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Food Security**



The SmartAG Partner

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COP 23
6-17 Nov 2017,
Bonn, Germany

Message From The Program Leader

We are pleased to share with you our SmartAg Partner newsletter, highlighting policy engagement and ongoing research from January to June 2017.

To celebrate international women's day, we shared how four women farmers from the Nyando Climate-Smart Villages (CSVs) in Kenya are improving their livelihoods through climate-smart agriculture.

CCAFS scientists authored and edited the recently published Special Issue on Climate-Smart Agriculture of the Agriculture for Development journal. The journal features an article about managing climate risks through small ruminants in the Nyando CSVs and our policy engagement processes that focus on integrating climate change and agriculture policies in East Africa.

In Tanzania, find out how scientists from the International Potato Center (CIP) and farmers in Lushoto are developing more resilient potato varieties for long and short rainy seasons and with higher yields. A recently released report by CCAFS and partners examined rainfall and temperature changes over the past 35 years in Uganda, as well as farmers' perception of climate change and how climate change impacted livelihoods. Read more about the findings and the recommendations that could assist with climate change adaptation in the region. In Rwanda, farmers are turning to locally-tailored climate forecasts to help them make farming and investments decisions. Read more on how the Participatory Integrated Climate Services for Agriculture (PICSA) approach is building on "Twigire Muhinzi" — a local farmer-to-farmer extension service model— to disseminate climate information.

In May, CCAFS East Africa hosted a seminar that explored the state of climate adaptation and mitigation efforts in African agriculture. The seminar created an opportunity for about 65 stakeholders and scientists from CGIAR centers to share knowledge, learn from each other and build synergies on climate change adaptation and mitigation in East Africa. We took this opportunity to launch our booklet highlighting some of the emerging stories of success of climate-smart agriculture technologies and practices that are positively changing the lives of smallholder farmers across East Africa.

In the latest CCAFS Annual Report, stories highlight working with scientists, farmers, governments and the private sector to expand knowledge and scale up solutions. The report features initiatives from East Africa, including projects on climate risk management, and partnerships aiming to close the gender gap in African agriculture.



Dr. Dawit Solomon



1

Kenya launches Climate-Smart Agriculture Strategy for 2017-2026

The strategy is a tool to implement Kenya's Nationally Determined Contribution for the agriculture sector.

By Tabitha Muchaba, Catherine Mungai and Maren Radeny

Kenya declared drought a national disaster and appealed for local and international help in February 2017. Drought has become more frequent in the past 10 years, affecting about 23 counties in 2017.

This is not surprising given that agriculture is the most vulnerable sector to climate change and extreme weather events. Media reports indicate the rate of malnutrition is above emergency levels in some areas while other parts of the country have serious acute malnutrition levels. Furthermore, a report by Relief Web shows that the number of people that are currently acutely food insecure in Kenya has doubled to 2.7 million from 1.3 million in August 2016.

The Kenya Climate Smart Agriculture Strategy (KCSAS) has been developed to guide investments and implementation of climate-smart agriculture (CSA) activities guaranteeing productivity and food security, while addressing climate change adaptation and mitigation. The strategy was jointly developed by the Ministry of Agriculture, Livestock and Fisheries (MoALF), the Ministry of Environment and Natural Resources (MENR) and other government ministries and departments with support from the World Bank through the Kenya Adaptation to Climate Change in Arid and Semi-Arid Lands (KACCAL) project, the Food and Agriculture Organization (FAO) and the United Nations Development Programme (UNDP). The team involved in developing the strategy comprised of experts from diverse disciplines, and included environment, crops, livestock, fisheries, meteorology, forestry, irrigation, policy formulation and

climate change. The overall objective of the strategy is to build resilience and minimize emissions from agricultural farming systems for enhanced food and nutritional security and improved livelihoods.

The strategy identifies four broad strategic areas:

- Adaptation and building resilience by addressing vulnerability due to changes in rainfall and temperature, extreme weather events and unsustainable land/water management and utilization;
- Mitigation of greenhouse gas (GHG) emissions from key and minor sources in agriculture sector;
- Establishment of an enabling policy, legal and institutional framework for effective implementation of CSA; and
- Minimizing effects of underlying cross cutting issues such as human resource capacity and finance which would potentially constrain realization of CSA objectives.

The coordination framework and implementation mechanism for the strategy will be harmonized within an inter-governmental coordination structure which is under development and will be mainly implemented by the county governments. The strategy will be reviewed periodically to address emerging challenges and issues.



Through CSA, women farmers benefit from the introduction of fruit trees which improve nutrition. The objective of the CSA strategy is to adapt to climate change, build resilience of agricultural systems and minimize GHG emissions.

Since 2012, the CGIAR Research Program on Climate Change, Agriculture and Food Security (CAFS) and CGIAR partners such as the World Agroforestry Centre (ICRAF), the International Center for Tropical Agriculture (CIAT), the Center for International Forestry Research (CIFOR) and the International Livestock Research Institute (ILRI) have been working with Kenyan policymakers to develop the climate-smart agriculture framework program (CSA-FP) which catalyzed the development of the comprehensive CSA strategy. CAFS scientists also participated in several review and validation workshops to provide technical input to the development of the strategy. Moving forward, CAFS and partners will continue to work with the government to support implementation of the strategy.

Read more:

Blog: Kenya integrates climate-smart agriculture into its intended nationally determined contribution: <http://bit.ly/2w9sZtT>

Blog: Linking national action to global processes: setting the agriculture agenda for Kenya <http://bit.ly/2vCAfge>

Blog: Post-COP22 roadmap: Kenyan stakeholders explore implementation of the Paris Agreement: <http://bit.ly/2qTub0C>

Info Note: Integrating climate change in agriculture and food security policies and strategies: Experiences and lessons from East Africa: <http://bit.ly/2x3r4TX>

CAFS news update: From local to global: Engaging policymakers to advance climate-smart agriculture in Africa: <http://bit.ly/2qgCnsQ>

Tabitha Muchaba, Catherine Mungai, and Maren Radeny all work for CAFS East Africa.

2

What's the state of climate adaptation and mitigation efforts in African agriculture?

Experts share insights on science to deliver adaptation and mitigation in East African agriculture.

“In East Africa, we are acutely aware of the consequences of climate change, with many parts of the region suffering from severe drought,” said Iain Wright, Deputy Director General from the International Livestock Research Institute (ILRI) in his introductory remarks at the CCAFS seminar on Science to Deliver Adaptation and Mitigation in East African Agriculture. The research community faces the challenge of helping farmers and pastoralists cope with the increasing challenges of climate change, reduce vulnerability and increase resilience, and adopt a combination of new technologies, organizational arrangements and policy support, among others. Researchers also need to be aware of the impact of agriculture on climate change, through greenhouse gas emissions, and find ways to reduce emissions from agriculture.

The seminar, which was hosted at ILRI on May 30, 2017, created an opportunity for about 65 of stakeholders drawn from Ministry of Agriculture, Livestock and Fisheries (MoALF), Climate Change Department of the Ministry of Environment and Natural Resources (MENR), Ministry of Northern Kenya and Arid Lands, Non-Governmental Organizations such World Neighbours, SNV, Pan African Climate Justice Alliance (PACJA), Arid Lands Information Network (ALIN), African Academy of Sciences (AAS), East African Farmers Federation (EAFF) and scientists from CGIAR centers to share knowledge, learn from

By Lili Szilagyi, Catherine Mungai and Dorine Odongo

each other and build synergies on climate change adaptation and mitigation in East Africa.

The seminar covered three broad themes—Policy and engagement, Mitigation, and Science and partnerships for impact. Scientists from ILRI, the International Center for Tropical Agriculture (CIAT), the International Institute of Tropical Agriculture (IITA) and CCAFS gave insightful presentations on adaptation and mitigation initiatives in East Africa.

Policy and engagement

Andrew Mude of ILRI, shared about the Index-Based Livestock Insurance (IBLI) project that is helping pastoralists manage risks of drought-related livestock losses, emphasizing that the impact of risk to the communities in drylands is immense. He highlighted that rigorous impact assessments have revealed considerable socio-economic and behavioural benefits of IBLI, drawing from policy and partner support. A key outcome of IBLI, has been getting the Government of Kenya to take up the concept as part of the Kenya Livestock Insurance Program (KLIP). IBLI scientists and the World Bank in Kenya have been invited by the Government of Kenya as technical and policy advisors to the KLIP program. He concluded that going to scale will require careful research and development efforts



Greenhouse gas emissions from livestock production systems are the largest source of agricultural emissions in East Africa. The livestock sector thus represents the best opportunity for mitigation in the region.

to further unlock the barriers, and an alignment of policy and technological forces.

Katie Tavenner of ILRI highlighted the need to get the gender indicators right in order to define how to measure the impact of development interventions for men and women. There is need to consider how gender power dynamics influence the participation of men and women in mitigation activities earmarked as climate-smart. In the Kenyan dairy sector, for example, four issues emerged as critical—milk marketing, labor dynamics, intersectionality and gender equity. Dairy is a male-dominated sector in Kenya, and gender dynamics influence farmers' ability to effectively participate in and benefit from low emissions dairy development.

Mitigation

Polly Ericksen, Program Leader at ILRI, gave an overview of ILRI's work on mitigation in East Africa. She stressed the incredible economic potential of the livestock sector, particularly for countries in Sub-Saharan Africa where six out of the 11 most profitable agricultural commodities are derived directly or indirectly from livestock. ILRI's research on mitigation complements the work of other institutions such as the Climate Change Department of Kenya's Ministry of Environment and Natural Resources in several ways: For example, ongoing work at ILRI's Mazingira Centre—an Environmental Research and Educational Centre—seeks to generate data specific to the Kenyan production systems. Acknowledging credible data alone is not enough, there is

need to engage farmers to demonstrate why it is important to adopt strategies and technologies produced, as well as demonstrate to donors why they need to invest in such initiatives.

Her presentation was followed by a speed-talk from David Pelster, of ILRI's Mazingira Centre. David's presentation focused on improving estimates of greenhouse gas fluxes from livestock in Sub-Saharan Africa, specifically emission factors from ruminants, manure management, and storage. Their research focuses on getting an actual depiction of the practice in the field, to obtain accurate methane conversion factors. The findings show that the current models are likely using incorrect emission factors for Africa, as they use emission factors from other regions with different climate, soils, management and livestock breed due to limited dataset for Africa. The Mazingira Center was set up to fill this void.

