



RESEARCH PROGRAM ON  
**Climate Change,  
Agriculture and  
Food Security**



**Theme leader 4.3**  
**2013 technical report**

## 1. Activity Reporting

### Activity 537-2013 (Milestone 4.3.2 2013.)

**Title:** Global model intercomparisons for analysis of climate change impact, related to mitigation and adaptation policy choices in the agricultural sector. Integration of modeling work into foresight and strategic scenarios building.

**Status: Complete.** 1. The Agricultural Model and Intercomparison and Improvement Project (AgMIP) Phase I has concluded. Theme 4.3, in association with the AgMIP community and the Inter-Sectoral Impact Model Intercomparison Project (ISI-MIP), had been leading a global economic model intercomparison exercise since 2011. The exercise harmonized the input datasets for 10 global agro-economic models, with the goal to better evaluate the model results. Each of the economic models ran simulations with standardized initial conditions for multiple scenarios. Through harmonizing the model inputs, this effort hoped to shed light on the different behaviors and more subtle aspects of heterogeneity between the 10 global economic models, with the goal of leading to meaningful analysis and intercomparison of the models. As a result of this work, a paper entitled "Climate change effects on agriculture: Economic responses to biophysical shocks", was published in a special Inter-Sectoral Impact Model Intercomparison Project (ISI-MIP) feature of the Proceedings of the National Academy of Sciences of the United States of America, in December 2013. Furthermore, seven studies were published in a special issue of Agricultural Economics, in January 2014. The latter were also introduced in a separate paper. 2. Several technical improvements and preliminary work towards developing user interfaces and data processing routines took place, upon the release of a major IMPACT Model update (IMPACT III). 3. Full communications strategies were organised upon the release of three major books on "African Agriculture and Climate Change". These activities included printing of several types of dissemination material, distribution of materials among partners, completion of multiple launching events at global, regional and national levels and a complete online communications strategy.

#### **Gender component:**

#### **Deliverables:**

- 5 papers, for an Agricultural Economics Special Issue, and one on "Assessing uncertainty along the climate-crop-economy modeling chain", PNAS

A paper entitled "Climate Change Effects on Agriculture: Economic Responses to Biophysical Shocks", was published in a special Inter-Sectoral Impact Model Intercomparison Project (ISI-MIP) feature of the Proceedings of the National Academy of Sciences of the United States of America, in December 2013. Furthermore, seven studies were published in a special issue of Agricultural Economics, in January 2014. These seven studies were also introduced in a separate paper.

- Database scripts that handle to data processing of SPAM into IMPACT  
Efficient code that allows for the rapid processing of SPAM results into inputs for the IMPACT model data processing code.
- Updated Climate Processing Code (GAMS), for IMPACT  
Re-coded the climate processing code, allowing for improved functionality and flexibility which allows for future use of new IPCC AR5 climate data.
- Excel Interface for IMPACT 3 Simulations (Desktop Version)  
Developed a completely new system for handling and designing scenarios in IMPACT. The new user interface is designed in excel with VBA, and can now fully replicate all of the functionality of the previous version of IMPACT.
- Beta version of web-IMPACT using IMPACT 2  
Available online.
- Updated beta-version to IMPACT 3  
The focus on developing web tools is changing from the development of web-based modeling tools to a focus on providing users with better access to IMPACT results and result visualizations. This change in focus is in response to user feedbacks on their demand for the model and model results.
- Three book Launches are organised: i. SA RM during FANRPAN High Level Food Security Policy Dialogue, Maseru, Lesotho, 02– 05 September ii. Kenya Country Chapter during Kenya National Adaptation Planning Meeting, Nairobi, 16-17 September iii) EA RM during 2nd ASARECA General Assembly and Scientific Conference, December 9 – 13, Bujumbura, Burundi.  
Three regional launches for three books on "African Agriculture and Climate Change" were organised with the three key regional partners of the project: CORAF, FANRPAN and ASARECA. A Kenya country chapter was presented and discussed during a National Adaptation Planning meeting in Kenya, which was co-organised by the CCAFS East Africa Regional Leader.
- Research results from the RMs to be discussed during a side event at the "Global Landscapes Forum" at the Nineteenth Session of the Conference of the Parties, UNFCCC (COP 19), in Warsaw, November, 2012.  
CCAFS and IFPRI co-organised a technical & networking session, titled: 'The good, the bad and the ugly: Climate change's potential impact on farmers in Africa', at the Global Landscapes Forum, during the Nineteenth Session of the Conference of the Parties, UNFCCC, November 16, in Warsaw, Poland.
- RMs outreach material printed and shipped to regional partners and CCAFS Regional Leaders.  
Several hundreds of copies of the three books on "African Agriculture and Climate Change", issue briefs and country chapters were printed and shipped to the three key regional partners of the project (CORAF, FANRPAN, ASARECA), as well as to the East Africa and West Africa CCAFS Regional Leaders, to be used in multiple dissemination activities.

**Partners:**

Columbia University; AOM; ASARECA; FANRPAN; CORAF

**Locations:**

Global

## 2. Succinct summary of activities and deliverables by Output level

### Output: 4.3.2

#### Summary:

The Agricultural Model and Intercomparison and Improvement Project (AgMIP)- Global Economic Research: Phase II

For the first time, many of the world's leading global models, with significant representation of agriculture, worked together to understand where their results are similar, where they differ, and more importantly, why they differ. In an uncertain future, understanding what the world's leading modelers think about how agricultural producers, food consumers and international trade flows will respond, provides valuable guidance to both the public and private sectors as they think about policy changes and investment priorities. The studies, which resulted from AgMIP's Phase II (whose global economics component was co-led by Theme 4.3), provide a unique perspective on the effects of climate change on agriculture by viewing it through the lens of nine global economic models with climate change inputs from two general circulation models and five crop models. An integral part of the analysis was the close integration of biophysical with socioeconomic modeling, making possible the ability to assess both the direct biological effects of climate change on yields and the responses of producers, consumers, and traders.

International Model for Policy Analysis of Agricultural Commodities and Trade (IMPACT): Redevelopment towards IMPACT III

The IMPACT model is designed to examine alternative futures for global food supply, demand, trade, prices, and food security. The IMPACT model provides fundamental global baseline projections of agricultural commodity supply, demand, trade, prices and malnutrition outcomes, along with cutting-edge research results on quickly evolving topics such as bioenergy, climate change, changing diet/food preferences, and many other themes. In collaboration with other IFPRI- led activities, supported by PIM and the Bill & Melinda Gates Foundation (during Phase 1 of the Global Futures project), several modules were coded to allow for better modeling of promising technologies. The agriculture production technology and adoption module allows for the simultaneous modeling of multiple technologies that produces a single commodity. The pathways of transition between the technologies can also be modeled. A second module, the welfare and benefit-cost module, was also developed. The post processing Food Security Module in IMPACT was also updated to include parameters, such the population at risk of hunger, that track progress towards achieving some of the Millennium Development goals. Alongside these additional modules, a consistent process to incorporate climate data into IMPACT was implemented. A major undertaking under the project was to move from IMPACT 2 to IMPACT 3. IMPACT 3 is a new version of the model with an updated base year of 2005. The code was made more efficient and redesigned to be more modular and efficient. Also, to meet the needs of the various centers, crops and regions were disaggregated further to include the CG mandate crops. As part of this effort, a new data processing framework was developed; the simulation framework was updated to be able to run scenarios more efficiently, and new analytical tools were developed to enable users to easily analyze results from scenario runs.

## "African Agriculture and Climate Change" Research Monographs

A 3-volume series on African agriculture and climate change was produced to assist policymakers, researchers, NGOs and donors to better understand the impact of climate change on agriculture in each country in the series (West Africa, East Africa and Southern Africa). Led by Theme 4.3, the series were published by IFPRI in partnership with regional institutes (CORAF, ASARECA, and FANRPAN) and under the umbrella and support from CCAFS, as well as funding from BMZ for two of the reports.

Each study analyzed the range of plausible impacts of climate change on agriculture by the year 2050, focusing almost entirely on annual crops. Studies used both crop models and global partial equilibrium models, informed by four different climate models and three socioeconomic scenarios. In some of the chapters on countries in which the livestock sector is important, authors highlighted several key aspects of this sector using secondary literature. Agricultural adaptation options are discussed throughout the monographs. The project used two approaches to study the impact of climate change on agriculture. The first was to apply the DSSAT crop modeling software to climate model data, to see how crop yields of major crops would be impacted by climate change, not accounting for technological change or adaptation. The second was to use IMPACT, a large global partial equilibrium model that focuses on food and agriculture, to take into account population and GDP growth on demand, as well as to consider the supply response, as impacted by climate change and also technological change. The series shows great geographical variations in climate change effects on agriculture. The series also shows that while most direct climate change impacts will be negative, there will be positive impacts on yields as well, mostly in areas with projected increases in precipitation and in some elevated areas that will be able to be cultivated due to warmer temperatures. As a result of global increases in income and population, real crop prices will rise, and more so with climate change than without. Yields will rise as a result of price increases spurring farmers onto using more inputs to increase yield, and general technological improvements in crops. In many cases, the price effect will lead yields to rise even more under climate change than they would without (this is true for Africa, but not true in all regions of the world). Finally, the series noted that the difference between the crop model results presented in this paper and the IMPACT model results was mostly due to technological improvements. To ensure that this very large and positive difference is realized, investment into agricultural research institutions and extension departments is required, and policies that enables the private sector to innovate and bring inputs to farmers is required. All research outputs were strategically disseminated through the use of multiple communications channels at global, regional and national level, in collaboration with key stakeholders.

## 3. Publications

### Publication #1

**Type:** Books

**CCAFS Themes:** Theme 2, Theme 4.3

**Citation:** Jalloh A, Nelson GC, Thomas TS, Zougmore R, Roy-Macauley H, eds. 2013. West African agriculture and climate change: a comprehensive analysis. IFPRI Research Monograph. Washington DC: International Food Policy Research Institute (IFPRI).

