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Policy Paper

Strategies for Advancing the Contributions of Climate Smart Agriculture (CSA) in Eastern and Central Africa

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Key Messages

- » The various direct or indirect policy instruments set out by ASARECA member countries to advance and scale up contributions of CSA, project a positive and resilient future for the agricultural sector
- Implementation of national CSA policies and strategies will ensure national ownership and sustainability of CSA initiatives
- » Some ASARECA member countries are making progress in financing CSA initiatives through various mechanisms including National Climate Change Funds (Rwanda, Uganda, and Kenya). There is a huge opportunity for these countries to develop a robust national climate change funding system, supported by policies and institutional arrangements to help mobilize, allocate, and monitor climate finance for CSA.
- » Scaling up CSA requires partnerships and coordination of activities that cut across several stakeholders, such farmers, farmer organizations women and youth groups, financial and credit institutions, national governments, NGOs, CBOs, research, and academia
- » Research, innovation, capacity building, and knowledge management for CSA are critical if progress is to be actualized within ASARECA member countries.

The concept of CSA is gaining momentum within ASARECA member countries with several of them initiating and implementing various CSA Initiatives. The focus of this policy brief is to highlight various strategies that countries have put in place to advance the contributions of CSA and identify some key recommendations that countries can incorporate in ongoing efforts to scale up CSA.

Introduction

In the Eastern and Central Africa (ECA) region, small-holder farmers dominate the agricultural landscape, deriving livelihoods from family farms as small as a quarter of an acre (Lowde et al. 2016; Murray et al. 2016). However, the livelihoods of these farmers are under threat from the impacts of climate change. Evidence indicates that climate in this region is already changing and the impacts are being felt (FAO, 2018; Adhikari et al., 2015; Niang et al., 2014; Shongwe et al., 2011; van de Steeg et al., 2009). For instance, rise in average temperatures, changes in rainfall patterns, increasing frequency of extreme weather events such as severe droughts and floods, and shifting agricultural seasons have been observed in different agro-ecological zones in the ASARECA member countries. To address these challenges imposed by the changing climate and ensure that the agricultural sector within the region becomes more resilient, ASARECA member countries are developing and implementing various CSA Initiatives to increase food productivity, enhance the adaptive capacity of farmers and reduce greenhouse gas emissions. Some of these CSA Initiatives include policies, strategies, plans, programs, projects, networks, partnerships, hubs, and platforms. Among the initiatives, a range of CSA practices and technologies are disseminated to farmers (crop, livestock, and fisheries) at various levels (local, national, and regional levels). A few studies have highlighted that adoption of CSA practices and technologies amongst farmers is low due to various factors at household and policy levels. Education level, income from non-farm sources, contact with agricultural extension agents, exposure to media, type of households, and membership to a farmer or women's group are some of the significant determinants of CSA adoption levels among small-scale farmers (Abegunde et al. 2019; Murray et al. 2016). Lack of supportive CSA policies with accompanying incentives such as input subsidies is also affecting adaption and scaling up of CSA (Partey et al. 2018).

Advances in CSA in ASARECA member countries are intended to increase the adoption of CSA and thus increase the productivity of smallholder farmers through policy, technological and human development, and financial investment sufficient enough to stimulate agricultural productivity. Therefore, this policy brief aims to highlight various strategies that countries are undertaking to advance contributions of CSA and identify some key recommendations that countries can incorporate in ongoing efforts to scale up CSA. This policy brief is also important to the national governments, organizations, and other stakeholders who have an interest in CSA. Additionally, the results of this study have implications for CSA policy, strategy design, and implementation.

2. Methodology

This study was commissioned by ASARECA to identify strategies that various stakeholders (policymakers, NGOs, CBOs, research, academia, UN bodies among others) are undertaking to advance the contributions of CSA. The study was conducted in ASARECA member countries namely; Burundi, DR Congo, Ethiopia, Eritrea, Kenya, Madagascar, Republic of Congo, Rwanda, South Sudan, Sudan, Tanzania, and Uganda. A mixed-method approach was used. Data and information were collected through key informant interviews and document reviews of various CSA initiatives. The interviews were administered through email and telephone calls. Content analysis was used to analyze the data focusing on national strategies, research, value chains, partnerships and networks, hubs/platforms; and financing for CSA.

