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Original Article

Climate Smart Agriculture in Kenya's ASALS: Gaps and Barriers in Policy Development and Implementation

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ABSTRACT

This paper presents an evaluation of the gaps and barriers in policy development and implementation with regard to Climate Change in Kenya's arid and semi-arid lands (ASALS). In spite of concerted efforts and considerable attention accorded to the climate change effects in the region, there is little improvement. Through a desktop review of previous studies and policy documents, this paper examines the mitigation measures proposed and interrogates the practicality of these measures as well as the gaps and challenges in formulation and implementation. The ASALS are the most hit by climate change, and they make up 89% of the country's landmass and are home to approximately 20 million people, which translates to 38% of the Kenyan population. The region is also home to 60% of the country's livestock, and the considerable contribution of livestock to global warming is justification enough to focus on Climate Smart Agriculture in the ASALS. The region is predominantly rural, and for their livelihoods, the farmers rely on rain, which has become unreliable due to climate, hence the persistent food insecurity. Policies have been formulated to address mitigation, adaptation, and food security with outcomes such as improving yields, growing net returns, lessening the emission of Green House Gases, boosting input use and efficiency, enhancing resilience, and improving gender and social inclusion. Understanding the constraints in the implementation of Climate Smart Agriculture (CSA) practices would be useful in improving policy formulation and intervention planning. The findings of this study reveal gaps and barriers in the formulation and implementation of CSA policies stemming from lack of awareness, which is responsible for the low adaptability levels, nature of land ownership in the ASALS, cultural factors, poor coordination between stakeholders and inadequate funding for CSA projects.

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INTRODUCTION

The importance of the agricultural sector in Kenya's economy has been underscored by various stakeholders from both governmental and non-governmental sectors. Besides providing livelihoods to a majority of the ever-growing Kenyan population, the agricultural sector's direct contribution to the Gross Domestic Product (GDP) stands at 33 percent while the indirect contribution from allied sectors stands at 40 percent (Central Bank of Kenya, 2023; FAO, 2023). The sector however faces challenges brought about by climate change. Changes in climatic conditions have had adverse effects on crop yields, livestock production, water and soil resources which have subsequently resulted in food insecurity, decline in economic growth among other worrying threats (Mahli et al. 2021; Zandalinas et al. 2022). With projections of extreme weather conditions particularly an increase in temperatures and changes in precipitation patterns, Climate Smart Agriculture (CSA) is fronted as a mitigation measure. It is expected that CSA would address the agricultural sector's contribution to climate change while at the same time building resilience and adaptation to its impacts (Gabriel, Olajuwon & Klauser, 2023).

The concept of Climate Smart Agriculture (CSA) emerged in climate change discourse two decades ago, and the first international policy convention on the topic was held at The Hague, Netherlands, in 2010. Led by the World Bank and the Food and Agriculture Organisation (FAO), the conference brought together representatives of both developed and developing governments, stakeholders from international and regional organisations like the European Union and the African Union, non-governmental organisations (NGOs), the private sector, humanitarian institutions, and scientists. At the conference dubbed *Global Conference on Agriculture, Food Security and Climate Change*, ministers endorsed the *Roadmap for Action on Agriculture, Food Security and Climate Change* that made the clarion call for critical measures aimed at addressing the plight of the poor inhabiting rural areas all over the world and specifically women (Neufeldt et al., 2013). It was the first instance that the protocol acknowledged, at ministerial levels, the interconnectedness between agricultural activities, ensuring that the world is food secure and grappling with the changes in climatic conditions, and the need to integrate policies to achieve CSA.

It however needs to be mentioned that even before the emergence of Climate Smart Agriculture, governments had been cognizant of the effects of climate change on agriculture. Kenya had come up with a *Strategy for Revitalizing Agriculture* 2004–2014 (SRA).