Charles Odhong from UNIQUE forestry and land use shared experiences and lessons from developing the Kenya dairy Nationally Appropriate Mitigation Action (NAMA) concept for GCF funding, highlighting the development process, including establishing partnerships, stakeholder consultations and training, and in-depth studies. The dairy NAMA is expected to transform Kenya's dairy sector to a low-emission development pathway, while improving the livelihoods of male and female dairy farmers. He concluded that there is limited research on adaptation implications of mitigation strategies, and on effectiveness of delivery mechanisms.

Science and partnerships for impact

Bruce Campbell, Director of CCAFS, emphasized the need for dramatic change in how we do research now; we have to become much more effective, outcome-oriented, focused, and different from what we are. We need to embrace the "three-thirds approach" (engagement, evidence, outreach) for the future of research.

Drawing on this approach, Evan Girvetz of the International Center for Tropical Agriculture (CIAT) showed how engagement, evidence and outreach together lead to impact and outcomes. Partnerships and early engagement with key stakeholders are critical, and the process is as important as the final product. Decision-makers want evidence, and they see the CGIAR and CCAFS as key technical and knowledge partners to provide them with the evidence. Communication and capacity building are equally critical to translating high-

level frameworks and guidelines into on-the-ground impact.

Edidah Ampaire of the International Center for Tropical Agriculture (IITA) shared successful examples of influencing change in policies in Tanzania and Uganda through multi-stakeholder platforms. Their project on Policy Action for Climate Change (PACCA) supported by CCAFS, adopted the learning alliances approach to foster exchange of new climate knowledge, ensure multi-actor climate action and connect public policy formulation and implementation structures at different governance levels to enhance policy implementation.

To bring it all together, the presentations and speed-talks were followed by a panel discussion moderated by Ravi Prabhu - Deputy Director General (Research), World Agroforestry Centre (ICRAF) and comprised of the following panelists:

- Dawit Solomon - Regional Program Leader, CCAFS East Africa
- Monica Parker - Scientist, International Potato Center (CIP)
- Joanes Atela - Senior Research Fellow, African Centre for Technology Studies (ACTS)
- Michael Okumu - Senior Assistant Director, Ministry of Environment and Natural Resources, Kenya
- Fiona Percy - Regional Coordinator, CARE International

Among many interesting points raised, Fiona Percy from CARE discussed the importance of innovative partnerships:

"We need to start shifting a bit the traditional thinking of roles (...) [and start] working together with the farmers collectively towards the common goal and start blurring the edges of our disciplines, so sticking to what we are good at but realizing that it is only when we put it all together that you can actually find ways for people to make decisions on the level that they want to."

Dawit Solomon was asked about where he would put investment to transform agriculture and deliver climate benefits. He said that he would primarily invest in climate services and safety nets, and put most of the money in sub-seasonal and seasonal analysis. He stressed that providing



Attendants of the seminar at ILRI Campus, Nairobi during one of the sessions.

African farmers with weather information is crucial, and added: “We need tools in Africa because climate-smart farming is a reality now everywhere, so I would put resource in that part.” Livestock and crop systems for low emission agriculture, credible evidence to inform policy, and in strong partnerships are among the areas he would make investments in.

Joanes Atela shared his views on finance; as he put it: “If we do things right, finance will follow”. He explained that we need to ask ourselves hard questions, such as what we want the finances for and how we use them in a manner that is going to achieve the sort of impacts we need. He added that the donor environment is changing, and donors want impact stories. For Africa and research organizations like CCAFS it means that in order to access finances, we need to show cases of impact stories and outcomes. And for that, he said, CCAFS and others need to reorient their research focus.

Stories of Success: Climate-Smart Villages in East Africa

After wrapping up the discussions, Vivian Atakos from CIP (formerly Communications specialist at CCAFS East Africa) presented the new CCAFS East Africa booklet that outlines some of the emerging stories of success of climate-smart agriculture technologies and practices that are positively changing the lives of smallholder farmers across East Africa, and highlights “livestock-smart” activities in the Climate-Smart Villages.

Read more:

See the presentations on Slideshare: <http://bit.ly/2x30zOk>
Download the booklet: Stories of Success: Climate-Smart Villages in East Africa: <http://bit.ly/EASuccessStories>

Lili Szilagyi is the Communications Consultant for the CCAFS Program Management Unit and CCAFS East Africa.

Catherine Mungai is the Partnerships and Policy Specialist at CCAFS East Africa.

Dorine Odongo is the Communications & Knowledge Management Specialist at ILRI.

3

Power of partnerships: CCAFS 2016 Annual Report highlights

Significant progress on agriculture under climate change was made in 2016; discover the most recent outcomes and innovations from CCAFS and partners in the 2016 Annual Report.

By Lili Szilagyi

“The power of partnerships – in helping foster outcomes and contributing to important scientific outputs – is the theme of our 2016 annual report and a key strategy that will continue to inform CCAFS going forward.” Bruce Campbell, Director, CCAFS

Impact through policies and partnerships

In more than 20 countries, CCAFS researchers collaborated in farmers' fields and in global initiatives and with farmers, civil society, governments and researchers to help advance the concepts and practices around climate-smart agriculture.

In South Asia, CCAFS is working with rural communities to expand Climate-Smart Villages. In 2016, governments, private sector and development partners committed to scaling up the climate-smart village approach and related local actions in more than 2,000 villages in South Asia. This involves building portfolios of interventions together with farmers, National Agricultural Research Systems, CGIAR centers, local

universities, non-governmental organizations, the private sector and farmers' groups.

in
2016
there was
STRATEGIC
SUPPORT

TO

23 8 NATIONAL
INITIATIVES
15 SUBNATIONAL



Capacity development and innovative communication

Smallholder farmers in the developing world are particularly vulnerable to the impacts of climate fluctuations and weather extremes. Supporting farmers with weather and climate information services for agricultural decision-making is an essential strategy for enhancing food security in already vulnerable areas, and a key component of climate-smart agriculture. Although existing initiatives have been successful in reaching out to some smallholder farmers, the challenge of broadening the on-the-ground impact of climate services for vulnerable communities remains.

In Colombia, CCAFS and the International Center for Tropical Agriculture (CIAT) worked closely with the Ministry of Agriculture and Rural Development to strengthen the adaptive capacity of farmers to climate variability. CIAT-CCAFS' agroclimatic prediction science has profoundly changed how agricultural sector organizations generate and share climate variability adaptation recommendations.

IN 2016



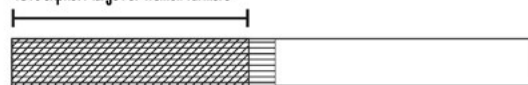
Breakthrough science and innovation

In climate change plans submitted to the United Nations in 2016, 104 countries included intentions to reduce emissions in the agriculture sector, but no global target for mitigation from agriculture had been set. To fill this gap, scientists from CCAFS, with partners from 5 CGIAR centers (CIAT, CIFOR, CIMMYT, ILRI and IRRI) and 15 organizations, calculated, for the first time, the amount of agricultural emission reductions needed to limit warming to 2°C in 2100. They found that annual emissions from agriculture must be reduced by 1 gigatonne of carbon dioxide equivalents per year (GtCO₂e/yr) by 2030 to stay within the 2°C limit, and that the incremental actions we are taking will be insufficient for meeting this target. Scientists called for urgent development and implementation of transformative technical options.

IN 2016

125 *TECHNOLOGIES AND PRACTICES*
RESEARCHED

45% explicit target of women farmers



50% assessed for gender-related impact



from Daga-Birame were inspired to create a “one woman, one fruit tree” juice business to generate income and increase nutrition immediately, and they joined resources to plant fruit-bearing trees, an investment in future income and nutrition.

Way forward

The successful initiatives highlighted in the 2016 Annual Report demonstrate that partnership is crucial to achieve outcomes. As Bruce Campbell writes:

The power of partnerships is vast, as are the increasingly urgent climate change adaptation and mitigation challenges faced by smallholder farmers. In Phase II we have to achieve even more – partnerships are central to that ambition.

IN 2016
CCAFS SCIENTISTS PRODUCED
349 PUBLICATIONS



54% OPEN ACCESS

134 PEER REVIEWED
JOURNAL ARTICLES

88% IN ISI JOURNALS

Integrating gender and youth

Exchange visits among rural communities show farmers how others are adapting and building resilience to climate change. CCAFS uses a “farms of the future” approach and organizes trips for community leaders to places that have a climate that is similar to what their communities might experience in the future. Farmers are able to see what they can do now and how they can prepare for the future.

A visit organized for leaders from Daga-Birame – a CCAFS Climate-Smart Village in Senegal – showed a path to economic opportunity from agroforestry. Women farmers



Read more:

Read the CCAFS 2016 Annual report: <http://bit.ly/2wPH7pf>

Lili Szilagyi is a Communications Consultant at the CCAFS Program Management Unit.

Special Issue of Agriculture for Development on Climate-Smart Agriculture

CCAFS scientists share insights on the directions for climate action in agriculture.

By Paul Harding

In 2016, the editors of *Agriculture for Development*, the journal of the Tropical Agriculture Association (TAA), invited Bruce Campbell and Dhanush Dinesh to guest edit a special issue on climate-smart agriculture. In consultation with the Coordinating Editor of the journal, they interacted with colleagues and partners at the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) to produce a broad-ranging selection of articles, news from the field, and book reviews. The special issue of the journal (*Ag4Dev30*) was published in May 2017.

In their guest editorial, Campbell and Dinesh explain how agriculture and food systems stand at the nexus of three of the greatest challenges of the 21st century: overcoming food insecurity, coping with the impact of climate change, and reducing greenhouse gas (GHG) emissions. For these reasons, a major movement has arisen around 'climate-smart agriculture (CSA)', which is focussed on the three pillars of productivity, adaptation and mitigation. The development of the CSA concept and its relationship with climate change and agricultural development is described in a new book entitled *Climate change and agricultural development: improving resilience through climate smart agriculture, agroecology and conservation*, edited by Udaya Sekhar Nagothu and reviewed in this special issue by Manyewu Mutamba.