3. Results

3.1 Country Preparedness to Respond to the Impacts of Climate Change on Agriculture Sector

Various strategies are being implemented and adopted by different stakeholders in ASARECA member countries to advance the contribution of CSA to increasing food production, enhancing adaptation, and reducing Greenhouse Gases (GHGs). The strategies are undertaken at various levels including grassroots, sub-national, national, and regional by national governments, various Community-Based Organizations (CBOs), private sector and Non-Government Organizations (NGOs) that are individually or jointly pulling resources to support transformative and scalable climate actions in the agricultural sector.

CSA is context-specific since farming systems and farm typology are very diverse and thus require specific climate smart interventions. An ideal CSA conceptual framework should integrate policies around adaptation, mitigation, and food security including six desirable outputs: increase productivity, income, and resilience, improve input use efficiency, reduce emissions and increase gender and social inclusions. CSA should help to improve farm productivity, increase resilience to weather extremes, and decrease greenhouse gas emissions wherever possible. Findings show ASARECA member countries are implementing various activities to enhance the contribution of CSA in increasing food production, building resilient farms, and communities while lowering the carbon footprint in farming systems (Table 1 below).

Table 1: Country's preparedness to respond to the impacts of climate change on the agriculture sector

CSA Preparedness Strategies	No. Countries Implementing	Countries Implementing
Predictions and evaluations of climate change and its impacts in agriculture and using the data to develop national strategies and plans (e.g., NDCs and NAPs)	12	Burundi, DRC, Eritrea, Ethiopia, Kenya, Rwanda, Republic of the Congo, Madagascar, South Sudan, Sudan, Tanzania, Uganda
Integrating climate change into national and agricultural policies	5	Burundi, Kenya, Rwanda, Eritrea, and Uganda
Integrating climate change into national and agricultural strategies and plans	12	Burundi, DRC, Eritrea, Ethiopia, Kenya, Rwanda, Republic of the Congo, Madagascar, South Sudan, Sudan, Tanzania, Uganda
Establishing National climate change funds	3	Rwanda, Uganda, and Kenya
Improving understanding and sharing knowledge on science, policies, and best practices within the country and across the region	12	Burundi, DRC, Eritrea, Ethiopia, Kenya, Rwanda, Republic of the Congo, Madagascar, South Sudan, Sudan, Tanzania, Uganda
Facilitating readiness for and accessing various climate and green funds	12	Burundi, DRC, Eritrea, Ethiopia, Kenya, Rwanda, Republic of the Congo, Madagascar, South Sudan, Sudan, Tanzania, Uganda
Assessing technology needs and facilitating technology transfer for adaptation and mitigation within agricultural sectors	12	Burundi, DRC, Eritrea, Ethiopia, Kenya, Rwanda, Republic of the Congo, Madagascar, South Sudan, Sudan, Tanzania, Uganda
Improving community livelihoods and resilience, strengthening local institutions	12	Burundi, DRC, Eritrea, Ethiopia, Kenya, Rwanda, Republic of the Congo, Madagascar, South Sudan, Sudan, Tanzania, Uganda
Capacity building of national governments and other relevant stakeholders with critical knowledge for climate change and CSA	12	Burundi, DRC, Eritrea, Ethiopia, Kenya, Rwanda, Republic of the Congo, Madagascar, South Sudan, Sudan, Tanzania, Uganda

Table 1: Country's preparedness to respond to the impacts of climate change on the agriculture sector

3.2 Increasing National Government Ownership of CSA Initiatives

Findings from the study show that National Governments in most ASARECA member countries have developed CSA initiatives including strategies, programs, policies, and partnerships. A total of 58 CSA national strategies/plans were identified in member countries (Figure 1). A total of 58 CSA strategies/plans were identified in ASARECA member countries (Figure 11). Kenya had the highest number (13) of strategies, followed by Tanzania (7) and Rwanda (7). Burundi and Ethiopia had 4 each while 3 strategies/plans were found in Uganda. in Madagascar, South Sudan, Sudan, DRC, and Eritrea, strategies/plans were found and only one was found in the Republic of Congo had the least number of strategies/plans (1), while each had 2 strategies/plans.

