



REPUBLIC OF KENYA

# KENYA CLIMATE SMART AGRICULTURE IMPLEMENTATION FRAMEWORK

2018-2027



CLIMATE RESILIENT, LOW CARBON AGRICULTURE



REPUBLIC OF KENYA

**Ministry of Agriculture, Livestock, Fisheries and Irrigation**

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The views expressed in this document are those of the authors and do not necessarily represent those of the FAO, the UNDP or other contributing partners.

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# FOREWORD

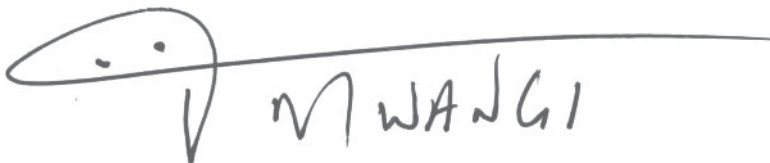
According to the Kenya's national development blue print, the Kenya Vision 2030, Kenya envisions being a middle-income country with citizens enjoying high quality of life and a sustained annual economic growth rate of at least 10% by year 2030. The agriculture sector is one of the key sectors to contribute to the projected annual national economic growth.

The Government of Kenya is fully aware that the progress being made towards food security, poverty reduction and sustainable development is at risk due to adverse impacts of climate change. Historical records show that Kenya has experienced rising temperatures over the last 50 years coupled with intense and extreme climate and weather events like droughts and floods. Future climatic predictions for Kenya indicate possible temperature increase of 1°C by 2020 and 2.3°C by 2050.

These changes unless effectively mitigated, will likely result to erosion of the productive assets and the weakening of coping strategies and resilience of rain-fed farming systems, especially in the arid and semi-arid lands. This will lead to more climate related vulnerabilities thereby predisposing farming communities to food insecurity and more poverty. In response to this scenario, the Government has been exploring innovative and transformative measures to assist stakeholders across the agricultural value chains to manage the effects of current and projected change of climate patterns. Consequently, the Kenya Climate Smart Agriculture Implementation Framework, 2018-2027 (KCSAIF) has been developed to provide guidance in mainstreaming Climate Smart Agriculture (CSA). The Framework envisions a climate resilient and low carbon growth sustainable agriculture that ensures food security and contributes to national development goals in line with Kenya Vision 2030.

Further, the Framework explores climate smart practices relating to sustainable intensification of crop, agro-forestry, livestock and fisheries production; adaptation and mitigation practices in livestock production systems; efficient management of agricultural commodity value chains; opportunities to leverage climate finance for CSA; knowledge sharing and effective learning; strengthening key institutions and systems for CSA initiatives; and mainstreaming CSA elements into national policies and development planning process.

I therefore, urge all the relevant stakeholders to play their respective roles in ensuring that the Kenya CSA Implementation Framework is successfully implemented to shield the agricultural sector from the negative impacts of climate change to ensure its growth and maintain its position as a pillar of Kenya's development.



**Hon. Mwangi Kiunjuri, EGH, MGH**  
**Cabinet Secretary,**  
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## PREFACE

The agriculture sector is a major contributor to Kenya's economy in terms of food and nutrition security, employment creation, supply of agro-based industry raw materials and foreign exchange earnings. About 98% of Kenya's agricultural activities are rain-fed and highly susceptible to climate change and climate variability. The susceptibility of the agricultural sector to climate change is likely to compromise attainment of the sector's contribution to food and nutrition security, national economy and the global Sustainable Development Goals (SDGs).

The Kenya Climate Smart Agriculture Implementation Framework 2018-2027 (KCSAIF) has been developed to provide a guide to various innovative and transformative initiatives and best practices that will strive to address challenges brought about by climate change. It is envisioned to ensure increased agricultural productivity and sustainably build resilience of the national agricultural systems. It also aims at providing various options for implementation of the Kenya Climate Smart Agriculture Strategy 2017-2026 (KCSAS). The summary actions outlined in the framework provide broad guidelines from which the Counties and other stakeholders in the sector are expected to develop appropriate activities towards building the resilience of the agricultural systems and value chain actors in order to cope with effects of the current and projected climate change patterns based on specific climate change vulnerabilities.

