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STG Policy Papers

POLICY ANALYSIS

COMPETING PRIORITIES: ADDRESSING CLIMATE CHANGE IN AN AGRICULTURE-DEPENDENT REGION

HOW SUB-SAHARAN AFRICA IS HANDLING THIS

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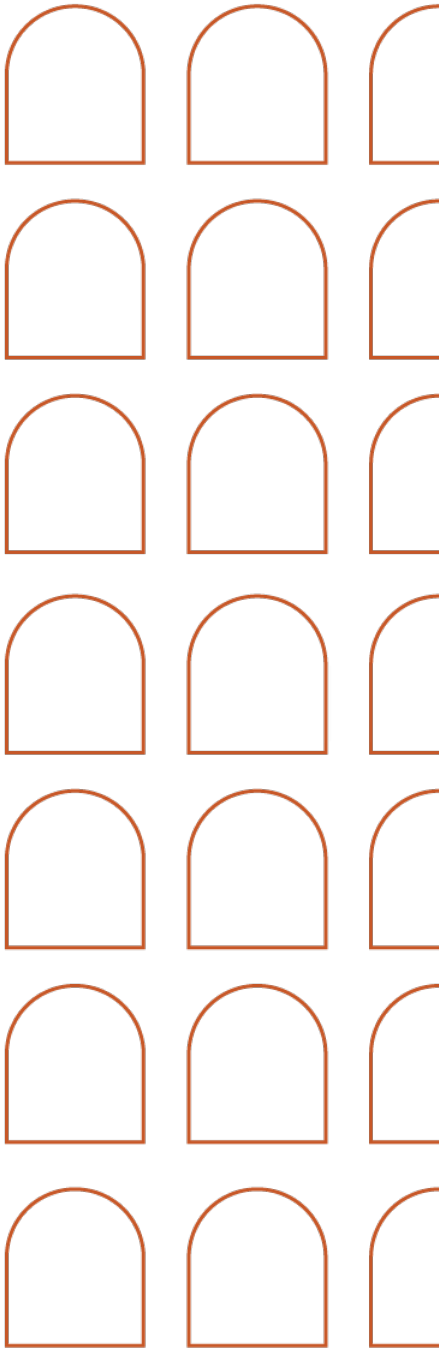

EXECUTIVE SUMMARY

Africa suffers multiple impacts of climate change such as droughts, floods, water scarcity and famine, yet it contributes an insignificant amount of greenhouse gas emissions, estimated to be less than five percent of the total global ratio. The agriculture sector, which is a source of food, employment, and income to over 70 percent of the sub-Saharan African population, is highly vulnerable to heightening impacts of climate change. Agriculture also induces climate change through the emission of greenhouse gases. In order to address climate variability and the adverse effects of climate change, national and sub-regional measures have been instituted within sub-Saharan Africa (SSA), including national and regional agriculture and climate policies, climate-smart agricultural technologies, and institutional frameworks. Nonetheless, climate change and agriculture are often looked at in isolation, yet they are interdependent aspects. Thus, this paper undertook an exploratory analysis of published and unpublished literature from reputable platforms for the period 2010-2022 to illustrate how climate change and agriculture are inter-reliant but competing priorities in SSA. As a result, the paper recommends mainstreaming climate-smart agriculture as a policy priority and developing holistic and transformative climate and agriculture policies and institutional frameworks mainstreamed into national and sub-regional development agendas. The basis of these recommendations are to increase agricultural production while devising climate adaptation measures and mitigating greenhouse gas emissions.

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1. INTRODUCTION

Over the years since the 1970s, climate change has heavily impacted Africa, particularly Sub-Saharan Africa (SSA).[1] Africa contributes less than five percent of total worldwide greenhouse gas (GHG) emissions, yet it is the most affected region. The disproportionate climate change implications in the African continent are already causing devastating effects on the socio-economic and ecological features. Predictions point to varying occurrences in different regions within the continent. Warming trends are projected in SSA, including rainfall variability, increased aridity, and heat events. In 2020 alone, extreme weather events were experienced in SSA, such as extensive flooding in Kenya and Sudan, long-term drought in Southern Africa, and cyclonic storm Gati in Somalia.[2] Similarly, climate change effects have since destabilised several sectors, the agricultural sector being one of those hard-hit. Over 95 percent of Africa's food production is rainfed, meaning continued water scarcity, erratic rains, and droughts risk food security within SSA and other parts of the world that depend on agricultural products from Africa. The 2020 regional economic outlook report by International Monetary Fund on SSA estimated that food insecurity in Mali, Ethiopia, Tanzania, Niger, and Malawi rose by 5-20 percent with each drought or flood.

Although the impacts of climate change are widely known to devastate the agriculture sector, poor farming methods and the cultivation of already degraded lands are thought to induce climate change. With that in mind, building climate resilience in the agriculture sector is inevitable; however, several socio-cultural, economic, political, and environmental factors must be well-thought-out. Many policies and regulations have been developed in the process, although most of them are fragmented. The purpose of this paper is to demonstrate climate change and agriculture as competing priorities that should not be viewed as standalone elements in SSA, as the world races towards a net-zero emission target. In addition, this paper exemplifies how climate variability affects agricultural operations while discussing how agricultural practices induce climate change, such as through emissions of greenhouse gases (GHGs) and the consequent effects on crop production, livestock rearing, and human livelihoods. Without taking sides, the paper presents a review of some of the sub-regional climate and agriculture policies and institutional frameworks, culminating in policy recommendations.

2. METHODOLOGY

The study took an exploratory analysis approach where online research was carried out to locate secondary information on climate change and agriculture in SSA. Information was retrieved from reputable sources, including peer-reviewed articles, government websites, authoritative organisations, and research institutions. The research was restricted to information published during the 2010-2022 period. Live data was also used to generate visual representations. The study also focused on sub-regional policies and institutional frameworks instead of national-level. Based on the information, the following research questions were intended to be answered;

1. Where is the meeting point between climate change and agriculture?
2. Do agricultural operations emit greenhouse gases?
3. Is agriculture significant in reaching net-zero emissions?
4. What is the nature of climate and agriculture-related policies and institutional frameworks at sub-regional levels in SSA?

As much as the paper consulted a wide range of literature, the author recognises that the topic is wide and that all existing relevant data could not be reviewed. This presents a window for further research and analysis.