Of the 58 CSA strategies and plans, 49 were implemented at the national level, while 7 and 2 were implemented at the regional and global level, respectively. Of the 58 CSA strategies and plans, 49 were implemented at the national level, while 7 and 2 were implemented at the regional and global level, respectively (Figure 2 below).



Figure 1: Number of CSA strategies/plans implemented in each country (n=49)

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Figure 2: Percentage of CSA strategies/plans implemented at national, regional and global levels (n=58)

Kenya has developed a CSA national strategy with an accompanying CSA implementation framework, while the rest of the countries have strategies that do not mention CSA but implicitly contribute to CSA pillars. Dinesh et al. (2017) noted that developing CSA strategies and programs at national levels creates a favorable enabling environment for CSA that is accompanied by government commitment and financing. Additionally, all the ASARECA countries have drafted and submitted their Nationally Determined Contributions (NDCs) that mention CSA directly or indirectly. Countries that explicitly mention CSA in their NDCs are Burundi, Eritrea, Kenya, Madagascar, South Sudan, Tanzania, and Uganda. Equally, the National Adaptation Plans (NAPs) submitted by Ethiopia, Sudan, and Kenya mention CSA as part of their adaptation strategies in the agriculture sector. Currently, some of the ASARECA member countries are preparing to revise their NDCs in the coming year, thus providing a great opportunity for directly mainstreaming CSA as a priority (with a wide plethora of adaptation priority measures).

3.3 Developing Financial Mechanisms that support Implementation of CSA Initiatives

Development of appropriate financial mechanisms and investments for CSA including climate change funds, micro-grants, and impact investments on CSA and agriculture in general is critical for enhancing food security and adaptive capacity. ASARECA member countries have outlined in their various national strategies, plans, projects, and programs bold aspirations to increase agricultural productivity, enhance adaptive capacity, and reduce GHG emissions. These bold aspirations are accompanied by considerable financing needs to meet the triple objectives of CSA. According to Khoza et al. (2020), a key indicator of a government's commitment to CSA is the amount of resources it allocates and spends through the national budget from its resources for preparedness and resilience to shocks, extreme events, and current and future threats.

Findings show that some of the ASARECA member countries have developed National Climate Change

Fund (NCCF) mechanisms that are underpinned by the national climate change and agricultural strategies and policies, including NDCs and NAPs. Rwanda, Uganda, and Kenya are some of the countries that have established NCCF and have demonstrated a strong political will to support climate change action, including CSA. These NCCFs prioritize and finance investments to reduce climate risk and achieve adaptation within the county and therefore, places these countries in a position to access climate finance for CSA. For example, Kenya's NCCF has attracted an estimated USD4.6 billion for projects and programmes in various sectors including CSA. In Kenya, there is the devolution of climate funds to the sub-national level to ensure that climate resources reach the communities at the local level (National Treasure, 2017). County Governments of Garissa, Isiolo, Kitui, Makueni, and Wajir have established County Climate Change Funds (CCCFs) that are aligned to Kenya's NCCF.

At the regional level, the Africa Climate Change Fund administered by the African Development Bank aims to 'support African countries to strengthen their capacities to access international climate funds and to pilot innovative small-scale climate adaptation projects (AfDB, 2020). At the continental level, the establishment of the Green Climate Fund (GCF) to mobilize and scale up climate finance, ensures that ASARECA member countries can tap into this fund. Since its inception in 2010, GCF's goal is to mobilize USD 100 Billion annually (GCF, 2020).

3.4 Increasing Scientific Research and Development for CSA Practices and Technologies

The increasing complexity and multidimensionality of social, economic, and environmental implications of climate change on agricultural systems in ASARECA member countries have made policymakers, researchers, and other relevant stakeholders aware that innovative and more integrated approaches to research and innovation have to be adopted to effectively tackle the challenges posed by climate change. Scientific research and development will play an important role in developing and scaling up CSA in ASARECA member countries. This is because the availability of climate change data is crucial to determining the type of CSA practices and technologies to adopt for a specific socio-cultural and environmental context. Therefore, research is important for creating an evidence base for CSA in the diverse agro-climatic and weather conditions. National and international research institutions are undertaking studies on climatic predictions, vulnerability, and resilience and using the data to inform national policies and strategies. For example, the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) in collaboration with national research organizations is researching CSA

