

A Historical Investigation of Sustainability of Climate Smart Agriculture to Poverty Stricken Kenyans, 2017-2024

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ABSTRACT

The paper examined a historical investigation of sustainability of climate smart agriculture by poverty-stricken Kenyans. Its emphasis began globally in 2009, with an aim of carbon sequestration, and ecological balance, until it was launched in Kenya in 2017. The objective was to assess sustainability of the climate smart agriculture by the poverty-stricken smallholder agriculturalists in Kenya between 2017 and 2024. In the Literature review section; this paper employed the social ecological resilience theory to investigate the interconnectedness of social and ecological systems in agriculture, building flexible agricultural systems that can adapt to changing environmental conditions and societal needs. The methods included the collection and synthesis of both secondary and archival data sources. The study significantly allowed investigation on whether the poverty-stricken people could sustain the climate smart agriculture without the government interventions by controlling, monitoring, managing the already established agricultural projects and support due to its demand on ecological balance, contribute to the historiography of climate smart agriculture in Kenya to the future scholars from Green House Gas Emission. The research was justified, since it chose the vulnerable people of Kenya because of their characteristics that hardly allow them to ensure ecological balance due to insufficient funds, monoculture practices, and the aim was to improve the smallholder farmers who are unable to withstand the ecological balance. The data derived from sources showed that the Kenyan government give fund through FLLOCA-Kenya among others, but the underprivileged had poor maintenance, inability to continue with the already established projects, hence the inaccessibility of climate smart practices and technologies, such as, livestock keeping, cropping, fishery, forestry, mulching, genetic diversity, machineries, solar powered irrigation, participating in research, extension, and education. The study recommends that, the Kenyan government should formulate durable projects when funding, and incorporate both traditional and new mechanisms for food security.

Keywords: Sustainability, Climate Smart Agriculture, Poverty Stricken Kenyans

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1. INTRODUCTION

This paper historically examined Kenya, and specifically poverty-stricken areas such as arid, semi-arid among others that have challenges in fostering the climate change agricultural practices, ecological balance, due to lack of funds, insufficient funds to withstand the climate smart agriculture techniques. These include

the ones with the extreme or the absolute poverty, who live below three Dollars per day, which according to the World Bank Report 2025, approximate it to 43.8%, Super Metro, Nakuru City Politics, showed the national poverty rate increased from 38% in 2022 to 49% in 2025

In the world, the climate smart agriculture was emphasised in 2009 that allowed the incorporation of the climate change response into sustainable agricultural development techniques free from carbon by the United Organizations, Food and Agricultural Organizations. There were stakeholder debates that provided guidelines on management of agriculture for food security (Lipper & Zilberman, 2018). Conferences including the Rio Conventions of 1992, which led to the establishment of United Nations Framework Convention on Climate Change (UNFCCC), to reduce the carbon in the soil through forestation (McCarl and Schneida 2001). Other conferences included the 2012 Hanoi Vietnam as the second global conference, 2014 Johannesburg South Africa, among others which created the Global Alliance on Climate Smart Agriculture.

In Kenya, the Climate Smart Agriculture was launched and

emphasised in 2017 and the Implementation Framework was between 2018 and 2027, which was to ensure soil fertility management by using both the organic and inorganic manure, mulching, maintaining forestation (World Bank Report of 2015 and 2017).

The study had significance since it allowed the investigation on whether the poverty stricken smallholder farmers, comprising of the vulnerable people of Kenya can sustain the climate smart agriculture due to its demand on ecological balance, and will contribute to the historiography of climate smart agriculture in Kenya to the future scholars, for example, why the emphasis on the climate smart agriculture tried to outdo the activities of the green house agriculture, and what the stakeholders who embraced climate smart agriculture and the government need to do to make it sustainable among the less fortunate in Kenya, since it is environmental friendly, finally, how the Kenyan poverty stricken areas can ensure ecological balance for food security. These justified this research hence would facilitate food production; enhance good agricultural management practices, and agricultural resilience through adequate funding to smallholder agriculturalists and more specifically the smallholder farmers. According to USAID, (2022), Kenya's Climate Smart Agriculture Strategy (2020-2030) has potential and can change the lives of smallholders, but lack funding.

The study helped in assessing the shift from the green house agriculture, history of climate smart agriculture in the world, emphasis of climate smart agriculture in Kenya, how it was welcomed by the poverty stricken citizens of Kenya, its progress

in Kenya, challenges faced by poverty stricken smallholder farmers in Kenya in embracing climate smart agriculture and whether climate smart agriculture is sustainable to them, the climate smart agriculture contributions and the future directions towards food security to both the various societies.