The Climate Change- Agriculture Conundrum

Agriculture provides humans with foods, fibres, fuels, and raw materials, but it is also responsible for the generation of 19 - 29 % of the entirety of emitted greenhouse gases (GHGs) that cause global warming, which in turn impacts agricultural productivity. Sombroek and Gommes (1996) christened this relationship *The Climate change- Agriculture conundrum*. As a mitigation measure, there is a global consensus to adopt climate smart agriculture (CSA), which denotes agriculture that increases productivity in a

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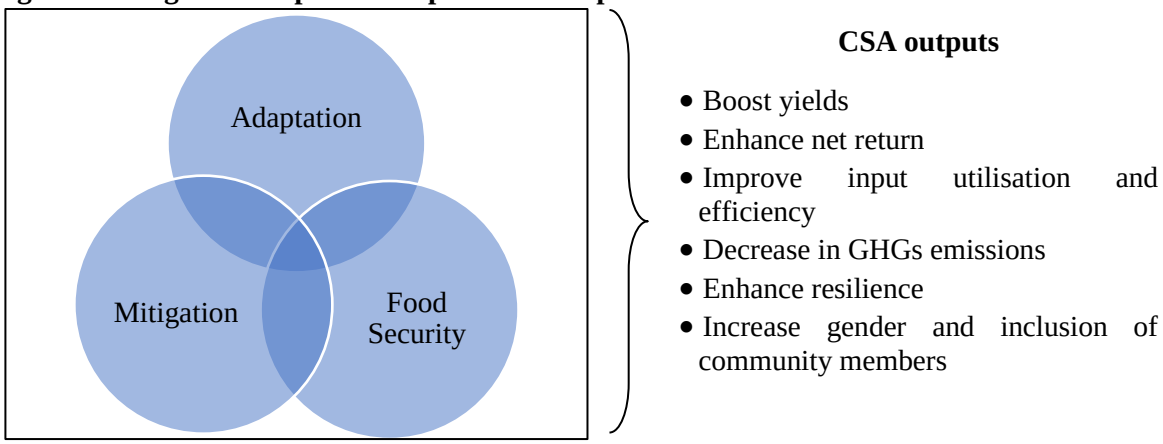
sustainable way, improves resilience (adaptation), lessens/eliminates greenhouse gases (GHGs) (mitigation), and boosts attainment of a country's food security and development goals (FAO, 2013). These three pillars (adaptation, mitigation, and food security) define Climate Smart Agriculture, and the expected outputs are increased yields, rise in net return, improved input utilisation and effectiveness, reduced emission of GHGs, enhanced resilience, and boosted involvement of both men and women and social inclusion.

Figure 1: Integration of policies as per the three pillars



Developing countries are the hardest hit by climate change, and its effects have included an increase in temperatures, variations in precipitation patterns, rising sea levels and severe weather conditions events that are threats to agriculture, forests and food and water supplies. Presently, in Kenya, the noticeable effects of climate change are evidenced by the delay in the beginning of the rainy season; rains are experienced way beyond what was traditionally the long rainfall season, March to July. These persistent climate change effects are foreseen to worsen the already biting food insecurity, increase poverty levels and hinder the attainment of the country's development goals.

Why the Interest in the ASALS?

The ASALS are the most hit by climate change, and they make up 89% of the country's dry land, which is 23 of the 47 counties. The ASALS is home to approximately 20 million people, which translates to 38% of the Kenyan population. Ondiko and Karanja (2021) observe that the population in the ASALS is the most affected by drought and starvation. According to Reliefweb (2022), the most affected counties with regard to food insecurity are Marsabit (50%), Turkana (40%), Baringo (35%), Wajir (35%), Mandera (35%), Samburu (35%) and Isiolo (30%). A unique trait to note is that these counties are predominantly inhabited pastoralist communities that rely on livestock, meaning their livestock, too, are feed insecure.

