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**Climate Change,
Agriculture and
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Report: Policy Action for Climate Change Adaptation. Project synthesis report, 2014-2020

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Policy Action for Climate Change Adaptation

Project synthesis report, 2014-2020

CGIAR Research Program on Climate Change,
Agriculture and Food Security (CCAFS)

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About CCAFS

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Abstract

Climate change is increasingly threatening the livelihoods of millions of smallholder farmers in Sub-Saharan Africa. Increased climate variability, including changes in mean temperatures, variation in the onset of rains, and increases in extreme weather events, are directly affecting the growing seasons of commercial and subsistence crops, significantly disturbing socio-economic activities in the agricultural sector and leaving many smallholder farmers in a situation of food insecurity and malnutrition.

Within this context, it has become increasingly crucial that governments and relevant stakeholders in the region develop policy strategies that help adapt to changes in climate and help build more resilient food systems. To support these policy processes, the CGIAR Program of Climate Change, Agriculture, and Food Security (CCAFS) started in 2014 the seven-year initiative “Policy Action for Climate Change Adaptation (PACCA)”. PACCA consisted of a first phase (2014-2017), which operated under the project entitled “Influencing and linking national and local level policies and institutions to adopt climate-resilient food systems” in Uganda and Tanzania, and a second phase (2018-2020), which operated under the project entitled “Stimulating adoption of nutrition sensitive climate smart agriculture by aligning national level agenda with implementation” in Uganda and Ethiopia. This report summarizes the main findings that emerged from Phase 1 and 2 of PACCA, presents the lessons learnt and achievements for climate change policy action work and reflects on both projects impact pathways, providing some recommendations for future policy initiatives in the region.

Keywords

Policies; agriculture; climate change; adaptation; food security.

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Introduction

PACCA's approach to influencing climate policy

The PACCA initiative sought to examine and assess how enabling policy environments at regional, national and local level can contribute to the development of gender-responsive climate-smart interventions that help increase the food and nutrition security and reduce poverty in East Africa. For this, the PACCA initiative built on a close research collaboration between different CGIAR centers and research institutions (e.g. the International Institute of Tropical Agriculture, the Alliance of Bioversity and CIAT, the World Agroforestry Center, University of Utrecht) and a strong inter-governmental collaboration, with continued policy engagement with national and sub-national governments and institutions of Uganda, Tanzania, and Ethiopia. The PACCA initiative took place and was implemented within a process of transition towards One CGIAR, where enhanced inter-center and inter-government collaboration was central for increasing institutional integration, obtaining maximized impacts, securing more coordinated results, and amplifying collective impact towards the achievement of the Sustainable Development Goals.

The two phases of PACCA sought the following results:

- Phase 1 of PACCA (2014-2017) had as its main objective the development and use of science-based recommendations to influence policy processes to encourage the adoption of climate-resilient and gender-responsive practices among actors across multiple scales in Uganda and Tanzania.
- Phase 2 of PACCA (2018-2020) aimed at supporting the governments of Uganda and Ethiopia with scientific evidence and guidance on climate-smart agriculture to help encourage nutrition and gender responsive policy action.

To achieve these objectives, PACCA relied on two main approaches:

- Establishment and support of Climate Change Learning Alliances: district and national multi-stakeholder platforms were used as spaces for discussion and participatory policy

engagement to promote climate-proof, nutrition sensitive and gender responsive policy action.

- Direct and continued engagement with Climate Change Departments and other relevant governmental units: dialogues and evidence-base knowledge sharing with the governments in East Africa to assist and support with policy formulation and implementation on climate change, gender and nutrition issues.

For each of the PACCA phases, several research activities contributed towards advancing the scientific knowledge on locally appropriate climate-smart agriculture, nutrition and gender research evidence to support national and sub-national development of climate-proof policymaking processes in the agriculture sector. Table 1 provides an overview of the different activities for PACCA.

Table 1. PACCA activities and activity descriptions by project phase.

	Phase 1 Activity	Description
Phase 1 (2014-2017)	Network analysis	<ul style="list-style-type: none"> ▪ Understand drivers of climate-smart technology (CST) uptake ▪ Identify key actors, and actor linkages, involved in developing CST for climate change adaptation, CSTs 'on offer', patterns of influence between intermediate organizations and farmers regarding CST supply and adoption, impact of extant policies on those actors decisions/actions ▪ Provide recommendations for creating and strengthening key linkages among and between farmers, CST supply organizations, policy makers ▪ Contribute to the identification of options for national-level sector-specific and overarching climate change-related policies ▪ Create a baseline against which interventions can be measured after 4 years (or more)
	Trade-off analysis	<ul style="list-style-type: none"> ▪ Identify potential locally appropriate climate-smart agricultural practices and strategies across scales ▪ Assess trade-offs within and between CSA practices to identify "no-regret" portfolios favourable to men and women ▪ Communicate and discuss CSA options with the engagement forum/policy makers for making better-informed decisions

Phase 1 Activity		Description
	Scenario development and identification of adaptation options across levels	<ul style="list-style-type: none"> ▪ Participatory identification of scenarios for climate change adaptation - build on site-specific theory of change ▪ Exploring different scenarios to help identify appropriate adaptation packages suitable for different contexts ▪ Engaging policy actors (i.e. decision makers and implementers) around available options so that they can negotiate the most appropriate ones
	Gender analysis	<ul style="list-style-type: none"> ▪ Review the state of gender inclusion in current policies and identify gender gaps ▪ Analyse how the gender gaps affect the adoption of CSA practices and effect on food security, specifically for target countries ▪ Create evidence-based gender awareness among policy actors to influence gender responsive implementation of climate change adaptation policies ▪ Suggest recommendations for gender inclusion in selected national policies or implementation strategies
	Policy analysis	<ul style="list-style-type: none"> ▪ Identify policy formulation and implementation gaps, conflicts and incentives/disincentives ▪ Map current status of adaptation policies and identify entry-points for improvement ▪ Identify key actors, linkages and incentives for enabling adaptation of climate smart agricultural practices ▪ Jointly engage policy makers and structures to pilot policy interventions focusing on the inclusion of gender and other marginalized groups

Phase 2 Activity		Description
Phase 2 (2018-2020)	Situation Analysis	<ul style="list-style-type: none"> ▪ Gendered, value-chain focused analysis of the nutrition needs and related climate risks ▪ Stock-taking of existing and promising new climate-smart nutrition-based technologies ▪ A multi-scale assessment of policies, strategies, declarations, multi-sectoral responses, structures and interventions from the various government

Phase 2 Activity	Description
	<p>ministries, departments and agencies that work on nutrition</p>
<p>Policy pathways for scaling nutrition-based CSA technologies</p>	<ul style="list-style-type: none"> ▪ Assess the effects of gender-transformative approaches to disseminating nutrition-related technologies in influencing (i) adoption and scaling potential of the technologies, (ii) reduction in climate risk, and (iii) access to and utilization of the nutritive foods at household level ▪ Identification of constraints and opportunities (pathways) for scaling nutrition-based technologies in an inclusive way
<p>Scenario-guided land use and adaptation planning & foresight analysis</p>	<ul style="list-style-type: none"> ▪ Participatory engagement with stakeholders to apply findings to the development of scenarios for (i) implementing nutrition sensitive CSA with communities and (ii) integrating nutrition sensitive CSA priorities in adaptation planning at the district level
<p>Policy engagement</p>	<ul style="list-style-type: none"> ▪ Present and validate research findings at district and national level learning alliances ▪ Provide targeted capacity building to learning alliance members on the basis of needs identified in the situation analysis ▪ Participatory development of strategies and tools that impact partners can use to implement a gender responsive and nutrition sensitive advisory service ▪ Engage with key national level forums to provide evidence to influence adoption of nutrition sensitive and climate resilient policies and investments

Project activities and key findings

PACCA Phase I

Network analysis

Beginning in May 2014, comparative network analyses were conducted in Rakai, Uganda, and Lushoto, Tanzania, to document the vertical and horizontal linkages in the flow of information on CSA technologies and practices among and between farmers and expert organizations at the local, district, and national scales, and to assess how the number and pattern of such linkages differ between the two sites. These studies also sought to identify to what extent the flows of information and influence among farmers themselves and between farmers and experts correlate with the use or non-use of various farming practices, awareness of government programs, and with perceptions of climate change. In total, 298 farmers and 70 experts were surveyed in Uganda along with 302 farmers and 85 experts in Tanzania. The results indicate that a considerable fraction of farmers in both Rakai and Lushoto report not seeking or receiving information on farming practices either from other farmers (25% and 29% in Rakai and Lushoto, respectively) or from experts of any kind (60% and 49%, respectively). The study also observed that in both Rakai and Lushoto only small fraction of farmers (35% and 12%, respectively) were aware of governmental or other programs designed to improve farmers' access to and/or awareness of CSA technologies. These generally low rates of connectivity between experts and farmers were later validated in workshops with district officials and other stakeholders, who noted that limited financial resources, few extension staff, and the need for additional capacity development as being among the primary bottlenecks to greater engagement and information sharing with farmers.

