Can Climate-Smart Agriculture Be A Solution to Agri-Food Systems Resilience Building and Greenhouse Gas Emission Reduction? An African Perspective

Executive Summary

Climate-Smart Agriculture (CSA) is deemed a vital approach to fostering increased food production, building climate resilience, and mitigating emissions associated with farming. CSA has been adopted far and wide in Africa in response to climate variability, increased food shortage, famine, droughts and insect outbreaks. Despite its growing momentum, concerns have emerged as to whether CSA is, in reality, is capable of building the resilience of agri-food systems. Moreover, the extent to which CSA can mitigate agricultural Greenhouse Gas (GHG) emissions is a discourse with no consensus. To enable an understanding of the adaptation and mitigation concerns of CSA from an African perspective a series of discussions were initiated. The policy brief is based on multi-stakeholder virtual discussions held in March 2022, hosted by Enviro Wild Initiative and Kenya Lawyers café. Consequently, the policy brief addresses CSA issues, including farmers' needs, research gaps, and CSA controversies and challenges. It was established that policies aimed at directing and guiding CSA practices in Africa are still in their infancy, evolving and fragmented and that CSA transformed agri-food systems towards better resilience and productivity in some communities while presenting complexities in others. It is recommended that CSA promoters to embrace research-based and data-driven CSA implementation.

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Introduction

The adverse impacts of climate change on the agricultural sector are limiting people in vulnerable regions from accessing their fundamental right to food. In response to climate change, CSA has been presented as an approach that helps guide actions to transform agri-food systems towards green and climate-resilient practices while reducing GHG emissions wherever possible. It is argued that CSA is an important discourse among African governments and international agencies as a basis for enhancing increased food production while addressing climate change and promoting sustainable development goal 2-ending hunger.[1] Despite the importance of CSA, the vulnerability of Africa's agriculture to climate change denotes complexity shaped by the socio-cultural, economic, political, legal and biophysical dynamics challenging farmers' adaptive capability.[2] Ensuring farmers' resilience mandates a change in farming approaches corresponding to the current climatological conditions. While being promoted at different scales in different African countries, climate-smart farming interventions portray variability in its adoption and unmasks an array of weaknesses. With an estimated 33 million small-holder farms contributing to over 70 percent of food supply in Africa, it was found crucial to hold a multi-level discussion to deliberate the working of CSA in African nations, inhibiting factors from different perspectives and explore possible suggestions to strengthen and upscale CSA to meet its key pillars: increased food production, climate adaptation and mitigation. The multi-level discussion inspired three perspectives; farmer, policy and research.

Farmer perspective

Farmers hold different narratives regarding CSA based on their socio-cultural, economic, and geopolitical elements. It emerged from the discussion that CSA has transformed agri-food systems for some communities, complicated others while having little impact on others. Also, the assumptions associated with CSA differed among youthful farmers, older farmers, rural and urban farmers. For instance, young

1 Ogunyiola, A., Gardezi, M., & Vij, S. (2022). Smallholder farmers' engagement with climate smart agriculture in Africa: Role of local knowledge and upscaling. *Climate Policy*, 1–16. https://doi.org/10.1080/14693062.2021.2023451

2 Nyasimi M, Amwata D, Hove L, Kinyangi J, and Wamukoya G. 2014. Evidence of Impact: Climate-Smart Agriculture in Africa. CCAFS Working Paper no. 86. CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Copenhagen, Denmark. Available online at: www.ccafs.cgiar.org

farmers were more open to innovative farming technologies. According to some discussants, CSA is only viable in the short-term and for small-scale farming, which in essence may not solve the food insecurity problem affecting many African countries. A 2021 regional overview of food security and nutrition in Africa indicates an increased moderate or severe prevalence of food insecurity between 2014 (47.3percent) and 2020 (59.6percent). Where CSA is well applied according to the locally held farming knowledge, farmers stated that their adaptive capacity to climate change improved. An evidence-based research by CGIAR-CCAFs proposes the adoption of integrated CSA methodologies and technologies in order to build farmers' resilience to climate change. Fundamentally, an integrated CSA addresses ecological degradation, alleviates poverty, reduces greenhouse gas emissions, and promotes food security. In addition, some farmers posited that CSA technologies being introduced to them in some cases is unfamiliar, meaning they contradict the existing traditional farming practices that have shaped their food systems over the years. This is a case of CSA adding little to no value to farmers' vulnerability to climate risks. Therefore, recognising indigenous knowledge and utilising it in introducing and implementing CSA practices would build farmers' resilience in the long-term. The unfamiliarity aspect of CSA technologies in some communities is due to limited education, insufficient sensitisation and information on the basic principles and ideologies of CSA as well as failure to localise and contextualise it.