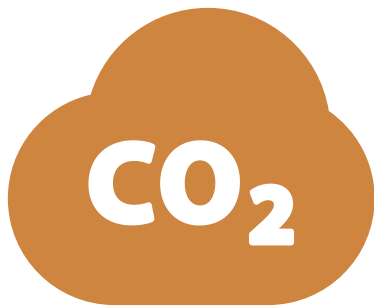
In the first article, *The rise in Climate-Smart Agricultural strategies, policies, partnerships and investments across the globe*, Dinesh *et al* summarise key CSA efforts at global, regional and national levels. These include the growth in



Global uptake of climate-smart agriculture policies has been witnessed in recent times

publications using the term 'CSA'; global and regional alliances of national governments; regional and national strategies, policies and action plans; CSA concepts, programmes and projects; and investments in, and funding for, CSA. It is clear from this overview, that CSA really is one of the key 'movements' of our times. In *CSA-Plan: strategies to put CSA into practice*, Girvetz *et al* present guidance for operational planning and implementation of CSA. CSA-Plan frames actions into four components: situation analysis, targeting and prioritisation, programme design, and monitoring and evaluation. Putting CSA into practice requires knowing what is climate-smart in different locations and what best suits the context. There are therefore often trade-offs between the three goals of CSA: productivity, adaptation/resilience, and mitigation. CSA-Plan has already been successfully applied in many countries and with various partners.

The third pillar of CSA focuses on mitigation. This is a challenge, particularly for developing countries, where food security and adaptation are the main priorities. In many countries, fertiliser applications are below levels required for



New CSA innovations have been invented to reduce and mitigate impact of GHG gases

increased, sustainable production, and therefore need to increase. However, this usually leads to rises in GHG emissions. An article by Lini Wollenberg, entitled *The mitigation pillar of CSA*

– *targets and options*, argues that agriculture in developing countries should be put on a low emissions development (LED) pathway. She justifies a mitigation target, for agriculture globally, of 1 gigatonne of carbon dioxide equivalent (CO₂e) per year by 2030 to stay within a 2°C emissions budget of 6-8 gigatonnes CO₂e for agriculture generally. However, LED alone will not be sufficient to achieve this, so more ‘transformative actions’ will also be necessary. These include innovations such as methane inhibitors for dairy cows, and breeds of cattle and crops that reduce GHG emissions; policies such as more rigorous carbon pricing, taxes and subsidies; sequestering soil carbon; reducing deforestation; and decreasing food loss and waste.

In their article *Agricultural diversification as an adaptation strategy*, Noriega *et al* explain how agricultural biodiversity plays a key role in sustaining ecosystem services and adapting to climate change. However, the full potential of agricultural biodiversity is yet to be realised because it is context-specific, and is often dependent on appropriate enabling policies.

Loboguerrero *et al* highlight important contributions from outside the agricultural community in their paper *Climate services and insurance: scaling CSA*. Promoting CSA ‘at scale’ is a key challenge, yet climate services and insurance can provide tools to scale-up CSA by providing an enabling environment and protecting against the impact of climate extremes. In this context, climate services include the production, translation, transfer and use of climate knowledge and information to support climate-informed decision-making and climate-



The impact of diversification in mitigation and adaptation to climate change and its impact.

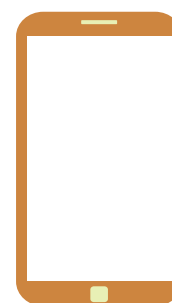
smart policy and planning. Index-based insurance, whereby payouts are based not on farmers’ actual losses, but on an objectively measured index that is correlated with losses, has overcome many obstacles associated with traditional crop insurance. This in turn has facilitated climate change adaptation and climate-resilient development goals.



Index insurance among farmers

Differentiation and inequality within communities can provide barriers that constrain women’s ability to adapt to climate change, thereby further widening the gender gap in agriculture. In their paper *Closing the gender gap in agriculture under climate change*, Nyasimi and Huyer demonstrate how gender-responsive climate-smart agricultural practices and technologies can provide opportunities to close the gender-gap, while at the same time adapting to climate change.

Van Etten *et al* argue that ‘big data’, including emerging techniques of machine-learning and citizen science, can help CSA to achieve scale and reach millions of farmers with options for tackling climate change. In their paper *How can the Data Revolution contribute to climate action in smallholder agriculture?* they describe and illustrate five data-related concepts linked to agricultural climate action: lean data, crowdsourcing, big data, ubiquitous computing, and information design.



Use of technology among farmers

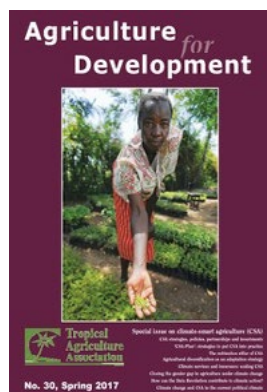
A selection of Newsflashes and News from the Field articles illustrate some of the many CSA projects currently on-going around the world, including *Climate-Smart Agriculture across scales in Latin America*, where Loboguerrero *et al* highlights how policy makers of Central America and Dominican Republic are producing a regional CSA Strategy, complemented by national efforts to promote and implement CSA, for example in the Nicaraguan coffee sector. At the local level, an approach for decision making in the context of climate change was developed in Colombia, which enables farmers to make decisions using climate forecasts, this approach is now being scaled up in Colombia’s Nationally Determined Contribution.



S. Kilungu (CCAFS)

Small holders across the world are applying climate-smart innovations to improve their output.

Other examples of the scaling up of CSA are the climate-smart village approach, the Adaptation for Smallholder Agriculture Programme (ASAP), and the VUNA project. Geoff Hawtin reports on climate change research in mountain areas; and Philip Thornton provides a salutary opinion piece on *Climate change and CSA in the current political climate*.



Finally, the TAA's 11th Hugh Bunting Memorial Lecture, entitled *Climate change and agriculture: risks and*

opportunities to food and farming systems in the tropics, presented by Tim Wheeler, summarises the challenge of global food production in the context of a growing population, over- and under-consumption of food, and a warming world. Impacts of climate change are presented, and some of the opportunities and responses are described.

Read more:

Campbell BM, Dinesh D, (Eds.). 2017. Special issue on climate-smart agriculture (CSA). *Agriculture for Development* no. 30: <http://bit.ly/2uIRwFG>

Paul Harding is the Coordinating Editor of the *Agriculture for Development* journal and former Assistant Director General of Bioversity International

Special issue on climate-smart agriculture (CSA)

Stakeholders in Mt. Elgon region agree to use local legislation to improve coffee quality

Multi-stakeholder platform in Uganda works to revitalize a previous coffee ordinance.

By John Francis Okiror

The quest for innovative solutions to complex agricultural problems has been a major theme of agricultural research for development, leading to a shift from technology-oriented approaches to systems-oriented solutions, and more recently to innovation approaches.

The evolution of these approaches parallels the evolution of development interventions in general from a top-down approach to a participatory one. The Transfer of Technology approach reflects the top-down transfer of research knowledge and technologies by extension staff to farmers, while the Farming Systems approach focuses on socio-cultural, economic, and agro-ecological drivers that influence performance of agricultural innovation at the level of the individual field, farm, or collection of farms. But these approaches retain power in the hands of scientists who obtain information from farmers to identify what might be good for them. The Agricultural Innovations Systems approach emphasizes the institutional and political dimensions of change processes and considers innovation as a process that is shaped by interactions between actors and institutions inside and outside the agriculture sector.

Beyond the different dimensions (i.e. biophysical, technical, socio-cultural, economic, institutional and, political), agricultural problems are entangled in interactions across different levels (international, national and subnational), and

involve multiple stakeholders, including researchers, farmers, policy makers, private sector and civil society. The approach of working together to find solutions to complex agricultural problems such as impacts of climate change on food security has been given various names that include innovation platforms, multi-stakeholder platforms, learning alliances, social learning, or self-help groups.

Learning alliances are increasingly seen as a promising vehicle for agriculture innovation and development. Since 2014, the CCAFS-funded Policy Action for Climate Change Adaptation (PACCA) project has assisted in the establishment of learning alliances in Uganda and Tanzania, with the goal of influencing and linking policies and institutions from national to local level for the development and adoption of climate resilient food systems in East Africa. Learning alliances have catalyzed collective cycles of learning, action and reflection around climate change impacts and policy related issues, in addition to being at the heart of strengthening relationships between key stakeholders where the project is implemented.

The Uganda Ministry of Water and Environment through its Climate Change Department has partnered with PACCA to build not only capacity of district stakeholders on the National Climate Change Policy (2012) but also proactively engage them on the process of drafting the Climate Change Bill, with the aim of making the process all-inclusive and adapting the policy to local contexts using district ordinances



E. Kemigisha

Growers harvesting coffee berries in Luweero, Uganda.

and sub-county bylaws.

Mbale District Local Government, through the district learning alliance, prioritized reinstating the Coffee and Cotton Ordinance (1998) during a two-day learning alliance planning meeting that took place at the District Council Hall on 29 – 30 March 2017. This event was organized with support from the PACCA project in partnership with USAID, Family Health International, and Uganda's National Agricultural Research Organization.

"The ordinance is necessary in my view as a technical person because it will address the constraints of the coffee industry," said Julius Ayo, the district agricultural officer, while presenting the achievements and challenges of the ordinance that was suspended after only two years of implementation. Stakeholders in the region agreed to use the ordinance to address the impacts of climate change, rampant pests and diseases, and quality of coffee, but there was need to further consult key stakeholders at community, sub-county and district levels to get their position, and to set up a review committee as well as a sectoral committee to draft the revised coffee ordinance before it is sent to the District

Council for approval.

"What the council is interested in is that the ordinance will work this time and the existing gaps that led to its suspension are addressed," said the Deputy Speaker, Rose Nafuna, adding that it is important to secure farmers with a guiding framework.

During the coming months, stakeholders from the Mbale Learning Alliance will work on revitalizing the Coffee Ordinance by involving key stakeholders within the districts of Mt. Elgon region to pass similar ordinances that not only address the impacts of climate change but also the quality of coffee beans as well as pests and diseases.

John Francis Okiror works in the communications team at the International Institute for Tropical Agriculture. He supports communications for the IITA-led PACCA project.

Who calls the shots? Youth participation in agricultural decisions and national policy

New info note presents research findings from a study on youth decision making in agriculture.