in Tanzania, Ethiopia, Kenya, Rwanda, and Uganda intending to identify best practices. The Research Program also aims at supporting the scaling up of practices and technologies that can contribute to food and nutritional security and poverty reduction under changing climatic conditions. Additionally, CIAT has developed national and sub-national climate risk profiles to guide CSA investments and priorities in Kenya, Ethiopia, Rwanda, Tanzania, and Uganda (CIAT, 2015). In collaboration with research institutions and national statistical bodies, UN Bodies such as FAO and World Bank are collecting, collating, and availing large-scale cross-sectional climate change and agricultural data that can be used to recommend appropriate CSA interventions for a specific locale. A review of research and innovation priorities shows that national governments are affirming their political will to better integrate research and innovation through co-designing, co-financing, and co-ownership of joint CSA programs, projects, networks, and platforms. These partnerships aim at researching, identifying, and sharing innovative CSA solutions that are climate resilient, efficient, cost-effective, and sustainable. Some of the innovative CSA research priorities include; (i) inclusive profitable and sustainable CSA supply chains to help guarantee resilience at farm and landscape level and across the value chains; (ii) promoting quality CSA inputs and outputs, that are resilient to weather changes and extreme events (drought and floods) to ensure high productivity and contribute to reducing greenhouse gas emissions; (iii) developing various mobile apps to support CSA; and (iv) developing and scaling up business models for CSA, Micro-insurance and Index based insurances schemes

3.5 Development and Implementation of CSA Value Chain

Climate-Smart Agricultural (CSA) practices are increasingly adopted as a means to adapt to a changing climate, as well as mitigate agriculture's negative environmental impacts. This is because countries and various stakeholders are recognizing that the impacts of climate change do not stop at production but also affect processes such as post-harvest storage, marketing, and transportation along the value chain. Across ASARECA member countries, there are increasing interests in ensuring that climate-smart interventions are integrated into the entire CSA value chain, that is from production to consumption. Findings from the study show that about 258 CSA initiatives targeted value chains. Some of the CSA activities in the various value chains are highlighted in Table 2 below.

Table 2. CSA activities/practices		
CSA activities/practices	No. of CSA activities/	
	practices (n=489)	
Linking farmers to profitable markets	88	
Post-harvest storage to help reduce losses	47	
Minimizing water usage and water efficiency (e.g., use of drip irrigation)	97	
Recycling organic waste (e.g., composting of livestock waste and crop	105	
residues)		
Commercialization of maize and sorghum	18	
Dairy values chains	12	
Promoting the use of micro-irrigation solar systems	23	
Generating bioenergy from crop and livestock residues (bio-digester)	4	
Promoting agribusiness to enhance farmer profitability	93	
Capacity enhancement in CSA value chains	74	
Mean	56.1	

Table 2. CSA activities/practices

⁶Climate Resilient Agribusiness for Tomorrow (CRAFT) project that is implemented in Kenya, Tanzania and Uganda aims to increase investments and business growth in climate smart value chains; and increase involvement of women and youth agribusiness development.⁹

3.6 Strategic Partnerships for Research and Scaling Up CSA

Research and scaling up of CSA practices and technologies requires collaborative efforts, coordination, and partnerships amongst various stakeholders including national governments, farmer organizations, financial sectors, input distributors, national and international research organizations, NGOs, CBOs, private sector, and UN Bodies. Findings show that across the countries, CSA initiatives are implemented under multiple partners, each with different roles such as the provision of an enabling policy environment, provision, and mobilization of resources and research expertise as well as technical expertise for implementation (Table 3 below). Some of the partnerships are used to leverage finance for CSA (e.g., CGIAR centers working with national governments to access green climate funds) and for improving understanding and sharing knowledge on CSA science, policies, and best practices