1 Pausata, F. S., et al. (2020). The Greening of the Sahara: Past Changes and Future Implications. One Earth, 2(3), 235–250. https://doi.org/10.1016/j.oneear.2020.03.002

2 World Meteorological organisation. (2021). State of the Climate in Africa 2020. World Meteorological Organization (WMO). Retrieved from https://library.wmo.int/doc_num.php?explnum_id=10929

3. AGRICULTURAL TRANSITION

To understand the vulnerability of the agriculture sector to climate change and its role in increased GHG emissions, as well as argue viable pathways to build resilience and promote sustainable farming, it is crucial to paint a picture of the notable transformation of agricultural practices. One example is shifting cultivation, also known as the slash and burn method, still practiced by some communities within SSA but with some modifications. Shifting cultivation is a farming practice where the natural land, usually a forest fallow vegetation, is cleared and burned then cultivation is shifted to another open land.[3] In some countries like Tanzania, land-use policy enforcement has limited the slash, burn and migrate farming techniques. Population growth, changing living dynamics, and reduced land sizes have forced people to reconsider their farming practices. Nonetheless, slash and burn is evident, only that people opted to settle in one place and farm the same piece of land recurrently; no shifting.

Several discourses around shifting cultivation have emerged whether this practice is good or bad. Some researchers argue that shifting cultivation is rotational farming that promotes forest management and natural regeneration. In contrast, others claim it is the genesis of deforestation, air pollution, biodiversity loss and increased carbon emissions in the atmosphere. In view of the deferring thoughts, it is difficult for policy-makers to develop informed land-use policies. Although there is not enough data for the Africa region to triangulate the actual past and present status of shifting cultivation for decision making and policy development, it is paramount to research the factors driving abandonment or re-activation of the practice, implication on the livelihoods of those practicing it and potential outcome in the phase of climate change.[4]

In response to poor soil fertility, reduced agricultural yields, high demand for food, and adverse climate change effects, improved farming systems were adopted. For instance, conservation agriculture, a farming system that maintains permanent soil cover, regenerates degraded lands, and promotes biological diversity, is universally embraced.[5] According to the Food and Agriculture Organization (FAO) of the United Nations, conservation agriculture is less labour intensive at about 20-50 percent, demands lower energy inputs, translating to reduced GHG emissions. Where minimum tillage is practiced, the release of carbon into the atmosphere is reduced. Putting it in context, enhancing conservation agriculture in line with national priorities in SSA addresses food insecurity, a challenge exacerbated by climate change.

Mechanised farming that has faced many obstacles from boardroom discussions to mythical ideologies and perceptions in the African continent was introduced to complement conservation agriculture.[6] In principle, mechanised farming is not a new concept in SSA but a subject of poor management and negligence of earlier mechanised agricultural programmes. Currently, the idea of mechanising the agriculture sector seems to be gaining prominence with several questions arising, such as i) is it a viable solution to food shortage? ii) are people going to lose jobs? iii) will energy demand go up? iv) will it inject more GHGs into the atmosphere? v) does it degrade or protect the environment? Vi) is it expensive? At the top of the discussions are the arguments that mechanisation will lead to loss of jobs and propagate environmental problems such as deforestation, loss of vegetable cover, and increased emissions. While many scholars and proponents of agricultural mechanisations recognise negative implications, they propose, for instance, for SSA to develop favourable

3 Kilawe, C. J., Mertz, O., Silayo, D. S. A., Birch-Thomsen, T., & Maliondo, S. M. (2018). Transformation of shifting cultivation: Extent, driving forces and impacts on livelihoods in Tanzania. *Applied Geography*, 94, 84–94

4 Kilawe, C. J., Mertz, O., Silayo, D. S. A., Birch-Thomsen, T., & Maliondo, S. M. (2018). Transformation of shifting cultivation: Extent, driving forces and impacts on livelihoods in Tanzania. Applied Geography, 94, 84–94. https://doi.org/10.1016/j.apgeog.2018.03.002

5 FAO. (2017). Conservation Agriculture. Food and Agriculture Organization of the United Nations.

6 FAO & AUC. (2018). Sustainable Agricultural Mechanization: A Framework for Africa. Addis Ababa. 127pp. Licence: CC BY-NC-SA 3.0 IGO. https://reliefweb.int/sites/reliefweb.int/files/resources/ca1136en.pdf

agro-environmental policies and adopt innovative energy-efficient mechanisation ideas.[7]

Currently, climate-smart agriculture (CSA), launched slightly over a decade ago, designed specifically to respond to climate change effects, help communities adapt to the changes, and foster sustainable development goals is implemented by governments and the private sector at the local, national, and sub-regional levels.

The World Bank defines CSA as, "an integrated approach to managing landscapes—cropland, livestock, forests and fisheries-that address the interlinked challenges of food security and climate change."[8]

The World Bank promotes CSA around a triple-win scenario to increase productivity, strengthen resilience, and reduce emissions. As rosy as it sounds, implementing CSA involves financial investment, extensive research, technical know-how, and stronger policies. The approach varies per country or locality; hence, context-specific interventions are fundamental.

4. KEY CHALLENGES AFFECTING AGRICULTURE SECTOR IN SUB-SAHARAN AFRICA

While many challenges are affecting the agriculture sector in SSA, consulted literature predominantly highlight the following issues: i) climate change and climate variability, ii) poor policies and governance, iii) food security, iv) market volatility, v) degraded landscapes and soils vi) water scarcity, vii) land rights issues and viii) financing and technological integration. It is important to note that the extent and complexity of these issues differ per country and region.

The East African Community (EAC) singles out policy constraint as one of the region's significant challenges alongside technological and natural factors. It is expected that a sensitive sector like agriculture could have integrated and working policy frameworks where all persons are consulted. Yet, insufficient research and limited monetary allocation are evident which further limit policy enforcement. Such seemingly avoidable constrictions impede the ability of individual communities to adapt to climate change appropriately. Establishing favourable safety nets for all persons, building resilience, and improving physical infrastructure and community knowledge are crucial aspects of improving the agriculture sector and reducing climate vulnerabilities.

West Africa, just like other sub-regions, is vulnerable to the food crisis and climate change. Identifiable are the limited climate adaptation and mitigation technologies, inadequate food security and nutritional policies. An anticipated rural-urban migration due to rapid urbanisation is likely to weaken an already threatened agricultural system in the rural areas where poverty is high and most of the population depends on agriculture. The fundamental essence of the agriculture sector in West Africa lies not only in addressing food and nutritional security but also job opportunities and overall economic situation; agriculture is responsible for over 60 percent and about 35 percent of the employment and gross domestic product in the region, respectively. The West Africa Agriculture Productivity Programme (WAAPP) was launched by the Economic Community of West African States (ECOWAS) to bolster agricultural research and extension, enhance food security and promote improved agricultural technologies. Although the programme aimed to address a high-priority aspect within the region, there was no specific focus on climate change as an influencer. However, the subsequent agricultural policies and institutional frameworks have introduced the element of climate adaptation and mitigation, including the proposition for the adoption of CSA.

Similarly, Southern Africa Development Community (SADC) recognises varying rainfall patterns, duration, and intensity as a huge challenge affecting husbandry. Agriculture is a vital part of SADC's social and economic development, with about 70 percent of its

7 Sims, B., Hilmi, M., & Kienzle, J. (2016). Agricultural mechanization A key input for sub-Saharan African smallholders. Food and Agriculture Organization of the United Nations.