2.0 Literature Review

2.1 Definition of Green House Agriculture or Protected Cultivation and Its Spread in the World

This is an agrarian system which involves the planting of crops in an enclosed on either transparent or translucent plastic materials, which control temperature, humidity and light, and guard crops from extreme weather, pest and disease infestation. It ranges from the small shed to the industrial, while some can use glass houses to conserve water, minimize water vapour (Valera, et. al. 2016; Annes, 2000).

The world history on the green house agricultural technology, its construction began in Rome, during the emperor Tiberius in 30 CE after the birth of Christ. In Korea, the Koreans constructed it in 15th century during the reign of Joseon, in Netherlands; it appeared in the 17th century which had the largest green house in the world, which spread to England. In the 1737 at the early 18th century, Andrew Faneuil a Boston merchant constructed the first American green house. In the 19th century, several green houses were built in French, England, New York to allow plants and horticultural knowledge. In the 20th century, the wider sheets of polythene became available for small scale production (Muijzenberg and Erwin, 1980).

2.2 Shifts from the Green House Agriculture to Climate Smart Agriculture Practices for Carbon Sequestration

There emerged the transition from the green house agriculture due to several reasons that were crucial and also to allow the smallholder agriculturalists to increase the agricultural production. This was to allow the adaptable agricultural practices and reduce greenhouse gas emissions, to give direction to sustainable approaches to food production for long term food security, since Green Gas Agriculture was no longer suitable for all regions and crops. The green house agriculture was seen possessing the following advantages; it rhymed with the climate change adaptation and mitigation; allowed water conservation; embraced the use of the drought resistance crops; supported agroforestry; gave farmers chance to adapt to changing weather patterns and harsh climate; reduced emission of gases, improved agricultural productivity, and allowed long term sustainability through availing food for the future generation (Alliance Bioversity & CIAT, 2024). Even though it had the above advantages for fostering the climate smart agricultural practices, it was later detected that it had the emission of gases that were very harmful to the environment. The efficient agricultural practices that came with the emphasis on climate smart agriculture included the adoption of the drought resistant crops, which could do well in low water conditions, introduction of the genetically modified varieties through the Alliance's Gene Editing Platform. Some traditional crops are today neglected but they are good to the new climate change and are also adaptable in the world. For example, the scientists posited that the traditional bananas of the Philippines are nowadays doing well in and are productive in the new climate change of many regions in East Africa. According to Alliance Bioversity & CIAT, (2024), the core goals of climate smart agriculture were, focus on drought resilient varieties which minimize irrigation practices, and create low cost for farmers. Second practice is enhancing the soil health by depending on the organic matter through the environmentally friendly soil management techniques, by using the compost or the animal manure and also the green manure. This practice is hard to adopt by the smallholder farmers who experience the low animal husbandry, small sizes of land that can never allow agroforestry and forestation that can provide the green leaves to even control the soil erosion. Most of them are using the chemical fertilizers that are hard for them to sustain due to their high prices. Being that the poverty-stricken Kenyans highly embrace the mono-cropping, while the climate smart agriculture advice for cover cropping that increase the nitrogen fixing, reduce tillage, double or triple productivity hence protect

the environment without interfering with the soil structure.

Third, the climate smart agriculture initiatives detected that it was worth to implement agroforestry practices, because trees absorb the Carbon iv Oxide, reduce the wind strengths, erosion, evaporation, attract pollinators and pest predators for the successful food chain which minimize the use of pesticides, provide shades, fruits, medical plants, used for food, leaves for animal feeds, green manure. Fourth are the efficient water management strategies, such as drip irrigation by channelling tubes to plant roots, rain water harvesting, organic mulch, contour farming and terracing, ensuring balance ecosystem. Furthermore, it recommended the use of technological tools such as the remote sensing, when using the drones, satellites and weather forecast and soil moisture sensors to detect the moisture in the soil, temperature and nutrient levels, for good crop health, reduced water stress, and controlled pest infestations (Alliance Bioversity & CIAT, 2024). According to the researcher the above technological tools are great problem to be purchased by the vulnerable Kenyans. It also needed the farmers to implement the new practices through education, training, knowledge sharing in a multidisciplinary approach, and have easy access to climate financing and incentives, by making such fundings and incentives to be long lived when the service providers focus on their durability, monitoring and evaluating their usefulness in availing enough food for even subsistence that is able to give away to the surplus agricultural production for exports. Moreover, the Food and Agricultural Organization of 2009 contains the key features of climate smart agriculture (FAO, 2009).

