RESEARCH PROGRAM ON
Climate Change, Agriculture and Food Security

CGIAR

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The SmartAG Partner

CCAFS East Africa Bi-annual Newsletter

January - June 2018

Editing: Lili Szilagyi, Catherine Mungai and Maren Radeny
Design and Layout: Solomon Makau

Photo Credits: Cover page G.Smith (CIAT) Page 38. T.Muchaba (CCAFS), T.Muchaba (CCAFS), T.Muchaba (CCAFS), S.Tiema (Egerton University), T.Muchaba (CCAFS) Back page: P.Sheperd (CIFOR)

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Message From
The Program Leader

We are pleased to share with you our SmartAg Partner bi-annual newsletter, highlighting policy engagement, ongoing research, field updates and activities with partners from the first half of 2018.

In February, the CCAFS East Africa team convened in Arusha, Tanzania, for a strategy meeting that brought together 65 stakeholders comprising of researchers, regional policymakers, experts from government, private sector, multilateral international organizations and NGOs from East Africa and around the world to develop an integrated research for development strategy for CCAFS East Africa.

The CCAFS strategy meeting was held back to back with the kick-off meeting of the Food & Business GCP4 projects which took place on 6 – 7 February. The eight research projects funded by the fourth Global Challenges Programme call will be implemented in East Africa beginning 2018 and focus on how to scale climate-smart agriculture practices, private sector engagement and inclusive business model development in East Africa. The new projects will contribute to the achievement of the regional strategy for development.

In March, CCAFS organized a workshop for technical experts, educators, researchers, policy advisors, and Ethiopia's international development partners on the CCAFS Mitigation Options Tool. The tool allows users to rapidly identify sources of greenhouse gas (GHG) emissions, rank climate change mitigation options from multiple agricultural crop and livestock management systems, and quantify adaptation co-benefits. In April, the African Group of Negotiators (AGN) convened a working session with over 40 agriculture negotiators, experts and key stakeholders with representation from 17 countries from all five sub-regions of Africa. The session, supported by CCAFS, aimed to deepen understanding of the implications of the Koronivia Joint Work on Agriculture and prepare the AGN submission to SBSTA.

In April and May, we co-hosted an online discussion with the Climate Smart Agriculture Youth Network (CSAYN) about partnerships, innovations and financing for youth in climate-smart agriculture (CSA). Participants shared their thoughts around encouraging youth to take up agriculture as a career and adopt CSA.

Finally, we are pleased to announce that our Rwanda Climate Services for Agriculture project was announced as the winner of the first Climate Smart Agriculture Project of the Year Award at the inaugural Africa Climate Smart Agriculture Summit 2018 held by the Aid & International Development Forum (AIDF).

Dr. Dawit Solomon

1

Developing the African narrative for the Koronivia Joint Work on Agriculture: Setting the stage for climate-resilient agriculture in Africa

Country negotiators and agriculture experts from across Africa crafted a joint submission to the UNFCCC Subsidiary Body on Scientific and Technological Advice.

By Maren Radeny, Catherine Mungai, Laura Cramer and Dawit Solomon

It is not hard to imagine the enthusiasm and expectations around the momentous decision on agriculture at COP23—the Koronivia Joint Work on Agriculture—from Africa. Still, you might think it would be impossible for more than 40 people from 17 different countries to all work together to write a joint document on agriculture in less than forty-eight hours. But for the African Group of Negotiators (AGN), it's all in two days' work.

Since 2009, the AGN has led and supported efforts to include agriculture in the United Nations Framework Convention on Climate Change (UNFCCC) negotiations. In 2011, at the Seventeenth Conference of the Parties (COP 17) held in Durban, South Africa, the COP requested the Subsidiary Body on Scientific and Technological Advice (SBSTA) to consider issues related to agriculture.

While this was a great step forward, the Koronivia Joint Work on Agriculture adopted at COP23 marks an even bigger milestone for negotiations in agriculture. The decision calls on SBSTA and the Subsidiary Body for Implementation (SBI) to jointly address issues related to agriculture, through workshops, expert meetings, and working with constituted bodies under the Convention, thus linking science and implementation. Parties and observers have been invited to submit their views on elements to be included in the Joint Work on Agriculture.

On 5 and 6 April 2018 the AGN convened a working session with over 40 agriculture negotiators, agriculture experts and key stakeholders with representation from 17 countries from all five sub-regions of Africa. The session aimed to deepen understanding of the implications of the Koronivia Joint Work on Agriculture and prepare the AGN submission to SBSTA.

The negotiators and agriculture experts worked together to develop a joint African narrative on agriculture that can lay the foundation for mobilizing and building the finance, technology, knowledge, and capacity needed for innovation to improve food production, enhance food and nutrition security and livelihoods, and promote resilient agricultural transformation under climate change.

The two-day meeting was supported by the CGIAR Research

Susan Tiema (Egerton University)

The workshop identified priority areas for consideration, for example, to understand and identify approaches for assessing adaptation, related co-benefits and resilience.

Program on Climate Change, Agriculture and Food Security (CCAFS), African Group of Negotiators Expert Support (AGNES), the Food and Agriculture Organization of the United Nations (FAO), the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and African Centre for Technology Studies (ACTS).

Key areas identified for consideration by the AGN

Based on the outcomes of the five in-session workshops related to agriculture, the AGN identified four priority action areas in which more discussion and negotiation is needed between SBSTA and SBI:

1. Early warning systems, contingency plans and safety nets in the agriculture sector;

2. Vulnerability assessment and risk management including agricultural insurance;

3. International cooperation in technology development and transfer in the agriculture sector; and

4. Engagement of non-state actors, especially the private sector in the agriculture sector.

The AGN proposed in-session meetings between SBSTA/SBI and the constituted bodies under the Convention to discuss modalities for supporting the implementation of the key action areas above as well as other topics resulting from the Koronivia Joint Work on Agriculture. Specific areas for consideration include:

Susan Tiema (Egerton University)

Group discussion at the meeting.

- Methods, approaches and metrics for assessing adaptation, associated co-benefits and resilience: Understanding and identifying approaches for assessing adaptation, related co-benefits and resilience, including measurement, reporting and verification (MRV) frameworks;
- Improved soil carbon, soil health and soil fertility, including water management: Integrated landscape management and approaches, soil mapping (soil fertility and carbon) and integrated soil fertility management;
- Improved nutrient use and manure management: Optimization and rational use of inorganic fertilizers in agricultural systems and approaches for optimizing use and management of manure;
- Improved livestock management systems: Sustainable and efficient livestock management systems and value chains (including agro-pastoral systems), risk management of livestock production systems; and
- Socioeconomic and food security dimensions of climate change in agriculture: Residual impacts of climate change on agriculture (smallholder livelihoods, migration, conflicts, security, the nutritional value of food), the efficiency of agriculture value chains and food systems, and gender and youth in agriculture.

Additional topics identified included current and projected (potential) risks and vulnerabilities of agriculture value chains, agriculture data infrastructure and cutting edge digital solutions, and innovating financing for investment in agriculture.

Reflections on knowledge gaps and priority areas for African agriculture

While discussing the submission, participants also highlighted key issues for Africa in terms of moving forward to implementation. These include: i) changing the current low-investment and low-technology environment for the continent's agriculture sector, ii) increasing focus on mechanisms to finance climate actions in agriculture to include models of blended and private finance, and iii) the need for dedicated financial resources to be set aside by national and international financial mechanisms under the convention, in particular the Green Climate Fund (GCF), in order to address vulnerabilities of agriculture to climate change and to ensure food security.

Effective engagement of the private sector is equally crucial. CCAFS will continue to work with partners to support the AGN to unpack the Koronivia Joint Work on Agriculture and make a case for implementation of climate-smart agriculture at national and local levels including creating an enabling environment to attract financial support.

Read more:

Submission by the Arab Republic of Egypt on behalf of the African Group of Negotiators (AGN) on Koronivia Joint Work on Agriculture: https://bit.ly/2C1TJjF
Submission from the CGIAR System Organization, International Centre for Tropical Agriculture and the World Bank, in response to Decision 4/CP.23: https://bit.ly/2MWmx1p
Blog: Koronivia: setting the stage for an agricultural transformation: https://bit.ly/2Pique4

Maren Radeny is the Science Officer at CCAFS East Africa. Catherine Mungai is the Partnerships and Policy Specialist at CCAFS East Africa. Laura Cramer is the Science Officer at CCAFS Priorities and Policies for Climate-Smart Agriculture. Dawit Solomon is the Regional Program Leader at CCAFS East Africa.

2

Gender-responsive climate change science: Why it matters

"A great deal of scientific evidence now exists to show that science is not gender neutral. In fact, we need a new paradigm, a gender sensitive science." – Elizabeth Pollitzer, Coordinator of Global Gender Summits

By Mary Nyasimi and Catherine Mungai

Climate change impacts everyone, but not equally. The poor and women, especially those living in developing countries and those who derive their livelihoods from agriculture and natural resources, are more at risk from severe weather events and changing weather patterns as they have less ability to adapt. Scientists provide data to stakeholders, including governments, development agencies, and donors, to help them understand climate change, its impact on humanity, and develop actions to help communities manage extreme weather events. However, if scientific data is not gendered, adaptation actions will not benefit everyone and will potentially marginalize the most vulnerable segments of society.

Given this background, participants at the Gender Summit-Africa, held in Kigali, Rwanda from 19-20 March 2018, gathered to discuss the following questions:

- Does current climate change research require new approaches?
- Does it need to be gendered?

In her opening remarks, Elizabeth Pollitzer, Coordinator of Global Gender Summits, noted that a gender lens must be applied to science, especially in climate change research. Drawing upon the expertise of a diverse group of participants, the theme of the summit, "Climate Change Through the Gender Lens: Focus on Africa," aimed to promote greater diversity of thought and workforce in climate change science. The summit also hoped to advance the inclusion of sex and gender considerations in the content and processes of research, innovation, and socio-economic development measures. Participants, including those from the donor community and private sector, engaged in dialogue on how to leverage financial and technical resources to address gender considerations.