Research perspective

Scientists and researchers acknowledge that CSA is not a prearranged concept to be applied universally; instead, it should be area-specific guided by the socio-cultural, environmental, and economic conditions.[3] Developing appropriate site-specific CSA technologies requires in-depth research that is participatory and consultative. One of the delimitations of CSA floated during the discussion is the generality nature of most of the current CSA practices being proposed to the farmers. Although some farmers did not see the essence of research claiming that the existing knowledge was enough, the increasing climate risks amplify the urgent quest for robust scientific

3 Williams, T., et al. (2015). Climate Smart Agriculture in the African Context: Background Paper. UNECA, AU, AfDB. https://www.afdb.org/fileadmin/uploads/afdb/Documents/Events/DakAgri2015/Climate_Smart_Agriculture_in_the_African_Context.pdf

studies. For instance, introducing drought resistance crops with assured viability requires that soil tests are carried out to establish their fertility, water retention, and moisture content. Similarly, without research, there will be no data to inform current decisions and aid in projecting future farming-climate dynamics. Lack of data, analytical tools and appropriate information have been documented as one of the main problems challenging the introduction, implementation and scaling of CSA practices. It emerged that most governments in Africa have not invested in research, yet it is the foundation for knowledge, building technical expertise, and promoting progress towards sustainable farming technologies that do not harm the environment, human health and biodiversity. Governments were blamed for failing to allocate adequate resources for research and development, citing that such oversight has far-reaching implications on ending hunger, alleviating poverty, and general development. A point of reference is the desert locust infestation in Eastern Africa in 2020-2021 that caused havoc in farmlands, pasturelands and threatened food supply while disrupting normal operations. World Bank alludes to climate change as one of the key causes of upsurge in locust outbreak in Eastern Africa linking it to Indian Ocean Dipoles.[4] Effective response and management of the infestation that was estimated to threaten about 3million vulnerable households dependent on crop and livestock rearing in Kenya in 2020 required swift and dynamic research and multi-stakeholder coordination. Thus, scientific and participatory action research was presented as critical elements that should not be downplayed by politics, negligence, or trial and error if strengthening agri-food systems and reinforcing their resilience is to be achieved in the short, medium, or long-term scenarios.

Policy perspective

It emerged, policies aimed at directing and guiding CSA practices are still in their infancy, evolving and fragmented as well as varied per country. Noting the 'no universality' in implementation of CSA, existing agricultural policies are insufficient while developing new ones is presented with contradictory ideas prolonging the formulation and operationalisation. Nonetheless, it was pointed out that policy-

4 World Bank. (2021). The World Bank Group and the Locust Crisis. https://www.worldbank.org/en/topic/the-world-bank-group-and-the-desert-locust-outbreak#1

makers overlook the rudiments of across-the-board consultations that consider the local agricultural knowledge and private sector opinions in making policy decisions. A 2021 biennial Africa climate-smart stakeholder forum listed the following as some policy challenges affecting the implementation and upscaling of CSA: i) inadequate policies ii) limited policy coherence iii) inadequate policy-science interface, and iv) insufficient agricultural investment plans that are specific to the sundry African food systems and target rural communities. Land ownership, land rights, and tenure system are policy and governance issues impede CSA's potentiality in building farmers' resilience in Africa. Land acquisition and ownership in most African countries is cumbersome, laborious, and expensive. Most CSA practices such as agroforestry, fallowing, or crop rotation require several years to post results, making it impossible for most farmers that are on leased lands to apply smart farming approaches, thanks to intricate land tenure. In addition, the ambiguous land tenure system has forced gendered agriculture where women, despite growing over 70 percent of the food have limited land rights. Therefore, improving the adaptive capacity of women farmers remains a huge deterrent as long as the clan-based tenure system is still the basis of land ownership for most rural inhabitants. The role played by policies in streamlining applicable CSA technologies and ensuring the GHG contribution from the agriculture sector is neutralised is critical.

Controversies and challenges of climate-smart agriculture

Even though CSA has gained momentum as a sustainable solution to transform and reorient agriculture under the occurrence of climate change, it has been surrounded by several controversies. It has been relatively unclear as to which practices and technologies constitute CSA. The dynamism of agriculture and variation of agronomic practices across countries, regions, and continents challenges the account of which portfolio of practices should be considered CSA. Moreover, different stakeholders conceptualised CSA based on their understanding and available information. It was established that farmers receive information and training from several CSA implementers yet variances in approaches and techniques complicate implementation. Addressing this challenge has called for the contextualisation of CSA whereby the one-size-fits-all approach is no longer valid. Countries and communities are encouraged to approach CSA from their perspective, taking into

consideration socio-cultural norms, environmental conditions, and availability of resources (financial, natural, and physical).[5] CSA has also been seemingly controversial in its role to address multiple objectives. It is realised that CSA aims to build resilience, increase productivity and reduce GHG emissions. As these objectives are expected to be achieved in tandem, most CSA projects in Africa have targeted resilience building and increased productivity, whereas GHG emission reduction is neglected. At the moment, less empirical evidence exists on the ability of CSA to reduce GHG emissions in Africa.