This KCSAIF was developed by a multi-disciplinary team of crop, livestock, fisheries, meteorology, forestry and environment experts with knowledge on Climate Smart Agriculture (CSA) and well versed with climate change issues and its effects to the agricultural sector. A draft document of the framework was presented to various stakeholders including National and County Governments for consultations and their valuable inputs were incorporated in this CSA implementation framework.

It is our sincere hope that by proper implementation of this framework by all the stakeholders in the sector, Kenya's agriculture will immensely and sustainably contribute towards a food and nutrition secure country while at the same time enhancing conservation of the natural production environment.



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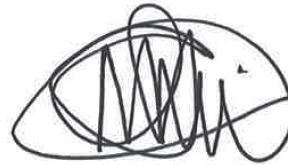


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# ACKNOWLEDGEMENTS

The Kenya Climate Smart Agriculture Implementation Framework 2018-2027 has been developed to promote climate resilient and low carbon growth sustainable agriculture that ensures food security and contributes to national development goals in line with Kenya Vision 2030. The support and goodwill from the Cabinet Secretary Ministry of Agriculture, Livestock, Fisheries and Irrigation, Cabinet Secretary Ministry of Environment and Forestry, State Departments for Crop Development, Livestock, Fisheries and Aquaculture and the Blue Economy, Agriculture Research and Irrigation were pivotal towards this accomplishment.

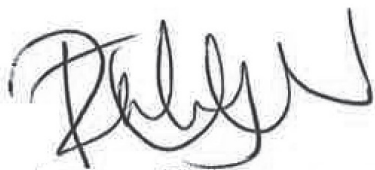
The preparation of the framework greatly benefited from insightful contributions from a wide range of institutions and individuals whose efforts I would like to recognize. I appreciate the multi-disciplinary team of experts drawn from state and non-state organizations who commenced the development of this framework in 2015. The invaluable contributions provided by the County Governments, the Private Sector, Civil Society, Researchers and Academia during the consultative stakeholder workshops is highly appreciated.

I express my gratitude to the following development partners who initially partnered with the team of experts in the development of the framework; the New Partnership for African Development (NEPAD), the Common Market for Eastern and Southern Africa (COMESA), East African Community (EAC), the CGIAR Program on Climate Change, Agriculture and Food Security (CCAFS) and the Department for International Development (DFID) of the UK Government.

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Finally, I am grateful to members of the task team comprised of Dr. Lucy Ng'ang'a, Robin Mbae, Zipora Otieno, Veronica Ndetu, Benjamin Kibor, Davies Makilla, Rose Akombo, Vincent Ogwang and Michael Okumu for their enthusiastic technical support culminating in the finalization of this document.

With this Framework we hope to work together to address climate change challenges in a manner that will promote climate resilient sustainable agriculture in Kenya.



**Dr. Andrew Tuimur, CBS**  
**Chief Administrative Secretary**  
**Ministry of Agriculture, Livestock, Fisheries and Irrigation**