2.3 History of Climate Smart Agriculture in the World in an Era of Climate Change and Sustainable Agriculture.

Gupta (2010), asserted that the climate smart agriculture debate began in 1979 to 2010, when there was need to solve the problem of the greenhouse gas emission where the international conferences were held due to the global climate change, which would further help both the developed and developing countries. These conferences included the Rio conventions of 1992, which established the United Nations Framework Convention on Climate Change (UNFCCC). This would help in absorbing the carbon from the atmosphere in soil and forestry for good soil management (McCarl & Schneida 2001). From 2001, United States withdrew from the Kyoto Protocol which allowed the absorption of Carbon iv Oxide from the atmosphere since China and her were the biggest carbon emitters (Lal, 2004). The increase in the price of food in 2008 and the issue of indirect land use, that embraced renewable energy, which led to incorporation of the biofuel policies, which fostered the use of fuels made from biomass, for example, wood, crops, plant materials and animal wastes. These policies could be beneficial for the poverty-stricken individuals, as long as it would protect the vulnerable population against the price shock (Huang et. al, 2012).

In 2009, the International Climate Policy Agenda for the UNFCCC Cop 15 deliberations which took place in Copenhagen created the global climate treaty to lay foundation for the reduced emissions. This even targeted the developing countries to develop mitigation measures to 2020, through giving the financial assistance to those developing countries. Later the Cop 16 which was Green Climate Fund established to support projects, programmes, policies and other activities in the developing countries through National Appropriate Mitigation Actions (NAMAS) (Result of Cop 18 2011).

The 2015, Paris agreement, the 21st conference of the members of UNFCC, wanted to address the climate change issues globally to reduce the greenhouse gas emissions, to reduce global warming by introducing the clean energy and conservation (Cooper, 2016). This put more focus on least developed countries (LDCs) (FAO, 2009).

In 2010, there was the production of climate smart agriculture policies, practices and financing for food security (FAO, 2010). This positive move encountered several challenges including the high transactional costs for smallholder agriculturalists to access and benefit from climate finance (FAO, 2011). This was followed by several conferences, such as the 2012 Hanoi Vietnam, the second global conference, 2013

University of California at Davis, 2014 Johannesburg South Africa, 2015 at CIRAD Montpellier, which recommended the Global Alliance on Climate Smart Agriculture (GACSA), through provision of knowledge and investment on Climate Smart Agriculture. This alliance was launched in 2014, at the United Nation Climate Summit, which brought together, the Governmental, Non- Governmental both local and international and Intergovernmental organizations, through research extension, education and financing. The examples of the supporting bodies were food and agricultural organization, World Bank among others.

According to FAO (2013), the climate smart agriculture source book showed the sustainable agriculture practices from livestock, cropping, fishery and forestry sectors. However, according to the researcher, the most vulnerable, poor or poverty-stricken individuals have challenges in keeping livestock, crop cultivation, fishery, forestry, since many are unable to access land, finance among other necessities to embrace the climate smart agriculture practices, for sustainable agricultural development. They have hurdles in purchasing nitrogen fertilizers, feeds for livestock, water among others. Furthermore, some lack good housing.

According to the Action Aid (2010), the agricultural transformation was to get financial support, to put the mitigation burden to poorest people, to reduce the greenhouse gas emission, through the Global Environment Fund to support climate smart agriculture (FAO, 2013). This is incompatible with the Kenyan situation. Lipper and Zilberman (2018), showed that the climate smart agriculture has contributed highly to the developing countries, by creating interest in the capacity of agricultural mitigation for food security, which is opposite to the case of the poverty-stricken people of Kenya (Lipper and Zilberman, 2018:24). Various debates were held on technologies for sustainable agricultural growth, which focused on soil quality or genetic diversity and use of manufactured capital inputs, such as inorganic fertilizers and machinery, improved seed in an agricultural production system from 1960s to 2010 (Tilman et al 2002; IAASTD, 2009). This debate was against the climate smart agriculture strategies, with its more focus on the inorganic fertilizer, improved seeds which are more costly, hence are commercially sourced.