### Publication #2

**Type:** Policy briefs

**CCAFS Themes:** Theme 4.3

**Citation:** Jalloh, Abdulai, Gerald C. Nelson, Timothy S. Thomas, Robert Zougmore, and Harold Roy-Macauley, eds. 2013. West African Agriculture and Climate Change: A Comprehensive Analysis. IFPRI Issue Brief 75. August. Washington: International Food Policy Research Institute.

### Publication #3

**Type:** Books

**CCAFS Themes:** Theme 4.3

**Citation:** Hachigonta, Sepo, Gerald Nelson, Timothy S. Thomas, and Lindiwe Majele Sibanda, eds. 2013. Southern African Agriculture and Climate Change: A Comprehensive Analysis. IFPRI Research Monograph. Washington: International Food Policy Research Institute.

### Publication #4

**Type:** Policy briefs

**CCAFS Themes:** Theme 4.3

**Citation:** Hachigonta, Sepo, Gerald Nelson, Timothy S. Thomas, and Lindiwe Majele Sibanda, eds. 2013. Southern African Agriculture and Climate Change: A Comprehensive Analysis. IFPRI Issue Brief 77. August. Washington: International Food Policy Research Institute.

## Publication #5

**Type:** Books

**CCAFS Themes:** Theme 4.3

**Citation:** Waithaka, Michael, Gerald Nelson, Timothy S. Thomas, and Miriam Kyotalimye, eds. 2013. East African Agriculture and Climate Change: A Comprehensive Analysis. IFPRI Research Monograph. Washington: International Food Policy Research Institute.

## Publication #6

**Type:** Policy briefs

**CCAFS Themes:** Theme 4.3

**Citation:** Waithaka, Michael, Gerald Nelson, Timothy S. Thomas, and Miriam Kyotalimye, eds. 2013. East African Agriculture and Climate Change: A Comprehensive Analysis. IFPRI Issue Brief 76. August. Washington: International Food Policy Research Institute.

## Publication #7

**Type:** Policy briefs

**CCAFS Themes:** Theme 4.3

**Citation:** Zhou, Peter P., Tichakunda Simbini, Gorata Ramokgotlwane, Sepo Hachigonta, Lindiwe M. Sibanda, and Timothy S. Thomas. 2012. "Southern African Agriculture and Climate Change: A COMPREHENSIVE ANALYSIS — BOTSWANA".

## Publication #8

**Type:** Policy briefs

**CCAFS Themes:** Theme 4.3

**Citation:** Gwimbi, Patrick, Sepo Hachigonta, Lindiwe M. Sibanda, and Timothy S. Thomas. 2012. "Southern African Agriculture and Climate Change: A COMPREHENSIVE ANALYSIS — LESOTHO".

## Publication #9

**Type:** Policy briefs

**CCAFS Themes:** Theme 4.3

**Citation:** Saka, John D.K., Pickford Sibale, Sepo Hachigonta, Lindiwe M. Sibanda, and Timothy S. Thomas. 2012. "Southern African Agriculture and Climate Change: A COMPREHENSIVE ANALYSIS — MALAWI".



## Publication #10

**Type:** Policy briefs

**CCAFS Themes:** Theme 4.3

**Citation:** Maure, Genito A., Silena Bila, Sepo Hachigonta, Lindiwe M. Sibanda, and Timothy S. Thomas. 2012. "Southern African Agriculture and Climate Change: A COMPREHENSIVE ANALYSIS — MOZAMBIQUE".

## Publication #11

**Type:** Policy briefs

**CCAFS Themes:** Theme 4.3

**Citation:** Johnston, Peter, Sepo Hachigonta, Lindiwe M. Sibanda, and Timothy S. Thomas. 2012. "Southern African Agriculture and Climate Change: A COMPREHENSIVE ANALYSIS — SOUTH AFRICA".

## Publication #12

**Type:** Policy briefs

**CCAFS Themes:** Theme 4.3

**Citation:** Manyatsi, Absalom M., Michael T. Masarirambi, Sepo Hachigonta, Lindiwe M. Sibanda, and Timothy S. Thomas. 2012. "Southern African Agriculture and Climate Change: A COMPREHENSIVE ANALYSIS — SWAZILAND".

## Publication #13

**Type:** Policy briefs

**CCAFS Themes:** Theme 4.3

**Citation:** Kanyanga, Joseph, Sepo Hachigonta, Lindiwe M. Sibanda, and Timothy S. Thomas. 2012. "Southern African Agriculture and Climate Change: A COMPREHENSIVE ANALYSIS — ZAMBIA".

## Publication #14

**Type:** Policy briefs

**CCAFS Themes:** Theme 4.3

**Citation:** Mugabe, Francis T., Sepo Hachigonta, Lindiwe M. Sibanda, and Timothy S. Thomas. 2012. "Southern African Agriculture and Climate Change: A COMPREHENSIVE ANALYSIS — ZIMBABWE".

## Publication #15

**Type:** Policy briefs

**CCAFS Themes:** Theme 4.3

**Citation:** Baramburiye, Juvent, Miriam Kyotalimye, Timothy S. Thomas, and Michael Waithaka. 2012. “East African Agriculture and Climate Change: A COMPREHENSIVE ANALYSIS — BURUNDI”.

### Publication #16

**Type:** Policy briefs

**CCAFS Themes:** Theme 4.3

**Citation:** Blandine, Nsombo M., Timothy S. Thomas, Miriam Kyotalimye, Michael Waithaka. 2012. “East African Agriculture and Climate Change: A COMPREHENSIVE ANALYSIS — DEMOCRATIC REPUBLIC OF THE CONGO”.

### Publication #17

**Type:** Policy briefs

**CCAFS Themes:** Theme 4.3

**Citation:** Ghebru, Bissrat, Woldeamlak Araia, Woldeselassie Ogbazghi, Menghisteab Gebreselassie, and Timothy S. Thomas. 2012. “East African Agriculture and Climate Change: A COMPREHENSIVE ANALYSIS — ERITREA”.

### Publication #18

**Type:** Policy briefs

**CCAFS Themes:** Theme 4.3

**Citation:** Admassu, Habtamu, MezgebuGetinet, Timothy S. Thomas, Michael Waithaka, and Miriam Kyotalimye. 2012. “East African Agriculture and Climate Change: A COMPREHENSIVE ANALYSIS — ETHIOPIA”.

### Publication #19

**Type:** Policy briefs

**CCAFS Themes:** Theme 4.3

**Citation:** Odera, Michael Makokha, Timothy S. Thomas, Michael Waithaka, and Miriam Kyotalimye. 2012. “East African Agriculture and Climate Change: A COMPREHENSIVE ANALYSIS — KENYA”

### Publication #20

**Type:** Policy briefs

**CCAFS Themes:** Theme 4.3

**Citation:** Vololona, Mireille Rahaingo, Miriam Kyotalimye, Timothy S. Thomas, and Michael Waithaka. 2012. “East African Agriculture and Climate Change: A COMPREHENSIVE ANALYSIS — MADAGASCAR”.

## Publication #21

**Type:** Policy briefs

**CCAFS Themes:** Theme 4.3

**Citation:** Tenge, Ngoga G., Mutabazi Alphonse, and Timothy S. Thomas. 2012. "East African Agriculture and Climate Change: A COMPREHENSIVE ANALYSIS — RWANDA".

## Publication #22

**Type:** Policy briefs

**CCAFS Themes:** Theme 4.3

**Citation:** Taha, Abdelmoneim, Timothy S. Thomas, and Michael Waithaka. 2012. "East African Agriculture and Climate Change: A COMPREHENSIVE ANALYSIS — SUDAN".

## Publication #23

**Type:** Policy briefs

**CCAFS Themes:** Theme 4.3

**Citation:** Kilembe, Caroline, Timothy S. Thomas, Michael Waithaka, Miriam Kyotalimye, and Siza Tumbo. 2012. "East African Agriculture and Climate Change: A COMPREHENSIVE ANALYSIS — TANZANIA".

## Publication #24

**Type:** Policy briefs

**CCAFS Themes:** Theme 4.3

**Citation:** Bashaasha, Bernard, Timothy S. Thomas, Michael Waithaka, and Miriam Kyotalimye. 2012. "East African Agriculture and Climate Change: A COMPREHENSIVE ANALYSIS — UGANDA".

## Publication #25

**Type:** Policy briefs

**CCAFS Themes:** Theme 4.3

**Citation:** Lawin, Agnidé Emmanuel, P. B. Irénikatché Akponikpè, Abdulai Jalloh, and Timothy S. Thomas. 2012. "West African Agriculture and Climate Change: A COMPREHENSIVE ANALYSIS — BENIN".

## Publication #26

**Type:** Policy briefs

**CCAFS Themes:** Theme 4.3

**Citation:** Somé, Léopold, Abdulai Jalloh, Robert Zougmoré, Gerald C. Nelson, and Timothy S. Thomas. 2012.

“West African Agriculture and Climate Change: A COMPREHENSIVE ANALYSIS — BURKINA FASO”.

### Publication #27

**Type:** Policy briefs

**CCAFS Themes:** Theme 4.3

**Citation:** Ahossane, Kadio, Abdulai Jalloh, Gerald C. Nelson, and Timothy S. Thomas. 2012. “West African Agriculture and Climate Change: A COMPREHENSIVE ANALYSIS — CÔTE D’IVOIRE”.

### Publication #28

**Type:** Policy briefs

**CCAFS Themes:** Theme 4.3

**Citation:** Nutsukpo, Delali Kofi, Abdulai Jalloh, Robert Zougmoré, Gerald C. Nelson, and Timothy S. Thomas. 2012. “West African Agriculture and Climate Change: A COMPREHENSIVE ANALYSIS — GHANA”.

### Publication #29

**Type:** Policy briefs

**CCAFS Themes:** Theme 4.3

**Citation:** Condé, Sidafa, Abdulai Jalloh, Gerald C. Nelson, and Timothy S. Thomas. 2012. “West African Agriculture and Climate Change: A COMPREHENSIVE ANALYSIS — GUINEA”.