3.7 Integrating Gender Equality and Social Inclusion Principles into CSA Initiatives

Integrating gender equality in agricultural development in Africa has conclusively been shown to stimulate the adoption of sustainable and climate resilient practices and technologies, enhance food security and nutrition and increase household incomes (Acevedo, et al. 2020). Gender and social differences such as age, wealth status, type of household, access to extension services, sex, and education level have been shown to influence the adoption of drought resistant crop varieties (Collins, 2018). For instance,

women in female-headed households are more likely to adopt climate smart agriculture practices if they receive information and inputs such as fertilizers and drought-resistant seeds (Acevedo, et al. 2020). In all these cases, a gender and social inclusion lens was applied to ensure different groups of people are targeted (Nyasimi et al. 2014; Nyasimi and Huyer, 2017). Results of this study show that most CSA initiatives (particularly CSA strategies, projects, and programs) integrated a gender and social inclusion (GSI) lens. Out of the 489 CSA initiatives identified, 77.6% (358) have integrated a GSI lens to reduce gender inequalities and social exclusion in agriculture. Some of the incentives that have led to reduction of inequalities and exclusion include rural credit and input programmes, provision of weather and agro-advisory services, safety nets, access to markets, and participation along CSA value chains for women, youth, and marginalized people that have the potential to positively impact livelihoods and enhance their ability to adapt to climate change.

Gender analysis is critical in ensuring that more farmers are targeted with appropriate CSA practices and technologies. This is especially more important during the design of CSA initiatives so that gender-responsive data is used to inform the implementation of interventions. Results show that most of the CSA initiatives identified integrated gender analysis to understand gender and social dimensions. This is instrumental in ensuring that the adoption of CSA technologies and strategies creates resilience among vulnerable groups such as women, youth, and the indigenous/marginalized people in the ASARECA

Table 3: Roles of different stakeholders in advancing CSA in ASARECA member countries		
Stakeholder	Roles and responsibilities	
National and subnational	Provision of an enabling policy environment	
Governments	Develop appropriate CSA policies	
	Provision and mobilization of resources	
	Capacity building of research and technical expertise	
	Agro-advisory and extension experts	
	 Sensitization and awareness creation on CSA practices and technologies; Coordination of CSA investments 	
	Coordination of partnerships among stakeholders	
	• Building networks that enhance access to global climate finance to support CSA.	
National and International	Conducting CSA research and provide data to inform policy	
Research Institutions	Provide research and technical expertise	
	Capacity building	
	Identification, prioritizing, and implementation of CSA interventions;	
	Coordination of research partners among stakeholders.	
Farmer organization and	Identification, prioritizing, and implementation of CSA practices and	
cooperatives, women groups, youth groups	technologies; sensitization, and awareness creation on CSA practices and technologies.	
NGOs and CBOs	Contribute to the implementation of CSA interventions.	
	Sensitization and awareness creation on CSA practices and technologies	
	Advocacy	
	Capacity building	
	Support the national government to access CSA finance	
	Dissemination and scaling up of CSA practices and technologies.	
Private sector (input distributors,	Provide credit, insurance, and inputs	
financial institutions, insurance)	Facilitate/support value chain development.	
Donors	Support financing and resource mobilization for CSA	
	Capacity building of technical expertise.	

Table 3: Roles of different stakeholders in advancing CSA in ASARECA member countries

member countries. Due to small land sizes and climate change pressures, there is an emphasis on building resilient ecosystems through gender integration leading to women's empowerment. By empowering women, agricultural productivity and profitability will increase and household resilience will be improved.

3.8 Knowledge Management and Capacity Building for CSA Initiatives

FAO (2013) has reported that knowledge management and capacity development across different scales is important to support the scaling up of CSA practices and technologies. Strengthening the capacity and increasing the knowledge of individuals (e.g., farmers, scientists) and organizations (e.g., research institutions, NGOs, CBOs, etc.) can enhance innovations and uptake of CSA. Findings from this study indicate that some CSA initiatives aim at equipping and developing the capacity of various stakeholders including farmers as well as developing a knowledge management system for climate smart agriculture. This is being achieved through training and the development of training materials, tools, and methodologies on CSA. For instance, the ICPAC project on building agricultural resilience that is implemented in Ethiopia, Kenya, and Uganda aims to 'build the capacity of National Meteorological Agencies in climate forecasting, early warning, remote sensing, environmental monitoring or information dissemination for sustainable development in Eastern Africa'.