2.4 Emphasis of Climate Smart Agriculture in Kenya

According to World Bank report (2017), in Kenya, the climate smart agriculture was emphasised and launched in 2017, through the Kenya Climate Smart Agriculture Strategy (KCSAS), and later the implementation framework was put in place for a period between 2018 and 2027, which was referred to as the Kenya Climate Smart Agriculture Implementation Framework 2018-2027, after various failed attempts, to ensure food security and increased agricultural production and low carbon agriculture. The Kenyan Government worked hand in hand with the international bodies such as World Bank which embraced its progress. The Kenya Climate Smart Agriculture Project of 2017-2022, embraced agroforestry, drought resistant crops, water harvesting techniques and soil management practices, for the boost in soil fertility. The other international bodies or the intergovernmental organizations included, the International Atomic Energy Agency (IAEA), the International Livestock Research Institute (ILRI), which have played a central role in research and climate smart agriculture implementations (World Bank, 2015, 2017).

The sustainability level encompassed the implementation of techniques for soil fertility managements, such as use of inorganic manure, mulching by use of pruned trees and facilitating sustainable forest management.

World Bank (2015), focused on the Kenya climate smart agriculture (KCSA 2015-2030), for water efficient irrigation, crop rotation, mulching, manure composing and application, intercropping, terracing, contour bunds, alley cropping, drought tolerant crop varieties, improved pasture management, biogas production, intensive dairy production.

FAO (2018), posited that in the Kenya Climate Smart Agriculture Implementation Framework (2018- 2027), very many, poverty-stricken farmers in Kenya constructed the fish ponds, which are today left to be carwash, water storage for livestock, through the

ministry of agriculture, livestock, fisheries and irrigation. Also, World Bank (2017), Kenya climate smart agriculture-initiated projects such as the construction of fish ponds, and buying or availing any idea, fingerlings, with some fast-growing tilapia. Chinese fingerlings put in Lake Victoria hence facilitated higher agriculture production (World Bank 2017). Most rural population have a challenge in adopting climate smart agriculture because of the high level of poverty, insufficient resources (World Bank 2017:3). The Kenya climate smart agriculture project through the Kenyan vision 2030 strategies, laid the importance of transforming smallholder subsistence agriculture into modern, innovative, commercially oriented sector for better soil management practices, increased food production through improved crop and livestock breeding (World Bank 2017:5). There was need to support the climate smart agriculture planning and prioritization at the county and ward level by establishing the community driven development committees (CDDCs) (World Bank 2017:39-40).

2.5 How Was Climate Smart Agriculture Welcomed by the Poverty-stricken Citizens of Kenya?

The poverty-stricken farmers of Kenya positively welcomed its practices, and responded by constructing fish ponds, planting many trees with an aim of getting financial support, which declined as time went by as was stated by the Kenya Climate Smart Agriculture Implementation Framework (FAO, 2018). This is because, the first people who planted the trees benefited from carbon selling fund, while those who did it later never benefited.

It is very important to know that up to date, the only benefit that the poverty-stricken people have included the trees that they planted for carbon selling, with the notion of getting compensation from the government through the Mama Ngina Foundation. It is worth noting that in Kenya, very few still sustain such fish ponds, being that they are no longer affordable due to ecological imbalance, inability of the government service providers to monitor, check, and ensure whether the climate smart agricultural projects initiated are long term, continuous, or collapse after the initiation and why they collapse.

Discussion of the Results

A historical assessment of the sustainability of climate smart agriculture by the poverty stricken people of Kenya with their characteristics, such as having large family sizes with hurdle in taking care of them, unease in accessing the essential services like health, education, low income generation opportunities for example, unemployment, landlessness, experience food insecurity, inadequate clean water, unease in accessing the credit and other financial services, political and social discrimination, inadequate access to information and technology, affected by the climate change impacts which lead to environmental problems, such as drought, flood, price fluctuation, disability, among others which discourage smallholder farmers in Kenya likewise to the extreme poverty affected areas in general (Hulme, 2010; Ravallion, 2009; Greenhill et al, 2015; Sumner, 2013; Von Braun et al, 2009). This showed that the poverty-stricken Kenyans can never ensure the ecological balance. This is true because, the sustainability requires ecological balance by avoiding the natural resource depletion, through the new mechanisms in agriculture such as innovations including irrigation, crop rotation, mixed farming, agroforestry that provides mulch, animal husbandry for the availability of organic manure (Recha et al, 2017). This is less sustainable to the poverty-stricken areas, since some were initiated by the county governments and later collapsed, for example, the Oluch Kimira irrigation Scheme in Homa Bay County, which underwent the hurdle of maintenance. The climate smart agriculture with its advantages, such as enabling food security, allowing water conservation, environmentally friendly has no longer been sustainable by the poverty-stricken farmers of Kenya.