Looking beyond these commonalities, important differences and distinctions were observed between the two locations, among male and female farmers, and among farmers with differing asset endowments. Specifically, cultivating smaller land areas, growing fewer crops, and obtaining lower yields were found to be associated with having smaller networks, including fewer connections both among other farmers and with experts. Women, despite being at least as active as men in farming activities in both sites, were found to exchange information on farming practices with smaller networks of other farmers and experts and

were less likely than men to attend training workshops or meet with extension personnel. Additionally, the study observed a greater density of horizontal information flows among expert organizations at the district level in Rakai than in Lushoto, while the reverse was true among local-level organizations and among farmers themselves. It was observed that Lushoto is characterized by a greater proportion of vertical linkages between district-level organizations, local-level organizations and, to a degree, with farmers themselves.

Finally, while it was reported that larger networks were associated with farmers cultivating both more new crop species and introducing a higher number of improved and traditional crop varieties, the study did not make clear that there was any evidence for an overall relationship between the size (or any other characteristics of a farmer's network) and increased adoption or use of CSA practices generally, or with differences in their understanding of climate change. Nevertheless, when taken together these findings appear to suggest there is at least some potential to expand the use of CSA practices among farmers via the strengthening and expanding of existing networks which facilitate the flow of information and incentives, within and across scales, related to CSA technologies.

Social network analyses were also conducted at the launch of the Nwoya and Mbale district-level Learning Alliances (LA) in December, 2015, and June, 2016, respectively, in order to better understand existing relationships and flows of information and influence among the stakeholders. The results indicated the existence, in both locations, of potentially significant gaps and asymmetries in information sharing networks which may have hindered the efficient flow of information, as well the existence of "bridging" organizations whose position within the networks may have made them more important to overall dissemination of information than might be gleaned from the number of their connections to other organizations alone. These conditions highlight the need for approaches, such as the LAs, capable of fostering more and more effective information sharing and collective learning among relevant stakeholders.

Trade-off analysis

A systematic review and meta-analysis, including a subsequent modeling and simulation study, was undertaken to estimate the magnitude of the effect, as measured in terms of (i) increased agricultural productivity, (ii) greater resilience to climatic changes, and (iii)

greenhouse gas mitigation, for all CSA practices for which data was available in the specific contexts of Uganda and Tanzania. After a search and screening of peer-reviewed literature and grey literature, a total of 6,342 data points were found which related the impact of a CSA practice relative to a control. That final data set allowed the analysis of 26 practices studied in Uganda and 29 practices studied in Tanzania, applied to a total of 12 different agricultural products. Among the most important findings is, firstly, the strong evidence that (i) each of the practices considered has a positive effect on at least one of the CSA indicators and (ii) very few of the practices considered have a negative effect on any of the CSA indicators. However, the review also found that no individual practice, for either country, is superior across all three CSA indicators, and that both the relative and absolute magnitude of the effects of any given practice on each of the indicators was found to be context specific, varying considerably depending on the specific production system into which it was introduced. Furthermore, it was also found that potential macro-level impact of a practice related as much to its rate of adoption among farmers as it did the actual magnitude of the practice's effect. Cumulatively, the effort provides both a portfolio of the most promising CSA practices for Uganda, Tanzania, and perhaps East Africa more generally, while at the same time serving to highlight the potential trade-offs implied by the prioritization – by researchers, policymakers, farmers organizations, or individual farmers themselves – of any given CSA practice or suite of practices.

Research seeking to assess how farmers themselves perceived the trade-offs associated with the adoption and prioritization of specific CSA practices also led to the development of novel ranking methodology, later used in the development of a shade tree decision support tool for Ugandan coffee farmers, as well as an assessment of how farmers perceived the relative significance of various constraints (e.g. cost, labor, requisite knowledge, etc.) to the adoption of different CSA practices. Consistent with the findings from other PACCA activities, this effort revealed important differences in how farmers perceive the relative costs to the adoption and use of many, though not all, CSA practices depending on their sex, age, the size and location of their farm, and other factors.

Scenario-guided adaptation planning

Building on prior work of the CCAFS Scenario Advisory Group and the Millennium Ecosystems Assessment, a series of workshops were held from 2011 to 2013 with a wide

variety of stakeholders, including representatives from government, civil society, research institutions, the media, and the private sector, to develop four plausible, alternative projections for conditions in East Africa in the year 2030. Modeling using the IFPRI's IMPACT and IIASA's GLOBIOM models were then used both to provide quantitative and semi-quantitative details to the scenario narratives as well as to validate the credibility of the different projections. The four futures described by the scenarios can be broadly characterized by anticipating a greater or lesser degree of regional integration and more or less proactive governance, with specific reference to climate change adaptation efforts in the agricultural sector.

These scenarios were subsequently employed in the first phase of the PACCA project, between February 2015 and August 2016, in a number of strategic planning initiatives with decision-makers in the region, both inside and outside of government, as well as scenario-guided policy reviews. This first involved meeting with stakeholders to adapt the regional scenarios to the specific national contexts of Uganda and Tanzania. Those down-scaled scenarios were then used as lenses through which to evaluate existing and draft strategies and policies. In Tanzania, these scenarios were used in the then-ongoing evaluation of the National Environmental Policy (1997), and in Uganda were used in evaluations of the draft Agricultural Policy and Mechanization Framework, the National Agriculture Policy of 2013, the Agricultural Sector Strategic Plan (2016-2021), and the National Water Policy. The scenario-guided policy reviews generated specific recommendations for policy revisions.

Modeling for the assessment and prioritization of CSA technologies

A novel research methodology for prioritizing locally appropriate climate smart agricultural technologies, known as Climate Smart Agriculture Rapid Appraisal (CSA-RA) was developed and, in a study conducted between March and October 2014, the approach was implemented in representative sub-counties of the Gulu district of Uganda and wards of the Kilolo district of Tanzania. CSA-RA, which incorporates methods from participatory rural appraisal (i.e. resource mapping, climate calendars, historical calendars, cropping calendars, organization/institutional mapping, and pairwise ranking) and rapid rural appraisal (i.e. transect walks, key informant interviews, and farmer interviews) was demonstrated to provide important information on how male and female farmers' own prioritization of CSA practices differ, as well as how farmers' prioritization of CSA practices differ among agro-

ecological zones, as illustrated in Table 2. Moreover, the study noted that the prioritized practices consistently skew toward maximizing productivity and increasing adaptive capacity, while only agroforestry, mulching, and improved livestock breeds possess notable greenhouse gas mitigation potential.

Table 2. Prioritized climate-smart agricultural practices as ranked by male and female farmers in different regions and agro-climatic zones in Uganda.

Prioritized practices by farmers in Uganda (n = 35) and Tanzania (n = 38) gathered through pairwise ranking matrix.