### Publication #30

**Type:** Policy briefs

**CCAFS Themes:** Theme 4.3

**Citation:** Karmorh, Benjamin S., Jr., Abdulai Jalloh, Gerald C. Nelson, and Timothy S. Thomas. 2012. “West African Agriculture and Climate Change: A COMPREHENSIVE ANALYSIS — LIBERIA”.

### Publication #31

**Type:** Policy briefs

**CCAFS Themes:** Theme 4.3

**Citation:** Yayé, Hassane, Adamou Danguioua, Abdulai Jalloh, Robert Zougmoré, Gerald C. Nelson, and Timothy S. Thomas. 2012. “West African Agriculture and Climate Change: A COMPREHENSIVE ANALYSIS — NIGER”.

### Publication #32

**Type:** Policy briefs

**CCAFS Themes:** Theme 4.3

**Citation:** Hassan, Shuaib M., Celestine E. Ikuenobe, Abdulai Jalloh, Gerald C. Nelson, and Timothy S. Thomas. 2012. “West African Agriculture and Climate Change: A COMPREHENSIVE ANALYSIS — NIGERIA”.

### Publication #33

**Type:** Policy briefs

**CCAFS Themes:** Theme 4.3

**Citation:** Khouma, Mamadou, Abdulai Jalloh, Timothy S. Thomas, and Gerald C. Nelson. 2012. “West African Agriculture and Climate Change: A COMPREHENSIVE ANALYSIS — SENEGAL”.

### Publication #34

**Type:** Policy briefs

**CCAFS Themes:** Theme 4.3

**Citation:** Johnson, Raymond G., Reynold G. Johnson, Mohamed Kandeh, Abdulai Jalloh, and Timothy S. Thomas. 2012. “West African Agriculture and Climate Change: A COMPREHENSIVE ANALYSIS — SIERRA LEONE”.

### Publication #35

**Type:** Policy briefs

**CCAFS Themes:** Theme 4.3

**Citation:** Tchinguilou, Abiziou, Abdulai Jalloh, and Timothy S. Thomas. 2012. “West African Agriculture and Climate Change: A COMPREHENSIVE ANALYSIS — TOGO”.

### Publication #36

**Type:** Journal papers

**CCAFS Themes:** Theme 4.3

**Citation:** Nelson, Gerald C.; Valin, Hugo; Sands, Ronald D.; Havlík, Petr; Ahammad, Helal; Deryng, Delphine; Elliott, Joshua; Fujimori, Shinichiro; Hasegawa, Tomoko; Heyhoe, Edwina; Kyle, Page; Von Lampe, Martin; Lotze-Campen, Hermann; Mason-d’Croz, Daniel; van Meijl, Hans; van der Mensbrugghe, Dominique; Müller, Christoph; Popp, Alexander; Robertson, Richard D.; Robinson, Sherman; Schmid, Erwin; Schmitz, Christoph; Tabeau, Andrzej; and Willenbockel, Dirk. 2013. Climate change effects on agriculture: Economic responses to biophysical shocks. Proceedings of the National Academy of Sciences of the United States of America p. 1222465110-

### Publication #37

**Type:** Journal papers

**CCAFS Themes:** Theme 4.3

**Citation:** Nelson, G. C. and Shively, G. E. (2014), Modeling climate change and agriculture: an introduction to the special issue. *Agricultural Economics*, 45: 1–2.

### Publication #38

**Type:** Journal papers

**CCAFS Themes:** Theme 4.3

**Citation:** von Lampe, M., Willenbockel, D., Ahammad, H., Blanc, E., Cai, Y., Calvin, K., Fujimori, S., Hasegawa, T., Havlik, P., Heyhoe, E., Kyle, P., Lotze-Campen, H., Mason d'Croze, D., Nelson, G. C., Sands, R. D., Schmitz, C., Tabeau, A., Valin, H., van der Mensbrugghe, D. and van Meijl, H. (2014), Why do global long-term scenarios for agriculture differ? An overview of the AgMIP Global Economic Model Intercomparison. *Agricultural Economics*, 45: 3–20.

### Publication #39

**Type:** Journal papers

**CCAFS Themes:** Theme 4.3

**Citation:** Robinson, S., van Meijl, H., Willenbockel, D., Valin, H., Fujimori, S., Masui, T., Sands, R., Wise, M., Calvin, K., Havlik, P., Mason d'Croze, D., Tabeau, A., Kavallari, A., Schmitz, C., Dietrich, J. P. and von Lampe, M. (2014), Comparing supply-side specifications in models of global agriculture and the food system. *Agricultural Economics*, 45: 21–35.

### Publication #40

**Type:** Journal papers

**CCAFS Themes:** Theme 4.3

**Citation:** Müller, C. and Robertson, R. D. (2014), Projecting future crop productivity for global economic modeling. *Agricultural Economics*, 45: 37–50.

### Publication #41

**Type:** Journal papers

**CCAFS Themes:** Theme 4.3

**Citation:** Valin, H., Sands, R. D., van der Mensbrugghe, D., Nelson, G. C., Ahammad, H., Blanc, E., Bodirsky, B., Fujimori, S., Hasegawa, T., Havlik, P., Heyhoe, E., Kyle, P., Mason-D'Croze, D., Paltsev, S., Rolinski, S., Tabeau, A., van Meijl, H., von Lampe, M. and Willenbockel, D. (2014), The future of food demand: understanding differences

in global economic models. *Agricultural Economics*, 45: 51–67.

## Publication #42

**Type:** Journal papers

**CCAFS Themes:** Theme 4.3

**Citation:** Schmitz, C., van Meijl, H., Kyle, P., Nelson, G. C., Fujimori, S., Gurgel, A., Havlik, P., Heyhoe, E., d’Croze, D. M., Popp, A., Sands, R., Tabeau, A., van der Mensbrugghe, D., von Lampe, M., Wise, M., Blanc, E., Hasegawa, T., Kavallari, A. and Valin, H. (2014), Land-use change trajectories up to 2050: insights from a global agro-economic model comparison. *Agricultural Economics*, 45: 69–84.

## Publication #43

**Type:** Journal papers

**CCAFS Themes:** Theme 4.3

**Citation:** Nelson, G. C., van der Mensbrugghe, D., Ahammad, H., Blanc, E., Calvin, K., Hasegawa, T., Havlik, P., Heyhoe, E., Kyle, P., Lotze-Campen, H., von Lampe, M., Mason d’Croze, D., van Meijl, H., Müller, C., Reilly, J., Robertson, R., Sands, R. D., Schmitz, C., Tabeau, A., Takahashi, K., Valin, H. and Willenbockel, D. (2014), Agriculture and climate change in global scenarios: why don't the models agree. *Agricultural Economics*, 45: 85–101.

## Publication #44

**Type:** Journal papers

**CCAFS Themes:** Theme 4.3

**Citation:** Lotze-Campen, H., von Lampe, M., Kyle, P., Fujimori, S., Havlik, P., van Meijl, H., Hasegawa, T., Popp, A., Schmitz, C., Tabeau, A., Valin, H., Willenbockel, D. and Wise, M. (2014), Impacts of increased bioenergy demand on global food markets: an AgMIP economic model intercomparison. *Agricultural Economics*, 45: 103–116.

## Publication #45

**Type:** Journal papers

**CCAFS Themes:** Theme 4.3

**Citation:** Sikhhalazo Dube, Robert J. Scholes, Gerald C. Nelson, Daniel Mason-D’Croze, and Amanda Palazzo (2013). South African Food Security and Climate Change: Agriculture Futures. *Economics: The Open-Access, Open-Assessment E-Journal*, Vol. 7, 2013-35.

## Publication #46

**Type:** Journal papers

**CCAFS Themes:** Theme 4.3

**Citation:** Sergey Kiselev, Roman Romashkin, Gerald C. Nelson, Daniel Mason-D’Croz, and Amanda Palazzo (2013). Russia's Food Security and Climate Change: Looking into the Future. *Economics: The Open-Access, Open-Assessment E-Journal*, Vol. 7, 2013-39.

## Publication #47

**Type:** Journal papers

**CCAFS Themes:** Theme 4.3

**Citation:** Eugene S. Takle, David Gustafson, Roger Beachy, Gerald C. Nelson, Daniel Mason-D’Croz, and Amanda Palazzo (2013). US Food Security and Climate Change: Agricultural Futures. *Economics: The Open-Access, Open-Assessment E-Journal*, Vol. 7, 2013-34. <http://dx.doi.org/10.5018/economics-ejournal.ja.2013-34>

## Publication #48

**Type:** Journal papers

**CCAFS Themes:** Theme 4.3

**Citation:** Liming Ye, Huajun Tang, Wenbin Wu, Peng Yang, Gerald C. Nelson, Daniel Mason-D’Croz, and Amanda Palazzo (2014). Chinese Food Security and Climate Change: Agriculture Futures. *Economics: The Open-Access, Open-Assessment E-Journal*, Vol. 8, 2014-1.



## 4. Communications

### Media campaigns:

Press Release: Report: Climate change to shift Kenya's breadbaskets. <http://ccafs.cgiar.org/news/media-centre/press-releases/report-climate-change-shift-kenya%E2%80%99s-breadbaskets> Also posted on IFPRI site: <http://www.ifpri.org/pressrelease/report-climate-change-shift-kenya-s-breadbaskets>

Three full media campaigns were organised by IFPRI upon the release of the "African Agriculture and Climate Change: 3-volume series, around the three regional launch events described in the events section. The media campaigns involved in each case are: a dedicated webpage, which provides an introduction to the work; relevant media material; a press release; electronic access to an issue brief; access to country summaries; an infographic; a blogpost; and access to e-book formats. Social media campaigns were also organised around the same time.

<http://www.ifpri.org/publication/west-african-agriculture-and-climate-change>

<http://www.ifpri.org/blog/climate-change-and-agriculture-southern-africa>

<http://www.ifpri.org/publication/east-african-agriculture-and-climate-change>

A media campaign which involved a press release, a blog post, and social media was organised upon the release of the paper "Climate change effects on agriculture: Economic responses to biophysical shocks", Nelson et al., in a special Inter-Sectoral Impact Model Intercomparison Project (ISI-MIP) feature of the Proceedings of the National Academy of Sciences of the United States of America, in December 2013.