8 World Bank. (2021). Climate-Smart Agriculture. https://www.worldbank.org/en/topic/climate-smart-agriculture

population depending on the sector for employment, food, and as a direct or indirect livelihood source.[9] While national and regional climate and agricultural policies have been developed towards a common agenda within SADC, the countries' social, political, and economic disparities are another challenge prolonging agriculture-related crises. This is not only a SADC problem but an SSA challenge.

Not to be ignored is the ongoing Covid-19 pandemic, which has devastated the continuous flow of agricultural operations, supply, accessibility, and availability of food products. The dynamics surrounding the management of the pandemic, mainly the lockdowns and controlled movements, have exposed the existing inefficiencies of climate adaptation and mitigation frameworks and policies across SSA. The pandemic also revealed the weaknesses in agricultural governance and policymaking. On 16 April 2020, ministers of agriculture of the African Union member states convened a virtual meeting in response to the concerns that the Covid-19 pandemic was worsening food shortage in the region due to restricted mobility. Perishable goods, for instance, could not be delivered to desired destinations in time and good condition. The pandemic presents a chance for the African governments to rethink their approach to food security and disaster response, keeping in mind the possibility of climate change paralysing an already weakened sector.

5. EXISTING ACTIONS TO FOSTER INCREASED AGRICULTURAL PRODUCTION AND COMBAT CLIMATE CHANGE EFFECTS

5.1. Regional policy and institutional frameworks

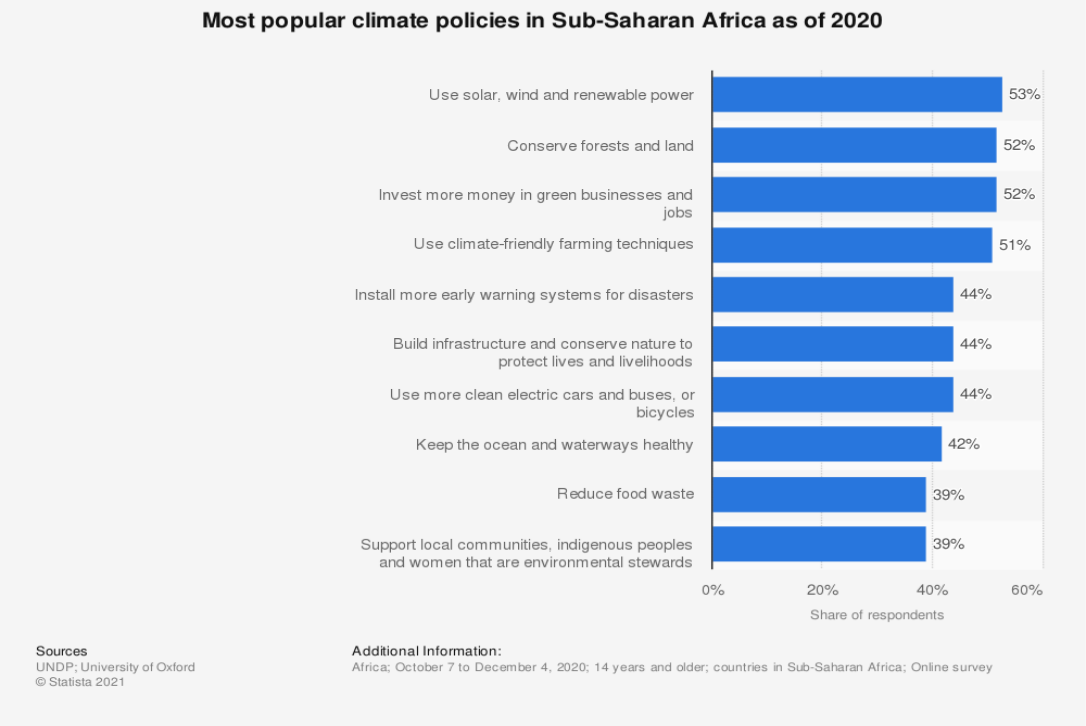
Climate change is an uneven and cross-cutting challenge, requiring holistic climate policies and consideration of numerous aspects to balance the equation. In SSA, where cultural, socio-economic and political variables play a significant role, designing adequate climate policies is tricky. Similarly, policies aligned to agriculture traverse different sectors, making it hard to conceive wholesome policies whose manipulation does not affect another industry and vice versa. Despite that, countries and regional economic communities within SSA have developed climate and agriculture policies whose context vary. Crucial to note is that agricultural policies in Africa have evolved over the years in response to the changing socio-economic, ecological, and climate conditions.

Based on a 2020 online survey carried out in nine SSA countries (Benin, the Democratic Republic of the Congo, Cote d'Ivoire, Ghana, Mozambique, Namibia, Nigeria, South Africa, and Uganda), to establish the perceived critical climate policy to be implemented within the region, figure 1 demonstrates that land and forest conservation and the use of climate-friendly farming technologies were among the most popular policies. Often, agriculture is considered a land-use activity whose expansion potentially causes forest degradation and deforestation. The illustration is not merely opinions but a representation of what the people believe to be important. It also gives policy-makers an idea of what should be prioritised. However, this may not represent the hierarchy of climate policies in all countries within the region.

The West African region, encompassing 15 countries, has set out several policies and frameworks outlining priority areas in its agricultural development agenda. First came the Economic Community of West Africa Agricultural Policy (ECOWAP) in 2005 presented by ECOWAS with primary areas being agricultural productivity and expansion towards sustainable food security. The policy has played an integral part in the agriculture sector and was developed to mirror the Africa Union's Comprehensive Africa Agriculture Development Program (CAADP). After ten years of ECOWAP's existence, appraisals were made to establish whether the policy had any impact in alleviating poverty, food insecurity, and improving nutrition. Positive outcomes in terms of declined food insecurity were reported, although poverty levels in rural areas were still perverse and undernourishment was evident. On other counts, the policy is portrayed as

9 SADC. (2012). Climate Change: Assessing the Policy Options for SADC Member States. Southern Africa Development Community.

FIGURE 1: MOST POPULAR CLIMATE POLICIES IN SUB-SAHARAN AFRICA AS OF 2020, BASED ON AN ONLINE SURVEY



Source: Statista.com

fragmented, hence, the need to address leadership issues to develop a standard and holistic regional agriculture policy. Despite the inadequacies of ECOWAP, its fundamentals as a regional policy contributed in part to the Malabo declaration on agriculture, ratified in 2014. The declaration re-emphasised the requisite of agriculture in Africa's growth and development. In addition, ECOWAP's appraisals informed the creation of the West African Alliance on Climate-Smart Agriculture in 2015. Scanning through the policy frameworks, climate change was not specifically a major priority until the realisation that there was need to strengthen the sustainability of food systems.