Gulu, Uganda				
Highlands			Lowlands	
Rank	Men	Women	Men	Women
1	Improved livestock breeds	Seed selection	Row planting	Timely planting
2	Agroforestry	Timely harvesting	Improved varieties	Crop rotation
3	Pesticides application	Correct spacing	Timely planting	Seed selection
4	Minimum tillage	Improved varieties	Mulching	Intercropping
5	Seed selection	Row planting	Intercropping	Row planting
Kilolo, Tanzania				
Highlands			Lowlands	
Rank	Men	Women	Men	Women
1	Improved varieties	Improved livestock breeds	Improved varieties	Improved varieties
2	Pesticides	Improved varieties	Irrigation	Irrigation
3	Mulching	Fallowing	Early planting	Fertilizers
4	Crop rotation	Contour ploughing	Pesticides	Pesticides
5	Fertilizer	Agroforestry	Correct spacing	Herbicides

A Bayesian belief network model was developed to determine the suitability of different proposed CSA interventions based on their predicted biophysical and economic impacts, as well as their effects on livelihoods and farmers' adaptive capacity. The model was piloted with biophysical and socio-economic data from Tanzania's Southern Agricultural Growth Corridor (SAGC) to examine the expected costs, benefits and other impacts of four different irrigation technologies.

Gender analysis

A series of desk reviews were undertaken to provide a qualitative analysis of gender integration, as well as a quantitative assessment of gender-related budgeting, within agri-food policies and strategies in both Uganda and Tanzania across different governance levels. In Uganda, the study examined 27 policy documents, 32 development plans and 24 action plans, and in Tanzania considered 28 policy documents, 18 development plans and 13 action plans. In Uganda, policy documents at district level presented a better integration of gender issues than national level, with sub-county level policies presented an overall lower integration of gender. Tanzania presented a better integration of gender issues at national level policies, with a lower degree of integration at district level, while policies were completely gender-blind at ward-level, suggesting the degree of gender mainstreaming efforts decreased at lower governance levels. The study found an overall insufficient

integration of gender in policies, especially at the lowest levels of governance (sub-county, wards), as seen in Figure 1, with restrictive budget allocations that fluctuated over time, and with the proposed gender activities being superficial in nature (e.g. celebration of international women’s day). The study further found that gender issues in climate change policy discourse were largely framed as a ‘women’s issues’ in both countries, sidelining men’s vulnerabilities and roles as agents of change in climate adaptation processes. Furthermore, women were normally presented as a homogenous group in these policy discourses, risking the development of simplistic policy strategies for climate change adaptation.

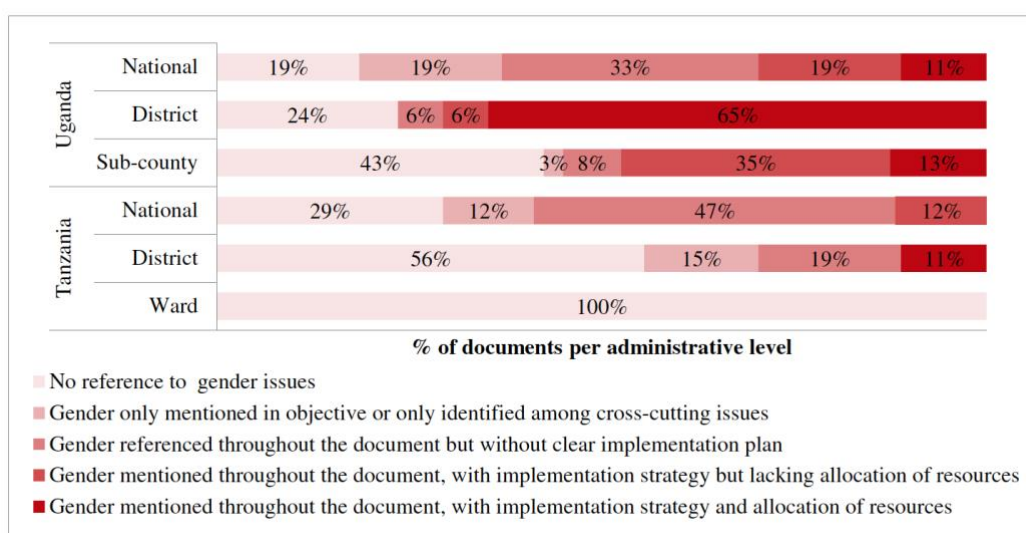


Figure 1. Level of gender integration by administrative level in Uganda and Tanzania.

In addition, a series of four studies examined the effect of local meaning making in the transformational potential of gender mainstreaming in agriculture and climate change policy in Uganda. At the national level, one study encompassing data from 30 interviews and 10 multi-stakeholder meetings revealed that while a gender equality narrative was predominant in Ugandan policy, policy actors often used other narratives that legitimized gender policy inaction, questioned the responsibilities on gender mainstreaming, and naturalized patriarchy, with the overall effect of disempowering the need for gender equality in agriculture and climate change policy. Another study examined 107 policy documents at different governance levels (i.e. national, district, and sub-county) to examine how processes of international norm translation into domestic policies in Uganda affect the transformative ambition of gender mainstreaming. The study identified five different

mechanisms through which the transformational potential of gender mainstreaming in agriculture and climate change policy in Uganda was considerably reduced, namely: neglecting parts of the gender and climate change discourse in sub-national level policy; perpetuation of gender stereotypes; oversimplification of the gender discourse in agriculture and climate change; persistent acts of symbolic politics with stale reproduction of text; and the abstract nature of the gender activities proposed in budgets and their restricted economic allocations.

Another study examined the meanings attached to gender equality concepts at local level, using the case of joint decision making in the District of Nwoya, in Northern Uganda. The study used a mixed methods approach that included a 474 intra-household survey and an in-depth qualitative case study in the village of Lodi. The study found that while national and sub-national policy use the concept of joint decision making to reflect processes where spouses participate equally, the concept is understood differently by men and women at the local level. Women tended to report joint decision-making processes more often than men, and had different understandings of what the concept meant for them in practice. These understandings ranged from no conversation between spouses to a conversation where the male spouse had the final decision, with no cases where both spouses had an equal say in the discussion. The study concluded by noting the importance of interrogating the meanings that local people attach to gender equality concepts on the ground since some of these might imply minimal change to the status quo.

A final study examined the potentials and advantages of locally formulated solutions to gender inequality in agricultural and climate change policy in Uganda as compared to those found in international discourse. The study used 37 semi-structured interviews and 78 questionnaires to show how policy actors in Uganda largely used global discourses on gender when asked about context-specific solutions to gender inequality. Local norms and culture, while acknowledged as one of the main barriers for gender equality, were not directly addressed in the local solutions proposed. The study emphasized the important role of local feminist movements to bring about local gender transformative change, working in conjunction with national and sub-national policy actors.

Together, the gender studies conducted in Uganda and Tanzania suggested that the formulation of internationally agreed norms on gender equality, such as gender mainstreaming, might not be sufficient to significantly challenge and transform structural causes of gender inequality in patriarchal societies. The formulation, budgeting and implementation of more gender-transformative policy and programs will be needed to foster more gender equality in rural societies, especially under the context of a changing climate.

Policy analysis

Policy assessments at national and districts levels in Uganda (Rakai and Nwoya districts) and in Tanzania (Lushoto, Kilolo and Bagamoyo districts) were conducted to map the status of the adaptation policies and identify entry-points for improvements. In Rakai, a study using a series of participatory vulnerability assessments with farming communities, policy document reviews, and interviews with policy actors found a communication disconnect between different governance levels (national, district, sub-county) and revealed a context where the development of policies were usually done by central government agencies, with local communities generally excluded of policymaking processes. Furthermore, the study exposed a limited technical capacity, limited financial capacity, political interference, and insufficient implementation capacity across governance levels that constrained effective climate change adaptation. These findings resonate with another study in Ugandan districts of Rakai and Nwoya, where a series of challenges to effective climate change adaptation policies were identified, namely overlapping mandates, limited technical capacity, poor coordination, skewed budget allocations, limited policy literacy at local levels and insufficient attention to local contexts in policy design and formulation. In Tanzania, a study comprising a desk review of national policy documents and legislation, and 20 semi-structured interviews found a good policy commitment towards supporting climate change adaptation in the agriculture sector. However, despite this commitment, the study also found a series of challenges that hinder implementation of climate change actions such as low levels of awareness on climate change issues among key stakeholders, lack of an effective national finance mechanism to direct climate funds, and poor coordination of climate change initiatives between national and local governments.