<http://www.ifpri.org/pressrelease/major-economic-models-climate-change-and-agriculture-point-same-direction-differ-magnit>

Although the above media campaigns were IFPRI-led, CCAFS has been acknowledged in each case. Most of the related links are listed in the last section of this report, under "Other communications and outreach".

### Blogs:

Nelson G. 2013. New report reveals how climate change will hit West Africa. <http://ccafs.cgiar.org/blog/new-report-reveals-how-climate-change-will-hit-west-africa#.Uv8k-fZRF9c>

Meadu V. 2013. Based on what we know, can Kenya plan its climate future? <http://ccafs.cgiar.org/research-highlight/based-what-we-know-can-kenya-plan-its-climate-future>

Thomas T, Kinyangi J. 2013. With proper planning, farmers can thrive in a world of shifting climates. <http://ccafs.cgiar.org/blog/proper-planning-farmers-can-thrive-world-shifting-climates>

Holt L and Atakos V. 2013. The good, the bad and the ugly. <http://ccafs.cgiar.org/blog/good-bad-and-ugly#.Uv8kfPZRF9d>

Tun N. 2013. What is the potential impact from climate change for Africa's farmers?  
<http://ccafs.cgiar.org/blog/what-potential-impact-climate-change-africas-farmers>

(re-post) International Food Policy Research Institute (IFPRI). 2013. New study models where agriculture is heading under climate change. <http://ccafs.cgiar.org/blog/new-study-models-where-agriculture-heading-under-climate-change>

(re-post) AgMIP website. 2014 (it refers to a 2013 activity) Agriculture and climate models under scrutiny: why are they not coming together?. <http://ccafs.cgiar.org/research-highlight/agriculture-models-under-scrutiny-why-are-they-not-coming-together#.UwQG0vldWAg>

CCAFS East Africa Team. 2013. Agriculture in focus: climate change planning in Kenya. <http://ccafs.cgiar.org/blog/agriculture-focus-climate-change-planning-kenya>

#### Websites:

None

#### Social media campaigns:

IFPRI & CCAFS Social Media campaign related to the release of the Kenya chapter in the "East African Agriculture and Climate Change" book. September/October. Blog: Meadu V. 2013. Based on what we know, can Kenya plan its climate future? <http://ccafs.cgiar.org/research-highlight/based-what-we-know-can-kenya-plan-its-climate-future>

Three social media campaigns were organised by IFPRI upon the release of the "African Agriculture and Climate Change: 3-volume series (around the three regional launch events described in the events section), as well as upon the release of the paper "Climate change effects on agriculture: Economic responses to biophysical shocks", Nelson et al., in a special Inter-Sectoral Impact Model Intercomparison Project (ISI-MIP) feature of the Proceedings of the National Academy of Sciences of the United States of America, in December 2013.

#### Newsletters:

None

#### Events:

"West African Agriculture and Climate Change: A Comprehensive Analysis" Book. Launched at the "Regional Workshop to Mainstream Climate Change in the West Africa Agricultural Productivity Programme," organized by CORAF/WECARD., April 2, Niamey, Niger. Press conference organised.

Global Futures for Agriculture: Phase I Final Workshop & Policies, Institutions and Markets (PIM) Strategic Foresight Priority-Setting activity 1st Technical Meeting. <http://www.ifpri.org/book-751/node/9400>

"Southern African Agriculture and Climate Change: A Comprehensive Analysis" Book. Launched at the FANRPAN High-Level Food Security Multi-Stakeholder Policy Dialogue, September 3, Maseru, Lesotho.

East Africa Event in September 2013: National Adaptation Planning event for Agriculture, based on the release of the IFPRI-led East African Climate Change and Agriculture book: <http://ccafs.cgiar.org/national-adaptation-planning-event-agriculture>

Session at the Global Landscapes Forum (GLF), COP-19, 16 November 2013. The Technical and Networking session "The good, the bad and the ugly: Climate change's potential impact on farmers in Africa" co-organised by IFPRI and CCAFS, and presented the "African Agriculture and Climate Change" book series. A booth and a press conference were also organised. [http://www.landscapes.org/agenda-item/day-1-nov-16-2/technical-networking-sessions/technical-networking-sessions-slot-2/good-bad-ugly-climate-changes-potential-impact-farmers-africa/#.UwQR2\\_lWAg](http://www.landscapes.org/agenda-item/day-1-nov-16-2/technical-networking-sessions/technical-networking-sessions-slot-2/good-bad-ugly-climate-changes-potential-impact-farmers-africa/#.UwQR2_lWAg)

Rosegrant, Mark C. and Timothy S. Thomas. 2013. "Climate Change Impact on Key Crops in Africa: Using Crop And Economic Models to Bound the Predictions", presentation at FAO workshop in November in Rome.

"East African Agriculture and Climate Change: A Comprehensive Analysis" Book. Launched at the 2nd Association for Strengthening Agricultural Research in Eastern and Central Africa General Assembly and Scientific Conference, December 9, Bujumbura, Burundi

#### Videos and other multimedia:

Infographics: Three new books about African Agriculture and Climate change. <http://www.ifpri.org/publication/three-new-books-about-climate-change-and-african-agriculture>

#### Other communications and outreach:

IFPRI. 2013. [Press Release] Countries in West Africa Must Add Climate Change Adaptation to Food Security Investments. <http://www.ifpri.org/pressrelease/countries-west-africa-must-add-climate-change-adaptation-food-security-investments>

IFPRI. 2013. [Blog] Coping with Climate Change in West Africa. <http://www.ifpri.org/blog/coping-climate-change-west-africa>

IFPRI. 2013. [Press Release] Climate Change and Agriculture in Southern Africa <http://www.ifpri.org/pressrelease/climate-change-and-agriculture-southern-africa>

IFPRI. 2013. [Blog] Climate Change and Agriculture in Southern Africa. <http://www.ifpri.org/blog/climate-change-and-agriculture-southern-africa>

(re-post) Meadu V. 2013. Based on what we know, can Kenya plan its climate future? <http://www.ifpri.org/blog/based-what-we-know-can-kenya-plan-its-climate-future>

James Kinyangi, Timothy Thomas and Michael Waithaka. 2013. [Blog] Climate change needs new farming plans. Business Daily.  
<http://www.businessdailyafrica.com/Opinion+and+Analysis/Climate+change+needs+new+farming+plans/-/539548/1995034/-/rta2gz/-/index.html>

Timothy S. Thomas. 2013. "Dark Clouds or Silver Linings? How Climate Change Will Affect Agriculture in Southern Africa", Food Tank, October 7. <http://foodtank.org/news/2013/10/dark-clouds-or-silver-linings-how-climate-change-will-affect-agriculture-in>

(re-post) L. Holt. 2013. The Good, the Bad and the Ugly. <http://www.ifpri.org/blog/good-bad-and-ugly>, <http://www.landscapes.org/good-bad-ugly/#.UwQSMPldWAg>

(re-post) Tun N. 2013. What is the Potential Impact from Climate Change for Africa's Farmers? <http://www.ifpri.org/blog/what-potential-impact-climate-change-africas-farmers>  
<http://blog.cifor.org/20654/landscapes-approach-could-alleviate-west-africa-climate-change-woes-scientists#.UwYjJvldWai>

IFPRI Event: Climate Change and Agriculture in East Africa. <http://www.ifpri.org/pressrelease/climate-change-and-agriculture-east-africa>

IFPRI. 2013. [Press Release] Major economic models on climate change and agriculture point in same direction, but differ on magnitude of effects. <http://www.ifpri.org/pressrelease/major-economic-models-climate-change-and-agriculture-point-same-direction-differ-magnit>

## 5. Case studies

### Case Study #1

**Title:**

Informing Policy Makers in Ghana on the Risks of Climate Change to Agriculture and Food Systems

**Author:** Tim Thomas, Vijay Nazareth, Ioannis Vasileiou**Type:** Policy engagement, Food security**Project description:**

In 2013, IFPRI published a 3-volume series, on African Agriculture and Climate Change, in partnership with three regional institutes CORAF, ASARECA, and FANRPAN, under the umbrella of CCAFS and co-funded by BMZ. Part of this work, the West Africa volume, focuses on 11 of the countries, including Ghana, and explores how climate change will increase the efforts needed to achieve sustainable food security. The Research Monograph was regionally launched and discussed at the “Regional Workshop to Mainstream Climate Change in the West Africa Agricultural Productivity Programme,” organized by CORAF/WECARD, in April 2013, in Niamey, Niger. IFPRI in collaboration with CCAFS, followed up with a comprehensive communications campaign through various fora, with the intention to make the research results broadly available to policymakers, the research community, donors and development practitioners. In alliance with this process, CCAFS West Africa Regional Leader participated in a high level meeting of parliamentarians and policymakers in Ghana on January 29, 2014, which was organized to discuss the impact of climate change and the long-term climate risks for agriculture and food security in the country. Convened by the Council for Scientific and Industrial Research (CSIR) and the Ministry of Food and Agriculture (MoFA), on behalf of the Ghana Climate Change, Agriculture and Food security Platform, the meeting brought together more than 80 participants including two ministers, seven members of parliament and chief directors from the ministries of agriculture and the environment, the Ghana Meteorological Agency and Council for Scientific and Industrial Research. The meeting began with participants receiving a copy of the book, followed by technical presentations and a stakeholders’ discussion on the research outputs, and resulted in a commitment on behalf of all participating parliamentarians to support the effective mainstreaming of climate change into agricultural investments initiatives in Ghana.

**Introduction / objectives:**

The organizers of the Ghana meeting had two key objectives: a) To make parliamentarians and high-level policy makers aware of the vulnerability of Ghana's agriculture and food systems to climate change, and b) To advocate for policy and budgetary support for action to adapt Ghana's agriculture and food systems to climate change.