Gender mainstreaming for strategic transformation in Africa

> "In sub-Saharan Africa, women spend about 40 billion hours a year collecting water. In Tanzania alone, increasing access to water would free up women's working hours and, if converted into paid employment, would be equivalent to one million new full-time jobs for women. Investments in improved agricultural technologies can also improve efficiency of household tasks and save women's time." Jemimah Njuki, Senior Program Officer, International Development Research Centre (IDRC)

African governments have committed to climate change action by ratifying the Paris Agreement. At the national level, some countries have developed strategies for mainstreaming gender into climate change actions.

G.Smith (CIAT)

Farmer Rachael Njeri collects soils samples on her land. She has started growing forage strips on her farm which prevent soil erosion and provide feed for her cattle.

M.Nyasimi (CIAT)

Catherine Mungai from CCAFS East Africa presenting her work during the Gender summit in Kigali, Rwanda.

Mozambique and Egypt have developed their climate change and gender action plan with the objective of ensuring national climate change efforts mainstream gender into policies, programs, and strategies in various economic sectors so that both men and women have equal access to, and can benefit from, climate change responses. This reflects the importance of gender mainstreaming into climate actions for African counties. By recognizing that climate change affects women and men differently, participants concurred that a gender perspective — firmly rooted in the principle of gender equality — is essential when considering policy development, decision-making, and the implementation of strategies concerning mitigation and adaptation.

Gendered climate change research data to inform policies and actions

In Africa, few studies have examined how adaptation to climate change is experienced in the context of gender inequality, despite gender in Africa determining how resources are owned, accessed, and used. Labor, including primary production and reproduction, is also determined by gender. These factors influence the way women and men respond to climate risks.

> "Africa requires more feminist presidents and leadership that can support gender mainstreaming and also look at past failures and pull out critical lessons that can help Africa put forward actions to mainstream gender in climate change." Prof. Heidi von Rooyen, Director, Human Science Research Council, South Africa

Participants argued that taking a gender lens to climate change research will deliver useful data for adaptation and mitigation actions at the local level and for policy making at the national level. In her speech, Dr. Beth Kaplin, scientist at the University of Rwanda, noted, "Scientists need to gather data on climate change, its impact on the different genders, and avail the data/research to the public." She further emphasized, "There is a need to use the gender lens on existing educational curricula to ensure that through anecdotes, gender-sensitive climate change education is mainstreamed into the classroom experience throughout the education cycle."

Through the Gender and Social Inclusion flagship, CCAFS has developed a strategy to inform, catalyse, and target climate-smart agriculture (CSA) solutions for women and vulnerable groups, increase their control over productive assets and resources, and increase participation in decision-making in order to close the gender gap by 2030.

Read more:

Event report: Gender Summit 14 - Climate Change Through The Gender Lens, 19-20 March 2018, Kigali: https://bit.ly/2MGuOXJ

Mary Nyasimi is Project Manager at CCAFS' Gender and Social Inclusion flagship and Catherine Mungai is Partnership and Policy Specialist at CCAFS East Africa.

3

Leave no one behind: The youth also have a say in the Koronivia Joint Work on Agriculture

There is a need to focus on issues around youth and agriculture in the UN climate talks.

By Daisy Ndunge

Agriculture has an image problem. This is a global challenge: half of the farmers in the United States are 55 years or older and the average age of farmers in Sub-Saharan Africa is around 60 years old.

Agriculture in the 21st century means more than subsistence farming. Fortunately, youth across the world are already turning to farming and the food system as a career option. Young people can explore career options in information and communication technologies (ICTs), forecasting, marketing, value addition, transport and logistics, quality assurance, urban agriculture projects, food preparation, environmental sciences, and much more.

The Koronivia Joint Work on Agriculture and youth

The COP23 decision on agriculture, also known as the Koronivia Joint Work on Agriculture (KJWA), which took several years of discussions to reach, is a turning point in the agriculture discussions, especially for smallholders. During the just-concluded Bonn Climate Change Conference 2018, negotiators agreed on a concrete roadmap to take forward the implementation of the KJWA which puts emphasis on gender and youth integration.

The United Nations (UN) Subsidiary Body on Implementation (SBI) and the Subsidiary Body on Scientific and Technological Advice (SBSTA) took note of the importance of issues, including but not limited to: farmers, gender, youth, local communities and Indigenous peoples, the vulnerability of agriculture to climate change, and approaches to addressing food security. The SBSTA and SBI encouraged the Parties to take them into consideration when making submissions and during the KJWA workshops. The SBI also welcomed the submissions from Parties and observers on elements to be included in this work, and youth were not left behind.

S.Kilungu (CCAFS)

Youth in Sub-Saharan Africa need to take up agriculture as a viable business venture because the average age of farmers is around 60 years.

H.Rutherford (CIP)

To ensure youth take up farming as a career, there is need for youth involvement in policymaking, workshops, expert meetings and, most importantly, consideration in the Koronivia Joint Work Programme on Agriculture.

60 Years

Is the average age of farmers in Sub-Saharan Africa

YOUNGO, the official youth constituency at the United Nations Framework Convention on Climate Change (UNFCCC), played an influential role in ensuring that the voices of young people were heard during SBSTA/SBI discussions. YOUNGO is made up of organizations and individuals who identify as youth from all over the world. Notably, members of YOUNGO have formed an Agriculture Working Group which has taken a keen interest in the development and effective implementation of the KJWA. Implementation of a realistic work programme on agriculture under the UNFCCC will serve as a breakthrough for sustainable agriculture production and food security.

As the youth constituency, the YOUNGO Agriculture Working Group would like to highlight the need for youth involvement in policymaking, workshops, expert meetings and, most importantly, consideration in the KJWA. This includes continuous involvement of youth at all stages including submissions that are part of the schedule of activities proposed by the G77 and China under KJWA during the Bonn Climate Change Conference 2018.

The YOUNGO Agriculture Working Group also identified that it has become difficult for countries to integrate climate-smart agriculture (CSA) into their practices because different countries interpret CSA differently. Awareness creation would therefore help farmers, local governments and other stakeholders to develop and implement appropriate CSA technologies and practices.

During a press conference held on 5 May 2018 at the Bonn Climate Change Conference, members of YOUNGO emphasized that the implementation of climate action in agriculture is going to need a stand-alone finance mechanism. At the same time, young farmers, and farmer organizations in general, need capacity building to access climate finance.

YOUNGO also emphasized the need for capacity building on the use of technology. In particular, they pointed out that their technology literacy should be specifically targeted and built upon to facilitate technology transfer. This targeting would, in addition, allow for an increase in youth involvement in agriculture. Modalities for capacity building and engagement with stakeholders should create a conducive environment to link youth with enabling institutions in the transfer of technology, such as the Climate Technology Centre and Network (CTCN). In this regard, the Agriculture Working Group fully supports the general YOUNGO decision to request that the CTCN Advisory membership board develop capacity and create an enabling environment in matters relating to technology transfer. Notably, the KJWA creates an opportunity to collaborate with other parties and constituencies within the UNFCCC. The need to engage young people in the discussions and implementation is critical from the outset.

Read more:

Online discussion: Partnerships, innovations and financing for youth in climate-smart agriculture: https://bit.ly/2PS3d3Z
Koronivia joint work on agriculture: Draft conclusions proposed by the Chairs: https://bit.ly/2onbnVd

Catherine Mungai is a Partnerships and Policy Specialist at CCAFS East Africa. Daisy Ndunge is a member of YOUNGO and a volunteer for Kenya Small Scale Farmers.

4

Using science to inform low emissions livestock policy development and implementation in East Africa

"There is a great opportunity to demonstrate mitigation progress as a co-benefit of agricultural development or resilience and adaptation building measures". H.E. Professor Fekadu, State Minister of Livestock Resources, Ethiopia

By Ravina Pattni

This was Professor Fekadu's opening statement for the Low Emissions Livestock: Supporting Policy Making and Implementation through Science in East Africa regional awareness raising workshop held at the UN Economic Commission for Africa (UNECA) in Addis Ababa, Ethiopia in 2–4 July 2018.

The workshop was organized by the Global Research Alliance on Agricultural Greenhouse Gases (GRA), the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), Food and Agriculture Organization of the United Nations (FAO) and the World Bank. These four organizations worked closely to bring together about 85 participants from across East Africa and the world. The workshop created a platform for senior government, policy and science representatives working in the livestock sector to:

- discuss countries' ambitions for livestock development and climate change, and understand the challenges;
- showcase relevant ongoing work of the four organizations that is focused on: (i) Improving the efficiency of livestock production; (ii) reducing greenhouse gas emissions and enhancing resilience; and (iii) strengthening national measurement, reporting and verification (MRV) for low emissions livestock systems;
- understand how science underpins this work, including helping to support countries' Nationally Determined Contributions (NDCs);
- identify ways that the GRA, CCAFS, FAO and the World Bank can help build regional and national capacity and contribute to project implementation through tailored initiatives in the future.

Understanding the challenges

The workshop started with scene-setting presentations by Sarah Ossiya of the African Union Inter-African Bureau for Animal Resources on the role of livestock in sustainable development in East Africa, and by James Murombedzi of the African Climate Policy Centre (ACPC) on the pathways to low emissions livestock farming in East Africa. Getachew Tegegn and Robin Mbae made presentations on the country objectives and trends of livestock production, production systems and climate change mitigation, NDCs and role of agriculture and livestock in Ethiopia and Kenya. These presentations led to an in-depth discussion about the future of pastoralism in East Africa, inequality and poverty reduction in the context of the livestock sector, the need for integrated efforts, and the importance of moving from Tier 1 to Tier 2 reporting of greenhouse gas emissions for all countries.

Ollivier Girard (CIFOR)

Farmers and their cows in Ethiopia. At a recent workshop, participants discussed East African countries' ambitions for livestock development under climate change.