# TABLE OF CONTENTS

FOREWORD	ii
PREFACE	iii
ACKNOWLEDGEMENT	v
TABLE OF CONTENTS	vi
EXECUTIVE SUMMARY	viii
ABBREVIATIONS AND ACRONYMS	x
GLOSSARY/DEFINITION OF TERMS	xii
<b>CHAPTER ONE:</b>	
<b>INTRODUCTION</b>	<b>2</b>
1.1 Background Information	2
1.1.1 Alignment with Relevant National Policies	2
1.2 Methodology	2
<b>CHAPTER TWO:</b>	
<b>SITUATIONAL ANALYSIS</b>	<b>5</b>
2.1 Background	5
2.2 Agricultural Production	6
2.2.1 Crop production	7
2.2.2 Livestock production	7
2.2.3 Fisheries and aquaculture production	9
2.2.4 Forests and agroforestry	10
2.2.5 Food consumption and nutrition	10
2.3 Policy Environment	12
2.4 Agricultural Growth and Development	14
2.4.1 Land degradation and declining soil health	14
2.4.2 Agricultural finance and investments	14
2.4.3 Extension and agro-weather advisory services	15
2.4.3.1 Extension services	15
2.4.3.2 Agro-weather advisory services	15
2.5 Context of Climate Smart Agriculture	16
<b>CHAPTER THREE:</b>	
<b>FRAMEWORK DESCRIPTION</b>	<b>18</b>
3.1 Introduction	18
3.2 Goal and Objectives of the Framework	18
3.3 Framework Implementation Components	18
3.3.1 Component 1: Institutional coordination	18
3.3.1.1 Sub-component 1.1: Inter-Ministerial and County Government Coordination	19
3.3.1.2 Sub-component 1.2: Government partnerships with private sector and civil society organizations	19
3.3.1.3 Sub-component 1.3: Programmatic Coordination with Development Partners	20
3.3.1.4 Sub-component 1.4: Research-Extension Liaison framework	20
3.3.1.5 Sub-component 1.5: CSA research funding	21
3.3.1.6 Sub-component 1.6: Appropriate CSA policies, strategies and regulations	21
3.3.1.7 Sub-component 1.7: CSA data collection, information management and dissemination systems	22
3.3.1.8 Sub-component 1.8: Strengthening institutional capacities	22
3.3.2 Component 2: Agricultural productivity and integration of value chain approach	22

3.3.2.1	Sub-component 2.1: Access to and use of adaptive technologies	23
3.3.2.2	Sub-Component 2.2: Increase area under efficient irrigation	24
3.3.2.3	Sub-Component 2.3: Value addition and products development	25
3.3.2.4	Sub-component 2.4: Competitiveness and markets access for climate smart products	25
3.3.2.5	Sub-component 2.5: Food and Feed storage and distribution	26
3.3.3	Component 3: Building resilience and appropriate mitigation actions	27
3.3.3.1	Sub-component 3.1: Soil health and land degradation	27
3.3.3.2	Sub-component 3.2: Water and other natural resources	28
3.3.3.3	Sub-component 3.3: Insurance and other safety nets	28
3.3.3.4	Sub-component 3.4: Synergies in adaptation and mitigation	29
3.3.4	Component 4: Communication systems on CSA extension and agro-weather issues	30
3.3.4.1	Sub-component 4.1: CSA knowledge generation and dissemination	30
3.3.4.2	Sub-component 4.2: Extension on climate information services and agro-weather advisories	31

#### CHAPTER FOUR:

<b>COORDINATION AND IMPLEMENTATION MECHANISM</b>	<b>33</b>	
4.1	Coordination	33
4.1.1	Intergovernmental Forum on Agriculture (IGF)	33
4.1.2	The Joint Agriculture Sector Steering Committee (JASSCOM)	33
4.1.3	Joint Agriculture Sector Technical Working Groups (JAS-TWGs)	33
4.1.4	Climate Change Units (CCUs)	34
4.2	Linkages and Partnerships with other Key Actors	34
4.3	Implementation of KCSAIF	34
4.3.1	Monitoring, Evaluation and Reporting	35
4.3.2	Reporting	35
4.3.3	Quality Assurance	36
4.3.4	Budget	36

<b>REFERENCES</b>	<b>37</b>
-------------------	-----------

<b>ANNEXES</b>	<b>38</b>	
Annex 1:	Kenya CSA Implementation Framework Result-Based Log Frame	39
Annex 2:	Ten year KCSAIF investment plan and budget (2018-2027)	59
Annex 3:	Team of Experts involved in development of the KCSAIF 2018-2027	60
Annex 4:	List participants of the National Consultative Workshop held at the Laico Regency Hotel, Nairobi on 28th May 2015	61
Annex 5:	List of participants of the National Validation Workshop held at Silver Springs Hotel, Nairobi on 30th June, 2015	63
Annex 6:	Team of Experts that finalised KCSAIF	64
Annex 7:	List of participants in County consultations	65



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# EXECUTIVE SUMMARY

The Agriculture Sector is the backbone of Kenya's economy, contributing 25% of National Gross Domestic Product (GDP) directly and another 27% indirectly. Kenya's agriculture is mainly rain-fed (98%) and predominantly small-scale, especially in the medium to high-potential areas which covers less than 15% of the country. The larger proportion of the country (83-89%), is arid and semi-arid with an annual average rainfall of 400 mm. This, coupled with increased land degradation, inadequate access to land and support services, limited credit and markets, inadequate incentives for investment in agriculture, weak producer associations and institutional arrangements, has increased the vulnerability of the farming systems. This has led to erosion of productive assets and weakening their resilience, hence predisposing poor households to food insecurity and high poverty levels.