CSA knowledge management is mainly being achieved through CSA hubs and platforms that store data and disseminate knowledge and information to support CSA in ASARECA member countries e.g., FAO, CIAT, and World Bank data hubs. Due to its diverse memberships, CSA hubs and platforms also bridge the gap between the different stakeholders and enable the sharing and exchange of CSA practices and technologies. Findings from the study show that 24 Communities of Practice, 64 Networks/Partnerships/ Alliance, and 11 Hubs and Platforms are active across ASARECA member countries.

4. Conclusion

Strategies for advancing the contributions of CSA in ASARECA member countries are being implemented at various levels. This is expected to put the CSA concept into practice at national, regional, and global. These strategies are going to increase food security, enhance resilience, and contribute to reducing GHGs emissions in the agriculture sector. National Governments' commitment to scaling up CSA is exemplified in creating a favorable strategy and policy environment (e.g., Kenya's climate smart agriculture strategy). The success of these strategies, programs, and projects are strengthened by the financial commitment of national governments and access to regional and global climate funds such as the Africa Climate Change Fund administered by the African Development Bank and the Green Climate Fund (GCF), respectively. Partnerships/collaborations and knowledge exchange between and amongst stakeholders is another strategy that can enhance the contribution of CSA in ASARECA member countries.

Finally, all these strategies must have a gender and social inclusion lens to ensure that all social groups, including women, youth, indigenous/marginalized people are targeted with CSA practices and technologies. This will enhance resilience amongst these vulnerable groups and increase the adoption of CSA innovations.

5. Implications and Recommendations

There is no single 'best strategy' for enhancing the contribution of CSA to increasing food productivity, adaptation, and mitigation in ASARECA member countries. Therefore, bringing on board various stakeholders (public and private sector) with different roles and responsibilities will effectively improve the chances of successfully dancing the contribution of CSA practices and technologies. In particular, the role of national governments to develop and implement national CSA policy and strategy frameworks will indicate a commitment by national governments to invest in and advance CSA contributions to increasing food security, enhancing resilience, and reducing greenhouse gas emissions from the agricultural sector.



Some recommendations that ASARECA secretariat can implement to support CSA's successful contribution against climate change impacts include:

- » Support and facilitating national governments to design CSA policies and strategies framework that can help in advancing CSA contributions and enhancing sustainability
- » Develop a compendium of CSA 'best practices" being implemented in different agroclimatic systems and socio-cultural environments and can be scaled up
- » Provide evidence on how the CSA innovations can be practically incorporated into agricultural systems, particularly evidence that can provide an understanding of how farmers can achieve synergies and minimize trade-offs in implementing multiple interventions on real farms
- » Support national governments to mainstream land degradation interventions into national action plans, strategies, and programs for addressing land degradation

- » Support national governments and other stakeholders to rapidly modernize with the use of CSA digital tools, new technologies, and renewable energies while at the same time tapping the potential of indigenous knowledge to address climate change issues in the agricultural sector
- » Support and engage with research institutions and relevant partners to generate knowledge evidence on potential CSA technologies
- » Develop and communicate potential CSA technologies through appropriate formats
- » Identify and establish linkages with different types of the private sector that can support upscaling and out scaling CSA such as local medium and small enterprise and intentional corporation
- » Establish strong partnerships that can galvanize stakeholders into action and improve coordination of CSA initiatives and leverage finances from different funding sources
- » Support integration of innovative gender and social inclusion CSA strategies to bolster local resilience, and reinforce women's, youth, and the indigenous/ marginalized people's coping strategies under a changing climate.



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ASARECA Partners



The Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA) is a not-for-profit sub-regional organization of the National Agricultural Research Systems (NARS) of 11 member countries, namely: Burundi, the Democratic Republic of the Congo, Eritrea, Ethiopia, Kenya, Madagascar, Rwanda, South Sudan, Sudan, Tanzania and Uganda.

ASARECA brings together scientists from the national agricultural research institutions of the member countries, national agricultural extension service providers and other strategic development oriented partners to generate, share and promote knowledge and innovations to solve common challenges facing agriculture in the member countries.

The ASARECA's strategic plan (2007-2016) and both the first (2009-2013) and second operational plans (2014-2018) have been aligned to the CAADP and the Science agenda. ASARECA significantly contributes directly to the CAADP Pillar IV, while also supporting the other 3 Pillars in joint collaborations with other like-minded institutions and partners.