> "Reducing greenhouse gas emissions is a huge task and because of that, it can seem overwhelming to individuals, policy-makers and governments. Breaking the problem down and tackling its component parts is ever more critical."
> H.E. Mark Ramsden, Ambassador of New Zealand to Ethiopia and the African Union

This discussion on ambitions and challenges regarding low emissions livestock saw participants address key questions in relation to the livestock and environment objectives of their respective countries in a facilitated group session. The outcome of this session was a convergence of three overarching challenges and priorities across the region:

- MRV for low emissions livestock systems
- Identifying options to reduce emissions in the context of the broader development and food security agenda
- Awareness raising of low emissions and climate-smart livestock systems

Identifying opportunities

The participants learned about the ongoing regional activities and initiatives on low emissions development in the livestock sector from the World Bank, CCAFS, FAO, and GRA. This allowed participants to identify opportunities for research and policy agendas at the national and regional levels.

The participants highlighted the opportunity for developing a central and consolidated database for data generation, collection, and coordination. Moreover, participants shared details of their platforms that could be used as stepping stones and opportunities to spread awareness of low livestock emissions and the science of greenhouse gases at the global, continental, regional and national levels.

T.Muchaba (CCAFS)

Delegates during the regional awareness raising workshop, UNECA Addis Ababa, Ethiopia.

Moving forward together

An increasing understanding of low emissions livestock, key challenges, priorities and opportunities at the regional and national levels allowed all stakeholders to reflect on ways to strengthen their strategies and work together in multistakeholder initiatives. This approach allows for greater engagement at the policy and implementation level using science.

To show their support for the low emissions livestock agenda, participants made a commitment to move forward together and specifically to share their learnings from the workshop with their colleagues and incorporate the learnings into their strategy. Beyond this, some committed to continue networking with regional actors and work together on the challenges and opportunities identified, for example around awareness raising.

The workshop ended with a common sentiment of continuing the work that was kicked off during the workshop by collaborating on concrete and sustainable actions. This was also highlighted in the closing remarks of H.E. Gemedo Dalle, Minister for Environment, Forestry and Climate Change (MoEFCC), Ethiopia, who said:

"We need to strengthen regional and national coordination and exchange of data and information to achieve sustainable solutions."

The three-day workshop at UNECA was organized by Hayden Montgomery, Harry Clark, Laura Kearny and Sinead Leahy (GRA); Carolyn Opio (FAO); Pierre Gerber (WB); James Murombedzi and Yosef Amha (ACPC); and Catherine Mungai, Maren Redeny and Dawit Solomon (CCAFS EA).

The workshop participants included national, regional and international experts from the livestock sector, and other dignitaries including: H.E. Professor Fekadu Beyene, State Minister of Livestock and Fisheries Development Sector - Ministry of Agriculture and Livestock Resources (MoALR), Ethiopia; H.E. Dr. Gebregziabher Gebreyohannes, State Minister of Livestock Health and Feed Regulatory Sector - MoALR, Ethiopia; H.E. Gemedo Dalle, Minister of MoEFCC, Ethiopia; and H.E. Mark Ramsden Ambassador of New Zealand to Ethiopia and the African Union.

Read more:

Presentations: The role of livestock in sustainable development in East Africa: https://bit.ly/2wsE7R5
Presentations: Pathways to low emissions livestock farming in East Africa: https://bit.ly/2wCVjm3
Presentation: The Low Emissions Livestock Workshop | Ethiopia Ministry of Agriculture and Livestock: https://bit.ly/2wztJXC
Presentations: Ambitions and challenges regarding low emissions livestock sector in Kenya: https://bit.ly/2C6lNSV
Presentations: Livestock MRV at national level: https://bit.ly/2ows80d
Presentations: What Science tells us: What are the emissions & how can they be reduced?: https://bit.ly/2C872z4
Presentations: Opportunities for LED in agriculture in East Africa: a regional perspective: https://bit.ly/2wyCZeK

Ravina Pattni is a Graduate Fellow at CCAFS East Africa and a Graduate Student at Columbia University working with the International Research Institute for Climate and Society (IRI) on a five-year project called Adapting Agriculture to Climate Today, for Tomorrow (ACToday), for which CCAFS and the CGIAR are key partners.

5

Climate services in agriculture: What are the costs and benefits of investment for Africa?

New paper reviews different evaluation methods for informing stakeholders about the benefits of different options for investing in climate services for African agriculture.

By Lili Szilagyi and Catherine Mungai

Extreme climate events such as droughts, floods, dry spells, heatwaves and storms are becoming more frequent and severe around the world. Smallholder farmers in Africa are especially vulnerable to weather variability, which can occur both between seasons and within a season.

The benefits of climate services

Climate services empower smallholder farmers, particularly in climate-sensitive developing countries such as those in Africa, and allow them to reduce climate-related losses and enhance benefits, protecting lives, livelihoods and property.

There are many promising initatives across Africa that aim to improve the access to and quality of climate information services. On the national scale, however, funds for public sector services, including climate services, have come under increasing budgetary pressure. Therefore, there is a need to make decisions on how to use the often scarce financial resources for climate services in agriculture most effectively.

Decisions to invest in new services or improvements to existing ones are best made on the basis of evidence of the benefits that the changes are predicted to produce, relative to the costs. A recently published working paper by the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) reviews the suitability of ex-ante evaluation methods for informing funding agencies, the private sector, and other national and regional stakeholders about the benefits of different investment options in climate services.

Approaches for evaluating the benefits of climate information

The paper classifies the approaches available to quantitatively estimate the benefits of climate information into four categories: economic modelling, stated preference, avoided loss and benefit transfer.

The review considers relevant and recent studies that used methods in these categories, and details how the methods are used to estimate the benefits of investing in climate services for the agriculture sector in Africa.

The authors explain the benefits of the four types of approaches as follows:

- economic modelling has so far been used mainly for understanding the scope for using climate information (primarily weather and seasonal forecasts) for agricultural management decisions.
- stated preference is a reasonably simple and cost-effective approach for estimating the subjective value that individuals place on existing climate services.

C.Schubert (CCAFS)

Participatory climate service and information training in Tanzania. The trainings showed farmers how to calculate risks and probabilities of crops failure, while identifying which crops could work well in their area.

- when estimation of the benefits of climate services in the agriculture sector is conducted with limited time and resources, as is common in Africa, the benefit transfer method can be used to estimate value in one geographical location based on evidence from another.
- the avoided loss approach is a good fit for assessing the contribution of early warning information to disaster risk management, including interventions designed to protect farmer and pastoralist livelihoods from frequent climate variabilities and extremes and in the face of climate-driven food crises, particularly in East Africa.

The paper concludes that all of the methods reviewed can provide the necessary information to convince stakeholders that investing in climate services in the continent is worthwhile. The cases reviewed in the study support the generalization that climate information services are beneficial to the agricultural sector in Africa.

Working with partners, CCAFS continues to help farmers across Africa, Asia and Latin America with climate services that meet their needs and the institutions that support them, enabling the transition toward climate-smart agricultural systems and resilient livelihoods.

The working paper is an output of USAID's Africa Climate Services project, and it was made possible by the generous support of the American people through the United States Agency for International Development (USAID). The opinions expressed are those of the authors and do not necessarily reflect the views of USAID or the United States Government.

Read more:

Blog: Helping farmers adapt to climate change through climate services: https://bit.ly/2wOQgCq
Blog: Partnering with national meteorological services to support farmers in Africa: https://bit.ly/2GoQUGm
Flagship webpage: Climate Services and Safety Nets: https://bit.ly/2INjbeO

Lili Szilagyi is the Communications Consultant at CCAFS East Africa. Catherine Mungai is the Partnerships and Policy Specialist at CCAFS East Africa.

6

How Ethiopia's social safety net program leads to climate change mitigation co-benefits

Social safety net programs that include the restoration of degraded land and agroecosystems at scale are expected to provide increased food nutrition and security, while also contributing to climate change mitigation as a co-benefit.

By Dawit Solomon, Dominic Woolf, Lili Szilagyi and Catherine Mungai

Land degradation is a global problem that adversely affects the livelihoods and food security of billions of people. Among the world's largest food security programs are public works programs focused on restoring degraded land. Such land restoration is expected—over the long term—to contribute to increased food security.

A recently published article by Cornell University and CCAFS researchers, co-authored by Dawit Solomon, CCAFS East Africa Regional Program Leader, looks at the potential and possible pitfalls of the climate mitigation co-benefits of such programs, focusing on Ethiopia's Productive Safety Net Program (PSNP).

Ethiopia's Productive Safety Net Program

Key facts:

- PSNP provides food and financial support to beneficiaries in exchange for public works.
- More than 8 million farming communities benefit from the program which covers over 600,000 ha of land.
- PSNP implements participatory integrated watershed management and degraded ecosystem rehabilitation programs at both the landscape and smallholder farm levels to restore and build the productive capacity and ecosystem services of the land.

Ethiopia has been deemed a climate "hotspot"—a place where a changing climate could pose grave threats to agricultural production, food security, and human well-being. These threats are exacerbated by the rampant land degradation in the country. Ethiopia's Productive Safety Net Program (PSNP) aims to increase the rural smallholder communities' long-term resilience to food shortages. Ethiopia launched the PSNP in 2005 to respond to the needs of food-insecure households while creating productive investments that promote rural economic growth and environmental rehabilitation.

The authors suggest that, although the intent of Ethiopia's PSNP was to improve resilience and livelihoods, an unintended co-benefit is climate change mitigation from reduced greenhouse gas (GHG) emissions and increased landscape carbon stocks.

According to the study, which was carried out in 24 woredas (districts), the total reduction in net GHG emissions from PSNP's land management strategy at the national scale is estimated at 3.4 million Mg CO_2e y^{-1}, approximately 1.5% of the emissions reductions in Ethiopia's Nationally Determined Contribution (NDC) for the Paris Agreement.

The article explores some of the opportunities and constraints for scaling up this impact. For example:

• Improving management and implementation of individual projects can bring the average carbon benefits closer to the higher levels that were observed in the better performing survey sites.
• Further scaling up will require a transition away from the sub-watershed projects that presently characterize PSNP, towards jurisdictional approaches that incentivize the sustainable management of landscapes over entire woredas, zones or regional states.
• PSNP is only one of the large-scale programs conducting sustainable land management in Ethiopia. The potential for scaling up of public works to provide a more substantial contribution towards Ethiopia's NDC should, therefore, take a coordinated and integrated approach that encompasses all of the relevant national programs.