By Anne Miki and Laura Cramer

Young people are the backbone of a nation and can change the future of the society. However, in East Africa, precarious employment opportunities and challenges to traditional agricultural practices due to climate change have prompted the need to explore the role of the youth in adaptive farming practices. By learning the extent of their decision-making power in agricultural adaptations to climate change, researchers and development practitioners can better tailor programs and messages to young people.

As part of a research project on youth decision making in agricultural climate change adaptation strategies, data was collected in three CCAFS Climate-Smart Villages: Wote, Kenya; Hoima, Uganda; and Lushoto, Tanzania. At each site, focus group discussions and case study interviews were conducted with youth between the ages of 18-35 years old. All sessions were divided by gender and included youth who were involved in agriculture as some facet of their household's livelihood. Half of all interviews were conducted with males, and half with females.

Policymakers and stakeholders were also interviewed individually in Nairobi, Kenya; Dar es Salaam, Tanzania; and Kampala, Uganda to understand their views on youth involvement in policymaking on issues related to climate change and agricultural adaptation, including representatives from national ministries, research institutions, finance institutions and NGOs in each country.

The interviewed youth involved in agriculture have an understanding of the impacts of climate change and how to appropriately adapt their agricultural practices in part because extension services have been successful in providing appropriate training for them. Decision making power of youth in agriculture is contingent upon their education and experience and also varies depending on age, gender, and marital status.

For example, a young unmarried woman still living with her parents has less influence on agricultural decisions for her household than a young man who is married and leads his own household. They may have similar levels of education, training, and experience, but their influence on agricultural decisions is mediated by their social standing in the household and community.

The primary agricultural concerns of youth in the three sites are lack of financial capital, lack of land ownership and lack of agricultural inputs. These deficits hinder the ability of youth to implement the adaptation strategies they have learned through various training sessions, thereby limiting their decision-making power at the household and

Youth want to be part of the decision making process





A. Eitzinger (CIAT)

Farmers follow a footpath through a maize field in Hoima, Uganda, one of the sites where youth were interviewed.

community levels. Despite programs at the national level that offer loans, youth were quick to note that accessing this funding is not feasible, due to lack of transparency and complex bureaucratic requirements.

At the national level, the policymakers and other stakeholders who were interviewed reported the importance of youth and adaptation to climate change. However, although policymakers and stakeholders value the opinion of youth, involvement of youth in policymaking is indirect and limited.

What's next?

The youth interviewed in Kenya, Tanzania and Uganda demonstrated an understanding of climate change and its impacts on agricultural productivity, however they need to be empowered in decision making at household and community levels. Government fund disbursement procedures to the

youth need to be more transparent and less bureaucratic to allow easier access to the funds. Policymakers and stakeholders need to actively include the youth in national level decision making to better align their decisions with young people's priorities and needs.

Read more:

Blog on initial findings: New skills or access to resources: what do young farmers need most? <http://bit.ly/2w1YqpD>

Info note: Youth Decision Making in Agricultural Climate Change Adaptations: Research Findings from East Africa: <http://bit.ly/2x4IGPu>

Anne Miki and Laura Cramer work in the Priorities and Policies for CSA Flagship of CCAFS.

The authors of the info note are Kelly Amsler, Chloe Hein and Genêt Klasek. They are Masters in Development Practice candidates at the University of Arizona, in Tucson, Arizona. For questions regarding this project please contact k.amsler@cgiar.org, c.hein@cgiar.org and g.klasek@cgiar.org.

What is the issue with gender budgeting?

Perspectives from local government practitioners on creating budgets to eliminate disparity and promote gender equality.

By John Francis Okiror

“Gender equity and budgeting is a requirement for all sectors and local governments,” said Joel Atim, senior inspector with the Ministry of Local Government, while presenting at the gender budgeting feedback workshop in Nwoya district of Uganda on 23 February 2017. He explained that gender budgeting focuses not only on eliminating gender disparities in all sectors of government and ending all forms of discrimination against women but also promotes gender equality and women’s empowerment in the development process.

To highlight the importance of gender relations and equality in sectors such as agriculture, natural resources, education and health, gender and development practitioners have argued that expecting a country to develop with half of its population unable to fully participate in the process is like asking someone to work with one arm and leg tied behind his/her back.

Gender budgeting has become a recognized approach to use fiscal policy and administration to address gender inequality and promote women’s advancement. According to the International Monetary Fund (IMF) survey of gender budgeting efforts in sub-Saharan Africa, Uganda and Rwanda have achieved notable success in their efforts to integrate gender-oriented goals into budget policies, programs and processes. This success is attributed not only to leadership by the Ministry of Finance but also non-governmental organizations and parliament that play an essential role in gender budgeting advocacy.

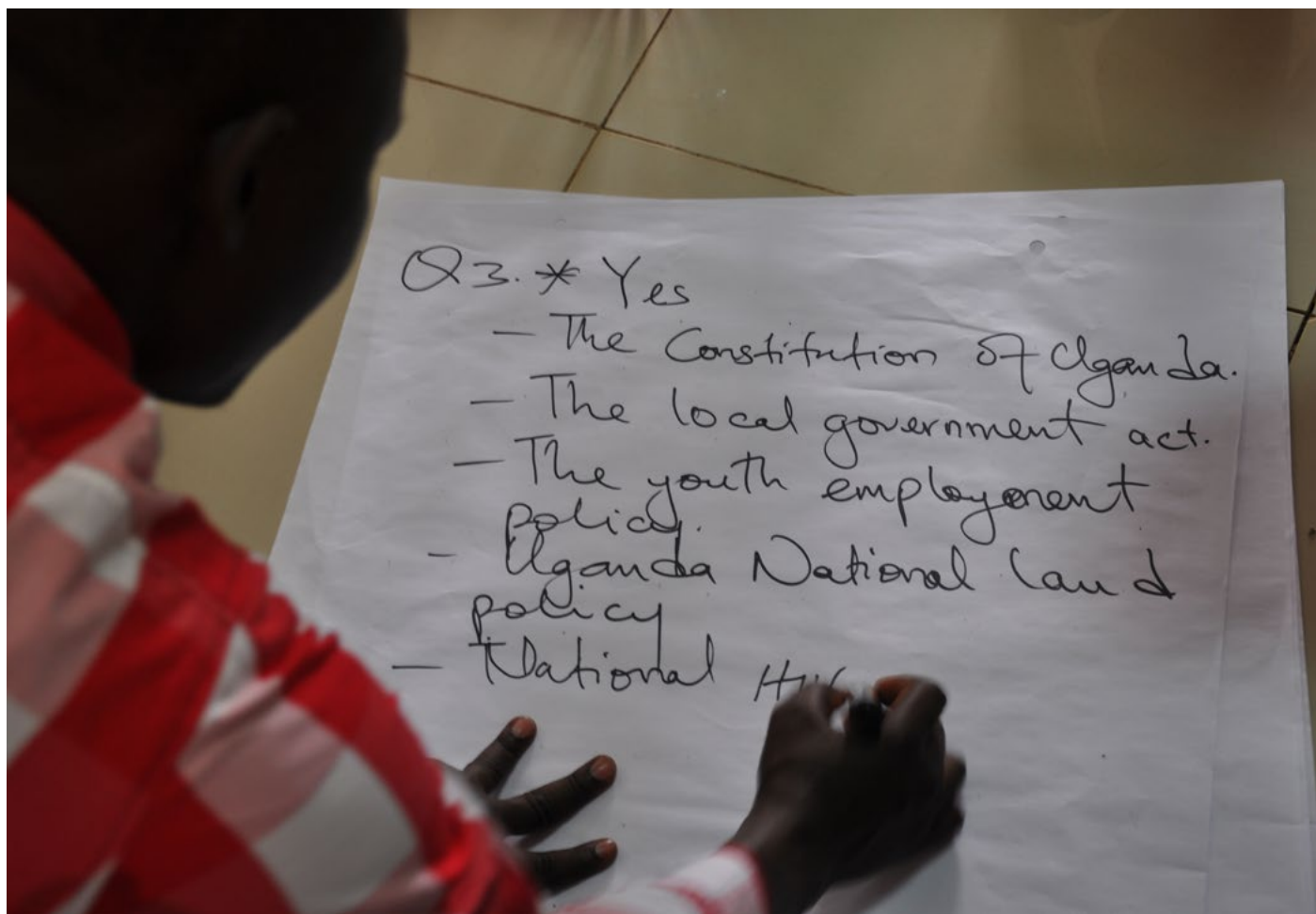
Focus on Uganda

Uganda has undertaken a number of initiatives to promote gender equality. The Constitution of the Republic of Uganda (1995) provides a framework that promotes equal consideration of women and men in government programs, the National Gender Policy (1997, revised in 2007) provides for mainstreaming gender in the development process, and gender budgeting guidelines from the Ministry of Local Government facilitate planning and budgeting processes at the local government level. However, the challenge remains to transform policy objectives into practice.

Gender Budgeting Feedback workshops were conducted in February 2017 in Luweero, Rakai and Nwoya districts in Uganda to give feedback and validate findings of the gender budget analysis conducted by the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) through its Policy Action for Climate Change Adaptation (PACCA) project. The study analyzed four district and twelve sub-county budgets for four financial years (2012/13 to 2015/16), with specific reference to the agriculture and natural resource sectors.

While presenting the research findings, Mariola Acosta, a research fellow at the International Institute of Tropical Agriculture (IITA), told district and sub-county officials in Nwoya that gender activities are allocated an average actual budget of 0.09 percent and 0.43 percent of the total annual budget for the district and sub-county respectively.

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Participants highlight the policy initiatives Uganda has undertaken to promote gender equality.

opportunities to improve. The central government has provided guidelines for gender mainstreaming and budgeting such as the Local Government Gender Mainstreaming Guidelines, Local Government Act (1997), Equal Opportunities Commission Act (2007), and the National Gender Policy (2007). Discussions by local governments revealed that there are actions they could take on immediately to address gender budgeting and allocation gaps. These include lobbying for funds, allocating part of local revenue to the gender budget, using a bottom-up approach in planning, and awareness creation and gender mainstreaming in all sectors at district and sub-county levels.

Moving forward, PACCA plans to build on the information shared in these feedback workshops and continue supporting

district officers in Uganda to transition towards more responsible gender budgeting in climate change policy formulation, which would not only involve an increase in budget allocated to gender issues but also a diversification of the gender activities planned by the districts.