The policy analysis studies identified different entry points for improving climate change policy. In Tanzania, suggestions for effective policy implementation included the establishment of a financial mechanism for climate change, tailored capacity building activities for different actor groups, provision of user-friendly information products for different audiences, and the strengthening of institutional coordination. In Uganda, the studies suggested to strengthen the policy coherence between national climate change policies and local-level climate action plans; to foster equitable funding allocation across district- and sub-county levels; to strengthen inter-sector and multi-level linkages for improved coordination; the development of structures (e.g. sub-county committees) to support the implementation of climate adaptation policies; the development of climate policies in an inclusive and participatory manner; to invest in human capacity development, to invest in climate research and to strengthen research-policy linkages; to use multi-stakeholder climate action platforms to strengthen vertical and horizontal communication; and the need for more effective decentralization.

Policy engagement

Establishing and supporting national and sub-national Learning Alliances (LAs) in Uganda and Tanzania were central to PACCA's efforts to engage with policymakers, to jointly identify scientifically-grounded, gender-sensitive policy initiatives capable of fostering "triple-wins" in the agricultural sector and, finally supporting policymakers and other stakeholders in the successful implementation of those jointly established policy priorities. The work with the LAs was also inseparable from other activities in both phases of the PACCA project including, among others, the scenario-guided adaptation planning, gender analysis, and policy analysis activities. Not surprisingly, considerable effort was invested in learning best practices and common pitfalls associated with the work of developing, supporting and leveraging the LAs for improved policy outcomes. The resulting lessons, which were drawn from researchers' participant observation of 80 different LA meetings, a review of meeting minutes, and a baseline survey of stakeholders conducted at the LA inception meetings, have been elaborated and disseminated in a number of briefs, flyers, white-papers, book chapters and peer-reviewed journal articles, a number of which were published by members of the PACCA team in collaboration with other development partners and/or governments themselves. A small selection of the lessons learned and best practices identified includes:

- Learning Alliances have a demonstrated potential to serve as a vehicle for collaborative learning about climate change related risks to food and nutrition security, for the assessment of the synergies and trade-offs of specific CSA practices in order to identify and prioritize nationally- and locally-appropriate practices, and the co-creation and implementation of harmonized, gender-sensitive policy interventions to address locally relevant drivers and constraints to their adoption. The mutually supportive efforts and information sharing between national and sub-national learning alliances further increased their efficacy, and the evidence that the LA's collectively contributed to concrete changes in policy is compelling despite the impossibility of meaningfully quantifying such contributions.
- Important gaps and inconsistencies persist in the East African policy environment with regard to the recognition of, and approaches for addressing, the differing opportunities, constraints, resources, and vulnerabilities of male and female farmers. The precise nature and extent of these issues differ among countries and across governance scales, but to the extent that it persists, this failure to mainstream gender in the elaboration and implementation of agricultural and climate change policy will likely hinder climate adaptation and mitigation efforts, including bringing proven CSA technologies to scale. The Learning Alliances have been an effective forum for raising awareness of these issues among policymakers and other stakeholders and taking steps to craft a more gender-sensitive policy environment, but this requires that gender issues associated with climate-related interventions be given explicit consideration from the outset.
- Establishing and maintaining LAs capable of achieving their greatest potential does not happen automatically: crucial to their continued success has been finding the right mix of participants and participating organizations (i.e. the optimal balance between government representatives and non-state actors) while nurturing mutual trust, common goals, and a sense of collective ownership. This was seen to require regular meetings and capacity development efforts, which in turn necessitated sustained financial and technical support. Considerable institutionalization of both the national and sub-national LAs was achieved, but it remains to be seen how the level of financial support, technical backstopping, any future evolution in LA membership composition, and other factors will effect strategic planning and policy formulation efforts, as well as their perceived legitimacy.

- It has been noted that monitoring, evaluation and learning (MEL) for communication and engagement activities cannot assume the entirely same form as those undertaken for more “traditional” Research for Development (R4D) activities; neither the number of published outputs nor typical measures of their reach or readership are designed to measure outcomes which manifest as changes in attitudes, the development of skills, or improved operating procedures adopted by next-users. In light of this, several novel MEL methods were piloted during the PACCA project, including: next-user mapping methods (e.g. network analysis), benchmark behavior surveys; end-of-event evaluations by participants; and the soliciting of live feedback from participants (e.g. asking participants to speak to what they have learned, what outstanding questions they have, or their level of agreement with an assertion or position). These methods were observed to fill a number of important gaps in what can be learned from MEL activities with limited additional investment in time or capacity development, and they succeeded in providing for evidence for project outcomes. This evidence includes reports from LA participants that they had shared knowledge acquired from the LAs with colleagues, politicians and community members, and public recognition by participating government officials of the role the LAs had played in “improv[ing] the understanding of climate change and its impacts, thus enabling public institutions, individuals and non-state sectors to tap into the opportunities and co-benefits arising from mitigation and adaptation actions”. Some of the best available methods, however, to substantiate long-term changes in norms, behaviors and institutional operating procedures, such as post-activity surveys or interviews, are generally resource intensive and of limited value where response rates are low.

PACCA Phase II

Situation analysis

With the benefit of prior research findings and policy engagement activities from PACCA’s first phase, PACCA’s second phase work in Uganda began with an integrated situation analysis, which included a gender-sensitive assessment to identify the current status of nutrition-security at the national and sub-national levels and to identify the opportunities, constraints and climate-related risks to value chains central to improving men’s and women’s food and nutrition security. The situation analysis, which was published in March

2019, further sought to map the institutional infrastructure (including governmental and non-governmental initiatives) currently in place to address food and nutrition insecurity and identify candidate pathways for improving policy in these areas. Methodologically, the situation analysis relied on an extensive desk review of peer-reviewed literature on the issues of gender, climate change, and food and nutrition security as well as a review of 50 documents relating to policies, strategies, programs, and projects at national and sub-national levels. In addition, a historical climate scenario analysis since 1980 for the Nwoya and Mbale districts was undertaken in collaboration with CIAT, and these two efforts were complemented with a series of 32 expert interviews and four focus group discussions.

Overall, the findings indicate that gender and nutrition issues are not consistently mainstreamed in policy documents, and are indeed missing from key sections, of policies related to climate change and food security in Uganda. Additionally, the study identified a number of prominent challenges to the formulation, implementation and funding of policies for addressing both climatic risks and food and nutrition security. Regarding the former, it was noted that planning and implementation occur (primarily) at the national and sub-county levels, respectively, while district level activities (including budgeting) are fragmented across several different departments with generally low levels of inter-departmental coordination, resulting in a system which is highly fractured and not always well-tuned to local needs or priorities. Currently existing budgeting standards at the district level also treat climate change as cross-cutting, which as has been observed previously in research on gender-mainstreaming, can inadvertently result in actually lowering the prominence of the issue and reducing financial allocations to address it if the mainstreaming effort is incomplete. Some additional challenges to the implementation of strategies for addressing climate risk include: 1) low levels of awareness of climate related risks among district staff and the lack of reliable and efficient climate information or early warning system, 2) lack of dedicated district staff responsible for addressing climate change related risks and, relatedly, low technical capacity of district staff to apply climate smart technologies, and 3) frequent lack of political will to develop and enforce climate change related ordinances.

Regarding the policy environment for fostering food and nutrition security, it was observed that district level funding for interventions to improve food and nutrition security come in the form of conditional grants, which can vary substantially year to year and thus makes it

difficult to undertake sustained efforts or engage in long-term planning. This situation is exacerbated by low levels of coordination, as evidenced by some efforts being duplicated while others go unfunded, and by a lack of adequate logistical support for district level staff. Additional work is also needed to understand and harmonize the linkages between the initiatives of district-level agriculture and health departments.

The cumulative effect of such conditions is that adoption of climate smart technologies has remained low and uncoordinated, with few of the potential synergies which could be achieved from landscape-level coordination and collective action actually being realized. However, the findings generated during the first phase of PACCA suggest that multi-stakeholder platforms such as the learning alliances could make an important contribution in addressing some of these challenges.