The World Bank's PSNP Climate Smart Initiative in Ethiopia was the basis for the study. Key international policy insights from CCAFS' assessment of the initiative include:

• Food security programs can contribute to climate change mitigation by creating a vehicle for investment in land and ecosystem restoration.
• Maximizing mitigation, while enhancing but not compromising food security, requires that climate projections, and mitigation and adaptation responses should be mainstreamed into planning and implementation of food security programs at all levels.
• Cross-cutting oversight is required to integrate land restoration, climate policy, food security and disaster risk management into a coherent policy framework.
• Land-based productive safety net and food security programs have synergies with climate change mitigation. These efforts are not mutually exclusive.
• The study shows that the unintended climate change mitigation co-benefits of this food-security and safety net investment is clearly supporting Ethiopia's Climate Resilient Green Economic (CRGE) policy and programs.

The lessons learned from the Ethiopian experience described in the article have the potential to inform safety net programs in developing countries worldwide, creating an opportunity for social protection to also provide a mechanism to support international and national responses to climate change. Additional research on the social and economic trade-offs and co-benefits between land restoration works and food security will be required to fully realize the potential of such programs to contribute to stabilizing the Earth's climate within safe limits.

G. Smith (CIAT)

Landscape in Ethiopia, one of the East African countries where CCAFS works to help farmers adapt to climate change.

In order to build resilience in agricultural systems in Ethiopia and to provide evidence and data on climate-smart agriculture (CSA) technologies and practices, CCAFS has established 3 Climate-Smart Villages (CSVs): Borana pastoral site in Southern Region, Lemo district site in the Southern Highlands and Basona-Worana district site in the central highlands. The CSVs enable researchers, local partners, farmers' groups and policymakers to test portfolios of CSA technologies and practices with the aim of scaling up successful innovations.

Read more:

Download the article: Land restoration in food security programmes: synergies with climate change mitigation. Climate Policy : https://bit.ly/2rP6e9l
Brochure: Climate-Smart Villages An AR4D approach to scale up climate-smart agriculture: https://bit.ly/2IqWX3a
The PSNP is implemented by the Government of Ethiopia with support from the following development partners: UK Department for International Development, United States Agency for International Development, Royal Netherlands Embassy, Swedish International Development Cooperation Agency, Canadian International Development Agency, Irish Aid, European Commission, World Food Program and The World Bank.

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7

Seed networks for climate change adaptation in Kenya, Uganda and Tanzania

Info Notes describe strategies to improve access to genetic diversity and information.

By Tobias Recha and John Recha

Farmers often manage, select, and conserve genetic diversity according to their needs, but climate change is quickly eroding this genetic diversity. Therefore, accessing genetic resources and related information is paramount to farmers' ability to cope with the effects of climate change.

Farmer seed networks are an important element of seed access because they are resilient and work to maintain and conserve crop genetic diversity. These seed networks are believed to supply about 80% of seeds to farmers in Kenya, 85% of seeds to Ugandan farmers and 85% of seeds to farmers in Tanzania.

Research in East Africa suggests that community-generated information sharing might support more effective farmer response to the changing seasonal and weather patterns associated with climate change.

Bioversity International, with support from the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), carried out studies in Kenya, Uganda, and Tanzania to better understand farmers' primary sources of seed and information in the Climate-Smart Villages (CSVs) in those countries.

Data was collected through household surveys from about 1000 households in total in the three countries, and through focus group discussions with 120 farmers in Uganda. The surveys collected various farm- and individual-level data on household demographics; sources of bean, millet and sorghum seeds and their networks for access and exchange; sources of information on adaptation to climate change; and the varieties that are widely used for climate change adaptation.

UCINET software was used to conduct a social seed network analysis, illustrating how information is transmitted through farmer networks and how seed is accessed and exchanged among smallholders.

> "Accessing genetic resources and related information is paramount to farmers' ability to cope with the effects of climate change"

Sources of seeds and information among farmers

A high percentage of seeds in Kenya come from informal sources: 'own seed' (55%), followed by local market (37%), neighbours (25%), farmer groups (24%), and seed companies (15%). The most common sources of seed information were field days (68%) and agricultural shows (50%). In Uganda, the respondents reported 'own seed' as their main seed source (78%), then local markets (48%) and neighbours (12%). The main sources of seed information were radio talks (71%), agricultural research stations (54%), and agricultural shows (49%). Respondents in Tanzania reported 'own seed' as their main seed source (67%), followed by neighbours (24%), local markets (21%), and extension services (17%). Approximately 34% of Tanzanian respondents were affiliated with an agriculture-related organization.

G.Smith (CIAT)

Uyole 03, an improved bean variety helping farmers improve their lives and empowering women, is the result of a joint effort by the government funded Uyole Agricultural Research Institute.

Differences in seed exchange between male and female farmers

In all three countries, female farmers' networks were stronger than those of male farmers, meaning that more women actors are connecting with each other, creating longer chains of seed exchange.

Policy implications

Based on the analyses, climate-related challenges have not only led to genetic erosion but also to the narrowing of choices farmers can make for adaptation to climate change. Most respondents indicated that they had experienced climate-related challenges.

Acknowledging the needs of farmers that result from climate challenges is crucial in applying adaptive strategies, especially for women farmers as they are critical in providing household food and nutrition security. Because women's networks were larger and more connected, they could also be used to distribute seed and information.

The reliance of farmers on their own seeds and the networks that are relatively disjointed make it difficult for farmers to access more seed. Management and conservation of genetic resources are often based on collective decisions; the disjointed networks display a lack of collective decisions in the management of these resources.

R. Vernooy (Bioversity)

In Kenya, Uganda and Tanzania, women are connecting to each other and creating longer chains of seed exchange than men.

Establishing a community seed bank in this site would help to improve the collective decisions in the management and conservation of genetic diversity for adaptation to climate change. Community seed banks are repositories of local genetic diversity that is often adapted to prevailing climate conditions, including biotic stresses.

Finally, strengthening informal seed networks and building connections between the formal and informal sectors, such as community seed banks and breeding programmes and national gene banks, can be crucial in providing farmers with a diversity of adapted seeds.

Read more:

Info Note: Social Seed Networks for Climate Change Adaptation in Western Kenya: https://bit.ly/2wsCiDJ
Info Note: Social Seed Networks for Climate Change Adaptation in Uganda: https://bit.ly/2PWAWt6
Info Note: Social Seed Networks and Climate Change Adaptation in Central Tanzania: https://bit.ly/2N5jYdi
Blog: Open source seed systems for climate change adaptation in Kenya, Uganda and Tanzania: highlighting the importance of policy support: https://bit.ly/2PYhJY3
Blog: How community seed banking strengthens adaptive capacity: Experiences from a farmers exchange visit: https://bit.ly/2MKokHm

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8

The climate-smart way of transforming agriculture in Africa

Highlighting the opportunities and challenges of scaling up climate-smart agriculture and Climate-Smart Villages in East Africa.

By Lili Szilagyi

Agricultural systems in East Africa are mainly rain-fed and highly vulnerable to climate change and variability. The frequency and severity of climate shocks such as drought, floods, heat and cold stress have increased with negative impacts on agriculture and food security.

The CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) East Africa Regional Program is working in Ethiopia, Tanzania, Uganda and Kenya to help farming communities adapt to the effects of climate change. CCAFS work involves action on the ground, engagement with partner organizations and policymakers, and research. CCAFS East Africa research focuses on climate-smart agriculture (CSA) technologies and practices, and the testing of these CSA interventions in Climate-Smart Villages (CSVs).
In a recently published book titled "Climate and Environmental Justice in Africa", CCAFS scientists highlight the opportunities and challenges of scaling up CSA and CSVs in the region.

Climate-smart agriculture partnership for Africa: Prospects and challenges

In the article on CSA partnerships for Africa, CCAFS scientists express the need to reduce climate vulnerability of the African agriculture sector, and suggest that there's no silver bullet pathway for achieving sustainable agricultural growth in Africa. Instead, the continent's agricultural transformation will depend on multiple and context-specific pathways that seek to address the main challenges of climate change, food and nutrition security, natural resource depletion and land degradation, limited market and trade opportunities, while contributing to mitigation of greenhouse gas (GHG) emissions.

CSA provides opportunities that can address the diverse needs of stakeholders as well as the production contexts of different farmers to yield winning outcomes of increasing food production and incomes, and reduce GHG emissions. The authors highlight a few examples of CSA practices that perform well under variable weather conditions, such as development and adaptation of stress tolerant crops and livestock breeds; innovations for combining conservation agriculture (CA) and integrated soil fertility management (ISFM) technologies; diversification in crop-livestock production systems; water harvesting and soil and water conservation in rain-fed and irrigated systems.

The authors suggest that the success of CSA in Africa will depend on the capacity of farming communities, governments, and regional and national institutions to understand various climate change related risks. They express the need for a continent-wide partnership of diverse stakeholders to address the multiple aspects of the problems and challenges which the CSA agenda seeks to achieve. The authors highlight the Climate-Smart Agriculture Partnership for Africa (CSAP-Africa); as a response to the global calls for the promotion of CSA solutions, as most governments and sub-regional organizations in Africa are developing policy frameworks and strategic plans for climate change adaptation and mitigation.

G.Smith (CIAT)

Suliman Sebuliba – Research Technician. CIAT's bean genebank at Kawanda research station, Uganda, receives new varieties from Colombia and safeguards beans across Africa.

K. Trautmann (CCAFS)

Farmers in the Nyando Climate-Smart Villages, where CCAFS is testing a portfolio of climate-smart agricultural interventions.

Climate-Smart Villages: A community approach to climate resilient agriculture and sustainable livelihoods

The diversity of Africa's farming systems, coupled with socio-cultural practices and systems of social and political governance, requires for localized adaptation interventions. Agricultural adaptation will involve developing a range of new technologies and farm-level innovations for crops and livestock, farmer services, markets, and institutional arrangements and policy reforms. Localizing interventions will enable farmers and farmer groups to access appropriate agricultural technologies, climate information, and enable technological and institutional innovations.