The findings on the history of climate smart agriculture in the world showed that the new agricultural development initiative was majorly formulated, and its policies were implemented to support the developing countries, to boost the climate smart agriculture projects, programmes, and other activities that would

ensure food security. The vulnerable people were given more priorities through funding, training, sharing ideas on climate change mitigations (COP 18, 2011). Even globally, smallholder agriculturalists had challenge to access and benefit from climate finance (FAO, 2011). This interfered with their active participation and facilitation of climate smart agriculture, a case that is common among the poverty-stricken farmers of Kenya. Even though the government of Kenya tries to support the climate smart agriculture projects by establishing the new projects, the poverty-stricken individuals have had the challenges in maintaining them, because the service providers are reluctant to monitor, maintain these projects for them to be the long term hence most of them turn to be the short-term showing no sustainability. The intergovernmental organizations such as the World Bank, Danish International Development Agency (DANIDA), Swedish International Development Cooperation Agency (SIDA), German State-Owned Development Bank (KfW), have accorded the support to the Kenyan government, to help them ensure the sustainability of the climate smart agriculture among other development projects (Kenya Climate and Nature Directory, 2025). The poverty-stricken people of Kenya or the poverty-stricken areas in Kenya, have low ability to lend money from the microfinance, and cooperative societies to maintain the government-initiated projects, hence can no longer pay back what is lent. They however highly rely on the government subsidies, like installing the solar powered irrigation system, supplying the cheap fertilizers, which mostly benefit the rich in the society who possess money.

The climate smart agriculture has had contributions and achievements in few counties in Kenya and few regions in East Africa, such as Makeni, Homa Bay, Kisumu specifically, Nyando, Marsabit, Isiolo, Tana River, Garissa, Wajir, Mandera in North Eastern and Nyandarua (CCAFS, 2017). According to Consultative group on international agricultural research CCAFS (2017), in East Africa, the climate smart villages included, Lushoto in Tanzania, Wote in Makeni, Nyando in Kenya, Hoima and Rakai in Uganda, Boranain Ethiopia. The above finding has shown that in Kenya, the only place where the smallholder agriculturalists have succeeded in fostering climate smart agriculture is only one that is Nyando, because of the vast challenges experienced by the poor people for its adoption, and maintenance. Other findings also showed that the Kenyan government has always facilitated funding to the smallholder agriculturalists in Kenya through the counties to facilitate the climate smart financing and mitigations, such as through Financing Locally- Led Climate Change Action (FLLOCA Kenya), while very many smallholder agriculturalists have low sustainability rate for longer serving towards food production, such as the solar irrigation pumps to provide water during dry spell, free seedlings for coffee, trees in Kericho county, creation of ward climate change planning committee, training on project management, proposal writing, and climate change adaptation hence boost crop yields (County Government of Kericho, 2025), the National Treasury of Kenya, 2025). However, the vulnerable population of Kenya, have problems in making these initiatives into practice hence are short lived.

Methodology

The study assessed the sustainability of the climate smart agriculture by the poor Kenyans from 2017 to 2024, employing the descriptive, and historical design to describe information from the sources, analysing the historical records to give an overview on the historical transition from the greenhouse gas emission to climate smart agriculture implementation, and whether the poor people of Kenya can manage and sustain the climate smart agriculture practices or not without the government support, under the social ecological resilience theory to investigate the interconnectedness of social and ecological systems in agriculture, building flexible agricultural systems that can adapt to changing environmental conditions and societal needs, by expanding farming practices, promoting farmer knowledge and collaboration, and finally achieving food security. This theory helped in assessing the shift from the green house agriculture, and gave status of the society, and what is easily accessible, and what

is inaccessible in such environment that can create ecological balance. The researcher used the secondary source methodology approach, and archival source approach to findings as per the objective, through the literature evaluation of relevant data for this study and collected the relevant information. Several records from e learning platforms, and Kenyan Universities such as Rongo University Library, Tom Mboya University Library, Kisii University Library were used. The researcher visited Kenya National Archive and Documentation Services (KNADS) in Nairobi, gathered information on the history of climate smart agriculture in the world general and Kenya in particular. This methodology was crucial since the researcher filled the gap identified during the literature review. The data was analysed phenomenologically by considering all the in-depth information from the sources as equal, provided that they were related to the objective of the study. The study showed that the climate smart agriculture is the bests for food security because, it aimed at of carbon sequestration, and ecological balance, but with adequate financing from the government which include county government and national government, non-governmental organizations, and also the intergovernmental organizations.