Given that PACCA's efforts in Ethiopia were only initiated with the start of the second phase, the situation analysis there began with a comprehensive stakeholder mapping, with a focus on the livestock sector. This stakeholder mapping included: (i) a characterization of the institutional mandates, roles, responsibilities and capacities of governmental and non-governmental entities, (ii) an assessment of information flows among these stakeholders and institutional information needs, (iii) an evaluation of the degree of functional and structural alignment among the relevant government ministries and other stakeholders. The effort succeeded in identifying the data required from respective policymaking institutions deemed essential for evidence-based policy formulation and review, planning, service delivery, and monitoring in the livestock sector, while also indicating that presently, the flow of this and other critical data among stakeholders is inconsistent and not uniform, which has led to an undersupply of important livestock data for the sector

The findings from this stakeholder mapping, which was undertaken in association with the A Livestock Information Vision for Ethiopia (aLIVE) project, also directly supported subsequent efforts - described in the following sections detailing policy analysis and engagement activities - to develop a livestock information roadmap and to scale-out the National Livestock Information System on behalf of the Ethiopian government. Importantly, these activities also helped inform the decision that existing partnerships and collaborations among government entities and development partners in Ethiopia would be effective

platforms for fostering the science-policy interface sought by the project, obviating the need for the establishment and support of Learning Alliances or other multi-stakeholder platforms in the manner pursued in Uganda and Tanzania.

Policy analysis and pathway identification

Building on the work of the Situation Analysis, effort was made to identify avenues by which a gender- and nutrition-sensitive enabling environment for climate change policy could be fostered. In the case of Uganda, one recommendation to emerge from this was that greater inter-sectoral alignment with the goals and targets enumerated in the Comprehensive National Development Planning Framework (CNDPF) is needed in gender- and nutrition-relation policy provisions. This could be supported through efforts such as the fuller elucidation of national-level guiding policy documents and the explicit mainstreaming of gender and nutrition in those national-level guiding policy documents. Greater inter-sectoral policy alignment can also be aided through systematic efforts toward harmonization of policies related to climate change, food and agriculture, and health and nutrition across different governance scales within different sectors. It was also recommended that offices tasked with coordinating and monitoring actions addressing climate change and food- and nutrition-insecurity across sectors (i.e. the Climate Change Department of Ministry of Water and Environment and the Office of the Prime Minister) should regularly hold joint performance reviews with relevant stakeholders to avoid duplication of efforts, to strengthen cross-sectoral synergies, and to foster alignment with the national policy objectives.

In Ethiopia, policy analysis and pathway identification efforts proceeded in tandem as part of two distinct initiatives, with a third initiative assessing the impact of the on-going COVID-19 pandemic on food security and rural livelihoods in Ethiopia via a comprehensive literature review. The first of these initiatives was the aLIVE project, which focused on the livestock sector, and was undertaken in collaboration with the Bill & Melinda Gates Foundation, the Ministries of Trade and Agriculture and the Livestock Improvement Corporation. The policy analysis provided a comprehensive review of national policies, strategies and action plans pertinent to the livestock sector. The findings helped elucidate the policy directions and priorities of the government vis a vis the national livestock information services, such as the recently launched Digital Transformation Strategy to deploy a digital agricultural platform to

facilitate the flow of data required for informed decision-making within and outside the government. It was noted that all the respective livestock policy and strategy documents the government has acknowledged the need for timely, reliable, quality, data on livestock production, management, and marketing in order to accelerate livestock production and productivity.

The second policy analysis undertaken by PACCA in Ethiopia was pursued as part of the Green Innovation Centers project, which focused on climate-risk profiling of three priority value chains (wheat, fava bean and honey) in the Omoria Region's Arzi Zone, which was undertaken in partnership with GIZ, the Ministry of Agriculture and the Ethiopian Institute of Agricultural Research. The project identified a series of key challenges that hinder the implementation of climate-aware policy in Ethiopia, which included the weak institutional and financial capacity along with the critical need for gender-inclusive policies and strategies. The project also highlighted the need for cost benefit analysis to appropriately evaluate agricultural innovations and make informed climate-sensitive investment decisions, the need to put forward a variety of opportunities for potential collaboration, funding, and existing synergies to advance CSA at scale, and the need for collaborative work with developmental partners, investments in improving infrastructure, and broader access to essential goods and services.

Additionally, between November and December of 2019, a series of 55 focus group discussions involving a total of 544 farmers were held across seven districts and 14 sub-counties of northern Uganda. These focus group discussions sought to understand farmers' understanding of climate change and climate smart agricultural technologies, including how familiar they are, their various costs and benefits, and the major constraints to their adoption and use. The study also sought to understand whether, to what extent, and in what manner these understandings differ among male and female farmers and what are the gendered differences in the accrual of costs and benefits to the use of different CSA practices. The focus group discussions revealed that rates of CSA use are generally quite low, and there was broad agreement between men and women on the major actor-related challenges, including a lack of adequate information/training (exacerbated by lower literacy among women), a lack of financial resources to cover the required investment(s), and actual or expected increases in labor requirements, including the time required to implement a

practice and/or the physical exertion required. Men and women differed more, however, in what they perceived to be the most important context-related constraints. Men, for example, highlight the fact that that much of CSA practices focus on crops rather than livestock and were thus of lower interest to them and the poor roads and associated difficulty/costs getting products to market. Women, in contrast, noted that they often lacked sufficient land to implement the practices or had limited power to make the decision within their households to implement a CSA practice, and that there was frequently a mismatch between timing of training activities and timing of farming activities. Both men and women remarked on the low quality and high cost of inputs available on the market as well as inadequate follow-up and support from those promoting CSA use. Overall, the study succeeds in demonstrating the need for gendered understanding of local attitudes toward climate smart agriculture and local constraints to their adoption and use at both the individual and landscape level, which noted specific areas that could serve as a common goal for multi-stakeholder platforms or other policy engagement efforts to begin improving conditions for scaling nutrition-sensitive CSA practices in a gender equitable way.

Policy engagement and scenario-guided adaptation planning

The bulk of PACCA's phase II work in Ethiopia was focused directly on policy engagement and scenario-guided adaptation planning, with the latter taking the form of climate-risk profiling of priority value chains. That effort, which built on a comprehensive literature review, climate modeling, surveys of key informants and a cost-benefit analysis of agricultural practices and adaptation strategies, provided important insights into both climatic hazards and risks as well as climate smart agricultural practices and other adaptation strategies pertinent to the wheat, fava bean and honey, value chains which were previously identified as priority areas in the Arzi Zone. The findings indicate that drought, heat stress, shortened growing seasons, and flash floods were among the primary climatic hazards to agricultural production in zone, while ongoing and potential adaptation strategies included: adjusting sowing dates, intercropping, planting trees, adopting some elements of soil and water conservation, crop and livestock integration, better weeding management techniques, and traditional control methods against honey and bee pests and predators. These findings, along with the results of the cost-benefit analysis, were made available to key stakeholders in both public and private sectors.

In addition to this, two major policy engagement activities were undertaken as part of the aLIVE project, with the objective of providing support to the government of Ethiopia in translating the National Livestock Master Plan and the 10-Year National Agricultural Strategic Plan to actionable policy and investments. The first of these was the development and promulgation of a roadmap for improved collection, management and use of livestock data, in order to help advance decision-making in the Ministry of Agriculture as well as other key federal and regional institutions. This involved validation workshops with key stakeholders, facilitating engagement between the Ministry of Agriculture and the Livestock Improvement Corporation, providing the former with experience with improved practices for developing information systems and databases to support livestock sector development, and direct support to National Genetics Improvement Institute for the development of a herd performance management system. As part of these efforts, several senior staff were employed who were seconded to the Ministry of Agriculture. This seconded staff continued to provide direct technical support for the livestock state minister, as well assisting the Ministry in policy engagement, stakeholder discussion and implementation with other works related to livestock sector.