**Project results:**

Through various presentations and dialogue among the participating stakeholders, the meeting resulted in a comprehensive overview of the impacts of climate change on Ghana’s agriculture, water resources and fisheries, and the role of national research in climate-change adaptation and mitigation initiatives. Furthermore, concrete

solutions, suggested by the research community to address the adverse effects of climate change on Ghana agriculture and its economy, were also discussed. Following the meeting, the Chair of the Parliamentary Select Committee on the Environment put out a "Statement of Commitment" on behalf of attending parliamentarians, to support the effective mainstreaming of climate change into agricultural investment initiatives in Ghana, including support for research on climate-smart agriculture (CSA) to benefit the most vulnerable populations. The five key points in the statement were as follows: a) Improve the resilience of the agriculture and food security sectors for CSA and capacity strengthening of extension services to promote CSA options. b) Support for programs and projects that mitigate the risks of climate change and disasters caused by climate extremes. c) Mobilize funds and set up institutions for investment in climate change adaptation. d) Work with policy makers to mainstream climate change through implementation of appropriate policies and plans. e) Support the Ghana Climate Change, Agriculture, and Food Security Platform to promote interaction and synergies among national institutions for informed decision making relating to adaptation of agriculture to climate change.

### Partners:

Under the CCAFS umbrella, IFPRI partnered with the West and Central African Council for Agricultural Research and Development (CORAF/WECARD), several CGIAR centers as well as local institutions, to develop, launch, and disseminate the "West African Agricu

### Links/sources for further information:

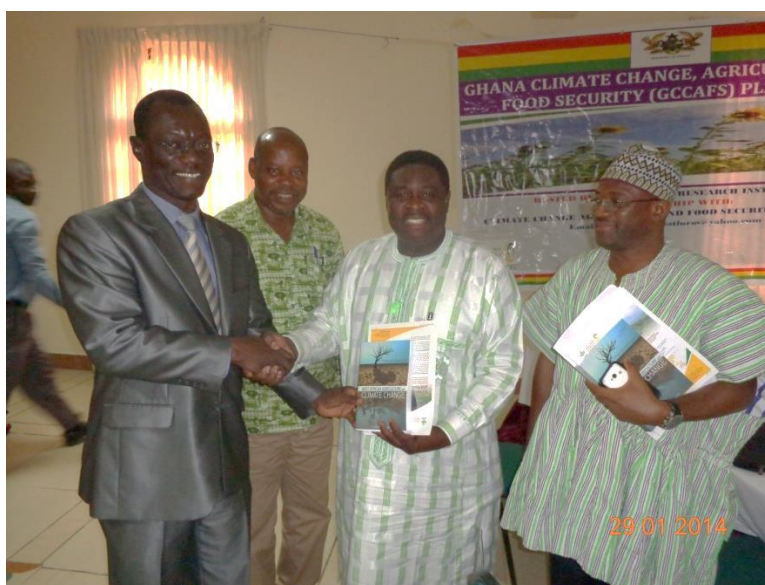
Robert Zougmore. 2013. [Blog] "Climate Smart Agriculture Integrated into Decision-Making in Ghana"

<http://ccafs.cgiar.org/blog/climate-smart-agriculture-integrated-decision-making-ghana#.UvuVTvldUqY>

<http://www.ifpri.org/publication/west-african-agriculture-and-climate-change>

<http://www.ifpri.org/publication/west-african-agriculture-and-climate-change-ghana>

<http://www.ifpri.org/sites/default/files/publications/rr178ch06.pdf>





## Case Study #2

### Title:

How Monograph on West African Agriculture and Climate Change is helping with the development of Climate-Smart Agricultural Policy in Nigeria

**Author:** Tim Thomas, Vijay Nazareth, Ioannis Vasileiou

**Type:** Policy engagement, Food security

### Project description:

The research monograph "West African Agriculture and Climate Change: A Comprehensive Analysis", by IFPRI, coordinated under the CCAFS umbrella and co-funded by BMZ, was developed with the intention to provide policymakers, researchers, donors, and development practitioners with quantitative measures for the impact of climate change on agriculture in the region, and to suggest policy solutions to deal with the predicted outcomes. The work was initially launched at the "Regional Workshop to Mainstream Climate Change in the West Africa Agricultural Productivity Programme," organized by the West and Central African Council for Agricultural Research and Development (CORAF/WECARD) in Niamey, Niger in April 2013. CCAFS has been invited and is currently participating on an advisory role in the Advisory Committee on Agricultural Resilience in Nigeria (ACARN). Under this context, a copy of the monograph has been shared with the Ministry of Agriculture & Rural Development in Nigeria, to serve as a useful source of information towards the ministry's work to build resilience in the country's agricultural sector through developing a policy framework for climate-smart agriculture. The report by the Advisory Committee on Agricultural Resilience in Nigeria (ACARN) is expected to be released by April 2014.

### Introduction / objectives:

The research monograph on West African Agriculture and Climate Change examines the food security threats facing 11 of the countries in the region, including Nigeria, and explores how climate change will increase the efforts needed to achieve sustainable food security. In order to draw better attention to the main conclusions of the monograph, CCAFS engaged with key national, regional and global stakeholders, in various sorts of events and processes. Under this framework, copies of the monograph were provided to the Nigerian government by CCAFS in September 2013 to help ACARN develop a Climate-Smart Agriculture (CSA) policy for Nigeria.

### Project results:

The conclusions in the research monograph are currently being informally reviewed, upon the provision of the monograph to several ACARN committee members. The outcome from the use of the monograph, in terms of how it helped influence the development of climate-smart agricultural policies in Nigeria, will become clearer when ACARN publishes its report due out before April 2014. However, the fact ACARN contacted CCAFS to help develop policies on climate-smart agriculture, and that a copy of the monograph was provided and discussed with ACARN and the Head of the Ministry for Agriculture & Rural Development, Dr. Akinwumi Adesina, has paved the way towards consideration of key conclusions of this project into the formulation of Nigeria's national CSA policy. The case study and outcomes will be updated once the ACARN report is published.

**Partners:**

Under the CCAFS umbrella, IFPRI partnered with the West and Central African Council for Agricultural Research and Development (CORAF/WECARD), several CGIAR centers as well as local institutions, to develop, launch, translate and disseminate the "West Afri

**Links/sources for further information:**

<http://www.ifpri.org/publication/west-african-agriculture-and-climate-change>

<http://www.ifpri.org/publication/west-african-agriculture-and-climate-change-nigeria>

### Case Study #3

**Title:**

Global Futures for Agriculture: Towards a community of practice in evaluating promising technologies, investments, and policy reforms

**Author:** Ioannis Vasileiou

**Type:** Inter-center collaboration, Breakthrough science, Food security

**Project description:**

The CGIAR project Global Futures for Agriculture is designed to provide tools to use limited resources more efficiently to support agricultural productivity and environmental sustainability in developing countries. It is focused on evaluating promising technologies, investments, and policy reforms. One of the most interesting features is the development and evaluation of virtual crops. The virtual crops are being tested under a set of drivers, including climate change scenarios. To achieve its goals, the project is enhancing IFPRI's International Model for Policy Analysis of Agricultural Commodities and Trade (IMPACT), a suite of state-of-the-art economic models that can not only generate scenarios of future production, consumption and trade of key agricultural commodities, but also assess the effects of climate change, water availability and other major trends. Improvements to the IMPACT model make it possible to more effectively evaluate potential research expenditures and their impact on the world's most important crops, forests, and livestock. Research activities assess how changes in global trading regimes, mandates for biofuels and energy prices, land degradation and climate change affect human well-being. Project tools will make it easier to see how these trends affect developing countries' progress towards achieving the Millennium Development Goals of reducing hunger, malnutrition, and poverty. The analysis improves on previous research by incorporating the following: detailed location-specific data; climate, soil type, crop variety, and other critical variables; detailed models of crop, hydrology, and water supply and demand; improved measurement of effects on human welfare; and the impact of potential agricultural investments on economic growth, incomes, and poverty alleviation.



### Introduction / objectives:

Under Global Futures Phase 1 (2009-2013), a unique community of practice between several (7) CGIAR centers was created, including economists, crop modelers, breeders and physiologists. The community focuses on global foresight and scenario analysis. A large-scale investment in building center-based capacity, as well as developing cross-cutting methodologies to incorporate promising technologies into the IMPACT framework, took place. Several donors, including BMGF, have renewed their support towards a Phase 2, which intends to expand the work with three new CGIAR centers, and make key research outputs available to a large group of key stakeholders.

### Project results:

Phase 1 of the Global Futures project has demonstrated the importance of a system of rigorous quantitative multi-disciplinary analysis in evaluating the impacts of prospective future technologies on yields, production, prices, trade and consumption of key agricultural commodities in the context of climate change and other key drivers of change. Bringing together the expertise of biophysical scientists and economic modelers allows improved understanding of long-term challenges and opportunities in agriculture and food security at a variety of scales, and helps inform priority setting for scarce investment resources. A key output of Phase 1 includes major re-developments of IFPRI's International Model for Policy Analysis of Agricultural Commodities and Trade (IMPACT). The project has been focusing on the following crops: rice, cassava, beans, wheat, maize, groundnut, sorghum, pearl millet, chickpea, pigeonpea, potato and sweet potato, as well as livestock. Highlights of the work include the following: ILRI, in collaboration with scientists at IIASA, completed a review of the productivity potential of global livestock production systems, and prepared detailed assessments of global datasets on livestock numbers, productivity, and livestock-related greenhouse gas emissions. In addition, a stand-alone livestock module was developed, that models the demand and supply relationships characterizing the livestock sector. IIRI completed a milestone study on "Opportunities for Global Rice Research in a Changing World", while it has also been working on ex ante assessment of several promising new rice varieties, with a focus on climate change, including in South Asia. CIMMYT has also tested scenarios for drought and heat tolerant wheat and maize varieties and technologies. Finally, ICRISAT has identified and prioritized key promising technologies for sorghum, pearl millet, groundnut, chickpea, and pigeonpea, after discussion with breeders, physiologist, crop modelers, and economists, while several modeling exercises have taken place.