To explore how localized interventions can enhance and sustain agricultural productivity in addition to increasing resilience to climate change, farmers, in partnership with CCAFS East Africa, national and international research institutions, the private sector, non-governmental organizations and community-based organizations (CBOs) initiated the CSVs approach that could increase food security, enhance resilience to climate change and reduce GHG emissions.

CCAFS has been working in the Nyando CSVs in Kenya, working with over 2,000 households, to test a portfolio of climate-smart agricultural interventions. CCAFS and partners provide opportunities for adaptive learning and innovation that builds household and community resilience through participatory action research and field-based learning approaches.

Through this process, farming households are making progressive changes to their crops as well as introducing new climate resilient livestock breeds. The farming households are able to apply new agricultural knowledge and practices to address climate-related risks and build resilience at local scales.

By using the evidence from the CSVs, CCAFS is also involved in engaging policymakers to provide a supportive policy environment in which farmers can access technologies and other incentives for adaptation.

There is huge potential for African policymakers at local, national and regional or continental levels to embrace CSA and scale up CSVs; and commit to transformational change processes that spur sustainable agricultural growth and utilization of natural ecosystems. But this will call for revamping their knowledge of agriculture and technology systems, in particular, critical technical and policy advisory services on CSA as well as sustainable governance of agricultural support systems.

Read more:

Climate Smart Agriculture Partnership for Africa: Prospects and Challenges: https://bit.ly/2L6N0ph
Climate Smart Villages: A Community Approach to Climate Resilient Agriculture and Sustainable Livelihoods: https://bit.ly/2k37wux
Stories of Success:Climate-Smart Villages in East Africa: https://bit.ly/2Im57JY
Project page: Scaling up Climate-Smart Village models in East Africa: https://bit.ly/2wRXCoW
Blog: Examples of good practices on climate change adaptation from Nyando shared to foster learning: https://bit.ly/2Ku4w5q

Lili Szilagyi is the Communications Consultant at CCAFS East Africa.

9

Addressing climate risks through improved potato production in Lushoto Climate-Smart Villages, Tanzania

Farmers in Lushoto select better potato varieties and receive training on improved production practices to enhance their crop management.

By John Recha, Maren Radeny and Stephen Kuoko

To address climate-related risks in Lushoto District, Tanzania, the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) has coordinated a partnership of local government and research organizations. The International Potato Centre (CIP) and Tanzania's Selian Agricultural Research Institute (SARI) are working with the Lushoto District Council in Tanga Region to increase farmers' resilience to climate change.

In 2011, farmers did not think it was possible to grow potatoes three times a year. The potato farmers could not plant more than one crop cycle per year due to a lack of suitably adapted varieties, knowledge of improved agronomic practices, and viable, high quality seed. Six years later, thanks to positive changes in these three areas, they now grow potatoes in three cycles per year, using two early-maturing varieties known as Shangi and Unica (Mkanano). These varieties take 90 days to reach physiological maturity, tripling the production and benefits for a 12-month period.

Better adapted potato varieties, more yield, more farmers involved

> "Six years ago, we were growing potatoes only once per year during the long rainy season of March to May. Local varieties like Kidinya were attacked by diseases and we could only plant it once a year, to avoid drier months when disease pressure was high. The partnership facilitated by CCAFS guided us to form savings and credit cooperative organizations, and through them we co-evaluated better-adapted potato varieties that suit our needs, such as Shangi and Unica (Mkanano), which take 90 days in the field, Asante, which takes 100 days, and Mvono, which takes 120 days," said young farmers Florian Vitus and Mputa Mputa of Kwesine and Kwekitui villages. The improved varieties are not only high yielding but also have resistance to late blight disease and are able to withstand high temperatures.

The potato participatory varietal selection started in the administrative villages of Kwesine and Boheloi in early 2014 and involved 50 farmers. On the first attempt, farmers who planted potato varieties meant for consumption tripled the yield, from 7 tons per hectare per season for local varieties like Kidinya, to 24 tons for Asante, 29 tons for Shangi, and 32 tons for Unica (Mkanano) varieties. Farmers who chose to grow the potatoes for seed production but not consumption also tripled their yield. For example, the Asante variety yielded 18 tons per hectare per season for the seed potatoes

S. Quinn (CIP)

Women farmers at the participatory varietal evaluation of CIP potato genotypes in Lushoto, Tanzania.

compared to 5 tons per hectare per season for the local Kidinya variety. This yield doubling effect energized the farmers, and the message spread rapidly. Within six months, the adjacent administrative villages of Maringo, Kwekitui, and Milungui had embraced the co-evaluation trials, involving 135 farmers. Two years later, by the first rainy season of 2016, more than 1,000 farmers were planting the Asante variety in Lushoto.

Production costs for the improved varieties also decreased, because farmers were trained in improved practices. From the selection of planting materials, to planting, pest and disease control, harvesting and post-harvest handling, improved practices were undertaken correctly by over 70% of the farmers. Moreover, due to varietal resistance to late blight and timing of planting, the use of pesticides by the farmers was drastically reduced, further reducing the cost of production. With the use of climate information that involves a combination of both Indigenous knowledge and scientific weather forecasting by the Tanzania Meteorological Agency, Lushoto farmers can now plant the early maturing potatoes three times a year.

Access to high quality, viable seeds

Lushoto potato farmers are now linked to the quality declared seeds (QDS) program of the Tanzanian government, which seeks to empower farmers who face challenges with accessing high quality viable seeds. The QDS project involves multiplying seeds at the village level, using select trained farmers who grade the seeds based on uniformity in size. QDS seeds are presumed to be free of deadly diseases,

S. Quinn (CIP)

Obama; one of the potato varieties introduced to the farmers in Tanzania.

like bacterial wilt, which causes extensive losses. Within Lushoto District, 41 farmers, including 15 women, have been certified by the Tanzania Official Seed Certification Institute (TOSCI) as potato QDS multipliers. This is one of the highest concentrations of QDS farmers for potatoes within a district in the northern part of Tanzania. Their farms range from 0.25 to 1 hectare in size and the seeds that are produced are sold in nearby villages.

Diffused light storage of potato seed

Lushoto farmers are using the diffused light storage (DLS) technology, which is a low-cost method of storing seed potatoes developed by CIP. DLS uses natural indirect light instead of low temperature to control excessive sprout growth and associated storage losses. The basic criteria for a DLS structure includes an insulated roof, translucent walls, and adequate ventilation. The units are built with a combination of timber, corrugated iron, plastic sheets, and fly screen. In Lushoto, the QDS farmers store between 1 to 2 tons of seed potatoes, and DLS has been useful in extending potato storage life and therefore maintaining their productivity.

New partnerships for Lushoto potato farmers

New partnership opportunities have emerged for the Lushoto community. Farmer exchange visits took place between 15 and 21 December 2016, when 153 potato farmers from West Kilimanjaro region, including 53 women, travelled to Lushoto for a one-week farmer learning tour from their Lushoto peers. Apart from the knowledge exchange, trade ties were formed through which the QDS Lushoto farmers will supply the farmers in other parts of northern Tanzania, such as the Kilimanjaro, Meru, and Arusha regions. The farming learning visits to Lushoto are ongoing.

In addition, another 40 farmers, including 15 women, have been recruited into a project called Calories and Household Income in Potato Subsector (CHIPS), which is funded by Kilimo Trust, a non-governmental organization. From March 2018 onwards, CHIPS is linking Lushoto farmers to high-end markets where they can fetch premium prices. Apart from the savings and credit cooperative organizations (SACCOS), another major local farmer organization linked to the project is the Usambara Lishe Trust, comprising 3,000 farmers.

Read more:

Info note: Climate-smart villages and progress in achieving household food security in Lushoto, Tanzania: https://bit.ly/2L6z3aG
Booklet: Stories of Success: Climate-Smart Villages in East Africa: https://bit.ly/2Im57JY
Media coverage: Tanzania Sets Record in Potato Research, to Release Improved Varieties | The Citizen: https://bit.ly/2rUJHtl

John Recha and Maren Radeny work with the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) East Africa Regional Program. Stephen Kuoko works with the Selian Agricultural Research Institute (SARI) in Tanzania.

10

Using the CCAFS Mitigation Options Tool to identify adaptation co-benefits in Ethiopia's agriculture sector

CCAFS-MOT is a tool that provides fast, accessible, and reliable information about emissions from different agricultural practices to inform policy and management decisions in support of emission reductions in agriculture.

By Catherine Mungai, John Recha, Dawit Solomon and Diana Feliciano

At a recent workshop organized by the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), technical experts, educators, researchers, policy advisors, and Ethiopia's international development partners discussed synergies between climate change mitigation and resilience- and adaptation-building efforts in agriculture. The workshop was a training on the CCAFS Mitigation Options Tool (MOT), which allows users to rapidly identify sources of greenhouse gas (GHG) emissions, rank climate change mitigation options from multiple agricultural crop and livestock management systems, and quantify adaptation co-benefits.

Supporting the implementation of Ethiopia's Nationally Determined Contribution

Ethiopia's Nationally Determined Contribution (NDC) is one of only a few considered "2°C compatible" by the Climate Action Tracker. This rating indicates that Ethiopia's climate action plans will bear a fair share of the global effort needed to meet the Paris Agreement. If fully implemented, Ethiopia's NDC would lead to a 64% reduction in GHG emissions by 2030, compared to the Ethiopian business-as-usual (BAU) scenario. The majority of the abatement (about 86%) is expected to come from the agriculture, forestry and other land uses (AFOLU) sectors.

The CCAFS-MOT can support the Ethiopian agricultural sector's contribution to the country's NDC. It can be used to estimate GHG emissions from multiple agricultural crop and livestock management practices in different geographic regions, providing policymakers with critical information that should inform decisions on emission reductions and adaptation co-benefits from the agriculture sector. The tool identifies options and practices that reduce emissions and sequester carbon that are available for specific production systems in distinct locations—essential for a country with diverse agroecological zones, land uses and farming systems such as Ethiopia. Most often, obtaining and applying this information for such diverse systems is time-consuming and requires specialized personnel.