The second major policy engagement activity undertaken in Ethiopia focused on the development of the Ethiopian National Livestock Market Information System (NLMIS). This platform enabled the collection and dissemination of up to date information on livestock prices and volumes in the main markets in Ethiopia, providing both institutional and individual users timely access to valuable market information and serving as a provider of critical information and analyses for Horn of Africa's various early warning systems. The price and volume data were collected at designated markets and conveyed to the NLMIS server in Addis Ababa using small message system (SMS) enabled cell phones and a data coding system. The data were then made available to all interested parties via SMS query of the server or through the internet portal. Related policy engagement efforts associated with the initiative included a training of trainers (TOT) on the NLMIS system, which provided capacity development to 25 technical staff drawn from federal and regional livestock marketing and Information Technology (IT) departments, including senior staff from live animal marketing directorate and supporting partners. A subsequent training was also conducted with the objective to acquaint members of the Ministry of Trade and Industry, the Ministry of

Agriculture, and regional technical staff in the livestock marketing and IT departments with the knowledge and skills to the use of livestock market information system, how to manipulate the database, livestock grading techniques, market price collection, volume data collection techniques, and use of short message service (SMS) for market information delivery and enquiry. The ultimate target was to support enhanced technical and management capacity of the Ministry of Trade and Industry's 150 field-based market monitors in to collect, manage and disseminate information and to further improve the system, and to support Ministry of Trade and Industry in efforts to expand the system into key 50 key livestock markets in Amhara, Afar, Tigray, SNNPR, Oromia, and Ethiopian Somali regions. The partnership also aimed to ensure the system would be owned and sustainably implemented by the Ministry of Trade and Industry at the federal level, who would also coordinate the implementation activities at regional level. As such, the expected result was the establishment of an effective and sustainable livestock market information system capable of serving needs of pastoralists, producers, consumers, traders, processors and policy makers, while eliciting appropriate market behavior. The Standing Panel on Impact Assessment (SPIA) of the CGIAR System identified NLMIS as one of policy and animal agriculture innovations that contribute to the agriculture system in Ethiopia

June 2018 to June 2019 another round of strategic planning workshops were held also in the Mbale and Nwoya district of Uganda as part of PACCA's second phase. In these workshops, district-level policymakers, representatives of farmers organizations, researchers and other stakeholders met to identify priority value chains for the district, particularly with respect to food and nutrition security, to review the findings of the situation analysis and to undertake strategic planning in light of two scenarios, developed during the Situation Analysis, modeling near-term effects of climate change in the district. Deliberate effort was made during this strategic planning process to differentiate the anticipated impacts and hazards, at various stages in the value chain, according to farmers' gender, age, socio-economic status, agro-climatic region, and other factors. This process led to the identification of four priority value chains (i.e. poultry, onions, cabbage and groundnuts in Mbale and cassava, bean, chicken and goat in Nwoya), the enumeration of specific climate change related risks to individual stages along those value chains, and the identification of underlying hazard factors that can be expected to increase the risks for specific populations (e.g. youth, women, the

HIV-positive). Finally, specific recommendations were formulated, which ranged from on-farm practices (both new and currently practiced), to policy initiatives, to private-sector service provision, which were jointly deemed to possess the greatest potential to reduce risks and foster improved food and nutrition security. However, it was noted that the process, especially in the selection of priority value chains, was at times contentious, with different groups prioritizing different value chains based partly on their relative concern for risks which climate change poses to the economic vitality of the region's agricultural sector broadly construed versus the more specific concerns related to food and nutrition security.

Theory of change, impact pathways, and progress towards outcomes

The centrality of creating an effective science-policy interface in PACCA's overall strategy is reflected in the impact pathway for the project's first phase, depicted in Figure 2, where a forum for the iterative process of co-learning between the scientific community and various types of policy actors helps foster the improved communication which is expected to drive subsequent outputs, outcomes, and impacts. Gender mainstreaming can similarly be seen to be central, not only defining the aims of one of the phase's seven activities but also helping to define how other activities are pursued and one of the criteria by which outputs and outcomes are measured. The outputs enumerated in the figure further cohere around the central idea of motivating and supporting policymakers to develop and implement evidence-based policy to close gaps and exploit synergies which will together foster both gender-equality and climate resilience in the region.

The centrality of gender mainstreaming and the multi-stakeholder platforms is constant throughout the PACCA project, but the impact pathways for the two phases of projects do differ in other important ways. Most notably, nutrition-security is introduced in the second phase as a cross-cutting issue to be mainstreamed alongside gender considerations. Additionally, the scenario-guided strategic planning and policy engagement in the second phase are supported by a more limited set of research activities in the second phase (i.e. the

situation analysis and policy analysis) than in the first, while the expected outcomes extend beyond influencing policy actors only, as was the case in the first phase, with the target outcomes of the second phase making specific reference to decisions taken by extension personnel as well as by farmers themselves. The indicators designed to measure progress toward flagship outcomes are also more ambitious in the second phase (Table 3).

In reviewing the project's theory of change and impact pathways, and in evaluating the progress made toward its stated aims, several important considerations need to be borne in mind if the lessons learned are to be as useful as possible in serving as guidance for future projects and programs. First and foremost among these are the wholly unforeseeable challenges wrought on this and other projects beginning early in 2020 by the global SARS Covid-19 pandemic, which was further compounded in Ethiopia by the outbreak of hostilities in Tigray.

Secondly, PACCA's work in Ethiopia only began during phase II and, correspondingly, built up much of their research and policy engagement activities upon a different set of on-going policy initiatives and institutional frameworks than existed in Uganda and Tanzania. In practice, this meant that the work undertaken in Ethiopia followed a modified impact pathway, with activities and target outputs which differed from those in Uganda. Target outcomes and overall project objectives were, of course, broadly shared across all countries where PACCA was operational.

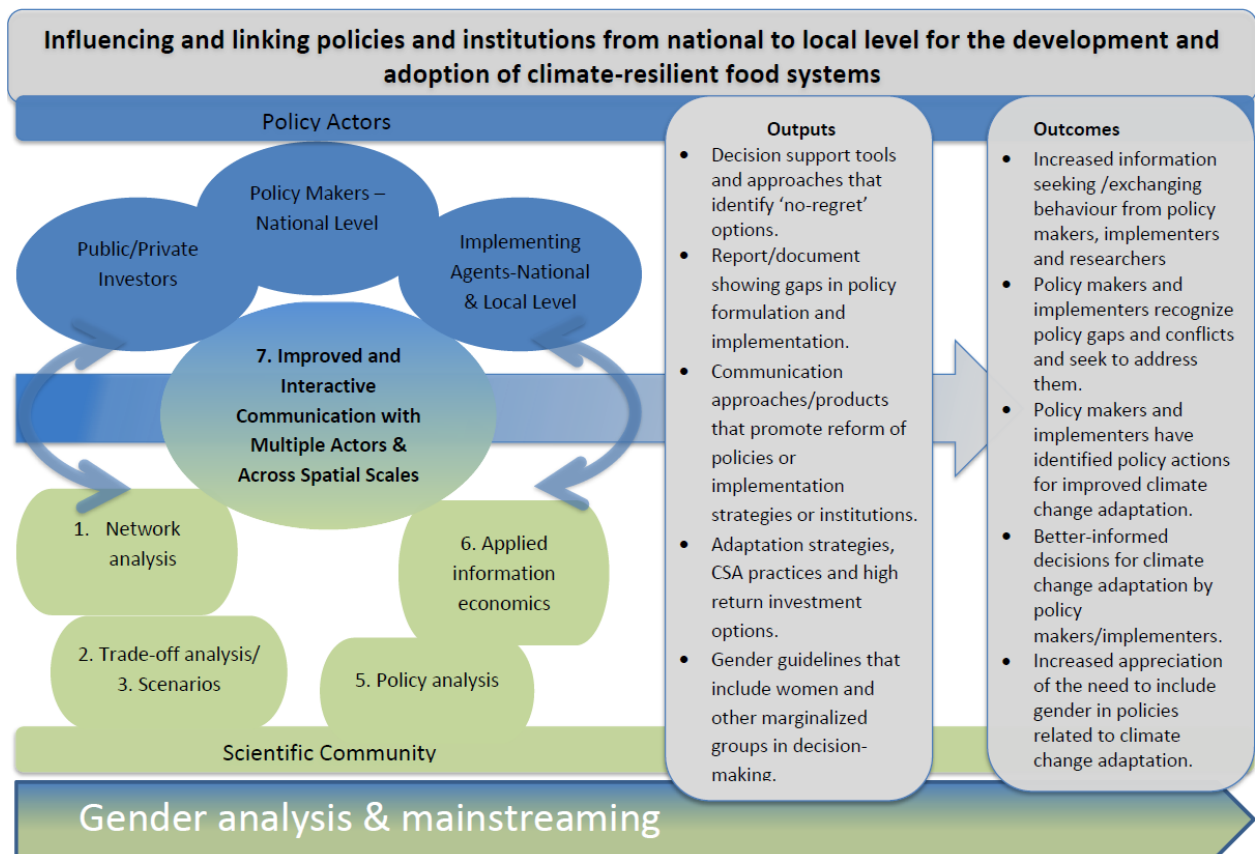


Figure 2. PACCA Phase I impact pathway.

