contrasting coffee zones in Nicaragua about: 1) the vulnerability of their livelihoods to climate changes ; 2) existing and desirable strategies to adapt to these changes; 3) existing diversity in coffee farms; 4) what on-farm diversification would represent for them to be an effective way of adapting to climate change. Taken into account the gender issue, we conducted interviews in farm households to understand how actual diversification is related to climate risk management and food security status, and to identify specific needs to enable farmers making use of the potential for diversification. To embed our results in local development and research processes, our activities were linked to existing farmer initiatives and the local university agronomy faculty. In each coffee zone, phenological calendars for the principal crops were developed on the basis of the collected information to support farmers´ crop management under the existing climate variability.

Preliminary results and discussion: Farmer families in both coffee zones indicated crop diversification among adaptation options that they prefer, particularly enrichment with fruit perennials like plantain, banana and citrus. These crops provide cash flow through the year and can be used also for own consumption to enrich the diets of farmer families. Though a large diversity of agricultural species is grown in the landscape, most on-farm activities are concentrated around coffee, maize and common beans and take place between May and August, which coincides with the months of seasonal hunger. This suggests a high potential for diversification which is currently little utilized to improve food security, generate income and to adapt production systems to climate variability. The literature review allows us to draw a first typology of complementarity and competition effects amongst crops. Some farmers have already enriched their coffee farms with fruit perennials and other crops. Because of their experience, they are key persons to share knowledge about benefits and risks of crop diversification with other farmers. At landscape level, farmers stressed the importance of sufficient tree cover to ensure key environmental services like water availability. Restoration and conservation activities at landscape level will require coordination among farmer s and governmental organizations.

Acknowledgements: This study is financed by the PCP Research Platform and CCAFS.

2225 - Climate Smart Agriculture: Propaganda or Paradigm Shift?

ORAL PRESENTATIONS

K-2225-01

From a global science conference towards UNFCCC negotiations: mobilizing science for transitions

P. Caron (1)
(1) Cirad, General direction, Montpellier

This presentation aims at presenting the main out comes from the 3rd Global Science Conference on Climate Smart Agriculture (CSA) in Montpellier, France, 16-18 March 2015 where more than 600 researchers and 150 stakeholders and policy makers from 75 countries and 5 continents convened. CSA is a framework that mobilizes synergies and can lead to innovative and comprehensive solutions at local, regional and global levels. Delegates also confirmed that CSA solutions exist and can be brought into reality provided favorable conditions.

Agriculture was acknowledged as a sector particularly vulnerable to climate change, which impacts the livelihoods of the world's poorest people. This places increased strain on global food systems, especially since expectations for meeting demand for food will change tremendously within the next 40 years. Agriculture has also a central role in strongly reducing greenhouse gas emissions and lies therefore at the heart of complex challenges to be addressed. CSA invites researchers, practitioners and policy makers to explore solutions combining three pillars, food security, climate change adaptation and mitigation, underpinning sustainable landscapes and food systems. This is essential since the sector is facing unprecedented uncertainty and risks: synergies have to be looked at and trade-offs addressed. Recognizing that agriculture is a pivotal sector for international negotiations on sustainable development and climate change, CSA therefore provides a framework for looking at necessary transitions.

The main recommendations were as follows: (i) agriculture in the future must also address the challenges of sustainable food systems and landscapes; (ii): based upon a renewed research agenda that addresses a more complex set of objectives, researchers and practitioners must engage to build evidence and design the trajectories for multiple transformative transitions of climate-smart agriculture; (iii) the future relies upon policy, institutional and financing decisions and particularly upon the involvement of policy makers, development agencies, civil society and the private sector with researchers and research institutions in innovation platforms.

The strengthening of CSA scientific community must be pursued and better engaged in interfacing with policy makers, promoting scientific diplomacy. Their capacity to develop relevant global research programs and joint initiatives to address as from now questions that will be key in the future should be supported and stimulated through international cooperation platforms.