SADC recognises that climate change uniquely affects the southern African region through crop destroying, loss of human livelihoods, and increased incidences of cyclones and drought. As a result, several policies and frameworks specific to addressing food security, drought, and mitigating climate change impacts have been developed in the last ten years. Earlier, the development, harmonisation, and implementation of agricultural policies and programmes within the SADC region were bound by priorities under a 2001 Regional Indicative Strategic Development Plan, where food security, environmental sustainability, and research and information in the agriculture sector were vital aspects. Climate change as a stand-alone problem was not a question looked at critically. However, at the moment, climate change has become a priority to the SADC; for instance, the Drought Monitoring Centre had to be transformed into a Climate Services Centre. The centre, which was developed in 1990 and mainly focused on monitoring, communicating, and reporting drought-related information within the region, has expanded its scope on realisation that climate change is supreme and needs to be acted upon in order to reduce susceptibility to drought risks. The centre feeds data to various sectors, including the agricultural departments, on rainfall patterns and disaster occurrence. Such information is crucial in developing disaster risk preparedness and response strategy to food shortage, famine, and water scarcity, to name but a few.

According to a position paper by World Food Programme on climate change in Southern Africa, the region is an epitome of the association between climate change and the energy-food-water link. The reflection presented in the position paper explains the urgency exhibited by SADC through the development of climate policies, adaptation, and mitigation interventions with a specific focus on fixing food insecurity. In addition, the Climate Change Adaptation in SADC: A Strategy for the Water Sector was developed from a multi-stakeholder approach to address water issues in the sub-region and climate-related floods.[10] As stated, southern Africa is one of the highly exposed regions in the world to severe risks of coastal and deltaic flooding. Extreme climate events such as drought and floods are indicated in the strategy as likely to pose direct socio-economic impacts, particularly on the staple food crops in countries such as Lesotho, Swaziland, Zambia, and Zimbabwe. The SADC Climate Change Strategy and Action Plan's priority is adaptation to existing and projected climate change implications. The agriculture sector is one of the precedence areas in the action plan due to its vulnerability to climate change; livestock and crop production suffer the effects. The prioritisation of the agriculture sector in the strategy and action plan could be because over 70 percent of the population depends on it for food and employment and contributes more than a quarter of the total SADC's gross domestic product.

In addition, SADC's Regional Indicative Strategic Development Plan (RISDP) 2020–2030 manifests climate change and agriculture as cross-cutting intertwined issues.[11] The document presents causal-effect scenarios between climate change and agriculture, a portrayal of the significance of the two in the socio-economic and political development of the region. SADC's pillar one of its vision 2050 aims to transform the agriculture sector while sustainably exploiting natural resources and strengthening climate change adaptation and mitigation as a core issue. Based on a regional food security update in April 2020 for the season 2019-2020, over 43 million people in SADC were estimated to be facing acute food and nutritional insecurity due to a myriad of events associated with climate change such as erratic rains, invasion of locusts and excessive rains leading to floods. Even though country-level situations varied, for instance, Madagascar, Lesotho, and Namibia were expected to experience increased crop production in 2020 compared to 2019, while Mozambique experiencing the opposite, the common factor was rainfall variability. Despite the many climate and agriculture policies and frameworks, climate variability remains a massive threat in part because of disharmonised policies, limited research, and technology.

EAC demonstrates an aspect of inseparability in addressing climate change and food and nutritional insecurity in the sub-region. While many policies and frameworks have been developed, I consulted a few. For instance, the East African Community Climate Change Master Plan: 2011-2031 identifies agriculture (including fisheries, crops, and livestock) and food security as key issues that need to be prioritised in an uncertain era of climate change. Even though all the five EAC countries (Kenya, Uganda, Tanzania, Burundi, and Rwanda) fall under dry, semi-arid, arid, humid, or a combination of some or all of the climatic conditions, the master plan is critical on the climate devastations on food security and agriculture. Projected implications at the country-level provide an opportunity for member states to reinforce the design of specific climate policies and interventions privy to their socio-economic, political, and ecological potential. As crucial as it might be, the master plan only gives a blanket overview of the regional situation although it weighs challenges and opportunities at the sector level for mitigating GHG emissions.

Similarly, the 2016 East African Food and Nutrition Security Policy, just like the aforementioned policies, presents climate

10 SADC. (2011). Climate Change Adaptation in SADC: A Strategy for the Water Sector. Southern African Development Community. ISBN 978-99912-475-6-4

11 SADC. (2020). SADC Regional Indicative Strategic Development Plan (RISDP) 2020–2030. SADC Secretariat. ISBN 978-99968-464-2-7. https://www.sadc.int/files/4716/1434/6113/RISDP_2020-2030_F.pdf

change as a cross-cutting challenge that undermines the region's ability to address nutritional insecurity and hunger. Even though all the member states have national nutrition policies, the greatest challenge is that climate change is recurrent. Some of its protracted effects, such as the El Niño and drought events, are prone to some East African countries. These implications are setbacks to local and national efforts to increase food production, accessibility, availability, and diversification. The primary objective for the regional policy is to mitigate climate implications on nutrition and food security through multi-sectoral frameworks and regional integration of climate change adaptation and mitigation plans. Progressively, a 2019-2023 East African Community Food and Nutrition Security Action Plan was developed with the inclusion of South Sudan as a new member state, joining in April 2016. The action plan pinpoints climate change as one of the region's emerging driving factors to food insecurity. Other aspects discussed include rapid urbanisation, population growth, income, and poverty scopes. If other factors remain constant, climate change as a varying element will still affect human livelihoods with a possibility of triggering policy and governance debates. Crucial to note is that, in terms of climate vulnerability, South Sudan is ranked the fifth-worst affected country in the world according to the climate change vulnerability index 2017. Four countries out of the five extremely vulnerable to climate change are in SSA, as shown in figure 2. This should worry governments in the region and prompt them to devise workable measures to address climate change to reduce insecurities in the agriculture sector.

5.2. Climate-Smart Agriculture (CSA)

Since the launch of climate-smart agriculture in 2010 by the FAO with the goal of designing an integrated approach to deal with the effects of climate change threatening agriculture and food systems, it has been widely adopted. Climate change adaptation and mitigation frameworks or agriculture-related policies in SSA, for instance, strongly propose the adoption of CSA. As mentioned earlier, the conceptualisation of CSA was around three objectives; i) food security, ii) adaptation, and iii) mitigation of GHGs. That is, increasing agricultural production and income diversification to address food insecurity, building people's resilience to ensure they adapt to climate risks, and reducing the production and emission of GHGs. The basis of introducing such a concept was the growing population, changing food consumption patterns, and heightening climate change impacts, given the estimation that a 70 percent increment in agricultural production was needed to meet the swelling demand by 2050 from a global perspective. On the other hand, it is estimated that a 260 percent increase in crop production is needed

FIGURE 2: CLIMATE VARIABILITY INDEX 2017 FOR 5 WORST AFFECTED AND 5 LESS AFFECTED COUNTRIES GLOBALLY

Legend: Extreme Risk — High Risk — Medium Risk — Low Risk — No data

The five worst performing countries

Rank	Country	Region	Score	Category
1	Central African Republic	Africa	0.01	Extreme
2	DR Congo	Africa	0.20	Extreme
3	Haiti	Caribbean	0.24	Extreme
4	Liberia	Africa	0.25	Extreme
5	South Sudan	Africa	0.41	Extreme

The five best performing countries

Rank	Country	Region	Score	Category
191	Denmark	Europe	10.00	Low
190	United Kingdom	Europe	9.96	Low
189	Uruguay	S.America	9.95	Low
188	Iceland	Europe	9.85	Low
187	Ireland	Europe	9.83	Low

Source: Verisk Maplecroft

to feed Africa's population by 2050, growing at an average of 2.7 percent annually. Virtually all countries in SSA have embraced CSA.