### Partners:

Bill & Melinda Gates Foundation  
CIAT - International Center for Tropical Agriculture  
CIMMYT – International Maize and Wheat Improvement Center  
CIP – International Potato Center  
ICARDA- International Center for Agricultural Research in the Dry Areas  
ICRISAT – I

### Links/sources for further information:

<http://globalfuturesproject.org/>

<http://ccafs.cgiar.org/es/global-futures-agriculture>

Global Futures for Agriculture: Phase I Final Workshop & Policies, Institutions and Markets (PIM) Strategic Foresight Priority-Setting activity 1st Technical Meeting. <http://www.ifpri.org/book-751/node/9400>



## 6. Outcomes

### Outcomes #1

#### Title:

African Agriculture and Climate Change Series

#### What is the outcome of the research (i.e. use of research results by non-research partners)?

The intended use of the 3-series research monographs on African Agriculture and Climate Change in West, East and Southern Africa was to assist policymakers, researchers, NGOs and donors to better understand the food security threats facing the countries that make up the three regions, as well as how climate change will increase the requirements for achieving sustainable food security throughout the region. Moreover, it was the intention of the project to help policymakers further understand the uncertainties surrounding climate change effects in their countries, and to give national- and regional-level guidance with implications for a range of policy decisions, such as investments in the development of new plant and animal varieties, water management strategies, the role of regional trade policies, and many more policy areas. Since only one of the books (on West Africa) was launched in the first quarter of 2013, whereas the other two in the second half of the year, we are expecting to further document outcomes in the upcoming months of 2014 and onwards. For this reason, Theme 4.3 has been implementing three sets of online policy surveys, targeting the first phase participants of the regional fora, where the books were launched, together with some other key stakeholders (as identified by the three regional contact points and the two CCAFS Africa regional leaders). The project will also be the focus of an impact assessment study commissioned by Theme 4.3 in 2014. Consequently, a complete set of outcomes is expected to be published, possibly in a form of a policy brief, in 2014 or early 2015. The West and East Africa CCAFS Regional Leaders, as well as CCAFS Head of Research, have advised us of the following outcomes from the use of the book and monograph in the region. a) The IFAD country portfolio manager for Niger used the monograph to develop the ASAP (A Self Help Assistance Program) for Niger, with a budget of \$ 13M. It has been further used to design training in climate change and sustainable development in the Regional AGRHYMET. Finally, it has enabled country staff to complete the integration of climate change dimension in a communal development strategy (a guide available and used for updating the Plan of Development of the communal area of intervention, IFAD) b) Hub-rural (<http://www.hubrural.org/>), an ECOWAS technical support body, that provides advisory support on issues related to rural development and food security, used the book to set up the West African alliance for climate-smart agriculture. c) Several policy makers and parliamentarians recently received the book at a seminar sponsored by CCAFS on the risks of climate change to agriculture and food systems in Ghana. Technical presentations on key conclusions of the project and a subsequent tailored discussion among national stakeholders, contributed to the adoption of a statement to support climate-smart agricultural policies and practices in Ghana, which took into consideration several of the conclusions included in the Ghana chapter of the project. d) A special edition of the Kenya chapter was used in a high-level event coordinated by CCAFS, to positively inform the Kenya government's climate change policy. e) The West African book has been used by the Advisory Committee on Agricultural Resilience (ACARN) in Nigeria, as a source of information to develop a Climate-Smart Agriculture (CSA) policy for Nigeria. Other Outcomes1. We have worked with three regional organizations (CORAF, ASARECA, and FANRPAN), who now use our results, and with 29

national programs (associated with the countries in the regional monographs)<sup>2</sup>. The country-based chapter on Liberia was authored by Mr. Benjamin S. Karmorh, Jr., the Coordinator on Climate Change Enabling Activities at the Environmental Protection Agency of Liberia and Climate Change Lead Negotiator for the Liberian Delegation at the UN Climate Change Conference in Warsaw, Poland, in November 2013. Mr. Karmorh has provided the Ministry of Agriculture (MOA) with a set of various policy recommendations towards enhanced food security, given the implications of climate change in Liberia <http://allafrica.com/stories/201312110367.html?viewall=13>. Parliamentarians in Nigeria used the information provided in the West Africa Book, particularly the Nigeria Chapter, to influence budget policy discussions in the national parliament. The case was documented by a national newspaper.<sup>4</sup> Swaziland is in the process of developing a national climate change strategy and action plan (NCCSAP). The lead author for the Swaziland chapter included in the Southern Africa monograph also leads the team that is preparing the NCCSAP. As part of the process of developing the NCCSAP, several consultative workshops were held with stakeholders. During the consultative workshops, a situation analysis of climate change and climate change issues was presented. The comprehensive analysis that is reported in the monograph was used for the situation analysis. The recommendations presented in the monograph formed part of strategic objectives of the NCCSAP.

### What outputs produced in the three preceding years resulted in this outcome?

Three research monographs/ books, on African Agriculture and Climate Change, focusing on three different regions (West, East and Southern Africa), together with a multi-scale communications strategy, which involved three regional policy issue briefs, country policy summaries, launching events at national, regional and global fora, as well as traditional and social media campaigns, organised by IFPRI and CCAFS, have been resulting in the ongoing outcome stories for this project. The project outputs have helped to provide the information that policymakers need towards a better understanding of the uncertainties surrounding climate change effects on agricultural productivity and food security in their countries. The project outputs have also provided a set of policy options for targeted intervention at national- and regional-level. The project used computer software that models plant performance based on weather and management practices to assess the range of yield changes that climate change might bring. As agriculture does not operate in a vacuum, but is embedded in the economy of individual countries, and, as such, in regional and global economies, the project also factored in other important drivers of economic performance—population growth, income growth, and agricultural productivity improvements—to assess the range of potential outcomes of interest to policymakers and interest groups. Several publications and activities supported the launch of the 3-book series:- Three issue Briefs were published, one for each regional monograph in the series.- Twenty-nine country summaries were written.- Two op-eds were published to draw attention to the main conclusions of the monographs, around the COP-18.- In December 2012, FANRPAN sponsored a technical session at Agriculture, Landscapes, and Livelihoods Day, a side-event during the COP-18 UNFCCC negotiations in Doha. The session featured presentations for the three lead authors from the series.- In November 2013, IFPRI sponsored a technical session entitled "The Good, The Bad, and The Ugly: Climate Change's Potential Impact on Farmers in Africa" at the Global Landscapes Forum, a side-event for the COP-19 UNFCCC negotiations in Warsaw, Poland. - In November 2013, a presentation of a summary of the analysis was given to FAO, which is to become a chapter in a forthcoming book- Launch of "West African Agriculture and Climate Change" at the "Regional Workshop to Mainstream Climate Change in the West Africa Agricultural Productivity Programme," organized by CORAF/WECARD, April 2, Niamey, Niger. -

Launch of "Southern African Agriculture and Climate Change" in Maseru, Lesotho in September 2013, at the FANRPAN High-Level Food Security Multi-Stakeholder Policy Dialogue.- Publication of the special edition Kenya chapter in September 2013 to support initiatives by CCAFS in the East Africa region.- Launch of "East African Agriculture and Climate Change" in Bujumbura, Burundi in December 2013 at ASARECA's Second Annual General Assembly. The meeting was attended by several African Ministers of Agriculture. -Some of Kenya's most capable scientists and key policy makers participated in consultations (having been informed of the key project conclusions for Kenya), towards building consensus on the priority actions for agriculture proposed in the National Climate Change Action Plan (NCCAP). Government ministries (Ministry of Environment, Water and Natural Resources, Agriculture), private sector, non-governmental organizations, academia, donor agencies, national and international agricultural research institutions and farmers, as well as the parliamentary departmental committee on environment and natural resources, were all represented in the meeting.

### What partners helped in producing the outcome?

IFPRI, as the coordinating center, partnered with several local and regional organizations to produce the outcomes. These organizations included the West and Central African Council for Agricultural Research and Development (CORAF/WECARD) in West Africa, Food, Agriculture and Natural Resources Policy Analysis Network (FANRPAN) in Southern Africa, and Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA) in East Africa, all of which served as the key three regional contact points since the inception of the project. Furthermore, IFPRI and Theme 4.3 partnered with the following institutions, which mainly served as sources for authors for country chapters of the research monographs, as well as dissemination potential contact points within countries:

**Southern Africa:** University of Illinois at Urbana-Champaign International Institute for Applied Systems Energy and Environment and Climate Change Research Center, Botswana National University of Lesotho, Department of Environmental Health Natural Resources and Environment Center, Chancellor College, University of Malawi The World Bank Eduardo Mondlane University, Faculty of Sciences - Dept of Physics Climate Systems Analysis Group, Dept Env & Geog Science, University of Cape Town Horticulture Department, Faculty of Agriculture, University of Swaziland Zambia Meteorological department Director of Research and Resource Mobilisation, Chinhoyi University of Technology, Zimbabwe

**East Africa:** Ethiopian Institute of Agricultural Research, Melkassa Agricultural Research Center Rwanda Environmental Management Authority Hamelmalo Agricultural College, Eritrea Développement Transformationnel des Communautés (DTC) College of Agricultural and Environmental Sciences (CAES), Makerere University, Uganda Hamelmalo Agricultural College, Eritrea Ethiopian Institute of Agricultural Research The Bureau of Academic Standards and Evaluation of the National Board for Higher Education, Eritrea Food security Department of the Ministry of Agriculture, Food Security and Cooperatives, Tanzania Association for Strengthening Agricultural Research in Eastern and Central Africa, Entebbe, Uganda Faculty of Agronomics Sciences of the University of Kinshasa, DRC Farming Support International (FASI) Limited Hamelmalo Agricultural College, Eritrea International Institute for Applied Systems Analysis Agricultural Economics and Policy Research Center, Sudan Agrometeorology Research and Extensions Program, Rwanda Agricultural Board Ministère de l'Agriculture, Madagascar Association for Strengthening Agricultural Research in Eastern and Central Africa, Uganda West Africa National Polytechnic Institutes, Cote d'Ivoire Université de Parakou (UP), Benin Ministry of Agriculture, Republic of Guinea, Conakry, Guinea Bureau d'Études, de Formation, et d'Appui-conseil à la Réduction de la Pauvreté (BEFACREP), Niger Department of Geography and Environmental Management, University of Abuja, Nigeria Nigerian Institute for Oil Palm