The agricultural sector productivity is directly influenced by emerging and projected climate change patterns that include increased variability of seasonal rainfall and increased frequency and intensity of extreme weather and climate events such as droughts and floods. These have devastating impacts on the national economy and the livelihoods of the people. Negative economic growth indices have been associated with extreme weather events and unless climate change is not addressed, the economic costs of its impacts are estimated to be 3% of GDP per annum by 2030 and 5% by 2050. Further, climate change impacts are likely to increase the vulnerability of farming systems, thus weakening their coping strategies and resilience.

Innovative measures are therefore needed to help farmers and consumers cope with the changes in emerging and projected climatic patterns. This Kenya Climate Smart Agriculture Implementation Framework 2018-2027 (KCSAIF), hereinafter referred to as "the Framework", has been developed to set guidelines for implementing Climate Smart Agriculture (CSA) approaches, strategies, practices and technologies in Kenya. CSA is an approach that will simultaneously enhance gains in agricultural productivity, build resilience to climatic and weather shocks as well as reduce emissions intensity from agriculture and food systems by adapting to efficient practices. This would require collaborative actions amongst the various actors along the value chain, including: National and County Governments, farmers, the private sector, development partners, Non-Governmental Organizations, Civil Society Organizations and other value chain actors.

The Framework has been developed to guide implementation of CSA at national and county government levels and above all in the context of global obligations and local realities in consideration that Kenya is a signatory to the Kyoto Protocol and the Paris Agreements. It is realigned to the need for Kenya to realize its development goals under Kenya Vision 2030, of which agriculture is a key driver. The Framework aims at leveraging on global opportunities by providing clear structures through which farmers can directly benefit from by tapping the available global climate financing instruments in collaborations with the sector players.

The purpose of the Framework is to "promote climate resilient and low carbon growth sustainable agriculture that ensures food security and contributes to national development goals in line with Kenya Vision 2030". This will be realized through implementation of actions designed around four components, viz:

1. Institutional coordination component that will strengthen national inter-ministerial collaboration, enhance coordination between the national and county governments and provide an enabling policy and institutional environment for the realization of the overall purpose of KCSAIF.

- 
2. Agricultural productivity and integration of value chain approach component that will transform Kenya's agricultural sector into an innovative, commercially oriented, competitive and modern industry by supporting establishment of efficient and effective value chains. This is meant to support a shift in smallholder production strategies from subsistence to satisfying market demand through use of improved technologies and enhanced linkages.
  3. Building resilience and appropriate mitigation actions component which aims at building resilience and associated mitigation co-benefits to address issues related to soil health and land degradation; water and natural resources; insurance and other safety nets; building of synergies in adaptation and mitigation measures.
  4. CSA knowledge, extension and agro-weather services component which will raise awareness and strengthen mainstreaming of communication systems to transmit timely information on CSA extension and agro-weather issues among value chain actors. This component will also support local stakeholders to access and adopt methodologies as well as influence the local planning systems that support CSA.

Two layers of interventions are anticipated in the Framework. The first layer is expected to address climate smart issues in already planned and funded on-going projects/actions in sector ministries/county governments and private sector initiatives that need climate smarting/monitoring/tracking/learning. The second layer will involve development of new and/or additional actions in form of projects/programmes which address gaps and guides investors/development partners and which may require fund raising. The summary of action areas described will be a guide to achieve this.

The proposed investments under the Framework are aligned with MTP III investment priorities. The total budget needed to implement the programme is estimated at KSh. 167.31 Billion. These resources will be mobilized from diverse sources such as the National Government Funding, Bilateral and Multilateral Development Partners, Climate Finance (CF), Adaptation Fund (AF), Green Climate Fund (GCF), and from the Private Sector.