Despite the positive attributes associated with CSA, food and nutritional insecurity is still a huge problem in SSA, prompting the following questions;

1. Are area-specific CSA technologies being implemented?
2. Is comprehensive research done before implementation?
3. Do SSA countries have enough capacity in terms of finance and expertise?
4. Is there enough data on climate variability and area-specific implications?
5. Is CSA mainstreamed into the policies, regulations and institutional frameworks?
6. How smart is CSA?

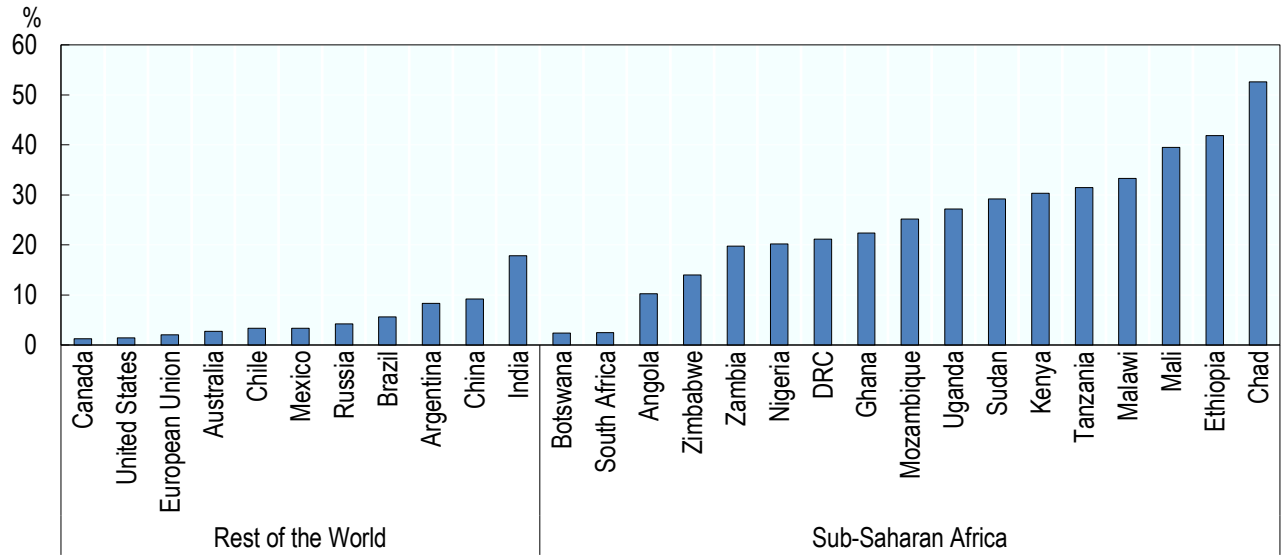
Owing to the idea that CSA is a relatively new concept needing the development and adoption of new technologies, many countries within SSA, most of whom are ranked as low-income nations according to the World Bank, are disadvantaged. The financial investment needed to kickstart a CSA project is inadequate, especially in economically weaker areas. Countering this problem means governments will need to mainstream CSA into their policies and institutional framework, and planning and development strategies at all levels. Already, CSA has been extensively mainstreamed into regional and national legal and development frameworks across Africa. However, mainstreaming into the community-level development projects is still weak. Also, fragmented climate and agriculture policies across the region together with financial and technical constraints slow down the adoption and expansion of CSA. On the contrary, debates have emerged challenging the credibility of the CSA approach; how smart is CSA remains the question.

6. WHY IS THE DISCOURSE AROUND CLIMATE CHANGE AND AGRICULTURE IMPORTANT?

6.1. Socio-economic importance

As discussed above, climate change and agricultural production have an intimate relationship. One is a sequel of the other. The two concepts with respect to SSA are vital due to their implications on human existence and their surrounding environment. One cannot survive without food; climate change affects

FIGURE 3: ILLUSTRATING AGRICULTURE AS A GDP SHARE OF SELECT COUNTRIES IN 2014



Source: World bank (2016) and adapted from OECD/FAO Actual data

food security; crop production and livestock rearing emit greenhouse gases and degrade landscapes if not well managed. Economically, agriculture is a direct source employment, income, and overall gross domestic product (GDP) in SSA. Subsequently, increased climate variability threatens the economic expansion which in turn affect the social and cultural prospects of the people. Figure 3 illustrates the high GDP share of the agricultural sector in SSA compared to other parts of the world; partly justifying the importance of discussions around climate change and agriculture as matters of urgency.

It is on record that SSA's population continues to grow; as of 2020, the growth rate was 2.6 percent. This increasing growth rate translates to more land for agricultural operations and more food to feed the people. To meet this need at a time when climate change effects are excruciating in some regions has prompted several actions, with the immediate ones being intensifying farming, heavy fertiliser use, and opening up new lands deemed fertile. Forested lands are a casualty of agricultural expansion, leading to forest degradation, deforestation, and the build-up of carbon emissions in the atmosphere. Trees are a carbon sink. Agricultural activities emit GHGs. Increased GHG in the atmosphere warms up the planet resulting in climate change, which is what the world is attempting to find adaptative and mitigation solutions.

6.2. Greenhouse gas (GHG) contribution

Because climate change is a weighty matter in the agricultural sector, it is crucial to understand the sources of GHG emissions from farming and the estimated quantities. The importance of GHG is this paper is based on the scientific attribution of anthropogenic greenhouse gases as amplifiers of climate change in the twentieth and twenty-first centuries implicating human livelihoods and food security.[12] The agriculture sector in SSA is considered among the largest emitters of GHGs where emissions are released directly or indirectly. Direct emissions come from farming operations like cultivation practices, livestock manure, and burning of the grasslands, while indirect sources come from agricultural extension into forests. Thus, it is predicted that direct agricultural emissions will increase by a third from 600 million to 800 million tons of carbon dioxide equivalent between 2012 and 2050 in SSA. Agricultural expansion is expected with every inch of rural population growth; hence, more forests will be cleared. The basis here is that the largest percentage of smallholder farmers in SSA are in rural areas. Overall, emissions from agricultural operations in Africa portrayed an upward trajectory based on FAO's analysis for 2000-2018 by six percent of the total global agriculture-linked emissions. [13]The upward trend is also demonstrated by the World Bank's estimation of agricultural methane emissions from 1969 to 2018, as shown in figure 4. Based on the emission trend, a strong correlation between farming operations and climate change can be deduced, validating the idea that they both deserve prioritisation. A business-as-usual scenario in the agriculture sector is bound to shoot the GHGs accumulating in the atmosphere, thwarting any urgent efforts to climate action.