Research, Benin City, Nigeria Institute of Marine Biology and Oceanography, University of Sierra Leone Sierra Leone Agricultural Research Institute (SLARI) Sierra Leone Climate Change, Environmental Protection Agency of Liberia (EPA), Liberia Ingénieur agronome, Senegal Faculté des Sciences et Techniques (FAST), Université d'Abomey-Calavi (UAC), Benin Environment and Land Management Division, Ministry of Food and Agriculture, Ghana International Institute for Applied Systems Analysis Ingénieur Agronome, Ministère de l'Environnement et des Ressources Forestières, Direction de l'Environnement, Togo Siège Social; Immeuble UNC Niger Other partners include: 1. Center for International Forestry Research (CIFOR), which co-organised the Global Landscapes Forum in 2013. 2. East and West Africa Regional Leaders. Particularly, the East Africa Regional Leader organised a key National Adaptation Planning Meeting in Kenya, in September 2013, where the Kenya Chapter was launched and discussed. Moreover, the West Regional Leader represented the project during a high level policy dialogue in Ghana, in January 2014. 3. Advisory Committee on Agricultural Resilience in Nigeria (ACARN)

### Who used the output?

The output was used by policy makers at various levels of national, regional and international administrations, researchers, country portfolio managers, and NGO's. As part of the above-mentioned policy survey process, we will be able to document end-users with much greater detail, once the surveys have been processed in 2014.

### How was the output used?

The related information has been captured in the first question. As a summary, some key points on how the outputs were used, include the following: -Parliamentarians and policy makers in Ghana used the book to produce a statement/commitment on policies and practices to address the impact of climate change on agriculture and food systems. -The launch of the Kenya chapter at an event sponsored by CCAFS was attended by high level government officials, who discussed project conclusions towards building a consensus on the priority actions for agriculture proposed in the National Climate Change Action Plan (NCCAP). -Information obtained by the regional director of CCAFS suggests that the book was used to support formulation of climate smart agriculture policies in Niger and other countries in West Africa. -The Advisory Committee on Agricultural Resilience (ACARN) in Nigeria has been using the West Africa book as a source of information to develop a Climate-Smart Agriculture (CSA) policy for Nigeria. Parliamentarians in the same country have been using the information to influence budget policy decisions. -Swaziland has been using the country chapter of the West Africa monograph in the process of developing a national climate change strategy and action plan (NCCSAP). -CORAF, ASARECA, and FANRPAN now use our results with about 30 national programs (the countries in the regional monographs) Under this context, it is also important to document the impressive web metrics associated with some of the key publications of the project, as well as the pick-up by traditional and stakeholder media, which have been both contributing to further influence outcomes between recipients. West African Agriculture and Climate Change: Book and Issue brief Web metrics Downloads from IFPRI.org

- Total downloads of whole book plus individual chapters: 20,920
- Total downloads of just the whole book: 5,843
- Total downloads of just the issue brief: 657
- English press release: 576
- French press release: 592 Unique page views on IFPRI.org

- Publication landing page: 6,993 people viewed the page
- Issue brief landing page: 890 people viewed the page
- Press briefing page on IFPRI.org (the page we advertised to journalists): 1,181 people viewed this page
- Press release landing page: 533 people viewed the page
- Blog post by Jerry Nelson: 762 people read the blog post Traditional and Stakeholder Media
- There were 27 stories in traditional and stakeholder media outlets in publications covering Nigeria, USA, Niger, Africa, Senegal, Algeria, France, Ghana, Togo, and international issues. The book was also mentioned in 8 stories in donor and stakeholder outlets, including Médiaterre, CIFOR Forests News blog, United States Department of State, Climate Change Policy & Practice, Le Sahel, New Security Beat, Rural 21: The Intl Journal of Rural Development. Southern African Agriculture and Climate Change: Book and Issue brief Web metrics Downloads from IFPRI.org
- Total downloads of whole book plus individual chapters: 6,010
- Total downloads of just the whole book: 1,514
- Total downloads of just the issue brief: 731
- English press release: 271 Unique pageviews on IFPRI.org
- Publication landing page: 2,074 people viewed the page
- Issue brief landing page: 294 people viewed the page
- Press briefing page on IFPRI.org (the page we advertised to journalists): 491 people viewed this page
- Blog post: 581 people read the blog post Traditional and Stakeholder Media
- There were 12 stories in traditional and stakeholder media outlets in publications covering Ethiopia, India, Africa and international issues. These include stakeholder-donor newsletter mention in CCAFS News and GFAR News.
- Op-ed by on FoodTank for the Southern Africa book: <http://foodtank.com/news/2013/10/dark-clouds-or-silver-linings-how-climate-change-will-affect-agriculture-in-kenya> Chapter Web metrics Downloads from IFPRI.org
- Total downloads of the individual chapter: 887
- English press release: 206 Unique pageviews on IFPRI.org
- Press release landing page on IFPRI.org: 279 people viewed this page
- Blog story cross posted from CCAFS site: 214 people read the blog post Traditional and Stakeholder Media
- There were 13 stories in traditional and stakeholder media outlets in publications in France, Ghana, Niger, Nigeria, Senegal, Togo, and international media outlets. The book was also mentioned in 7 stories in donor and stakeholder outlets, including AgriFeeds, DFID News, and the U.S. State Department website. East African Agriculture and Climate Change: Book and Issue brief Web metrics Downloads from IFPRI.org
- Total downloads of whole book plus individual chapters: 3,334
- Total downloads of just the whole book: 1,210
- Total downloads of just the issue brief: 1,433
- English press release: 216
- French press release: 114 Unique pageviews on IFPRI.org
- Publication landing page: 1,414 people viewed the page
- Issue brief landing page: 1,755 people viewed the page
- Press briefing page on IFPRI.org (the page we advertised to journalists): 515 people viewed this page
- Press release landing page: 296 people viewed the press release Traditional and Stakeholder Media

- There were 35 stories in traditional and stakeholder media outlets in publications covering Kenya, East Africa, Tanzania, Africa, India, Uganda, UK, USA, and international media outlets. The book was also mentioned in 8 stories in donor and stakeholder outlets, including Food Tank: The Food Think Tank, Meridian Institute, GFAR News, Inter-réseaux (Development Rural), Médiaterre, New Agriculturist, PAAP Newsletter, and PreventionWeb..

**What is the evidence for this outcome? Specifically, what kind of study was conducted to show the connection between the research and the outcome? Who conducted it? Please provide a reference or source.**

As mentioned above, since the beginning of 2014 theme 4.3 has been conducting three sets of online policy surveys, targeting at the first phase participants of the regional fora, where the books were launched, together with others key stakeholders. The project will be also the focus of an impact assessment study commissioned by Theme 4.3 in 2014. Comprehensive results from both studies will be published towards the end of 2014, or early in 2015. The use of the book in high level policy making meetings in Ghana and Kenya, as well the use of the book in Nigeria, are examples of outcome-related case studies that have been documented by CCAFS (Regional Leaders and the Head of Research). Our regional contact points (CORAF, ASARECA, FANRPAN) for the project have also informed us that they have been using the information to develop many of their programs at national level. More mature outcomes, are expected to be documented in the upcoming period, as some of these meetings result in an explicit integration of project outputs in formal policy documents etc. For the first two countries, the results have been documented in blog stories, published by CCAFS and partners, all listed in the communications section of the report. The use of the Swaziland chapter in developing the national climate change strategy and action plan (NCCSAP) for the country has been reported by the country author of the chapter, who also leads the relevant national process. We are also in the process of collecting anecdotal stories from partners.



## 7. Outcome indicators

### Outcome indicator #1

#### Outcome indicator:

Agriculture mainstreamed into the global climate change policies, and major international food security initiatives fully incorporate climate change concerns

#### Achievements:

Theme 4.3 was the team leader for the "Food Security and Climate Change" report, published by the High Level Panel of Experts (HLPE) on food security and nutrition, Committee on World Food Security (CFS), FAO. The report has incorporated key research outcomes, of previous CCAFS work. Although launched in 2012, there has been a significant uptake in several international processes in 2013, which is expected to continue in 2014. This has the potential to influence national policies and programs for all countries, and the decisions of the UNFCCC.

#### Evidence:

<http://www.fao.org/cfs/cfs-hlpe/reports/hlpe-food-security-and-climate-change-report-elaboration-process/en/>The impact of the project will be the focus of an impact assessment study, organised by theme 4.3 in 2014.

### Outcome indicator #2

#### Outcome indicator:

Global database and set of tools for climate-smart agriculture established and used by key international and regional agencies

#### Achievements:

The International Model for Policy Analysis of Agricultural Commodities and Trade (IMPACT) available and used by stakeholders. IMPACT has been redesigned and improved to meet the demands of model users and collaborators. A variety of capacity building in how to use our tools with gender mixed participants and large regional coverage has been conducted, and now trainees from various organizations are expected to be using the model in their operations :1.The new version of the model is being used by the OECD, Agriculture and Fisheries Division, for reports on climate change and agriculture.2. As part of the CCAFS Low Emissions Development Strategy project, coordinated by IFPRI, several staff of the following agencies have been trained, and are now expected to be using IMPACT in their operations:-The Department of Agricultural Extension, Government of Bangladesh-Bangladesh Rice Research Institute-Soil Resource Development Institute (SRDI), Ministry of Agriculture, Government of Bangladesh-Bangladesh Centre for Advanced Studies (BCAS)-Subdirección de Desarrollo Ambiental Sostenible, National Planning Department (DNP), Government of Colombia-Institute for Agricultural Environment (IAE), Vietnam National Institute of Agricultural Planning and

Projection (NIAPP), Vietnam-International Department, National Academy of Public Administration, Vietnam<sup>3</sup>. Theme 4.3 has been collaborating with the Food, Agriculture and Natural Resources Policy Analysis Network (FANRPAN) and WorldVision, to develop a training program, that has initially targeted several university students from Lesotho, Swaziland, and South Africa, who have now been trained, and are now expected to be using IMPACT in their operations.