This Framework will be implemented within the Joint Consultation and Cooperation Mechanism for the Agricultural Sector (JCCMAS) which is in line with Intergovernmental Relations Act 2012. This will involve the three layers mechanism of operations, viz; (a) Intergovernmental Forum on Agriculture (IGF) which is the highest level of JCCMAS. The IGF is rooted in Intergovernmental Relations Act, where it empowers the Intergovernmental Relations Secretariat to establish sectoral working groups or committees; (b) The Joint Agriculture Sector Steering Committee (JASSCOM) comprises high-level executives of the two levels of governments.

The committee will provide regular direction for sector transformation initiatives agreed between the two levels of government and prepares follow-up for IGF meetings; and (c) Joint Agriculture Sector-Technical Working Group (JAS-TWG) which aims at providing a uniform platform for intergovernmental technical consultation based on the principle of equitable representation at the two levels of government to enhance the framework effectiveness. The KCSAIF monitoring and evaluation plan will be agreed upon by the different stakeholders to ensure delivery and ownership. It will be based on Logical Framework Approach (LFA) with emphasis on results. Review of progress in the implementation of CSA actions will be organized annually or biennially through forums at national and county government levels. Public participation will be encouraged through inclusion of all stakeholders in these review forums.

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# ABBREVIATIONS AND ACRONYMS

AEZ	Agro Ecological Zone
AF	Adaptation Fund
AgGDP	Agriculture Gross Domestic Product
ASALs	Arid and Semi-Arid Lands
ASDS	Agricultural Sector Development Strategy
ASDSP	Agricultural Sector Development Support Programme
BAU	Business as Usual
CA	Conservation Agriculture
CAADP	Comprehensive African Agriculture Development Programme
CBOs	Community Based Organizations
CCAFS	Climate Change, Agriculture and Food Security
CCUs	Climate Change Units
CGIAR	Consultative Group of International Agricultural Research
CF	Climate Finance
COMESA	Common Market for Eastern and Southern Africa
CS	Cabinet Secretary
CSA	Climate Smart Agriculture
CSOs	Civil Society Organizations
DFID	Department for International Development
EAC	East African Community
ERS	Economic Recovery Strategy for Wealth and Employment Creation
FAO	Food and Agriculture Organization of the United Nations
FBOs	Faith-Based Organizations
GAPs	Good Agricultural Practices
GCF	Green Climate Fund
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GoK	Government of Kenya
HFCs	Hydrofluorocarbons
ICT	Information and Communications Technology
IGF	Intergovernmental Forum on Agriculture
IKI	International Climate Initiative
IPCC	Intergovernmental Panel on Climate Change
IVR	Interactive Voice Response
IWRM	Integrated Water Resources Management
JAS-IGS	Joint Agriculture Sector-Intergovernmental Secretariat
JAS-TWGs	Joint Agriculture Sector-Technical Working Groups
JASSCOM	Joint Agriculture Sector Steering Committee
JCCMAS	Joint Consultation and Cooperation Mechanism for the Agricultural Sector
KCSAIF	Kenya Climate Smart Agriculture Implementation Framework
KCSAS	Kenya Climate Smart Agriculture Strategy
KFS	Kenya Forest Service