Nonetheless, there are several uncertainties in estimating GHGs in the agriculture sector because the contributing factors are unknown, and data is insufficient. For instance, estimations from organic farming or small-scale farms in SSA is not monitored, meaning the projections may not be accurate, ultimately affecting the decisions and actions taken.

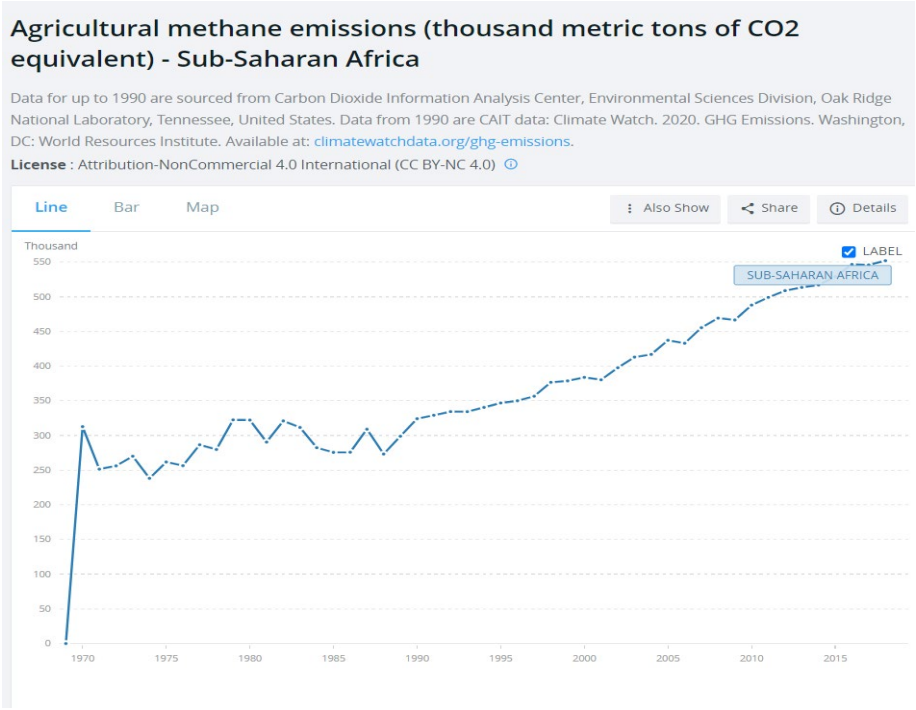
6.3. Towards net zero

The world is racing towards net-zero emissions to keep warming below 1.5 degrees Celsius by the mid-twenty-first century. Attaining this ambitious goal means every individual, governments, private sector, research institutions, and other entities need to limit their carbon footprints. Arguably, not all

12 IPCC, 2018: Summary for Policymakers. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. World Meteorological Organization, Geneva, Switzerland, 32 pp. https://www.ipcc.ch/sr15/

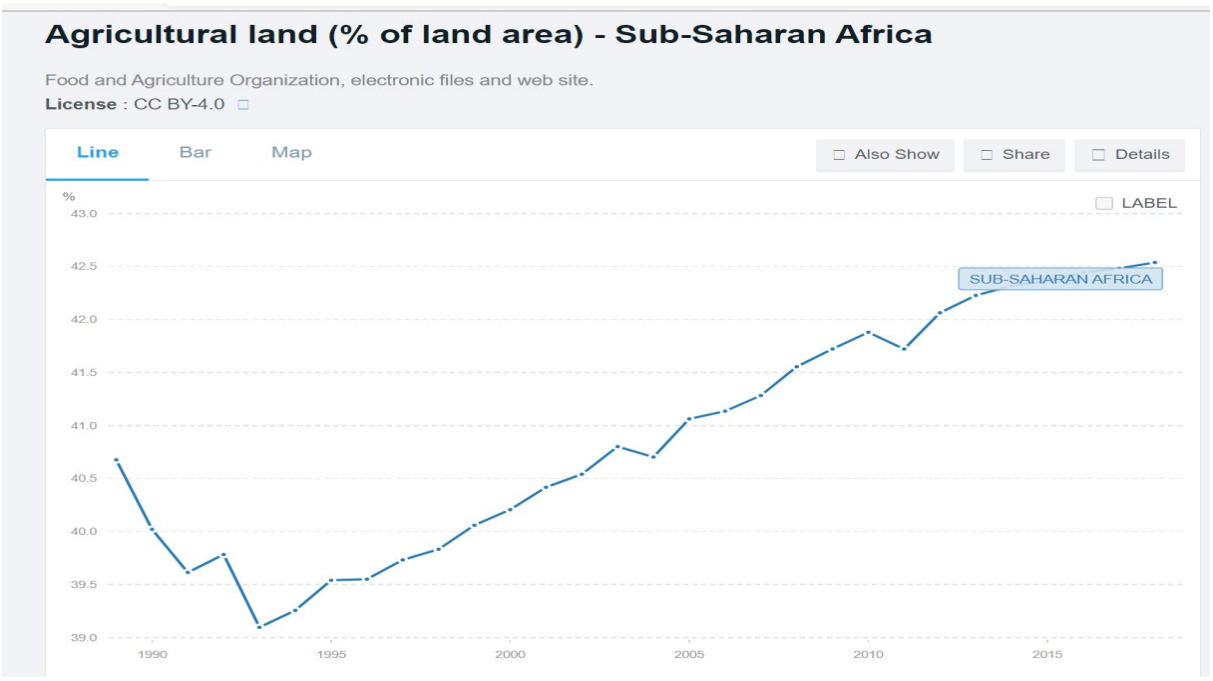
13 UNFAO. (2020). Emissions due to agriculture Global, regional and country trends 2000–2018. FAOSTAT Analytical Brief 18. https://www.fao.org/3/cb3808en/cb3808en.pdf