K-2225-02

Title not communicated

J-F. Soussana (1)
(1)Inra, Paris, France

Abstract not communicated

O-2225-01

Decision-support framework for targeting investment towards climate-smart agriculture practices and programs

A. Nowak (1) ; C. Corner-Dolloff, (1) ; AM. Loboguerrero, (2) ; M. Lizarazo (2) ; F. Howland (1) ; N. Andrieu (3) ; A. Jarvis (1)
(1) International Center for Tropical Agriculture (CIAT), Decision and Policy Analysis Research Area, Cali, Colombia; (2) CGIAR research program on Climate Change, Agriculture, and Food Security (CCAFS) , Ccafs latinoamerica, Cali, Colombia; (3) Centre de coopération Internationale en recherche agronomique pour le développement (CIRAD), L'unité mixte de recherche innovation et développement dans l'agriculture et l'agroalimentaire, Montpellier, France

Unprecedented impacts of climate change on agricultural systems around the world coupled with increasing food demand underlie the urgency of building a more productive, resilient, and low-emission agricultural development model – one that is climate-smart. Establishing climate-smart agriculture (CSA) systems requires investment in concrete on-farm practices and broader programs to establish implementation at scales that will transform systems to address food security and development goals in the face of climate change. The

CSA Prioritization Framework (CSA-PF) was designed by scientists at CIAT and CCFAS to guide actors at multiple levels in their effort to identify best-bet CSA investment portfolios through scientific and participatory evaluation of the broad set of applicable practices for a given context. The CSA-PF is a CSA implementation planning and policy support tool aimed at governments, donors, non-governmental organizations, and local actors. The framework explicitly targets investments that diminish trade-offs between productivity increases, gains in adaptive capacity, and lowering emissions contributions from agriculture. Given the various needs of potential users and investment targets, the CS-PF can be adapted to stakeholders' needs and resources. It has been designed as a four phase process, but current pilots has varied this approach, adding additional analyses and decision taking points as needed. The first phase leads the main user of the prioritization process, in collaboration with a team of experts, to identify the objectives, scope of the study based on vulnerable areas and production systems key for food security, and the associated climatic and non-climatic challenges to be addressed through CSA interventions. The process then continues with the development of a long list of CSA practices applicable to the selected region(s) and production systems, and the identification of indicators to assess the practice's impacts on productivity, adaptation and mitigation. In Phase 2, stakeholders validate these results through participatory workshops and select a shorter list of CSA practices for further investigation based on the analyses from the first phase. An economic analysis, most often a cost-benefit analysis, is conducted in Phase 3 for the short-listed practices. A second workshop for data validation is held in Phase 4, where stakeholders discuss strategies to minimize trade-offs, to increase synergies between practices, and to minimize barriers to adoptions. The process results in the collaborative development of CSA investment portfolios. Through a comparative case study approach, this paper also illustrates the results from implementing the CSA-PF in Colombia, Guatemala, and Mali, where the prioritization objectives vary from strengthening current national agricultural and climate change policy (Guatemala), to articulating governmental and non-governmental actors around CSA actions (Mali), to scaling out CSA initiatives with local community groups (Colombia). Opportunities and challenges related to the different approaches to using the framework are discussed and recommendations for down-scaling the CSA-PF and establishing multi-level planning platforms are formulated, thus contributing to the wider goal of informing agriculture and climate change policy and decision-making.

O-2225-02

The adoption of Climate Smart Agriculture innovations: a summary of an EU project

V. Blok (1) ; T. Long (2)

(1) Wageningen UR, Mst, Wageningen, Netherlands; (2) Wageningen UR, MST, Wageningen, Gelderland, Netherlands

Agriculture and its supply chains will be profoundly impacted by actions to mitigate against, and adapt to climate change. The emerging concept of Climate Smart Agriculture (CSA) is one response to this challenge, involving the simultaneous increasing of agricultural productivity and incomes, adaptation and the building of resilience, and the reductions of GHG emissions (FAO, 2010).

Whilst heavily advanced within developing country contexts, CSA is also forming a strategic priority within Europe. Technological innovations are signalled as playing a critical role in the transition towards CSA. However, the diffusion and adoption of technological innovations within OECD countries has been slow (del Río González 2005). This is due to the presence of social and economic barriers, including poor market incentives and low levels of awareness.