Read more:

Towards gender responsive policy formulation and budgeting in the agricultural sector: Opportunities and challenges in Uganda <http://bit.ly/2r0aL8H>

Gender and Climate Change in Uganda: Effects of Policy and Institutional Frameworks <http://bit.ly/2rZCs0B>

John Francis Okiror works in the communications team at the International Institute for Tropical Agriculture. He supports communications for the IITA-led PACCA project.

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Are these the climate-smart potatoes?

Ensuring food security and increased income for smallholder farmers through heat tolerant and adapted potato clones.

By Tabitha Muchaba

Situated in the Northeast of the country, the district of Lushoto is part of the so called highlands of Tanzania where potatoes are traditionally grown. Due to heat and lack of resilient potato varieties, farmers would lose all the crop especially when they grow the local variety called *Kidinya* which is extremely susceptible to Late Blight disease. To address these issues, the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), initiated a study aimed at developing more resilient potato varieties that can grow in both long and short rainy seasons and give higher yields. The study, initiated in 2013, was led by the International Potato Center (CIP) in partnership with Selian Agricultural Research Institute (SARI), Lushoto District Agriculture, Irrigation and Livestock Cooperatives Office (DAICO), YARA Tanzania Limited, Japan International Cooperation Agency (JICA), local Non-Governmental Organizations (NGOs) and Lushoto farmers.

Based on demand by Lushoto farmers, this participatory action research (PAR) also sought to develop potato varieties with better culinary traits. The trials were carried out in five villages: Kwesine, Boheloi, Maringo, Kwekitui and Milungui with experimental materials comprising of six advanced and heat tolerant clones from CIP. The data collected from three seasons of field evaluations showed a certain consistency in the high yielding ability of four genotypes: Asante, Shangii, CIP392797.22 and CIP398208.29. Two clones were named through a stepwise and participatory approach and proposed for official release. Findings are presented in a recently published working paper entitled *Participatory Evaluation of Resilient Potato Varieties in Climate-Smart Villages of Lushoto in Tanzania*.



Christine Bukania (CIP-SSA)

Thanks to resistant potato varieties, Late Blight disease is no longer a serious threat to these farmers.

Read more:

Blog: In pictures: tenfold potato yield in Lushoto, Tanzania <http://bit.ly/2rURmGp>

Blog: Improving potato yields for farmers in the Usambara Highlands <http://bit.ly/2qk5ZSt>

Blog: Potato farmers in Lushoto say 'Asante' <http://bit.ly/2qocD99>

Info Note: Climate-smart villages and progress in achieving household food security in Lushoto, Tanzania <http://bit.ly/1rtLmDB>

Workshop Report: Stakeholder Participatory Workshops in Lushoto, Tanzania: Climate Smart Agriculture Practices <http://bit.ly/2r14TOt>

Tabitha Muchaba is a Research Assistant at CCAFS East Africa. This news update was edited by Dieudonne Harahagazwe (CIP), Vivian Atakos (CIP) and Catherine Mungai (CCAFS East Africa).

PICSA training of trainers: Strengthening national and local capacity for climate services for agriculture in Rwanda

Providing farmers with localized, context-specific information which is easy to understand and interpret, enables them to make better farming decisions and helps build their resilience to climate risks and ensures their food security.

By Catherine Mungai , Desire Kagabo, Gloriose Nsengiyumva and Maren Radeny

Through the USAID funded Rwanda Climate Services for Agriculture project, the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) is helping communities in Rwanda and national government build their resilience and adapt to climate-related shocks by integrating climate services into decision making processes. This project is being implemented in collaboration with Rwanda's Meteorological Agency (Meteo Rwanda), Rwanda Agriculture Board (RAB), the International Research Institute for Climate and Society (IRI) at Columbia University and the International Center for Tropical Agriculture (CIAT).

The project builds on and aims to scale up the Participatory Integrated Climate Services (PICSA) approach — which has successfully been used in 7 countries in Sub Saharan Africa — to reach rural communities in Rwanda. PICSA is a participatory process that encourages farmers to take decisions by providing them with weather and climate information, the skills to interpret it, and a range of of livelihood, crop and livestock options that best fits their needs and the expected weather. Through the PICSA approach, agricultural extension staff, development partners and other intermediaries will be trained to integrate climate

services into their ongoing work with farming communities across Rwanda's 30 districts.

Using weather and climate information to make informed decisions

A PICSA training of trainers (ToT) workshop was conducted in Huye town from 12 to 16 June 2017. Organized by CIAT, RAB and Meteo Rwanda, the workshop equipped 68 stakeholders with skills to implement PICSA in their districts. Participants were drawn from all over the country and represented different organizations such as RAB, Meteo Rwanda, the IFAD-funded Climate Resilient and Post-harvest Agribusiness Support Project (PASP), Agriculture Information and Communication Program- Ministry of Agriculture and Animal Resources, Radio Huguka, Developpement Rural du Nord (DERN), Caritas Kibuye, CARITAS Kibungo, CARITAS Butare, IRI, IGAD Climate Prediction and Applications Centre (ICPAC) and CCAFS.

The training, which was conducted in two languages (English and Kinyarwanda), was facilitated by experts from CIAT, RAB and Meteo Rwanda with technical support from Peter Dorward from University of Reading and Tufa Dinku from IRI.

The training module combined short presentations by experts

group discussions and presentations by participants, a field practice session, and a wrap up planning session. Specific knowledge gaps as highlighted by the trainees included how to share information with farmers on climate services for agriculture, how to interpret forecasting information, how farmers obtain information on climate change, how farmers can cope with climate variability and change, how to differentiate between climate variability and change, and how to develop seasonal calendars using climate information, amongst others.

The trainees learnt how to use local climate information from historical data to seasonal forecasts to reduce risks associated with climate variability. The trainees and stakeholders were expected to use the knowledge and skills to train farmers how to use climate information to make better decisions in areas where they work. It is anticipated that in so doing, the agricultural productivity would be increased and farmers would become more resilient to future climate change.

This is the third training in Rwanda since the project began in 2016. It is expected that 150,000 farmers will have been trained directly and 750,000 farmers trained indirectly by the end of the project. This target seems ambitious, but through the Twigire Muhinzi approach, this will be achieved. Twigire Muhinzi is a farmer extension model implemented by Rwanda's Ministry of Agriculture (MINAGRI) and Ministry of Local Government (MINALOC) to ensure that at least one farmer in a village here referred to as a "farmer promoter" is empowered with better skills to improve his livelihood through better use of agricultural advisory information, and neighbours will learn from him or her. Through this model, farmers can easily access basic agricultural advisory information, including weather and climate information through trainings from farmer promoters, mobilisation and demonstration plots in each village.

Next steps

Following the intense training, some of the trainees still had some lingering concerns:

"I am worried about how we shall reach the blind farmers, and those who do not know how to read and write," said Donatha Mukamuganga, Nyamagabe District agronomist.

The trainees are now expected to train farmer promoters in their work places using the existing extension model Twigire Muhinzi. Using this approach, it is anticipated that 20,000



A. Nyandwi (MinAgri Rwanda)

Rwandan stakeholders learned about how to encourage farmers to take decisions by providing them with weather and climate information.

farmers will be trained by the end of 2017. A key observation and recommendation from Peter Dorward of University of Reading is to make the PICSA content and training process as localized and context-specific as possible.

Read more:

CCAFS Blog: Coordinating climate services with key institutions in Africa: <http://bit.ly/2vDfiSg>

CCAFS Blog: New program in Rwanda will transform agriculture through climate information and historic data reconstruction: <http://bit.ly/2wQ43V4>

PICSA Manual: Participatory Integrated Climate Services for Agriculture (PICSA) Manual: <http://bit.ly/2wPJ8SI>

Catherine Mungai is the Partnerships and Policy Specialist at CCAFS East Africa.

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Gloriose Nsengiyumva is the CCAFS Rwanda Climate Services for Agriculture project – Outcome 1 coordinator based at the International Center for Tropical Agriculture (CIAT), Kigali, Rwanda.

Maren Radeny is the Science Officer at CCAFS East Africa.

Celebrating women farmers in Nyando: Transforming lives through climate-smart agriculture

Empowering farmers: four inspiring stories of Nyando women bringing about change.

Today is International Women's Day, and the campaign theme is #BeBoldForChange, forging a more inclusive gender equal world.

Empower a woman, empower nations, so goes the common saying.

Nyando, a conservative society, is a rich agricultural flood plain around Lake Victoria in Western Kenya. Most households in Nyando are headed by women and food insecurity is a major challenge. As of 2011, 81% of the families experience 1-2 hunger months in a year, while 17% of the families experience 3-4 hunger months; a period when the household has difficulty getting food from any source. During the dry season, rivers in Nyando often run dry, requiring women to walk long distances for water.

Since 2011, the CGIAR Research Program on Climate Change, Agriculture and Food Security East Africa (CAAFS EA) has been training women farmers on sustainable agricultural practices and climate-smart interventions. There are three active community-based organizations (CBOs) - Friends of Katuk Odeyo (FOKO), NECODEP, KAPSOKALE. These CBOs cover 106 villages in Nyando, and more than 70% of the active members are women. As a result of the trainings, there have been several changes in the community and these include women

By Tabitha Muchaba, Caroline Odera, Maren Radeny and Catherine Mungai

starting small businesses, earning an income and making enough money to send their children to secondary school, something that was not happening before the targeted capacity building initiatives and empowerment.

To celebrate the International Women's day, we highlight stories of four women farmers who are making a difference in their communities and inspiring other women.

1. Mercyline Atieno – Poultry farmer benefiting from innovations funds



Mercyline Atieno, a poultry farmer in Nyando shares on how she has benefited from the innovation funds initiative. Since 2015, she joined the NECODEP CBO and borrowed money from the innovation funds to start her poultry business. She has always wanted to be self-employed, and her dream came true – she has increased the number of poultry owned and sold over 200 chickens.



“I needed to improve the housing for the chicken and only had a few building materials. I got a loan from NECODEP through the innovation fund and I was able to build a house. I started with ten chickens, I took my eggs to the hatchery and currently I have more than 50 chickens and I have sold more than 200.”

With just an investment of KES 10,000 (USD 100), Mercyline now sells eggs and chicken to her neighbors and gets a profit of about USD 100 a month. Sometimes she faces challenges like drought and Newcastle disease, but that has not been a reason for her to stop doing her business.