FIGURE 4: FIGURE ILLUSTRATING THE AGRICULTURAL METHANE EMISSIONS IN SUB-SAHARAN AFRICA FROM 1969 TO 2018



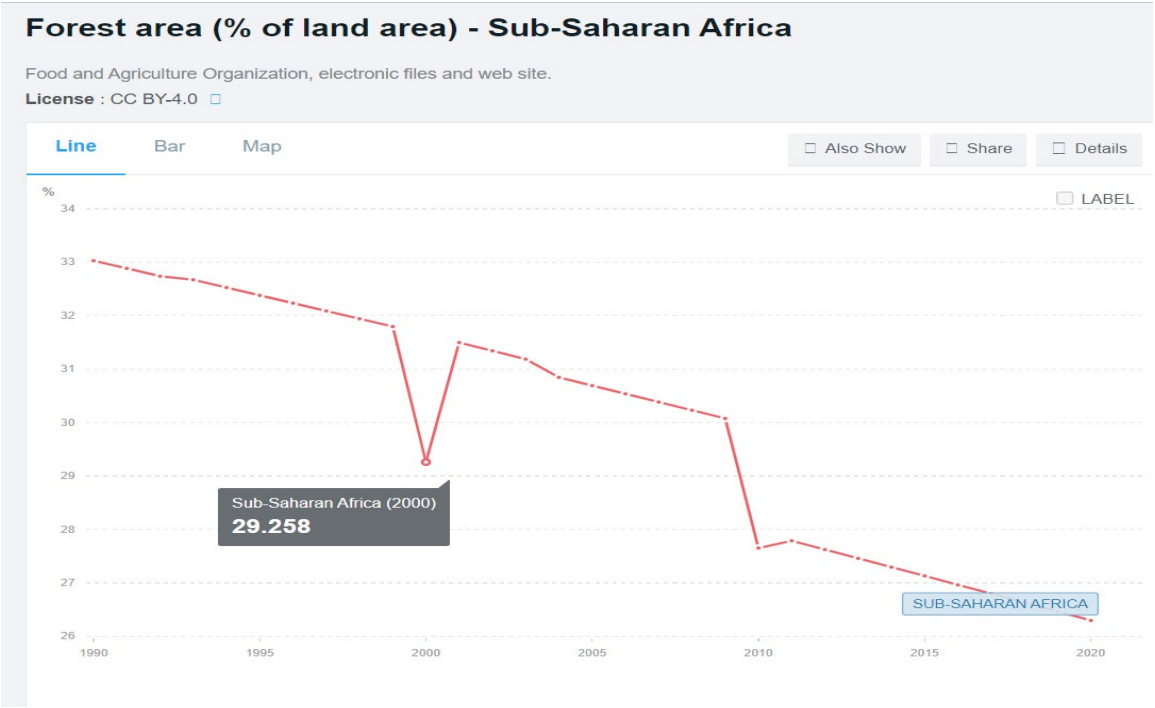
Source: World Bank generated on 22/01/2022

FIGURE 5: PERCENTAGE OF LAND AREA UNDER AGRICULTURE IN SUB-SAHARAN AFRICA 1990-2018



Source: World Bank, generated on 28/01/2022

FIGURE 6: PERCENTAGE OF LAND AREA UNDER FOREST IN SUB-SAHARAN AFRICA 1990-2020



Source: World Bank, generated on 28/01/2022

emissions can be curbed at once, for instance, the transport and industrial sectors that still rely on carbonised energy sources and influence the economic development of many nations. IPCC's 2018 special report on global warming of 1.5 degrees Celsius recommends drastic reductions in non-carbon emissions, particularly methane, to reach a net-zero by 2050. This means taking extreme measures to decarbonise the energy sector and deepen reductions in agricultural emissions. This recommendation can be a challenge to some countries in SSA as more than half of the population depend on agriculture not only for food but as a source of income and employment. Claims exist that countries that cannot stop carbon-emitting activities compensate their offsets by planting trees. Ethiopia and Kenya are examples of countries that initiated country-wide tree planting projects, targeting millions of tree seedlings. Ethiopia planted a record 350 million trees in a day. While trees are seen as the easiest and more realistic avenues to sequester carbon emissions in SSA, agricultural expansion inhibits the process, as shown in figures 5 and 6. The correlation between agricultural expansion and forest area signals a need to adopt more sustainable crop production and livestock rearing practices to save forests. Nevertheless, farming is not the only driver of forest shrinkage. Several critiques, while they agree with the significance of trees in sequestering carbon, contend it is not a sufficient avenue to combat the current state of climate change by itself, prompting the proposition to divest from GHG emitters.[14]

7. CONCLUSION

Climate change continues to devastate the agriculture sector in SSA, risking the livelihoods of more than 70 percent of the population. The degree of devastation varies per community, country, and region. At the same time, agricultural activities release GHGs causing climate change. While there are many measures SSA has adopted to reduce the effects of climate change in agriculture and to limit GHG emissions, CSA is one of

14 Buis, J. (2019). Examining the Viability of Planting Trees to Help Mitigate Climate Change. NASA. https://climate.nasa.gov/news/2927/examining-the-viability-of-planting-trees-to-help-mitigate-climate-change/

the highly advocated approaches. Still, CSA is not fully exploited and integrated into the development plans because it needs a lot of investments in terms of resources, expertise, and data. Fragmented policies remain a significant obstacle in effectively addressing climate change effects while increasing agricultural production. It is impossible to act on climate change effects without modifying the farming methods. Thus, climate change and agriculture are competing priorities that should not be looked at as separate entities but mainstreamed into policies, institutional frameworks, and development agendas at local, national, and regional levels.

8. POLICY RECOMMENDATIONS

Owing to the cogitation that climate change and agricultural production are interconnected variables regarded with high priority in their own measures in SSA, the following recommendations are deemed necessary to be considered: i) decarbonising the agriculture sector, ii) mainstreaming climate-smart agriculture iii) holistic policies iv) limiting agricultural expansion.

8.1. Decarbonising the agriculture sector

Presently, decarbonising the agriculture sector in SSA is not an easy task but is slow and achievable. As illustrated earlier, agriculture is an economic and livelihood mainstay for the residents of the SSA; however, with the continued threats and widening inequality gaps necessitated by climate change, the region needs to think of decarbonising. Doing so abates consequent implications even though Africa contributes less than five percent of total global GHG emissions.[15] From a continental overview, GHG emissions from agriculture are estimated to have increased at an annual average of about three percent during the 1994-2014 period. One of the prospects of agricultural decarbonisation in SSA is reducing methane emissions from enteric fermentation. The IPCC's 2018 report indicates that methane, mainly from the agriculture sector, is one of the principal non-carbon emissions likely to slow the ability to reach a net-zero emission target by 2050. Through the help of their governments, countries within SSA could reduce methane production by promoting better animal health, improved feeds, and livestock breeds. Another aspect critical in reducing GHG emissions is investing in organic fertiliser instead of artificial fertilisers. In a region where the landscapes are already degraded, farmers tend to use synthetic nitrogen fertiliser. Researchers suggest the use of locally obtainable nitrification inhibitors to reduce the nitrification of ammonia in ammonium-containing fertilisers lowering GHG emissions.[16] In this regard, it is the responsibility of the relevant government ministries in SSA to encourage the adoption of organic or low GHG emitting fertilisers by developing policies and regulations that cap fertiliser prices and ensure availability and accessibility by all. In addition, sensitising and educating the farmers on less carbonising farming practices through agricultural extension services goes a long way in reducing local, national, and regional GHG contributions.