Further, mainstreaming CSA into national-level actions has been challenging in several developing countries, including Ghana, Togo, Burkina Faso, and Mali. Already existing country-level policies, programs, plans, and strategies were initially developed without CSA reflection. Mainstreaming CSA will therefore require a thorough assessment, review, and adjustments to identify appropriate opportunities in national, regional policies, plans, programs, and strategies. However, opportunities for such reviews and revisions are hindered by compatibility challenges.[6] Many African countries are yet to link climate change adaptation to national agriculture development plans. Agriculture transformation and resilience-building require a significant increase in capital investment for CSA. In Sub-Saharan Africa, where CSA contributes to climate change adaptation and mitigation, more financial commitments are needed to increase its implementation. Access to capital for CSA has been a challenge due to low private sector investment, low national government commitments, and other climate-related issues that deserve global responses. The World Bank reports that stakeholders need to examine innovations for financial upgrades while delivering positive climate outcomes for CSA.[7] Addressing CSA financial needs can be an opportunity to increase private and public sector funds, strengthen the links between financial institutions, smallholder farmers, and Small-Medium Enterprises, and build the capacity of both lenders and borrowers.

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5 Branca, G. et al (2020). Assessing the economic mitigation benefits of climate-smart agriculture and its implications for political economy: a case study in Southern Africa. *Journal of Cleaner Production*, 125161.

6 Andrie, N. et al (2020). Ex-ante mapping of favourable zones for uptake of climate-smart agricultural practices. A case study in West Africa. Environment Development, 100566.

7 World Bank (2018). Climate-smart agriculture as an integrated approach to managing landscapes. Available at https://www.worldbank.org/en/topic/climate-smart-agriculture.

Conclusion and policy recommendations

CSA can help achieve sustainable development in developing countries as it incorporates social, economic, and environmental pillars in supporting agricultural systems transformation. CSA promotes environmental sustainability, reduces household poverty for livelihood improvement, enhances resilience towards adapting to climate change, and generates capital (including knowledge) to raise future well-being.

Thus, sustainable development concerns can augment welfare in intergenerational and intragenerational equity. Practically, CSA provides a manual for measuring and preventing sustainability from being a slogan, an empty phrase, or just conveying an expression of emotions.

Even though CSA implementation has progressed significantly in Africa, there is unsteady growth in up-scaling and out-scaling due to inadequate understanding of CSA, the marginality of agro-ecological regions in Africa, difficulty in mainstreaming CSA into existing policies as well as an inadequate financial investment towards broadening CSA packages. Therefore, we recommend that sub-national and national-level CSA policies be mainstreamed into existing and new policies and regulations within the relevant departments and ministries such as forestry, environment, agriculture, and livestock. This means strengthening national-level institutions and carefully identifying opportunities within already existing national policies to support CSA mainstreaming. Given that CSA practices require a strong financial muscle depending on the area and type of practice, it is prudent for governments to champion and establish a financial kitty with substantial monetary resources, primarily for marginalised communities that need more robust adaptation mechanisms. Besides government support and subsidies, working with financial institutions to offer low interest rated loans to farmers could build their socio-economic and climate resilience. We recommend that CSA promoters to embrace research-based and data-driven CSA implementation. They should engage farmers, agriculture extension officers, and local government officials on rigorous training towards collecting and reporting reliable data that can inform research towards CSA advancement.

Recognising that most smallholder farmers who form the majority in Africa possess traditional farming knowledge and skills, it is crucial for CSA promoters, research, and government institutions to strengthen the existing knowledge and build their research around it. We hold that CSA practices should not be completely alien; instead, they should augment and complement local or indigenous farming systems to foster long-standing resilience. The 2022 IPCC report for policy-makers observed that most adaptation measures being developed mirror near-term risks with more emphasis on planning than the actual implementation.[8] In this regard, African countries, especially those in sub-Saharan Africa where it is hard-hit by food shortage and other climate-related disasters, should design and redesign their climate policies and farmer adaptation strategies with a near-term, medium, and long-term ideation.

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