The community innovation funds have helped women farmers access loans at affordable interest rates to invest in new crops, improved crop varieties and livestock enterprises. When the program started, 17 groups in Nyando with membership from 306 households were operational and have been able to save nearly USD 69,500. Borrowing from the facility has reached 90% and most household use the loans to purchase food, procure farm inputs, pay school fees and set up small businesses.

Mercyline now works at the community hatchery, where she grades eggs and monitors them till they hatch.

2. Catherine Akinyi – Obinju Smart Farm

Catherine is the chairwoman of Obinju Smart Farm Group. The smart farm comprises of a greenhouse - which is free from flooding and drought, and is used for seed bulking of fodder for livestock, and growing horticultural crops. The smart farm also has two water pans with a total capacity of over 250,000 litres having over 1,000 tilapia fish. The group is also involved in producing sorghum, maize and bee keeping.



“Since we started this smart farm, we have never lacked food. We always have vegetables to sell and food to eat in our homes.”

The group started more than 5 years ago as a women’s group, and used to plant trees. With the help of CCAFS, they now grow improved varieties of crops. After men saw how successful the women were, they joined the group.



The women save profit from selling their produce in a group bank, locally known as ‘table banking’. At the end of each month, they divide the profit among themselves, each member can get up to KES 25,000 (USD 250).

“I used to find it very hard to ask for money from my husband before, but I now have money. I can now convince my husband to do farming as he can also see the good returns.”

The farm serves as a demonstration site for women groups to engage in climate-smart agriculture.

3. Dorothy Achieng – Small Ruminants Livestock Farming



“I am a happy woman,” says Dorothy, “my life changed since I started keeping sheep and goats”.

Dorothy Achieng is married to Joshua Omolo, NECODEP CBO chairman. She has been practicing livestock keeping for two years now and has a total of seven goats and eight sheep.

“I sell the sheep and goats to local farmers in Nyando. I also sell goat milk and I can now easily pay school fees for my children.”

Being less labor intensive, Dorothy is able to take care of the livestock as well as manage other household responsibilities. The improved breed of sheep and goats grow very fast, and fetch higher market prices of upto KES 5,000 (USD 50).



“The milk is very nutritious. Am I not healthy?” she asks.

Women have full control over the small ruminants which they can sell without seeking authority from the husbands unlike cows which can only be sold by men. CCAFS has been collaborating with World Neighbors, Vi Agroforestry and Kenya’s Ministry of Livestock Development to work with farmers to improve productivity of small ruminants (sheep and goats). Overall, about 120 households in Nyando are now benefiting from interventions on small livestock. Of these households, 70% are headed by women.

Dorothy is encouraging fellow women to get into small ruminant livestock production as it is not labor intensive and the production cost is low. She would love to teach other women about it.



4. Pauline Omondi – Water Harvesting

Pauline Omondi has four water pans and also practices soil conservation. The water pans have a capacity of more than 84,000 litres that meet her water needs during the dry season.



“The water pans are everything, I have irrigated my farm and used it for my household’s chores. I can do everything I want to do in the farm.”

Pauline has also constructed terraces to control soil and water movement on her farm. On the terrace, she has planted fruit trees which has increased her annual income. She also keeps and sells mad fish after every three months.

“I am not scared as my family will never lack food.”



“Most women in the area give up after the water pan has dried. During droughts and dry season, I divert water from the river to the water pans.”

Pauline advises that women should be trained on how to use and depend on water pan. “Despite the challenges, I have persisted in farming and increased my harvest every year.”

Partners working in the Nyando Climate-Smart Villages include Kenya Agricultural and Livestock Research Organization (KALRO), the Ministry of Agriculture, Livestock and Fisheries (MALF), Magos Farm Enterprises, Maseno University, County Government of Kisumu, Vi Agroforestry and Thin Qubator Aquaculture.

Read more:

Blog: Empowering women farmers to feed the world <http://bit.ly/2qkuoqE>

Blog: Gender, power and climate information in Nyando, Kenya <http://bit.ly/2qoujBK>

Blog: Improving the adaptive capacity of women farmers in Western Kenya <http://bit.ly/2qkqQVA>

Photos taken by Tabitha Muchaba (CCAFS).

Tabitha Muchaba, Maren Radeny and Catherine Mungai work at CCAFS East Africa. Caroline Odera is a consultant working with women in Nyando Climate Smart Village.

The changing climate of Karamoja Region in Uganda: Impacts and communities' adaptation strategies

Research from the Karamoja region, located in northeastern Uganda, examined rainfall and temperature changes over a 35 year period, perceptions of climate change, and how climate change impacted livelihoods.

By Kathlee Freeman and Mary Nyasimi

Like many communities in Sub-Saharan Africa, the population of the Karamoja region, located in northeastern Uganda, is highly dependent on subsistence agriculture for food security and livelihoods. Most of the families in the region practice both agro-pastoral and pastoral farming in an effort to meet food security and livelihood needs, making them extremely vulnerable to climate change.

In a recently released report, *The Impacts of Climate Change on Food Security and Livelihoods in Karamoja*, the effects of climate change on household food security and climate change adaptation strategies were examined using data from Karamoja. The research was conducted jointly by the Climate Change Department (Ministry of Water and Environment), Uganda National Meteorological Authority (UNMA), CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), and World Food Programme (WFP). Uganda is one of the CCAFS target and site integration countries in East Africa where agricultural systems are mainly rain-fed and highly vulnerable to climate change and variability.

The study conducted rainfall and temperature changes over a 35 year period and household levels assessment of the perceptions, and impacts of the changing climate on the community's livelihoods. Findings revealed that the Karamoja region has experienced changes in average rainfall and temperature over a 35-year period. There is evidence of

increasing rainfall amounts in the months of the short rainy season that starts from September through to November. One impact of this prolonged rainfall is extension of the growing season.

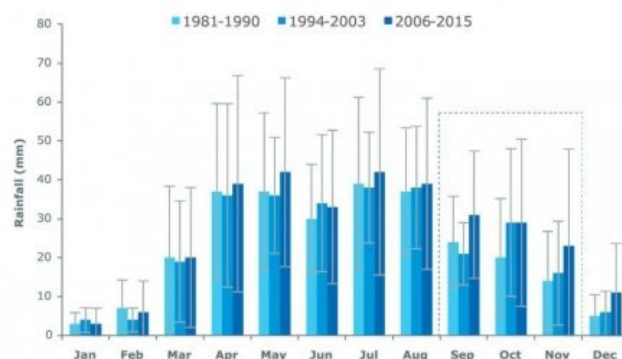


Figure 1: Decadal change in average monthly rainfall estimates for Karamoja. Error bars represent standard deviation in monthly rainfall estimates. Source: The Impacts of Climate Change on Food Security and Livelihoods in Karamoja

Average monthly temperatures in the Karamoja region are also increasing, affecting livestock forage quality and leading to negative livestock productivity.



Through CSA, women farmers benefit from the introduction of fruit trees which improve nutrition. The objective of the CSA strategy is to adapt to climate change, build resilience of agricultural systems and minimize emissions.

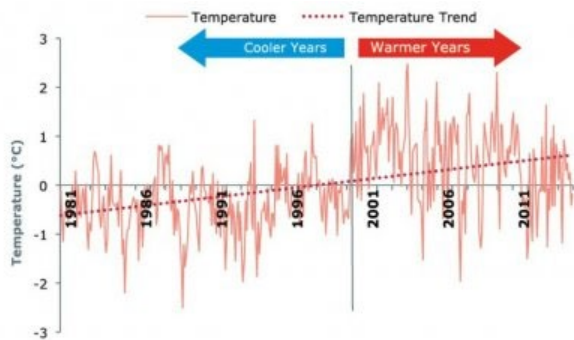


Figure 2: Average monthly temperature anomalies for Karamoja from 1981 to 2015. Source: *The Impacts of Climate Change on Food Security and Livelihoods in Karamoja*

The noted change in rain patterns in the Karamoja region, which include the Kaabong, Abim, Kotido, Moroto, Amudat, Napak, and Nakapiripirit districts, means that farmers are less able to depend on historic weather patterns when determining when to plant and harvest crops. Other climate shocks, including droughts and floods, impacted nearly 75 percent of respondents. For many farmers, the impact of erratic weather events leaves them vulnerable to food security and livelihood disruption. In the most impacted areas, coping strategies included begging, borrowing, or selling assets to meet household needs.

Despite the frequent occurrence of extreme weather events and shifting weather patterns, the perception of climate change amongst the community remained limited.

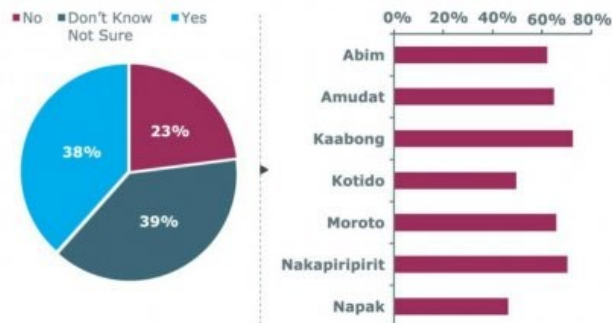


Figure 3: Have you noticed any changes in weather patterns or climate over your lifetime? Respondents who answered 'no' and 'not sure' or 'don't know' expanded to district level. Source: *The Impacts of Climate Change on Food Security and Livelihoods in Karamoja*

Nearly two-thirds of respondents from the region reported that they either did not notice or were unsure of climate change. Notably, female-headed households were less likely than their male counterparts to notice weather variability. These findings contrast with studies which demonstrate that African women are more attuned to the changing climate than men, with the amount of labor and time they invest in agriculture cited as the reason (see UNDP Report). Researchers note the troubling nature of these findings as it reveals the lack of preparedness from many farmers, especially women, and the decreased likelihood that farmers will adopt climate-smart farming practices.

Climate information services (CIS), which includes weather forecasts and agro-advisory services about agriculture production and management, are often accessed by farmers through radio. CIS is also a method of informing farmers of climate and weather changes as well as adaptation strategies. Researchers found that, in the Karamoja region, overall access to CIS is low. Female-headed households may have less access to CIS as they are less likely to own a radio.