Secondly, and as already been noted previously, the nature of the outcomes being sought and the pathways by which such changes were to be achieved by the PACCA project are often inherently more difficult to measure than those of other Research for Development efforts. It is challenging to assess the degree to which individuals' attitudes and perceptions, let alone institutional norms or priorities, shift over time and still more difficult to document spillover effects of this nature or to estimate a contribution to changes in policy which can take years to manifest and are subject to many shaping influences. Indeed, a key lesson is the need to continue the efforts made by the project toward identifying research methods which enhance such learning. This does not mean, of course, that the project did not yield concrete evidence of achievement towards its outcomes, areas of misalignment within the impact pathways, or areas where more specific areas where future efforts may need to work to enable more robust evaluation and learning.

Selected evidence of outcome achievement

A considerable amount of feedback from policy makers and other stakeholders, received both during various engagement events and as the result of follow-up interviews, surveys,

etc., suggest that a number of key research findings generated through the PACCA project were received, internalized, shared, and acted upon by national-level policymakers and other stakeholders. For example, in a 2017 meeting with Tanzanian policymakers, including 35 MPs, in which was presented the findings from a PACCA study on the degree of gender consideration in climate change policy in Tanzania, the opposition shadow minister for agriculture, Hon. Magdalena Sakaya remarked that “What I see is a scientific study that clearly shows the findings about our national policies. It shows what we have done well and the gaps that need to be filled. What we need to do is develop and implement strategies to close the highlighted gaps, and I think [that] is clear”. Some MPs subsequently requested a training session be organized in which the relationships between climate change, food security, gender, and the environment would be further examined. Somewhat earlier, at a high-level meeting with Ugandan parliamentarians, permanent secretaries, commissioners and civil society organizations in which a parallel study examining the degree of gender mainstreaming in Ugandan climate change policy was presented, the MP for Kumi County, Ilukor Charles, remarked that “I have now seen the linkage between gender, climate and food security”.

Feedback workshops were also conducted with members of the Parliamentary Forum on Climate Change and Food Security and other national level climate change stakeholders, in addition to ten local governments, in which were presented findings related to the (generally low) level of budget allocation by sub-national governments to gender-related issues. The sessions with officials from local governments revealed their perceptions of what drove this pattern, but also enabled the identification of several immediate actions which could be taken to remedy it, including allocating part of local revenue to the gender budget to help compensate the conditional grants, budget cuts and demand-driven budgeting which policymakers identified as being obstacles to sustained funding of long-term initiatives such as improving gender equality.

These examples are clearly indicative of an increasing recognition of the need for the inclusion of gender considerations in climate change policy as well as both increased knowledge seeking and sharing behavior by policymakers and researchers, and of policy makers and implementers recognizing gaps and conflicts in climate change policy and

seeking ways to address them. These accounts are also consistent with PACCA have made achievement in CCAFS flagship indicators 1.4 and 1.5 (Table 3).

Table 3. CCAFS Flagship Outcome Targets for Each Phase of the PACCA Project.

CCAFS Flagship Outcomes	PACCA Project Phase	
	Phase I	Phase II
1.1: Number of organizations and institutions in selected countries/states adapting plans and directing investment to optimize consumption of diverse nutrient-rich foods, with all plans and investments examined for their gender implications		4 (2 sub-national institutions each in Uganda and Ethiopia)
1.2: Number of countries/states where CCAFS priority setting used to target and implement interventions to improve food and nutrition security under a changing climate		
1.3: Amount of new investments by state, national, regional and global agencies, informed by CCAFS science and engagement	2 (Uganda and Tanzania)	
1.4: Number of national/state organizations and institutions adapting their plans and directing investment to increase women's access to, and control over, productive assets and resources	2 (1 National-level policy decision each in Uganda and Tanzania)	6 (1 national and 2 subnational institutions each in Uganda and Ethiopia)
1.5: Number of policy decisions taken (in part) based on engagement and information dissemination by CCAFS		4 (1 National and 1 Subnational policy decisions in each of Uganda and Ethiopia)

In addition, numerous policy review efforts helped to expose policymakers and other stakeholders to a range of plausible climatic and socio-economic scenarios which they or their successors are likely to confront, and in so doing to work through the implications for food- and nutrition-security in the region, with the ultimate aim of supporting policymakers in identifying and enacting better-informed policy for climate change adaptation. In November of 2015, PACCA collaborated with the Ugandan Ministry of Agricultural, Animal Industries and Fisheries (MAAIF) to hold a scenario-guided policy review and validation of the draft Agricultural Sector Strategic Plan. In August 2016, the Ugandan national Learning Alliance, under the aegis of the Ministry of Water and Environment's Climate Change Dept., provided a forum for a review of the draft Strategic Program on Climate Resilience. PACCA further supported the Ugandan MAAIF with the development and, via a 2016 meeting with a

wide variety of stakeholders, the validation of guidelines for mainstreaming climate change in the agricultural sector. These are in addition to the numerous scenario-guided strategic planning sessions and policy reviews held with members of the district Learning Alliances in Uganda and Tanzania, in the former country throughout both phases of the project. In fact, the Mbale District Local Government used a district learning alliance meeting in March 2017, to articulate its desire to reinstate a revised and improved version of the Coffee and Cotton Ordinance (1998), using the growing body of evidence of likely climatic changes and the input of a greater variety of stakeholders to overcome the shortcomings which led the original ordinance to be repealed after just two years. In contrast to this last example, however, it is difficult in most cases to ascribe any individual policy or policy revision outcome to the specific contributions made by PACCA, whether that be directly through the research evidence which the project provided during its engagements with policymakers or more indirectly insofar as it helped to foster more effective collective action through its support for the Learning Alliances. This does not mean that no such contribution was made, of course, but suggests that more tailored methods are needed to at least confirm, if not measure per se, outcomes related to improving policy outcomes vis a vis climate change adaptation.

PACCA's phase two impact pathway included two outcomes with direct bearing on the CCAFS flagship outcome indicator 1.1, which was not included among the targets for the project's first phase: (i) making men, women and young farmers aware of profitable food security and nutrition options that work for them, and (ii) extension personnel adopting strategies that facilitate nutrition-sensitive delivery mechanisms. Each of these appear to be supported in the project proposal's impact pathway primarily by the development and revision of the land-use planning manual and through the engagement and scenario-guided planning sessions with the Learning Alliances. It is not, as yet, apparent that the land-use planning manual has been updated, although that output may be forthcoming.

Correspondingly, little evidence is currently available which indicates that extension personnel have adopted strategies that facilitate nutrition-sensitive delivery mechanisms. There was also some contention reported in the scenario-guided planning sessions held in Mbale, where representatives of different stakeholders appear to have had some difficulty in reconciling the various trade-offs - in terms of potential climatic resilience, capacity to

support improved food- and nutrition-security, and profitability - in prioritizing agricultural value-chains. That such trade-offs exist was already well established during the project's first phase, but it remains to be seen whether or to what extent such differing prioritizations among differing groups of stakeholders (e.g. district-level officials and representatives of farmers' associations) may hinder adoption/scaling of the identified practices or reduce the credibility of such efforts more broadly. At a validation session, for example, held in the Mbale district of Uganda in January of 2019, the Chairman of the Mbale district Local Council V, Bernard Mujasi, remarked in relation to the fact that coffee was not included among the priority value chains, that "Leaving out coffee is bothering my mind. Coffee has to be there, whether it is resilient or not".