Developed by the University of Aberdeen and CCAFS, the CCAFS-MOT brings together several empirical models to estimate GHG emissions from multiple agricultural crops, crop groups (e.g. vegetables, legumes) and livestock systems using regionally-specific data.

Real-time data and training

A week before the training, a team of 12 CGIAR and national researchers and students traveled to Lemo district, Ethiopia to collect data from Inter Aide's and USAID's Africa Rising project site.

The data collected focused on field characteristics, farmers' current agricultural practices, perceptions on weather changes, and socio-economic characteristics. The data was then used at a learning event on 23 March 2018 to test the Mitigation Options Tool.

Testing the tool

After the hands-on training, workshop participants highlighted the strengths of the CCAFS-MOT tool as follows:

- It ranks mitigation options for crops according to mitigation potential, factoring in current management practices, and climate and soil characteristics;
- It is an easy way to learn about GHG emissions from farming, and adaptation co-benefits including carbon sequestration potential;
- It has a low data input requirement, in an environment where data and capacity are lacking;
- It is free, making it easily accessible to resource-limited countries such as Ethiopia; and
- It runs in Excel, making it easy to use.

Some concerns were also raised by participants. Their views included the following:

- The climate and agroecological classifications do not consider the Ethiopian classification system;
- The crop types are not diverse. For example, prominent Ethiopian orphan crops such as Teff and Enset are not included;
- Information on land use change needs to be more detailed. There is a need to consider changes in tree species, and the magnitude of change including spatial and temporal dimensions and distribution;
- Emissions occurring during processing (fermentation) of particular food types, e.g. Enset, are not captured; and
- GHG emission during the decomposition process of organic fertilizers is not estimated.

From the field to policymaking

In applying the CCAFS-MOT to the diverse agriculture and land use context of Ethiopia, workshop participants discussed the quality of data needed, feasible mitigation options, modeled adaptation co-benefits and results, changes needed to contextualize the CCAFS-MOT to the Ethiopian context, barriers to implementing mitigation options, and co-benefits of mitigation options.

S. Yasabu (ILRI)

Farmers in Ethiopia at a workshop organized by the Africa Rising team. Data collected from this project site was used to test the Mitigation Options Tool.

> "This CCAFS-MOT is very helpful for coming up with evidence-based results and conclusions in mitigation studies within the agricultural sector in Ethiopia," said Dr. Degefie Tibebe, Director of the Climate & Geospatial Research Program at the Ethiopian Institute of Agricultural Research.

Most participants considered the tool a useful starting point for providing information about GHG emissions, understanding adaptation co-benefits, and assessing mitigation options in agriculture. For the CCAFS-MOT to more specifically inform future work, participants suggested that it be updated with country-specific contextual data. This includes incorporation of a geospatial platform, especially if the intention is beyond stimulating scientific discussion and for actual planning decisions at scale. A community of practice is being established to develop the CCAFS-MOT to include more specific characteristics of the Ethiopian agricultural and land use sectors.

Read more:

Presentations: CCAFS EA Presentation for MOT training at ILRI Addis Ababa, Ethiopia: https://bit.ly/2MDIiDH
Photos: CCAFS Mitigation Options Tool (MOT) workshop: https://bit.ly/2C8QyXm
CIAT blog: CIAT and CCAFS launch Ethiopia Climate-Smart Agriculture Country Profile: https://bit.ly/2C2k557

Catherine Mungai is the Partnerships and Policy Specialist at CCAFS East Africa. John Recha is the Participatory Action Research (PAR) Specialist at CCAFS East Africa. Dawit Solomon is the Regional Program Leader at CCAFS East Africa. Diana Feliciano is a Research Fellow at the University of Aberdeen.

11

CCAFS and Irish partners committed to training the next generation of climate change, agriculture and food security researchers

CCAFS is building the capacity of future researchers by offering practical training grounds for climate-smart agriculture research and innovation.

By Charles Spillane, Dawit Solomon and Philip Thornton

To tackle the challenges smallholder farmers are facing under a changing climate, the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) works as a global strategic partnership between the world's leading research institutions on agriculture, climate change, and food security. The Program works with a wide range of partner institutions in government, civil society, the private sector, and academia.

Our strategic research partners create significant new avenues for interaction and synergies. For example, CCAFS is a partner in the award-winning MSc program on Climate Change, Agriculture and Food Security (MScCCAFS) at the National University of Ireland Galway (NUI Galway)—a university that ranks among the top 1% of universities in the world.

The MScCCAFS program is aimed at students who want to combine scientific, engineering, technical, and social or policy skills so that they are better equipped to understand and make significant contributions regarding the adaptation and mitigation of climate change impacts on global agriculture and food security. The program provides opportunities for students from developing countries to advance and refine their skills and tools for developing agricultural practices, policies and measures to address the challenge that global warming poses for agriculture and food security in their home countries and globally.

In 2017, a student from the MScCCAFS program spent three months working on a climate-smart agriculture (CSA) project with CCAFS and the International Livestock Research Institute (ILRI) in Feed and Forage program in Ethiopia. Supported by an Irish Aid Fellowship, the ILRI Feed and Forage program, and CCAFS's Flagship on Priorities and Policies for CSA, Ms. Kelebogile Kekae, a NUI Galway student from South Africa, investigated the impact of climate change on forage grasses in Ethiopian livestock systems. Her research results have been important for identifying both the challenges and solutions for climate-proofing of livestock production systems in Ethiopia for the future.

Ms. Kekae was afforded an opportunity by Patrick McManus, Head of Development Cooperation (Irish Aid, Ethiopia), to give a presentation on her research work with CCAFS/ILRI at the Irish Embassy in Addis Ababa. Dr. Dawit Solomon, CCAFS East Africa Program Leader also provided a briefing to the Embassy and Irish Aid program staff about the ongoing CCAFS activities for development of climate-resilient agricultural systems in the region.

Irish Aid

Group picture at the Irish Embassy in Ethiopia.

> "These are great opportunities, on both sides—they give young people a taste of working in different research environments, at the same time making a real contribution to a real-world problem at the start of their career." Dr. Philip Thornton, CCAFS Flagship Leader, Priorities and Policies for CSA

CCAFS East Africa is aiming to further strengthen its collaboration with NUI Galway, coordinating its efforts with the University's MScCCAFS program to receive additional students in the coming years, and helping to guide MScCCAFS students to focus on the regional priorities and projects highlighted under the various CCAFS flagship programs in East Africa.

As part of the initiative to expand the collaboration from Ethiopia to other East African countries, CCAFS East Africa is hosting Sean Kelly, a current MScCCAFS student, at the Nyando Climate-Smart Villages from May to July 2018. His research project with CCAFS East Africa will examine how formal and informal institutions influence the uptake of CSA technologies and practices. In addition, ILRI is hosting a second MScCCAFS student over the same period: Mercy Fakude, a crop scientist from South Africa, will be working with ILRI's Feed and Forage program and CCAFS Flagship on Priorities and Policies for CSA on new methods of targeting climate-resilient feeds and forages in smallholder systems in Kenya.

To build the capacity of current and the next generation of researchers in agriculture, food security and climate change, CCAFS East Africa is currently exploring common areas of interest and opportunities for collaborative partnership with other national and international universities.

> "NUI Galway is proud to be a Strategic Research Partner for the CCAFS program and is committed to continue working closely with the CCAFS program on research and education activities that contribute to the urgently needed transformation towards climate-resilient agricultural and agrifood systems that can support improved human livelihoods.
>
> The award-winning MScCCAFS program that NUI Galway has established with CCAFS has to date trained over 60 MScCCAFS graduates who are now deploying their inter-disciplinary skills across multiple institutions globally, where they are working on climate change adaptation, mitigation and sustainable development of agriculture and agrifood systems." Prof. Charles Spillane, Director of the MScCCAFS program at NUI Galway

Read more:

Course information: MSc (Climate Change, Agriculture and Food Security): https://bit.ly/2ouUW9D
Website: Kelebogile Kekae: https://bit.ly/2roVK2N

Charles Spillane is the Director of the MScCCAFS program, NUIG. Dawit Solomon is the CCAFS East Africa Regional Program Leader. Philip Thornton is the CCAFS Flagship Leader on Priorities and Policies for CSA. Catherine Mungai, Partnerships and Policy Specialist at CCAFS East Africa and Lili Szilagyi, Communications Consultant at CCAFS East Africa, also contributed.

12

Encouraging African youth to adopt climate-smart agriculture

What partnerships, innovations, and financing opportunities are available for young people in Africa to adopt climate-smart agriculture? Here are some highlights from our recent online discussion.

By Lili Szilagyi

Twelve million young people enter the African workforce each year with only roughly 3 million jobs available to them. To many, an agricultural career is not a glamorous prospect, particularly as climate change degrades land and disrupts weather patterns, making it harder for farmers to grow enough to feed even their own households.

In a recent online discussion about partnerships, innovations and financing for youth in climate-smart agtriculture (CSA), participants shared their thoughts around encouraging youth to take up agriculture as a career and adopt CSA.

Innovations

Respondents agreed that integrating information and communication technologies (ICTs) into CSA can be attractive to youth.

> "In my opinion, the only way to attract youth to CSA is to make it more appealing to the young people. This can be made possible through integrating technology in CSA. Not just technology but easily accessible technology which will allow the young people to conduct some operations from the comfort of their smartphones." Comment by Dolphine

Some participants shared good examples of such innovations, for instance: ESAFF Uganda piloted a platform to give farmers farming tips, and weather and market information, and the initiative was most popular among the youth. Another example came from a member of the Zimbabwe Farmers' Union (ZFU) that partnered with a local mobile operator and other service providers to scale up tested climate-resilient solutions such as weather-based index insurance, ICT-enabled climate information, and production advisory services.

Partnerships

Partnerships are key to fostering CSA in Africa but also have limitations, concluded some participants who took part in the discussion.