These findings led the researchers to a number of recommendations that could assist with climate change adaptation and preparedness in Karamoja region. Some of the recommendations include water harvesting and conservation, which will reduce the dire consequences of erratic rainfall patterns. Households should also be made aware of the hazards that climate change poses. Part of this process includes improving access to CIS and working to incorporate climate information into already established information systems. Finally, as findings indicated that female headed households were less likely to be aware of climate change and had less access to information produced through both CIS and indigenous information systems, gender must be explicitly incorporated into climate change adaptation and services.

Read more:

The Impacts of Climate Change on Food Security and Livelihoods in Karamoja: <http://bit.ly/2wfiLHA>

Mary Nyasimi is a Science officer and Kathlee Freeman is a Communications Assistant at CCAFS Gender and Social Inclusion Flagship.

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Coffee, cameras and climate change: Seeing drought through the eyes of the farmer

A photo exhibition at the Makerere Art Gallery shows how drought has impacted farmers' livelihoods through their own eyes.

By Onno Giller

At the end of February, during the tail end of a drought that has wreaked havoc across the Horn of Africa, coffee farmers on Mt. Elgon in Uganda were each given a disposable camera and asked to document how drought has been impacting their livelihoods. The images they captured cut across the lives of the farmers, and went far beyond just photos of the coffee plantations. Water, transportation, laboring in the coffee fields and family life were recurring themes throughout the photos taken.

The photos were part of a research project, with the aim of gaining an understanding of how farmers see the impacts of climate change. The research is being carried out by the International Institute of Tropical Agriculture (IITA) in collaboration with Tim McDonnell, a Fulbright-National Geographic Storytelling Fellow, who is working across Africa writing stories on food security and climate change. In discussing the process, McDonnell said,

"I was very impressed by the quality of the photos, and it captured photos that would have been nearly impossible for me to take without staying for weeks with the family to gain their trust."

As part of McDonnell's farewell, as his three months in Uganda were coming to an end, an exhibition of the photos

was produced by McDonnell and co-hosted by the US Embassy and IITA at the Makerere Art Gallery.

"I went through the community to take photos, as I wanted to show my community to the outside world. I also wanted to take photos of good and bad agricultural practices to show my community so they can learn from them".



Sam Massa (left) answers a question during the panel discussion, while Tim McDonnell (far right) and Onno Giller (centre) look on.



Boda-bodas caught in a dust cloud behind a truck.

The opening of the exhibition included a panel discussion with McDonnell, Onno Giller, an environmental anthropologist with IITA, and Sam Massa, a coffee farmer who had taken some of the photos that were on display. Niles Cole, a cultural attaché at the US Embassy, facilitated the discussion. The crowd had come to the exhibition out of a variety of interests, resulting in a broad array of questions asked. Questions were posed around the climate change projections, farmers' perspectives and knowledge on climate change, the agronomic impacts of climate change on coffee, the possible adaptation techniques to the changing climate, as well as the choice of documentation method.

The presence of Sam Massa gave the panel discussion an extra edge, as he could give an impression of how it was to take part in the research. In a follow up interview, Massa said,

This and other follow up interviews are also part of the research, as IITA is going back to the farmers to give them a copy of all the photos they took, as well as discuss each photo with them. The interviews are a means of participatory analysis of the photos, as the farmers are given a chance to give their own impression of the photos and what they had in mind while taking it.

In his concluding remarks at the end of the panel discussion, Massa said,

“What has happened here should not be confined to these walls. Go and do something.”

He makes a valid point, and he had earlier pointed out that these photos captured problems in his community that should be addressed locally, and supported by local policies.

Tim McDonnell



People get a chance to look at the photos and ask the panelists more questions.

The stories coming from these photo arrays can thus not only be used as an educational tool, but also to influence policymaking at all levels. Research is also being carried out that aims at addressing the problems that are captured by the photos.

After the panel discussion was finished, the exhibition stayed open for another hour, and there was a chance to ask the panelists more questions as people took the time to look at the photos on display. Elizabeth Kemigisha, Communications Officer with IITA, said,

“I like that “art met science” to make otherwise big concepts like climate change appear very real.”

The exhibition stayed open for three more days before it was taken down. The research is still on-going, as interviews

with the remaining farmers will take place over the coming months. The photos will also be exhibited again during the celebration of IITA's 25 years in Uganda.



Tim McDonnell

Sam Massa (left) answers a question during the panel discussion, while Tim McDonnell (far right) and Onno Giller (centre) look on.

Read more:

Tim McDonnell, a Fulbright-National Geographic Storytelling Fellow, is working across Africa writing stories on food security and climate change. He has so far travelled to Kenya and Uganda, and is now in Nigeria. Find his stories and keep up to date with his escapades at <http://www.timmcdonnell.org/>.

If you are interested in learning more about the methodology or have any further questions, please contact Onno Giller (O.Giller@cgiar.org).

Onno Giller is an Environmental Anthropologist and Scaling and Innovations Specialist at IITA, and a PhD candidate at Wageningen University.

Climate-smart agricultural planning at a landscape level in Uganda

Rakai district learning alliance looks beyond climate-smart agriculture as a set of practices and technologies.

By John Francis Okiror

Taking the lead in Uganda, the Rakai district learning alliance has integrated various sectors and stakeholders at the landscape level to enhance not only synergies between the three interlinked pillars of climate-smart agriculture (CSA) but also sustainable management of ecosystem services.

In 2012, the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) took action to create awareness about local climate risks to inform farming decisions, and contribute towards efforts to reduce hunger and malnutrition and improve household incomes and food security. CCAFS initiated partnerships between farmers, research organizations and policymakers to scale up and scale out the appropriate climate adaptation options.

According to the Food and Agriculture Organization of the United Nations (FAO), the three interlinked pillars of productivity, adaptation, and mitigation are necessary to achieve the principal goal of CSA, which is food security and development.

In developing countries, forests and trees on farms are important carbon sinks and are part of complex rural landscapes, which collectively fulfill the livelihood needs of the rural populace who rely on a variety of ecosystem services such as fuel, food, and water.

Agriculture, however, remains the key driver of deforestation, and the major cause of greenhouse gas (GHG) emissions from the forest sector. Estimates by the United States Environment

Protection Agency (EPA) of global GHG emissions from agriculture, forestry, and other land use sectors account for 8 billion metric tons of carbon dioxide (CO₂) or a quarter of the 2010 global GHG emissions.

Although there is need to consider interventions at the wider landscape level that increase resilience of forest systems to maintain the flow of ecosystem services and mitigate GHG emissions, learning alliance stakeholders noted that some organizations in the district such as Flora and Fauna International and Caritas have tried to introduce alternative sources of livelihoods in order to reduce pressure on forests and wetlands.

While speaking at the participatory land use mapping of Rakai district, International Institute of Tropical Agriculture (IITA) Uganda Country Representative, Laurence Jassogne, noted that the learning alliance provides space for various actors to discuss the need to show farmers benefits of conserving forests and wetlands, adding that if farmers know their usefulness, then stakeholders in the district can have a bottom-up approach of conserving the environment.

Whenever we talk about climate change it is always about practices but I want us to think about CSA and landscapes,” Jassogne said. “CSA starts at landscape level when we decide that this is where we will have forests and wetlands.”

The meeting was held at Kyotera, on 19 April 2017, and organized by the Rakai district Local Government with support from the CCAFS-funded Policy Action for Climate



JF Okiror (IITA)

Laurence Jassogne, IITA Uganda Country Representative, discussing climate-smart agriculture as a landscape level intervention.

Change Adaptation (PACCA) project and USAID-funded project on “Development of tools to facilitate Uganda coffee farmers’ adaptation to climate change,” implemented by IITA.

Learning alliance stakeholders mapped the district based on the following land use patterns identified by Rakai district Local Government: livestock and crop production, home gardens and fallow, settlements, forests, fishing, mining, and industrial use.

The participatory land use mapping exercise builds on previous learning alliance efforts to zone Rakai district based on criteria such as vegetation cover, topography and farming systems. Three zones were identified (i.e., cattle corridor, mixed farming and forested area), and participants discussed key zone enterprises, climate change effects on

the enterprise, constraints and policy issues. The issues prioritized by the learning alliance stakeholders were further refined and integrated by the District Technical Planning Committee (DTPC) into the five-year district development plans (DDPs).

The participatory land use mapping exercise has not only built the capacity of learning alliance stakeholders to engage in CSA planning at landscape level but has also encouraged synergies between conservation actors to encourage sustainable use of natural resources in the district.

John Francis Okiror works in the communications team at the International Institute for Tropical Agriculture. He supports communications for the IITA-led PACCA project.

Taking life step-by-step: Incrementally adopting climate-smart agricultural practices

Two approaches have been developed by IITA and partners to better target coffee farming households and help meet their aspirations and capabilities.

By Onno Giller

In Uganda, climate change is already threatening the coffee sector, but farmers' adoption levels of climate-smart agricultural practices are low. To try to address this discrepancy, two complementary approaches have been developed by IITA and partners. These two approaches are the climate-smart investment pathway (CSIP) approach and the farmer segmentation tool.

Climate-smart investment: step-by-step investment to sustainably increase coffee yields

Production of coffee requires an intricate farming system, which is made up of an array of practices that all require investment. Rather than try to promote farmers to increase investment in all areas of their farming practices, the climate-smart investment pathway approach looks at increasing investment through incremental steps. At each step an increase in yield is expected, and part of the added income from implementing these practices is envisioned to be re-invested in the farm to move to the next step of practices. As such, the practices will be adopted through a piece meal approach, with the final step completing the adoption of the site-specific basket of climate-smart agricultural practices in coffee.

The first step in the development of the climate-smart investment pathways is the development of general stepwise investment pathways. In Uganda, this was done for both

Arabica and Robusta coffee at national level, through consultations with coffee experts. These general stepwise investment pathways are then adapted into climate-smart investment pathways through local level prioritisation with coffee experts and validation by farmers. As such, the climate-smart investment pathways are locally adapted to target the specific constraints the farmers are facing in the region.