The ASALS are mostly rural, and Berre et al. (2016) draw attention to the fact that the farmers and households in rural areas are the most affected by climate change. Small-scale farming of dry-tolerant crops, mainly maise, beans, millet and sorghum, is also practiced. The farmers rely on rain, and their problems are compounded by the fact that their capacity to adapt to new farming systems is limited (Kalele et al., 2021).

The ASALS is also where 60% of the country's livestock is found (IGAD, 2021), and the considerable contribution of livestock to global warming is justification enough to focus on Climate Smart Agriculture in the region. While it is the most important source of income and subsistence for the inhabitants of the region, livestock also accounts for 14.5% of the global greenhouse gases (GHGs) emitted and is regarded as a key contributor to the depletion of the ozone layer (Mwongera et al. 2019). With the expected rise in demand for livestock products projected to double by 2050, which is in response to the rise in

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human population, there is a need to examine livestock production in the ASALS. Climate change affects livestock production (availability of water, quality of feed crop, animal growth and production, diseases, reproduction, and biodiversity), and livestock affects climate change through the emission of greenhouse gases (GHG) that deplete the ozone layer and lead to an increase in atmospheric carbon dioxide levels and temperatures which in turn affects livestock in a cyclic turn of events.

METHOD

This paper employs a desktop review of previous studies and policy documents related to Climate Change and Climate Smart Agriculture (CSA). The discussions in this paper are centred on the CSA outcomes that are derived from the three pillars of climate-smart agriculture, that is adaptation, mitigation, and food security.

DISCUSSION

Climate Change Policies in Kenya

Being a signatory of the *Paris Agreement*, The Climate Change Act, Number 11 of 2017, was promulgated in Kenya to aid in mitigating the effects of climate change at both National and County government levels. Closely associated with the *Paris Agreement* is the attainment of the 17 Sustainable Development Goals (SDGs) contained in the *2030 Agenda* that seeks to press on the development of social, economic, and environmental. Climate change effects could have negative impacts on multiple SDGs through, for example, loss of human and animal life, worsening malnutrition and disease, and the devastation of water sources, land for farming, infrastructural works, as well as the natural environment.

Given that climate change is a cross-cutting issue, Kenya developed its own customised document titled the National Climate Change Action Plan (NCCAP) 2018-2022. The document articulates development goals by providing mechanisms to realise low carbon climate resilient development. It emphasises sustainability, while prioritising adaptation and enhanced climate resilience for vulnerable groups, including women, youth, persons with disabilities, and marginalised and minority communities.

The implementation of government policies touching on Climate Smart Agriculture are under a number of ministries, notably the Ministry of Agriculture, Livestock, Fisheries and Cooperatives and Ministry of Environment and Forestry, in collaboration with other ministerial and departmental agencies as well as development partners.

There are a number of policies related to Climate Change Adaptation in Kenya. They include:

- National Climate Change Policy, 2018
- National Climate Finance Policy, 2016
- National Livestock Policy, 2013
- National Climate Change Action Plan, 2013 – 2017
- National Climate Change Strategy, 2010
- Climate Change Act, 2016
- ASDSP, 2013 – 3030
- Water Act, 2016
- Irrigation Act 2019
- Forest Act, 2005
- Environmental Management and Coordination Act, 2015

Summary of Solutions Proposed for Mitigating Climate Change in the ASALS

Various solutions have been fronted by researchers and scholars to mitigate climate change with regard to livestock production and farming in the ASALS. The solutions target the CSA outcomes that include increasing production, increasing net return, improving input use and efficiency, diminution in emissions, increasing resilience and improving gender and social inclusion. They include the following:

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- Formulation of Policies to address breeding strategies so as to get better herd and herd efficiency (Raina et al., 2023; Cassandro, 2020). This could also lead to a reduction in the number of animals grazing in a particular area, which in turn reduces soil erosion.
- Coming up with policies addressing the use of communal land (policies that would discourage practices like shifting cultivation and encourage afforestation) (Villa et al. 2021).
- Aim at introducing crop varieties that give better yields with varieties adapted to climate change (Marenya et al., 2022; Gebre et al., 2023).
- Improving the management of grazing land, enhancing animal dietary needs and genetics so as to increase fat content, for it has been established that an increase in fat translates to a decline in methane emission (Mwongera et al. 2019).
- Enhance the management of both land and water in the ASALS, mostly by the collection of rainwater (Kalungu et al. 2014).
- Changes in relation to diet trends of the population to cut down on dependence on livestock-related products (Kim et al., 2015).
- Improving access to awareness and technology through sensitisation done by agricultural extension officers, provincial administration, county government, and NGOs. Empowering the population on the impact of shifting cultivation could be useful in convincing the farmers to adopt new, less destructive practices (Elia, 2017; Mudekhere et al., 2023).

Gaps and Barriers

This section presents the reality on the ground and the strategies put in place by the Kenyan government to mitigate climate change and support climate-smart agriculture. This will be done through analysis of policies formulated, those implemented and the challenges in their implementation so as to reveal gaps and barriers in the development of policy and their subsequent implementation.

Sensitisation and Access to Knowledge

There is documented evidence that in spite of efforts to introduce climate-smart agricultural practices (CSAPs) to farmers, low adoption levels persist despite the equally low implementation of climate-smart agriculture practices amongst communities in many developing countries (Wamalwa, 2017; Brown et al., 2018).

In their study on factors affecting farmers' adaptation to climate change in two ASAL counties (Kajiado and Kitui), Ndungu and Mwangi (2023) established the need for increased awareness creation on climate change among farmers as well as agricultural extension training.

For CSA practices such as the adoption of specific varieties of crops and breeds that are climate resistant utilisation of climate information in farming and conservation agriculture, the major challenge to the adoption of these practices is attributed to lack of awareness amongst community members.

Lack of access to information affects not only farmers but also those implementing CSA strategies. While undertaking their study on climate change impacts and farmers' response in Yatta, an ASAL region, Kalele et al. (2021) established that the unavailability of location-specific data regarding the suitable adaptation practices for the region hamper the implementation and adaption of CSA strategies.

Land Ownership System in the ASALS

Land ownership in the ASALS is most communally owned, and despite the introduction of the Community Land Act in 2016, there has been little uptake of the law judging by the number of community ranches registered. This is attributed to the contestations over membership and boundaries (Mwangi, 2003; Wily, 2018). This form of land ownership system hampers the adoption of CSA in the sense that crops are still grown under shifting cultivation, and grazing

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lands are shared by community members. Kissinger et al. (2012) decry the rising degradation of land and its resources due to this kind of ownership.

For a population that does not live in one place and travels in search of pasture and water for their livestock, there are challenges in the implementation of climate change mitigation measures, such as afforestation, since the population does not dwell in one place long enough to nurture the trees. Also, the most ideal sites for planting trees are hilltops, which are often regarded as sacred sites by community members.

Gender and Social Inclusion

In Kenya, women run 40% of small farms and constitute 75% of the workforce in smallholder agriculture (ILOSTAT, 2019). In the ASALS, these figures are slightly higher due to other factors, such as the nature of agricultural activities and cultural roles assigned to women in pastoralist communities, the main inhabitants of the region. Denton (2002) posits that in tackling climate change, it is important to consider factors such as one's ethnic background, sex, religious affiliation, literacy level, age, culture, and disability. In echoing Denton's assertion, Van Aelst and Holvoet (2016) propose that there is a need to consider the marital status of farmers and pastoralists, for it is a determining factor in their access to the different socio-economic resources that are gender dependent. Sonwa et al. (2016) assert that households headed by women lack labour for taking herds to graze and access the best pastures, which are usually found in areas that are prone to conflicts. Turkana, Samburu, West Pokot, and parts of Baringo are examples of pastoralist regions that are cattle-rustling prone, hence defining the roles of women. Omolo and Mafongoya (2019) explain that women in pastoralist communities have the responsibility of ensuring there is food, taking care of the children and caring for the calves as well as sick livestock left behind in the homestead.