> "Partnership comes with advantages and disadvantages depending on different circumstances. If policies and procedures are followed properly between all parties then it can be beneficial to all… For these partnerships to work, all parties must get benefits according to the energy they invest and must agree before commencing." Comment by Rwechungura

One respondent, Nche Tala, explained that as CSA encompasses varied domains of specialization such as agriculture, agribusiness, environment, and development in general, it is difficult to find a particular institution/ organization that is grounded in or better still has a complete mastery of all domains. "I therefore strongly believe that actively engaging in strategic partnerships with organizations as well as academic institutions with a rich knowledge acquired through specialization in a particular aspect or domain of CSA, offers the opportunity to tailor projects that

H.Rutherford (CIP)

Evans Kimutai (24) is part of a CIP-led initiative teaching youth how to plant and harvest seed potato. With many youth moving to big cities, these programs aim to encourage youth to take up agriculture as a livelihood.

12 Million Young people join the African workforce with only 3 million jobs available

are concrete and that can bring about meaningful change."

Financing opportunities

Appropriate and inclusive financial services can equip youth with the resources and support they need to become productive and economically active and make the transition from childhood to adulthood. Participants shared their thoughts and experiences about financing opportunities for youth:

> "In Kenya, there's the youth fund where youth can access funds for an array of activities but there's not yet a funding mechanism that's only aimed at enhancing climate-smart agriculture adoption amongst the youth. Despite of the availability of the youth fund, logistical issues have made it hard for youth to access the funds in a stress-free way, one has to know someone who knows someone in order to access the youth fund. In my opinion for any funding mechanism to be convenient enough for all in almost every region in Africa there's need for the issue of good governance to be taken into consideration." Comment by Wesley Kibet

There is a need to make CSA activities attractive and accessible to youth. This means exploring and introducing more business- and market-oriented approaches to agriculture for youth engagement in the sector, as well as making the agricultural sector a more productive and attractive profession.

The government, private sector, and development partners need to play a central role in the development of CSA technologies, creating new employment opportunities for young people, nurturing linkages between education and business, and improving access to markets, financial services and innovation, as well as in the transfer of technology and skills.

The online discussion was organized by the Climate Smart Agriculture Youth Network (CSAYN) and the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), with support from the Global Alliance on Climate Smart-Agriculture (GACSA), the Technical Center for Agriculture and Rural Cooperation (CTA), African Forum for Agricultural Advisory Services (AFAAS), ICCO Cooperation and AgriProfocus.

Read more:

Online discussion: Partnerships, innovations and financing for youth in climate-smart agriculture: https://bit.ly/2wwZbWn
Report: Youth Engagement in Climate-Smart Agriculture in Africa: Opportunities and Challenges: https://bit.ly/2MDXfWp
Blog: Leave no one behind: the youth also have a say in the Koronivia Joint Work on Agriculture: https://bit.ly/2NDlVuy

Lili Szilagyi is the Communications Consultant for CCAFS East Africa.

13

Rwanda Climate Services for Agriculture project awarded the first ever Climate Smart Agriculture Project of the Year 2018

The project transforms Rwanda's rural communities and economy through climate information and historic data reconstruction.

NAIROBI, May 18 — At the inaugural Africa Climate Smart Agriculture Summit 2018 held by the Aid & International Development Forum (AIDF), the Rwanda Climate Services for Agriculture project was announced as the winner of the first Climate Smart Agriculture Project of the Year Award.

The Climate Smart Agriculture Project of the Year Award 2018 recognizes outstanding projects that bring together multiple stakeholders in the agriculture ecosystem—from governments, donors, and NGOs to the private sector—to form new partnerships that improve productivity, resilience, and efficiency while lowering carbon output. Nominations were judged on a variety of factors, including creative approaches to solving real challenges; proven impact and ability to demonstrate environmental, climate, social and economic impact; the longevity of the projects; and potential for self-sufficiency. The panel of judges included members from the Eastern Africa Farmers Federation, International Center for Tropical Agriculture (CIAT), United Nations Environment, and Aid & International Development Forum (AIDF). From more than 50 submissions, only 10 projects were shortlisted, and the list was released earlier in May 2018.

Funded by the United States Agency for International Development (USAID), led by the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) and implemented by the International Center for Tropical Agriculture (CIAT), the Rwanda Climate Services for Agriculture project seeks to transform Rwanda's rural communities and economy through climate risk management with an overall goal of improving agricultural planning and food security in the face of climate change.

Other project partners include the International Research Institute for Climate and Society (IRI), the International Livestock Research Institute (ILRI), the World Agroforestry Centre (ICRAF), the Rwanda Agriculture and Animal Resources Development Board (RAB), Meteo Rwanda, the University of Reading, Radio Huguka, DERN, N-Frnds, and Caritas (Caritas Kibungo, Caritas Butare and Caritas Kibuye).

"Our collective work benefits from a particularly strong set of government and local and international partners and generous support from USAID at the level needed to strengthen Rwanda's capacity to produce, deliver and use climate services. This investment of human and financial resources, and innovative solutions such as Enhancing National Climate Services (ENACTS)and Participatory Integrated Climate Services (PICSA), have made it possible to make things that have previously only been demonstrated at pilot scale work for farmers on a national scale," says Jim Hansen, leader of the CCAFS Climate Services and Safety Nets Flagship Program.

Francesco Fiondella (IRI)

Christine Niragire from Nyanza district sorting her beans after harvest.

"It is essential to build on local governance structures. For example, the hybrid of the 'Twigire Muhinzi' homegrown extension service system and PICSA, enables farmer champions in villages to rapidly reach a large number of farmers with weather and climate information to effectively inform farmers' decisions at farm, household and community levels," adds Desire Kagabo, CCAFS Rwanda Climate Services for Agriculture Project Coordinator based at CIAT.

Now about two-thirds of the way through the four-year project, there have already been significant accomplishments on several fronts. Building on the IRI's Enhancing National Climate Services (ENACTS) approach, the project supported Meteo-Rwanda to fill gaps in its historical climate records, and use the new high-resolution data set to produce one of the most advanced suites of online climate information tools and products for agricultural decision-makers available in Sub-Saharan Africa.

The project is working with partners to integrate climate services into Rwanda's national agricultural extension service, by training extension staff and volunteer farmers in a process known as PICSA. The trained agricultural extension personnel have led 75,000 farmers through the process of understanding local historical and forecast climate information and incorporating it into their farm and livelihood planning. The project also works with Radio Huguka, a rural radio station covering 75% of the country, to regularly broadcast weather information and innovative programming about its use for agricultural decision-making. Finally, the project has worked with Rwanda's government and the World Meteorological Organization to develop a national climate services framework that will oversee and foster sustained coproduction, assessment and improvement of climate services.

Read more:

Project factsheet: Rwanda Climate Services for Agriculture: https://bit.ly/2msT1PC
Press release: New program in Rwanda will transform agriculture through climate information and historic data reconstruction: https://bit.ly/2wwqRKc
Website: Enhancing National Climate Services (ENACTS): https://bit.ly/2N5DeqZ
Blog: PICSA training of trainers: strengthening national and local capacity for climate services for agriculture in Rwanda: https://bit.ly/2ovf1g8

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Setting an innovative vision for transforming agriculture and food security under climate variability and change in East Africa

Developing an integrated research for development strategy for CCAFS East Africa.

By Catherine Mungai and Maren Radeny

"We cannot conduct business as usual and expect to transform Africa's agriculture, especially in this era of increasing climate variability and change," Dawit Solomon, Regional Program Leader, CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) East Africa.

Dawit Solomon made this remark during the CCAFS East Africa Strategy Meeting held in Arusha, Tanzania between 8 and 9 February 2018. The meeting brought together 65 stakeholders comprising of researchers, regional policymakers, experts from governments, private sector, multilateral international organizations and NGOs from East Africa and around the world to develop an integrated research for development strategy for CCAFS East Africa. Through a range of participatory and interactive approaches, the stakeholders examined the interactions, synergies and trade-offs between climate change, agriculture, and food nutrition and security, highlighting new opportunities to advance climate-resilient and low emissions agriculture, reduce vulnerability, enhance nutrition and diversify smallholder incomes in East Africa, integrating gender and social inclusion.

National, regional and continental priorities

In order to ensure demand-driven research for development aligned with national, regional and global priorities, the meeting started off with a panel discussion comprising of policymakers from the four CCAFS focus countries in East Africa— Ethiopia, Kenya, Uganda and Tanzania—and representatives from the African Group of Negotiators to give a regional and continental perspective. The panel discussion focused on climate change-related challenges and opportunities for each country and identified entry points for CGIAR and specifically for CCAFS including opportunities for collaboration. George Wamukoya of VUNA and a member of the African Group of Negotiators (AGN) moderated the discussion and the panelists included:

- Debasu Bayleygn Eyasu – Ministry of Environment, Forest and Climate Change, Ethiopia
- Robin Mbae – Ministry of Agriculture, Livestock and Fisheries, Kenya
- Stephen Muwaya – Ministry of Agriculture, Animal Industry and Fisheries, Uganda
- Mponda Malozo – Ministry of Agriculture, Food Security and Cooperatives, Tanzania

G. Smith (CIAT)

Smallholder farmer in Kenya, one of the priorities countries of CCAFS East Africa.

• Raymond Kasei – Representing the African Group of Negotiators

Key challenges emerging across the region include low agricultural productivity, increase in pest and disease incidences, post-harvest losses and low uptake of technologies. Proposed priority areas for CCAFS and CGIAR support included:

• Developing of monitoring and evaluation indicators for measuring agricultural resilience;
• Data to inform the implementation of nationally determined contributions (NDCs);
• Implementation of the CSA strategies and frameworks developed in different countries including providing evidence on successful CSA practices and technologies for up scaling;
• Input into national Medium Term Plans;
• Climate finance and insurance;
• Information services and capacity building for researchers and policymakers in East Africa.

What role can science play?