Finally, PACCA demonstrated considerable success in establishing the Learning Alliances as vehicles for improved policymaking at both national and sub-national level. Following, for example, the greater integration of climate change adaptation, generally, and climate smart agriculture in particular, as priorities into district development plans, some of the learning alliances succeeded in acquiring funding from district governments, while the Ugandan Ministry of Land and Water has budgeted for regular support for LAs. This are clearly contributions toward CCAFS flagship outcomes 1.3 and/or 1.1, though neither was a target during PACCA's first phase and only the latter was during its second. The project also generated a considerable amount of evidence on best practices and common pitfalls, which have been published in partnership with regional governments and other development partners, and these and the observed indications of a growing institutionalization of the Learning Alliances indicate at least their potential to help foster and support continued pursuit of more evidence-based policymaking on gender- and nutrition-sensitive climate adaptation policy in the coming years.

Conclusions and recommendations

The PACCA initiative, through an approach based on the Climate Change Learning Alliances and direct engagements with relevant governmental units, has over a period of seven years contributed towards the provision of research-based evidence to improve climate change adaptation policy for the agricultural sector in East Africa. Over this period, PACCA has

drawn particular attention to the need of supporting and encouraging climate change policy action, generally, and for fully embedding such policy engagement in projects' implementation phase, specifically, in order to be able to realize intended results and learning outcomes. This is particularly true when policy action is directed toward improved implementation of CSA options at the farm level. As we enter into One CGIAR, this will need to be considered so that intended policy changes can be studied in time and so that closer collaboration can be sought between evidence generation and implementation in both space and time.

Processes of long-term attitude change and policy transformation are gradual and often extend over long periods of time. Consequently, the full effect of the Learning Alliances promoted through PACCA will not be entirely self-evident in the timespan of the PACCA initiative itself. However, keeping this in mind, the seven-year research for development initiative has yielded a rich number of key learnings from which a set of recommendations can be derived to help build an enabling policy environment for a gender-responsive and nutrition-sensitive climate change adaptation in East Africa.

Context-specificity of climate-smart agricultural practices

Climate-smart agricultural practices are context-specific and hence the effects of any given practice will vary substantially with the specific production system into which is being implemented or intended to be implemented. The perceived benefits and adoption rates of CSA practices by farmers and relevant actors play an even more fundamental role in the potential macro-level impacts of a practice. There are important differences in the way farmers perceive the cost and other considerations in the adoption and use of CSA practices depending on factors such as their sex, age, and the size and location of their farm. For example, PACCA research has shown how the prioritization of CSA practices can differ widely among agro-ecological zones and between male and female farmers.

Recommendations:

- Prioritization efforts with trade-off analysis exercises among researchers, policymakers, farmers organizations, and individual farmers are key to the successful introduction, enhanced implementation, and scale-out processes of CSA practices.

- These prioritization efforts should take into account key differences in CSA perceptions, including those relating to gender, age, and household and farm characteristics. For this, participatory exercises that lead to improved gendered understanding of local attitudes toward climate smart agriculture and local constraints to their adoption and use at individual and landscape level could prove useful.

Information sharing

Information flows among and between farmers and expert organizations at the local, district, and national scales are key to the successful adoption and continued use of climate-smart practices and more broadly to the success of climate adaptation policy initiatives. As evidenced by research conducted in Rakai, Uganda and Lushoto, Tanzania, information flows regarding climate-smart practices and technologies can be largely scarce, with only a minority of farmers seeking or receiving information, and with a consequent low rate of connectivity between farmers and experts. Furthermore, among farmers, women tend to have smaller networks of information and have less access to training sessions and extension services.

Recommendations:

- Increasing local climate financial investments and the number of extension staff, and investing in capacity development programs can greatly enhance information flow for increased adoption of climate-smart practices and the success of climate adaptation policy programs.
- Special attention should be put to make these investments gender-responsive, providing women with more facility to attend trainings and being able to access extension services (e.g. by hosting capacity development trainings during hours when women are more likely to attend or by providing childcare services in the extension programs).

Integration of gender in agricultural, nutrition, and climate change policy

Gender-responsive agricultural, nutrition, and climate change policy is needed to ensure that policies, and development programs that will be built on these policies, align with the needs

and challenges of men and women living in rural areas. However, PACCA research evidenced an overall insufficient integration of gender in climate change and agricultural policies, especially at sub-county and ward levels, with extremely limited budget allocations and with proposed gender activities not being transformative in nature. Gender and nutrition issues were also not consistently mainstreamed in agriculture and climate change policy. In addition, the policies reviewed tended to perpetuate gender stereotypes and oversimplify gender discourse in agriculture, nutrition, and climate change.

Recommendations:

- The formulation, budgeting and implementation of more gender-transformative agriculture, nutrition and climate change policy and programs at different governance levels is needed to foster more gender equality in rural societies.
- Improving the gender-responsiveness of agriculture, nutrition and climate change policy will necessitate efforts in capacity building policy makers and development actors (e.g. in conducting gender analysis, gender budgeting, gender-disaggregated indicators, gender-responsive reporting and evaluation, etc.)

Climate-proofing agricultural policy

The increasing threat of climate change in the East African region makes the need for effective policy action at local and national level necessary and urgent. Innovative policy formulation processes can help in fostering an enabling environment for climate-proofing agriculture and nutrition policies. For example, PACCA activities showed how the use of scenario-guided policy using modelling techniques to provide credibility to different climate projects were helpful in different policy review process in Uganda and Tanzania. A series of policy desk reviews conducted in Phase I and II of PACCA also revealed several challenges for improved climate change policy, including limited technical and financial capacity; low levels of awareness of climate-related risks; insufficient attention to local needs or priorities in policy design with frequent exclusion of local communities in policymaking processes; political interference or lack of political will to design and enforce climate-related ordinances; insufficient policy implementation capacity at different governance levels; poor

coordination of climate change policy initiatives and programs between national and local governments.

Recommendations:

- Establishment of sound financial mechanisms for climate change adaptation, including equitable funding allocation across district- and sub-county levels
- Invest in research and human capacity development, including the development of tailored capacity building initiatives with user-friendly climate information for different audiences.
- Strengthening research-policy linkages and institutional coordination and policy coherence for climate change adaptation across national and local levels.

Learning alliances as vehicles for climate change policy action

The Learning Alliances at national and district levels were central in the PACCA initiative as a strategy to engage with policy makers and to identify scientifically-grounded and gender-responsive policy initiatives for enhanced climate change adaptation policy action. The Learning Alliances have shown a demonstrated potential to raise awareness and to promote collaborative learning on issues surrounding climate change adaptation, climate-smart agriculture and gender-responsive agricultural policy. Through processes of information sharing, national and sub-national learning alliances were able to interact and plan for improved climate change policy action. However, the impact of the Learning Alliances is highly dependent on the institutions and individuals taking part in the meetings and the steering committees and coordinating offices of the Alliances and, as such, flexibility in the alliances' composition is important. The PACCA initiative has also shown that trust and the establishment of common goals between the different members of the alliances were important to foster unified action, as were adequate planning for timing of engagement and advocacy (e.g. coinciding with ongoing policy review processes). Weak institutional financial capacity was identified as one of the main challenges for the long-term sustainability of these Learning Alliances.

Recommendations:

- Host regular meetings and find a balanced mix of participants and participating organizations that ensures inclusive representation and which allows to build trust, to establish common goals, and to create a collective sense of ownership.
- Amplify and diversify sources of funding to ensure daily operations (e.g. hosting and convening meetings) and the long-term sustainability of the climate change Learning Alliances.
- Capacity building processes and the provision of technical and scientific support as needed to amplify the reach and credibility of the Learning Alliances advocacy efforts.
- Strong evaluation, monitoring, supervising and reporting systems should be put in place, enforced, and prioritized by learning alliance steering committees and coordinating offices.

Appendix: PACCA outputs reviewed for this synthesis report

PACCA Phase I

Network analysis

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