The development and refinement of appropriate business models for CSA, increasing awareness and the aligning of national and EU policies have been highlighted as responses to enhance the transition to CSA.

Results from a Climate KiC pathfinder project on CSA will be presented during this key note talk. This ongoing project seeks to increase the adoption and diffusion of CSA technological innovations across the EU by stimulating both supply and demand. The presentation will provide an overview of the projects approach and results to date, which will include consideration of:

- The role and form of inhibiting social and economic factors.
- The role of business models in enhancing CSA technologies, and identifying critical issues that shape successful CSA business models.
- Current policy and regulatory impacts, and how these could be altered in the future to further the diffusion of CSA technologies and practices.

The development of services to boost CSA in Europe.

2225-POSTER PRESENTATIONS

P-2225-01

Trends and Spatial Analysis of Temperature and Rainfall Patterns on Rice Yields in Nigeria

C. Akinbile (1) ; O. Ogunmola (1) ; S. Akande (2)

(1) Federal University of Technology, Akure(FUTA), Agricultural & Environmental Engineering, Akure, Ondo, Nigeria, Federal Republic of; (2) Federal University of Technology, Centre for space research and applications, Akure, Nigeria, Federal Republic of

Due to the increasing decline in food especially rice production, a research to access the impact of climate variability on food crop in Nigeria was conducted. Trends and spatial analysis of the effect of temperature and rainfall on rice yield was carried out using 40 years climate and rice yield data. Past trends analysis was conducted with forty years (1971-2010) climate data obtained from the International Institute of tropical agriculture (IITA) Ibadan, Nigeria while rice yield data were obtained from the Food and Agriculture Organization (FAO) of the United Nations and the United States Department of Agriculture (USDA) respectively. Future trends for the next forty years (2011-2050) projections on the climate variability and trends on rice yields were also forecasted. Six cities, one in each of the six agro-ecological zones of Nigeria were selected for the studies which were Calabar in Mangrove forest, Enugu in wooded Savannah, Ikeja in tropical rain forest, Ilorin in Guinea Savannah, Kaduna in Sudan Sahel and Maiduguri in Sahel savannah. . Geographic Information Systems (GIS) software was employed to map out spatial analysis of temperature and rainfall over the entire country using the six cities in each of the six zones as nodal sampling points. Results and predictions were analyzed using Statistical packages such as Mann-Kendall and Sens' tests, multiple linear regression, cross-correlation analysis, Statistical Packages for Social Sciences (SPSS), Analysis of Variance (ANOVA), Duncan's multiple range test (DMRT) and Arc surfer software, all at 95% level of significance. Rainfall showed increasing trends in Enugu, Ilorin, Calabar, Ikeja, and Maiduguri but decreasing trends were observed in Kaduna while temperature showed increasing trends in all the cities considered in the last four decades. The future climate projections showed increasing rainfall trends in Enugu, Calabar, Ikeja, and Maiduguri while decreasing trends were observed in Kaduna and Ilorin while temperature showed increasing trends in all the cities for the next four decades. For annual rainfall, no significant trend was observed in Calabar, Ilorin and Enugu but a statistically significant negative trend was observed in Kaduna. Similarly, statistically significant positive trends of rice yield, rainfall, and temperature were observed in Ikeja and Maiduguri in the last four decades. Rainfall decreased at the rate of 4.706mmyr-1 (P) while rice yield increased at the rate of 0.052t/ha/yr (P) in Kaduna. In Maiduguri, temperature increased at the rate of 0.063°C/yr (P) while rice yield increased at the rate of 0.063t/ha/yr (P. Mann-Kendall tests showed that rice yield and temperature had generally statistically significant positive trends in Calabar, Ilorin, Kaduna, and Enugu. Pearson correlation also showed that the relationship between rainfall and yield is not significant in Calabar, Enugu, Ilorin, and Maiduguri while temperature against yield is significant at 0.01 in Calabar, Enugu, Ikeja, and 0.05 level of significance at Ilorin. The multiple linear regression models also showed that rainfall was insignificant in Calabar, Ikeja, Ilorin, and Kaduna while maximum temperature was insignificant only in Maiduguri. Adaptation strategies such as genetically modifying rice varieties to tolerate projected changes in