#### **Evidence:**

Training programs have been taken place, coordinated by CCACFS. Electronic correspondence with participants has documented some of the outcomes.

### **Outcome indicator #3**

#### **Outcome indicator:**

New knowledge on how alternative policy and program options impact agriculture and food security under climate change incorporated into strategy development by at least 3 national agencies, and 3 key international and regional agencies

#### **Achievements:**

a. Achievements associated with the use of three Regional African Agriculture and Climate Change Research Monographs into strategy development at national level and regional level by various organizations (documented also under "4.3 Outcomes")

1. Three regional organizations; the West and Central African Council for Agricultural Research and Development (CORAF/WE CARD), the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA), and the Food, Agriculture and Natural Resources Policy Analysis Network (FANRPAN) are now being using our results within some 29 national programs (the countries in the three regional monographs on African agriculture and Climate Change).

2. The IFAD country portfolio manager for Niger has used the monograph to develop the ASAP (A Self Help Assistance Program) for Niger, with a budget of \$ 13M. It has been further used to design training in climate change and sustainable development in the Regional AGRHYMET. Finally, it has enabled country staff to complete the integration of climate change dimension in a communal development strategy (a guide available and used for updating the Plan of Development of the communal area of intervention, IFAD)

3. Hub-rural (<http://www.hubrural.org/>), an ECOWAS technical support body, that provides advisory support on issues related to rural development and food security, has used the book to set up the West African Alliance for Climate-Smart Agriculture.

4. In Ghana, the Council for Scientific and Industrial Research (CSIR), and the Environment Unit of the Ministry of Food and Agriculture (MoFA), on behalf of the Ghana climate change, agriculture and food security platform, have been integrated key conclusions of the Ghana chapter, in a parliamentary adoption of a statement to support climate-smart agricultural policies and practices.

5. The West African book has been used by the Advisory Committee on Agricultural Resilience (ACARN) in

Nigeria, as a source of information to develop a Climate-Smart Agriculture (CSA) policy for Nigeria.

6. The country-based chapter on Liberia was authored by Mr. Benjamin S. Karmorh, Jr., the Coordinator on Climate Change Enabling Activities at the Environmental Protection Agency of Liberia and Climate Change Lead Negotiator for the Liberian Delegation at the UN Climate Change Conference in Warsaw, Poland, in November 2013. Mr. Karmorh has provided the Ministry of Agriculture (MOA) with a set of various policy recommendations towards enhanced food security, given the implications of climate change in Liberia.

7. Swaziland is in the process of developing a national climate change strategy and action plan (NCCSAP). The lead author for the Swaziland chapter included in the Southern Africa monograph also leads the team that is preparing the NCCSAP. As part of the process of developing the NCCSAP, several consultative workshops were held with stakeholders. During the consultative workshops, a situation analysis of climate change and climate change issues was presented. The comprehensive analysis that is reported in the monograph was used for the situation analysis. The recommendations presented in the monograph formed part of strategic objectives of the NCCSAP.

#### b. Various

1. IMPACT Model has been redesigned and improved to meet the demands of model users and collaborators. The new version of the model is being used by collaborators in other CGIAR centers, and is also being used by the OECD Agriculture and Fisheries Division for reports on climate change and agriculture.

2. Data and Diagnostics Practice within the Bill & Melinda Gates Foundation have been explicitly asked Theme 4.3 to provide with feedback, summarizing key conclusions from the Global Futures for Agriculture project Phase 1 (co-funded by CCAFS), and are now being considering the results for incorporation within the foundation's strategy for agricultural development.

3. Theme has co-led the AgMIP Global Economics Team, and this work has resulted in significant changes to the leading crop modeling suite (DSSAT) and to 10 leading global economic models that have significant agricultural content. These include models developed and used by the following organizations:

Trade and Agriculture Directorate (TAD), Organisation for Economic Co-operation and Development (OECD)

Institute of Development Studies, University of Sussex

Australian Bureau of Agricultural and Resource Economics and Sciences, Australian Government

Department of Agriculture

Joint Program on the Science and Policy of Global Change, Massachusetts Institute of Technology

Joint Global Change Research Institute, Pacific Northwest National Laboratory

National Institute for Environmental Studies (NIES), Center for Social & Environmental Systems Research, Japan

Ecosystems Services and Management Program, International Institute for Applied Systems Analysis (IIASA)

Potsdam Institute for Climate Impact Research (PIK)

International Food Policy Research Institute

University of Illinois

Resource and Rural Economics Division, Economic Research Service (ERS), U.S. Department of Agriculture

Agricultural Economics Research Institute (LEI), Wageningen University and Research Centre

Agricultural Development Economics Division (ESAD), Food and Agriculture Organization of the United Nations (FAO)

4. At the CGIAR level, results from the Global Futures for Agriculture project have been important inputs into several CRP priority setting exercises.

**Evidence:**

Evidence for the outcomes related to three Regional African Agriculture and Climate Change Research Monographs has been provided in the "4.3 Outcomes" section of the report

## 8. Leveraged funds

### Leveraged fund #1

**Title:**

Global Futures for Agriculture (In 2013, CCAFS continued to co-fund the project (IFPRI, CIAT, CIP, ILRI, IRRI, ICRISAT, CIMMYT), which managed to receive new funding of ~\$ 5 Million for the period 2013-2016.)

**Partner name:** Bill & Melinda Gates Foundation

**Budget:** \$4996

**Theme:** T4

## 9. Theme Leader Summary by outputs

### Output: 4.3.1

#### Summary:

As part of the above output framework, Theme 4.3 has commissioned IFPRI to re-develop the International Model for Policy Analysis of Agricultural Commodities and Trade (IMPACT). In 2013, after two years of R&D investment, a version 3 has been implemented and tested by IFPRI. Analytic description of the model updates is included under Milestone 4.3.1.2013. This new version of IMPACT is currently being used in the Global Futures project and CCAFS regional scenarios, and is expected to be available to broader audiences through an appropriate web-platform in 2014.

Climate change impacts assessed on agricultural systems at regional level

(See also "4.3 Summary by Outputs")

The 3-volume series, African Agriculture and Climate Change, was produced to assist policymakers, researchers, NGOs and donors to better understand the impact of climate change on agriculture in the three regions of focus, which include West Africa, East Africa and Southern Africa. Published by IFPRI, the series were completed in partnership with regional institutes, including CORAF, ASARECA, and FANRPAN, and under the umbrella and support from CCAFS and co-funding from BMZ. Each study analyzed the range of plausible impacts of climate change by the year 2050, focusing almost entirely on annual crops. Studies used both crop models and global partial equilibrium models, informed by four different climate models and three socioeconomic scenarios. In some of the chapters on countries in which the livestock sector is important, authors highlighted some key aspects of this sector using secondary literature. Agricultural adaptation options are discussed throughout the monographs.

Climate change impacts assessed on agricultural systems at global level

The assessment of climate change impacts on agricultural systems at the global level will be the main focus of a "Climate Change, Agriculture and Water: Scenarios to 2050" report (scenarios, modeling results, policy options) using IPCC AR5 scenarios, new SSPs, estimates of GHG emissions, and updated scenarios for population and GDP growth. This report was commissioned by Theme 4.3 and being prepared by IFPRI in 2014/15.

Previous work at the global level has been integrated in the "Food Security and Climate Change" report, which was published by the High Level Panel of Experts (HLPE) on food security and nutrition, Committee on World Food Security (CFS), FAO in 2012, and has been reported as that in 2013.

**Output: 4.3.2**

**Summary:**

Disseminating conclusions from the 3-series research monographs on African Agriculture and Climate Change to regional and national stakeholders in West, East and Southern Africa.

Three research monographs/ books, on African Agriculture and Climate Change, focusing on three different regions (West, East and Southern Africa), together with a multi-scale communications strategy, which involved three regional policy issue briefs, country policy summaries, launching events at national, regional and global fora, as well as traditional and social media campaigns, organised by IFPRI and CCAFS, have helped to provide useful information to regional and national policymakers towards a better understanding of the uncertainties surrounding climate change effects on agricultural productivity and food security.

As a result, three regional organizations (CORAF, ASARECA, and FANRPAN), are now using our results, in approximately 29 national programs (associated with the countries in the regional monographs). Besides, national policy makers have been consulting the information provided in the books to draft policies in at least 6 SSA countries.

(See "4.3 Outcomes" for detailed information)

**WorldFish**

A conference on climate change research in fisheries and aquaculture in Vietnam was organised, which contributed to building important networks between Worldfish and several Vietnamese partners. As a direct result of this process, WorldFish will be now participating in several climate change adaptation projects, in the fisheries and aquaculture sectors, funded by the Vietnamese government.

**Output: 4.3.3**

**Summary:**

**Global Futures for Agriculture Phase 1**

During Global Futures Phase 1, which ended in 2013, Theme 4.3, based at IFPRI, brought together the expertise of biophysical scientists and economic modelers between seven CGIAR center (CIP, CIAT, CIMMYT, ICRISAT, ILRI, ICRAF, IFPRI) to work towards informed priority setting for investment resources. Through a variety of capacity building and in-house modeling exercises, the scientists and modelers gained an improved understanding of long-term challenges and opportunities in agriculture and food security at a variety of scales. A key output of Phase 1 includes the creation of Global Future "hubs" within the participating centers; these hubs now contain

the capacity of using IFPRI's International Model for Policy Analysis of Agricultural Commodities and Trade (IMPACT).

(See Milestone 4.3.3 2013 for detailed description on analyses, conducted within the participating centers, directly or indirectly associated with the Global Futures project.)

Complementary to this work, several trainings were provided to external stakeholders that enabled staff from several NARS as well as international organizations to learn how to use IMPACT model for their in-house operations.

(See "Theme 4 Outcome indicators: 2" for for detailed description on the capacity building exercises.)