With increasing climate variability and change, the scientific community has an essential role to play in informing synchronized, strategic investments to establish climate-resilient agricultural production systems, minimize greenhouse gas emissions, make efficient use of resources and ensure food nutrition and security. During the meeting, scientists from different CGIAR centers shared ongoing work on climate change adaptation and mitigation in East Africa. These included:

• Peter Craufurd of CIMMYT shared how the Taking Maize Agronomy to Scale in Africa (TAMASA) initiative is applying technology to increase knowledge delivery through smartphones.
• Polly Ericksen spoke on the work ILRI is doing under the program on climate-smart livestock which seeks to provide scientific evidence to livestock stakeholders. This is especially critical to inform countries as they implement their Nationally Determined Contributions.
• Evan Girvetz of CIAT highlighted various initiatives on CSA, including the application of CCAFS science to de-risk agriculture to improve access to credit for smallholder farmers, business models for scaling CSA and technical support to guide large investments in CSA.
• Todd Rosenstock shared some of the on-going climate change related projects at ICRAF which focus on climate-smart value chains including access to credit, climate-smart agroforestry and multi-scale co-learning processes to scale up climate-smart options.
• Laurence Jassogne shared how IITA is supporting the development and implementation of policies on climate change adaptation and mitigation, including an example from the coffee sector.
• Rosa Maria Roman-Cuesta of CIFOR demonstrated how a landscape approach can be used to manage trade-offs between social and ecological impacts including landscape restoration through integrated landscape management practices.
• Carlo Fadda of Bioversity spoke about community seed banking initiatives in Ethiopia, Tanzania and Uganda including seed trade within the region.

Emerging innovative research areas

To further support the scientific input, six presentations were shared by thematic speakers on emerging areas for research and development. The themes included climate services, climate finance, linking mitigation science and policy, the role of decision support tools and the role of the youth. Specific topics covered included:

• Improving availability, access, and use of climate information and ICT-based agro-advisory in East Africa, Jim Hansen – IRI, Columbia University, USA.
• Bringing East African countries together to find ways to grow more food without increasing greenhouse gas emissions, Hayden Montgomery – the Global Research Alliance on Agricultural Greenhouse Gases.
• Making climate finance work for agriculture in East Africa, Alberto Millan – World Bank's Global Food and Agriculture Practice (GFADR).
• Implementing innovative/transformative adaptation and mitigation science and policy measures for East Africa agriculture, Andreas Wilkes – UNIQUE forestry and land use, Germany.
• Applying interactive decision support tools to understand how climate change and natural disasters impact agriculture, food security and livelihoods in East Africa, Travis Franck – Climate Interactive.
• Transformation of East African Agriculture with ICT-based digital solutions and the youth, Romano Kiome – ILRI.

New CSA projects launched in East Africa

In terms of investments, moving forward, Bruce Campbell, director of CCAFS pointed out that 4 million dollars will be invested annually in the 4 CCAFS focus countries. "Yearly, about 20 million dollars is raised by the programme for climate-smart agriculture projects for all the five regions in the world, including Africa," he added during the media interview held at the strategy meeting.

The CCAFS strategy meeting was held back to back with the kick-off meeting of the Food & Business GCP4 projects which took place on 6 – 7 February. The eight research projects funded in the fourth Global Challenges Programme call will be implemented in East Africa beginning 2018, and focus on how to scale climate-smart agriculture practices in East Africa. The new projects will contribute to the achievement of the regional strategy for development.

Read more:

Blog: 8 new projects join forces to scale climate-smart agriculture: https://bit.ly/2L24D9r
Blog: What's the state of climate adaptation and mitigation efforts in African agriculture?: https://bit.ly/2wHuJeO
Blog: Unpacking climate-smart agriculture for upscaling in East Africa: https://bit.ly/2Inps1x
Blog: Is digital agriculture the key to revolutionize future farming in Africa? https://bit.ly/2rLYlCc
GCP/NWO summary: Kick-off meeting of the Food & Business GCP4 projects https://bit.ly/2L8VifY

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Out & About


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1. Participants at the Ethiopia Climate-Smart Agriculture Profile launch providing a snapshot of the key issues, climate-related challenges, CSA practices, relevant policies, and financing opportunities. 2. Discussions at the CCAFS Mitigation Options Tool (MOT) workshop in Ethiopia which allowed the technicians and policy-makers to identify suitable agricultural practices that reduce greenhouse gas emissions. 3. CCAFS members and partners gathered in Arusha, Tanzania for the East Africa Strategy Planning Meeting held in February 2018. 4. On 5 - 6 April 2018 the African Group of Negotiators (AGN) convened meetings related to agriculture and gender to develop submissions to SBSTA. 5. On 19 - 20 June 2018 the Rwanda Climate Services for Agriculture project organized the event for farmer promoters (trained farmers) to share with their fellow farmers on the lessons and practices learned from climate services training.

In our diary

August
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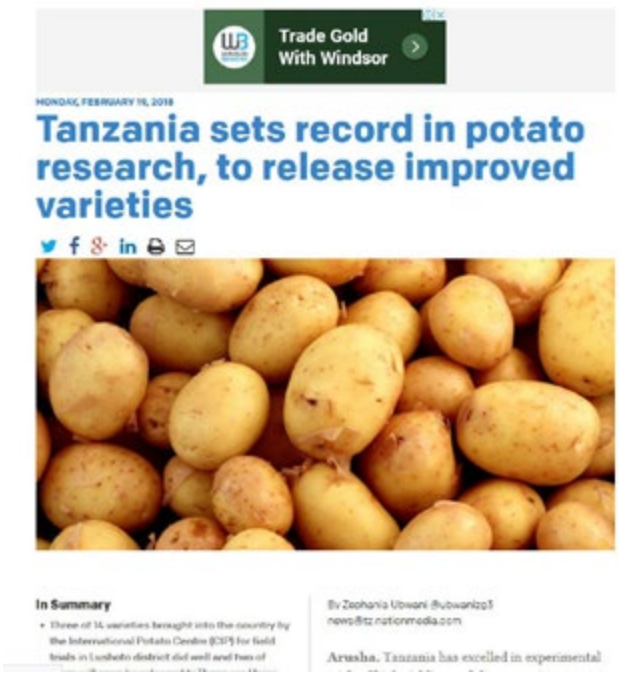
2018
Hoima Community Seed Bank Launch
Venue: Hoima, Uganda

August
29-30
2018
Global Landscapes Forum
Venue: Nairobi, Kenya

September
10-13
2018
International conference on agricultural emissions and food security: Connecting research to policy and practice
Venue: Berlin

December
3-14
2018
24th Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC)
Venue: Katowice, Poland

CCAFS EA in the media



Women have a key role in mitigating climate change | Deutsche Welle: https://bit.ly/2s4PP1W
Climate Smart Agriculture, combating climate change across Africa | Devdiscourse: https://bit.ly/2s2HJH8
Tanzania sets record in potato research, to release improved varieties | The Citizen: https://bit.ly/2x3SoWU

Further Reading

CCAFS Latest Publications

Journal article: Suitability of project M&E systems to support agricultural MRV: The case of the Kenya dairy NAMA: https://bit.ly/2E2pc5h

Working paper: Evaluation of farm-level impacts of soil fertility management strategies in maize-bean farming systems in Uganda and Tanzania: https://bit.ly/2PYPHiL

Working paper: Financial service supply with potential for supporting climate-smart agriculture: https://bit.ly/2BDAVVD

Report: The feasibility of low emissions development interventions for the East African livestock sector: Lessons from Kenya and Ethiopia: https://bit.ly/2KOziWO

Journal article: Land restoration in food security programmes: synergies with climate change mitigation: https://bit.ly/2s8755A

Working paper: Estimating the economic benefits of alternative options for investing in agricultural climate services in Africa: A review of methodologies: https://bit.ly/2KMNXBW

Journal article: Rainfall variability and drought characteristics in two agro-climatic zones: An assessment of climate change challenges in Africa: https://bit.ly/2x5qIB3

CCAFS Tools

CCAFS website and blog updated daily with news on policy and practice, research, events and downloadable publications from the CGIAR and partners. http://bit.ly/1gX2uKi Blog: http://bit.ly/Blogs_EastAfrica

Adaptation and Mitigation Knowledge Network (AMKN) is a map-based platform for sharing data and knowledge on agricultural adaptation and mitigation. http://bit.ly/AMKN_Maps

AgTrials Large public repository of agricultural trial data sets, with different crops, technologies and climates. http://bit.ly/AgTrials

Food Security CASE maps Map-based projections of crop area and yields, average calorie availability, and international trade flows across the world. http://bit.ly/Casemaps

MarkSim II Generator of future location-specific rainfall series, based on a choice of General Circulation Models: http://bit.ly/MarkSimGCM

GCM data portal Set of downscaled climate data sets. http://bit.ly/Climate_Data

Dataverse Public portal for full CCAFS data sets such as the baseline surveys from CCAFS East Africa sites that include information on farmers' current adaptive practices. http://bit.ly/Baseline-Surveys

Big Facts website Get all the links on climate change, agriculture and food security: http://bit.ly/1gYWjWt

Atlas of CCAFS sites Browse colourful maps of CCAFS research sites in three regions: East Africa, West Africa and South Asia: http://bit.ly/1iSfwHd

Core Sites in the CCAFS regions This portfolio includes brief descriptions of CCAFS core sites in East Africa, West Africa and South Asia, including coordinates of the sampling frames of the baseline surveys: http://bit.ly/1dKwrfG

Adaptation and Mitigation Knowledge Network is a map-based platform for sharing data and knowledge on agricultural adaptation and mitigation: http://bit.ly/1kiEnng

Climate Analogues This is a tool that uses spatial and temporal variability in climate projections to identify and map sites with statistically similar climates across space and time: http://bit.ly/1pzmVhl

Climate and Agriculture Network for Africa: This web-based platform seeks to link scientists with policy makers to address climate change, agriculture and food security issues in Africa. http://bit.ly/1BHmhG0

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RESEARCH PROGRAM ON Climate Change, Agriculture and Food Security

CCAFS East Africa is hosted by ILRI

INTERNATIONAL LIVESTOCK RESEARCH INSTITUTE

Led by:

CIAT

Research supported by:

CGIAR Fund
European Commission
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