Gender inclusion is a key factor in the adaptation of CSA practices and is generally explained by the fact that women and the youth make up the largest producers of food and labour in the agricultural sector but are often not decision-makers and have little access to resources and technology.

Resource Constraints for CSA Projects, Management of Funds and Lack of Policy Coherence

Implementation of CSA practices such as agroforestry, improved fodder production, improved breeds of livestock and water harvesting require funding. Resource constraints have been an impediment to the implementation of various projects in the ASALS. As noted by Chandra et al. (2017), the allocation of funds for CSA in developing countries is intimately linked to 'policy and institutional' factors, including 'decision making', 'collaboration', 'involvement of stakeholders', 'financing mechanisms', and 'national agenda'. This intricate network of several institutional and administrative planners results in diverse policy agendas as well as planning cycles that are often not harmonised to sustain the integration of strategies towards CSA.

A frequent concern in the literature on CSA funding, and a probable main barrier to CSA financing, is the increasing separation of mitigation from adaptation strategies in national climate change policies. Mitigation denotes curbing or lessening, while adaptation denotes adjusting and coping with the effects. As Suarez (2020) points out, a mitigation measure serves as an adaptation measure as well. For example, the promotion of sustainable agroforestry could serve as both a mitigation as well as an adaptation measure.

Climate change funding sources include budgetary allocations at the county level, dubbed County Climate Change Fund, the national climate change fund, as well as local and international partners. On paper, the CCCF mechanism covers finance, public participation, climate information and monitoring and evaluation of adaptation and resilience building. However, on the ground, this is not often the case. For the period covering 2012 to 2020, the

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government spent 1.8 billion to implement the Ending Drought Emergencies Framework (USAID, 2022)

Cultural factors

Diversification is fronted as an adaptation strategy for climate change to reduce climatic exposure (Marty et al., 2022). Diversification concerns the change in dietary needs, for example, shifting from the over-reliance on livestock for proteins to other sources like fish. Diversification also involves crops and change of types of crops and their varieties.

To illustrate how culture can be an impediment to the adoption of CSA practices, take the example of farmers in Yatta reporting that the newly introduced crops, that is, green grams, cassava, sorghum, and lablab beans, are a "poor man's food" (Kalele et al., 2021).

Marginalisation of the Region

There is documented evidence that the region already suffers from marginalisation with regard to agricultural policies and challenges in the implementation of the few in existence (Akuja and Kandagor, 2019). This marginalisation is reflected in the inadaptability of policies formulated specifically to deal with climate change in the ASALS.

CONCLUSIONS AND RECOMMENDATIONS

From the discussion above, strides have been made in the formulation of policies in the country; however, the challenges persist in their implementation. Climate Change contributory factors in the ASALS emanate from cultural, political, socio-economic, and demographic specifics. Pastoralists insist on owning large herds, regarded as a symbol of pride, wealth, prestige, status and security; the region is prone to cattle rustling, and the population has low income levels, high illiteracy rates and pronounced gender inequalities. There is improvement in the incorporation of a gender perspective in CSA initiatives; however, there is a need to step up this integration of women.

Climate Smart Agriculture adaptation strategies vary from region to region such that strategies applicable in Central Kenya, which is characterised by high rainfall, or Uasin Gishu, where there is high mechanisation of agricultural activities, may not be applicable and adaptable in the ASALS. Therefore, there is a need for tailor-made solutions that are adaptable for the ASALS.

Other recommendations for the attainment of CSA in the ASALS include awareness creation among farmers on CSA practices, collaboration involving both national and county levels of government, stakeholders from the private sector, civil society, and international organisations in the implementation of CSA programs. There is a need to empower young people and women in the ASALS since they are the ones who mostly participate in activities in the agricultural sector and, therefore, contribute considerably to a range of value chains. Also, there is a need for mobilisation of funds to support the implementation of practices geared towards CSA.

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