Farmer segmentation: better targeting of farmers through understanding their aspirations and resource endowments

Complementing the climate-smart investment pathways is the farmer segmentation tool. The farmer segmentation tool differentiates farmers into distinct segments, by looking at their level of entrepreneurship and their assets. A case study in Luweero highlighted six different segments of farmers: the entrepreneurs, the satisfied, the employed, the dependants, the survivors and the trapped. The entrepreneurs are those making money from coffee, and have a lot of entrepreneurship and assets, while the trapped are very poor and rely majorly on off-farm labour. The survivors are better off than the trapped, but still use a lot of diversification to survive, and investment in coffee is few and far between. The employed are those with farms growing coffee, and might be looking to invest more in coffee, yet have larger sources of off-farm income through employment. The satisfied are the older generation that have enough resources, but



JF Okiror (IITA)

Stakeholders discuss the development of climate-smart investment pathways for coffee production in Uganda.

no incentive and or motivation to invest in coffee. The dependants, usually the younger generations, are those with high motivation to grow coffee, yet no resources (especially land) to push this drive forward.

The above segmentation both highlights the need for differentiated approaches to help each segment and aids in better targeting of the climate-smart investment pathways. Promoting investment in coffee for both the trapped and survivors may be misplaced, as moving to other crops may actually be more suitable for them. Cross-generational learning between the dependants and the satisfied may be key in getting the dependants the start they need to becoming successful coffee farmers. Targeting the segments that do have the potential to invest in coffee through applying the climate-smart investment pathways means analysing where along the steps they already are, and which are the next recommended practices for the farmer to implement.

The two approaches can thus be applied separately, but their strength lies in combining the two in order to better target farmers and help them achieve their aspirations in coffee through increasing step-by-step their investment in their coffee gardens.

Read more:

Download the accompanying CCAFS info note: [Redesigning Delivery: Boosting Adoption of Coffee Management Practices in Uganda](http://bit.ly/2uPgEqw). The climate smart investment pathway approach and the farmer segmentation tool: <http://bit.ly/2uPgEqw>

If you are interested to learn more about the methodology or have any further questions, please contact Laurence Jassogne (L.Jassogne@cgiar.org). Onno Giller is an Environmental Anthropologist and Scaling and Innovations Specialist at IITA and a PhD candidate at Wageningen University.

Delivering targeted climate information services and products for farmers in Rwanda

Following trainings on climate information, smallholder farmers in Rwanda are turning to locally-tailored climate forecast to help them make decisions.

By Desire Kagabo, Gloriose Nsengiyumva and
Florentine Mukarubayiza

“Now we are real farmers!” say smallholder farmers in Rwanda.

Through the Participatory Integrated Climate Services for Agriculture (PICSA) approach developed by the University of Reading, trained farmers are able to use climate information services to make decisions about when to plant, which crops to plant and which inputs to use—and they are doing so at an increasing rate. Indeed, farmers are relying on seasonal and short term forecast information to update their farming calendars. Farmers acknowledge that some of the losses incurred in the past could be attributed to poor access to climate information services. The PICSA approach builds on the existing farmer-to-farmer extension service model locally known by its Kinyarwanda name as “Twigire Muhinzi.”

During the first year of the Rwanda Climate Services for Agriculture project, funded by the United States Agency for International Development (USAID) and implemented by the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), the PICSA approach has been implemented in four districts (Burera, Ngorero, Nyanza and Kayanza). Led by experts from the University of Reading, this process involved an initial ‘expert trainers’ workshop held in June 2016, where 31 senior staff from the Rwanda Meteorological Agency (Meteo Rwanda), Rwanda Agriculture

Board (RAB), the International Center for Tropical Agriculture (CIAT) and a number of non-governmental organizations (NGOs) were trained in the PICSA approach. The training yielded a core team of PICSA trainers who will continue to train other stakeholders in the PICSA approach during the four-year period of the project and beyond. This initial training was followed by two parallel sessions covering the project’s four implementation districts. During these sessions, CIAT staff and ‘expert trainers’ trained 48 farmer promoters in the PICSA approach. Farmer promoters in turn rolled out the PICSA training with 2,631 farmers in the four districts. Of these farmers, 1,254 (48%) were women.

The information provided within the project is locality specific and tailored to farmers’ needs and written in the local language to enhance farmers’ understanding. The information includes parameters such as the start and end of the rains, length of the growing season, total seasonal rainfall amount, longest dry spell within a cropping season, and short-term and long-term forecast. The farmer promoters were trained in advance and given printed copies of the information to be shared with farmers. Given the various levels of training from expert trainers to farmer promoters then to farmers, copies of the climate information products and training materials were distributed to all farmers to avoid distortion of information.



G.Nsengiyumva (CCAFS)

Through PICSA, farmers are using climate information services to make decisions. The approach builds on the existing farmer-to-farmer extension service model.

Following the trainings, farmers can now read, understand, and correctly interpret graphs or tables of historical climatic parameters of their villages. Farmers also understand that seasons vary annually, requiring different response measures. “Farmers are very enthusiastic to attend trainings because they are getting the information that can help them find solutions to their crop losses related to extreme weather events,” explained J.D’Amour Nzabandeba, a farmer promoter from Ngororero district, during a monitoring and evaluation visit. Farmers commended the effective communication on climate information services to farmers through PICSA and reinstated that this will positively impact future farmers’ actions.

Concurrently, and also through the Rwanda Climate Services for Agriculture project, Meteo Rwanda is increasing its capacity to provide climate information services as well as develop tools tailored to farmers’ needs, including the downscaled, gridded historical climatic data and downscaled climatology forecast. Forecast information and climate

tools are available online in the Meteo Rwanda Maproom developed by the International Research Institute for Climate and Society (IRI).

Read more:

Blog: Establishing the foundation for climate services in Rwanda <http://bit.ly/2rILSr1>

Blog: Collecting farmers’ feedback on climate information services in Rwanda <http://bit.ly/2qoo6po>

Blog: Building capacity of intermediaries to avail climate services to farmers <http://bit.ly/2qogmDT>

Field Manual: Participatory Integrated Climate Services for Agriculture (PICSA) <http://bit.ly/2qobBu3>

Desire M. Kagabo, Glorioso Nsengiyumva and Yvonne Uwase are based at the International Center for Tropical Agriculture (CIAT) in Kigali, Rwanda.

Out & About



1. Sector experts during the PICSA training of trainers (ToT) workshop in Butare district, Rwanda. 2. Post COP 22 meeting in Nairobi, Kenya. 3. IITA gave cameras to farmers to take photos of how climate change is impacting their lives. The photos were then displayed at a gallery in Kampala, Uganda. 4. CCAFS Program Director Dr. Bruce Campbell addressing stakeholders at the science seminar on successes and lessons learned on adaptation and mitigation in East Africa at the ILRI Campus in Nairobi, Kenya. 5. A group of participants discusses gender responsive budgeting during a workshop in Uganda. 6. Eliud Birachi of CIAT during a stakeholder planning session for the Rwanda Climate Services for Agriculture Project.

In our diary

October

International Day of Rural Women

15
2017

October

World Food Day

16
2017

October
May

Global Green Growth week:
CCAFS event: Innovating Agriculture for Climate and Food Security in Africa

18
2017

November

COP 23
Venue: Bonn, Germany

6-17
2017


CCAFS EA in the media

THE CONVERSATION
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Arts • Culture • Business • Economy • Education • Environment • Energy • Health • Medicine • Politics • Society • Science • Technology

Study reveals the gender gap in Tanzania, Uganda climate policies


May 13, 2017 12:23pm SAST



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From one organic to another municipality

OF THE PALLET ON APRIL 10, 2017 CAMPS, NEWS

5 stars great on 0

Ebbe Schiøler from Camps have been in Kenya. Here he experienced how ecology can be practiced in very different terms than those prevailing in Camps Municipality. That he talks about in this article.

Ecological Tour in Kenya II: It's been goat in the

17:28 (04/04/2017) KENYA | ENVIRONMENT AND CLIMATE | DMN:ECRD: domestic animals / methane gases / agro tour

Animals are a useful thing for small farmers in Kenya, although there is a climate impact. But it is now so bad? And can it be made easier? Here the second part of our series on agriculture, environment and climate in Kenya.




Photo: Ebbe Schiøler

At The Schiøler

Job exchange

International Media Support (IMS) is seeking an experienced Program Development Advisor

Senior Adviser (NS) to the Danish Energy Agency's Energy Partnership Program in Vietnam

Save the Children campaign section seeks Online marketing specialist FUNDRAISING

HUMANITARIAN ACTION - Save the Children Denmark is looking for a Humanitarian Surge Team

Save the Children campaign section looking ONLINE MARKETING SPECIALIST FUNDRAISING

Graphic employee / student assistant for Caritas

Wage subsidies Position at Family Planning

DonChurchAid (OCA) is looking for a Business & Human Rights Project Officer

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AVANCE

Online marketing specialist FUNDRAISING

Red Barnet

Study reveals the gender gap in Tanzania, Uganda climate policies (The Conversation) <http://bit.ly/2rIUbyQ>

From one organic to another municipality (Danish Viborher) <http://bit.ly/2sB0Oza>

Ecological Tour in Kenya II: It's been goat in the (Danish Globalnyt) <http://bit.ly/2sVRjgE>

Further Reading

CCAFS Latest Publications

Booklet: Stories of Success: Climate-Smart Villages in East Africa:
<http://bit.ly/2wTDfDt>

Journal article: Institutional challenges to climate change adaptation:
A case study on policy action gaps in Uganda: <http://bit.ly/2wj4Xf3>

Journal article: Nitrous oxide and methane fluxes from urine and
dung deposited on Kenyan pastures: <http://bit.ly/2v4y8OK>

Journal article: Climate variability/change and attitude to adaptation
technologies: a pilot study among selected rural farmers'
communities in Nigeria: <http://bit.ly/2fo1KxU>

Journal article: Welfare impacts of Index Insurance in the presence
of a poverty trap: <http://bit.ly/2wdKR6C>

Journal article: Quantifying the contribution of land use to N₂O,
NO and CO₂ fluxes in a montane forest ecosystem of Kenya:
<http://bit.ly/2v4SWFR>

Workshop report: Stakeholders' planning workshop for the Rwanda
Climate Services for Agriculture project: <http://bit.ly/2v4PCuf>

CCAFS Tools

CCAFS website and blog updated daily with news on policy and
practice, research, events and downloadable publications from the
CGIAR and partners.

Website: <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 se-
ries, 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 tem-
poral 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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 CGIAR Climate Change, Agriculture & Food Security (CCAFS)



RESEARCH PROGRAM ON
**Climate Change,
Agriculture and
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