Conclusion and Future Direction

In conclusion, the data collected from the secondary and the archival sources indicated that, if the climate financing is well coordinated, monitored, maintained, by both the government service providers and the smallholder agriculturalists, the farmers who participate in it can take part in agroforestry, sell the carbon credit, fruits, get compost, animal and green manure from leaves, buy hybrid seeds, and protect soil erosion among other benefits, for long term. Moreover, the climate financing facilitates large production on agricultural practices that ensure food security for future generation, and environmental sustainability, which have the impact to the smallholder farmers who must be forced to withstand the initiated project for longer duration. However, the poverty-stricken individuals should be enlightened to use the government facilities, non-governmental organizations financing firms, to enrich themselves, embrace the latest innovations, and avoid involvement in monoculture which hinder them in adapting the climate change strategies on research for development, hence underdevelopment in these regions (BDI & CIAT, 2024). In these societies, the purchase of livestock is a problem; the ecological balance is incomplete which follows the web of food chain, since most of the people live from hand to mouth. Majority of these populations can never keep livestock, for example cat to feed on insect which infest the crops. According to the study, one out of ten, or zero out of ten had the cat. The climate smart agriculture allows traditional agricultural practices, and genetically modification, and since most poverty-stricken farmers foster new advancement in agriculture, such as the use of genetically modified seeds, plants, animals, which take few months to mature. This makes them to stand at a risk of sustainable agricultural production, since this needs a lot of capital to purchase. There should be the smallholder's farmer engagement, through formation of cooperatives, adequate training, and looking for market for surplus agricultural products by the government to boost the morale of the smallholder farmers. There is need for coordination between both the national and county governments and the non-governmental organizations, to bring the poverty-stricken population on board, by spelling out their roles in the newly established projects, for sustainability, and for improved agricultural production. The Kenya Vision 2030 outlined the positive change to the smallholder subsistence agriculture for commercialized agricultural food production. However, this can only be achieved when there is surplus production of agricultural products, in which the extra food produced can be converted to cash for good money circulation that allow economic, social and political stability, hence development. The sustainability of the climate smart agriculture by the poverty-stricken farmers in Kenya depends on the government monitoring, maintenance, and improving the living standards of the less privileged to allow them like the ecological balance practices, such as the access of land, intercropping, organic farming, using drought resistance crops, ending social and economic inequalities, and embracing the

rapidly changing world agricultural practices. The study will allow the future readers to know that when all Kenyans are incorporated in adequate ecological balance, then there can be the production of the surplus food, which can sustain the climate smart agriculture, and contribute to the historiography of climate smart agriculture in Kenya to the future scholars from Green House Gas Emission. The future researcher must focus on the interconnectedness between the social and ecological balance systems in agriculture by keenly looking at the characteristics of the majority population. This population comprises of the vulnerable people who can ensure food security, when adequately involved in the new trends of agricultural production, which rhyme with the modern climate change strategies, such as ensuring that they are given subsidies of organic inputs, access rain water harvesting, infrastructural development, forestation and reforestation to allow carbon credit programmes among others, other than leaving only the haves to benefit their shares.

Recommendations

Based on the findings, the poverty stricken Kenyan farmers with their challenging characteristics, need to be forced by the government service providers through close monitoring and maintenance of the already established projects, when they get access to climate smart financing and incentives from the agricultural reform stakeholders, such as, government, non-governmental organizations, and the intergovernmental organizations, to allow long term livestock keeping, cropping, fishery, forestry, mulching, genetic diversity, purchasing inorganic fertilizers, machineries, solar powered irrigation, supplying free fertilizers, participating in research, extension, and education training as climate smart agriculture practices and technologies, for good soil management practices. This move will ensure that there is environmental sustainability, support climate smart agriculture policies for ecological balance, low carbon agriculture, to ensure environment friendly. This will have great impact to the vulnerable populations, because the climate smart agriculture was launched and implemented to support the least developing countries, with the large number of vulnerable populations, who have the low ability to lend money from the micro finance, and cooperative societies, hence, this can actively allow them to participate in the high food production.

Suggestion for Further Research

The Kenyan government implementation of monitoring, maintenance framework by giving long term service providers to support the newly initiated projects for vulnerable smallholder agriculturalists in era of climate change.

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