Generally, energy consumption in the agriculture sector is considerably high, although it does not trigger much attention in SSA, where most small-scale farmers have not mechanised their operations. The reality is that many operations ranging from land tillage, fertiliser spraying, transportation of farm inputs and produce, and processing factories such as tea factories demand a lot of energy, most of which comes from fossil fuels. While some countries like Kenya are already exploring renewable energy sources in the tea factories, there is still potential to sequester GHG emissions from agriculture. Most parts of SSA have the potential for wind, solar and geothermal power; financial commitment and policies aligned to the agriculture sector is a viable opportunity for economic growth and mitigating climate change. Thus, transforming agriculture from fossilised energy use to a cleaner and greener energy-consuming sector is one of the fundamental approaches towards meeting country-specific carbon mitigation

15 UNEP. (2021). Responding to Climate Change. https://www.unep.org/regions/africa/regional-initiatives/responding-climate-change

16 Ntinyari W., Gweyi-Onyango J.P. (2021). Greenhouse Gases Emissions in Agricultural Systems and Climate Change Effects in Sub- Saharan Africa. African Handbook of Climate Change Adaptation. Springer, Cham. https://doi.org/10.1007/978-3-030-45106-6_43

targets as specified in the submitted old and updated Nationally Determined Contributions.

8.2. Limit agricultural expansion

The proposal to limit agricultural expansion in SSA may sound onerous as the population is increasing and each country is racing to grow its economy. In reality, agricultural expansion in SSA is harming the ecosystem; the forests are on the receiving end. Figures 5 and 6 paint a picture of a significant relationship between agricultural expansion and shrinkage of the forest. It can be inferred that the region will witness increased deforestation if agricultural operations can encroach forested areas unchecked. Therefore, to avert the far-reaching consequences of forest destruction, it is prudent for policy-makers within the region to come up with stringent measures that protect forests. In the spirit of decarbonising the agriculture sector, destroying forests means a vital carbon sink is eliminated, promoting a build-up of GHG emissions in the atmosphere. The forest and land-use policies need to be updated and strengthened while detailing specific measures to be taken in case of unauthorised encroachments. Livelihood source diversification is an inevitable measure towards lessening agricultural expansion. Capacity building communities, availing drought-resilient and fast-maturing seeds, promoting improved livestock breeds, and providing agricultural extension services could motivate farmers to utilise their current lands instead of clearing new areas.

8.3. Mainstream climate-smart agriculture across all levels

In a quest to address food insecurity, build climate resilience, and reduce GHG emissions from agriculture, it is prudent to mainstream CSA into sub-national, national, and regional policies. Precisely, there is a variation in the scale of climate change impacts on different communities, meaning it is essential to develop context-specific climate situational analysis that aid in the implementation of appropriate CSA technologies. For instance, investing and promoting local CSA efforts encourages individuals to embrace new ideas without completely abandoning their original/traditional agricultural approaches. There is value in indigenous knowledge systems. In addition, scaling up CSA should be a shared responsibility with synchronised efforts between government agencies, private institutions, citizens, and research institutions. Government institutions are obliged to ensure there are satisfactory frameworks governing land-use operations to eliminate instances of contending priorities.[17] It also means allowing full participation of stakeholders in the CSA implementation process, from inception to monitoring and evaluation.

Mainstreaming CSA means allocating funds and investing in viable technologies; national budgets will have to incorporate climate finances. Accordingly, some of the gaps in CSA implementation in many SSA countries include low climate funds, policy constraints, and limited local knowledge. Knowing that CSA is cost-intensive to many individuals vulnerable to climate variability, the ministries and departments of agriculture, finance, and environment need to work with investors at the sub-national and national levels. This could include developing CSA investment plans or working with local and national financial institutions to facilitate tailored loans and credits at subsidised rates and lengthened repayment periods. It could borrow a leaf from World Bank's CSA investment plans, captioned, 'bringing CSA to life' targeting several SSA countries on the footing of financial investments, policy design, and scaling-up CSA operations. As a subset of investment, building the capacity of agricultural extensionists at the local or district levels on CSA interventions as a policy option facilitates sustainable decisions on climate adaptation. It is also important to mainstream CSA into the national adaptation plans (NAP) on the basis of the Cancun Agreement.[18] Given that not all SSA countries have submitted their NAPs, they have an opportunity to reinforce

17 Saeed, A.R. (2020). Why we must scale up climate-smart agriculture to feed a hungrier world. World Economic Forum. https://www.weforum.org/agenda/2020/11/why-we-must-scale-up-climate-smart-agriculture-csa-climate-hunger-population-resilience/

18 UNFCCC. (2011). Cancun Agreements. United Nations Framework Convention on Climate Change. https://unfccc.int/process/conferences/pastconferences/cancun-climate-change-conference-november-2010/statements-and-resources/Agreements

their plans on sustainable agricultural operations responsive to current and projected climate variability and risk.

8.4. Develop holistic and transformative policies

Whereas country-level and regional agriculture and climate policies have been developed, there is still a need to advance those policies and institutional frameworks to be holistic and transformative. For example, as the climate is constantly changing, implications on agricultural operations are also shifting; hence, adaptation approaches will automatically have to transform to be effective. A review of transformational adaptation in agriculture in a changing climate underscores that incremental adaptation alone is not enough in a hastily varying climate. It is thus necessary to have policies that drive systemic over incremental transformation. Leaders and policy-makers in SSA need to act swiftly as the climate change curve is not flattening. Caution is raised that transformative adaptation should not be replaced with 'sustainable development' or 'resilience'.[19] This means it should be fully integrated into agricultural systems and be audacious enough to transform the political arena to realise significant change in agriculture, food security, and people's livelihoods.

The legal and institutional frameworks are incomplete without rounded climate mitigation interventions, whether at national or regional levels. In this case, realistic and applicable strategies to curb GHG emissions in the sector need to be developed following the present and predicted climate changes. To be considered all-inclusive, the development of policies and frameworks should combine top-down and bottom-up participation channels. Also, it is essential to make the most out of community-driven transformation. This means building capacities of local actors and agricultural extension experts. Research is a low-invested sector in SSA, yet it is crucial if transformative, sustainable, and context-specific climate-smart agricultural interventions are to be developed.

19 Grist, N. (2014) Transformative adaptation in Africa's agriculture. Contribution Note for Africa Progress Panel meeting. "Expert Consultation: an African Agenda for Green, Low Carbon Development", Geneva, Africa Progress panel.

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