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KMD	Kenya Meteorological Department
LFA	Logical Framework Approach
M&E	Monitoring and Evaluation
MOA&I	Ministry of Agriculture, Livestock, Fisheries and Irrigation
MOALF	Ministry of Agriculture, Livestock, Fisheries and Irrigation
MDAs	Ministries, Departments and Agencies
ME&NR	Ministry of Environment and Natural Resources
MRV	Monitoring, Reporting and Verification
MT	Metric Tons
MTIP	Medium Term Investment Plan
MTP	Medium Term Plan
NASEP	National Agricultural Sector Extension Policy
NAEP	National Agricultural Extension Policy
NALEP	National Agricultural and Livestock Extension Program
NAP	National Adaptation Plan
NARS	National Agricultural Research System
NCA	National Carbon Accounting
NCCAP	National Climate Change Action Plan
NCCRS	National Climate Change Response Strategy
NCCSAP	National Climate Change Strategy and Action Plan
NDCs	Nationally Determined Contributions
NEMA	National Environment Management Authority
NEPAD	New Partnership for African Development
NGOs	Non-Governmental Organizations
NIB	National Irrigation Board
NIMES	National Integrated Monitoring and Evaluation Systems
NRM	Natural Resources Management
PFCs	Perfluorocarbons
PPP	Public Private Partnership
SAPs	Structural Adjustment Programs
SDA	State Department for Agriculture
SDF	State Department for Fisheries
SDGs	Sustainable Development Goals
SDL	State Department for Livestock
SEI	Stockholm Environment Institute
SMS	Short Messaging Service
SPS	Sanitary and Phyto-Sanitary Standards
SRA	Strategy for Revitalizing Agriculture
UK	United Kingdom
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
WB	World Bank
WMO	World Meteorological Organization
WY&VG	Women, Youth and Venerable Groups

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# GLOSSARY/DEFINITION OF TERMS

**Adaptation:** Adjustment in agro-ecosystems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.

**Agro-ecosystem:** The organisms and environment of an agricultural area considered as an ecosystem.

**Agricultural emissions:** Agriculture related atmospheric gases responsible for causing global warming and climate change released from converting land into cultivations, fertilizers application and/or livestock production.

**Agricultural productivity:** A measure of the amount of agricultural output produced for a given amount of agricultural inputs e.g. the value of all farm outputs divided by the value of all farm inputs. The process involves increased integration of agriculture with other sectors of the economy.

**Agricultural transformation:** The process by which individual farms shift from subsistence-oriented production towards more advanced production oriented towards the market or other systems of exchange.

**Arid and Semi-Arid Lands:** Areas characterized by inadequate precipitation, which constrains their two major interlinked services of primary production and nutrient cycling.

**Biodiversity:** The total diversity of all organisms and ecosystems at various spatial scales (from genes to entire biomass).

**Capacity building:** In the context of climate smart agriculture, it is the process of developing relevant technical skills and institutional capability to enable effective addressing of the causes and effects of climate change for the agriculture sector.

**Carbon sequestration:** The process of removing carbon from the atmosphere and depositing it in a reservoir such as the soil or trees.

**CSOs:** In this framework CSOs include Non-Governmental Organization, (NGOs), Community Based Organization (CBOs), Faith-based Organizations (FBOs), and other Non-State Actors.

**Climate change:** Climate change refers to a change in the state of the climate that can be identified (e.g. by using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcing, or to persistent anthropogenic changes in the composition of the atmosphere or in land use.

**Climate resilient:** Represents efforts undertaken to integrate the challenges posed by climate change and its impacts on agricultural systems.

**Climate Smart Agriculture:** Agriculture that sustainably increases productivity, resilience (adaptation), reduces/removes greenhouse gases (mitigation), and enhances the achievement of national food security and development goals.

**Co-benefits:** Multiple benefits in different fields resulting from one policy, strategy, or action plan.

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**Conservation Agriculture (CA):** An approach to manage agro-ecosystems for improved and sustained productivity, increased profits and food security while preserving and enhancing the resource base and the environment. It is characterized by three linked principles namely, continuous minimum mechanical soil disturbance; permanent organic soil cover; and diversification of crop species grown in sequences and/or associations.

**Degradation:** Refers to any change or disturbance in the environment, land or soil that is perceived to be deleterious or undesirable.

**Deforestation:** The conversion of forest to another land use or the long-term reduction of tree canopy cover below the 10% threshold.

**Drought:** The phenomenon that exists when precipitation is significantly below normal recorded levels, causing serious hydrological imbalances that often adversely affect land resources and production systems.

**Ecosystem services:** Ecological processes or functions that have monetary or non-monetary value to individuals or society at large e.g. Productivity or biodiversity maintenance; provisioning services such as food, fibre, or fish; regulating services such as climate regulation or carbon sequestration; and cultural services such as tourism or spiritual and aesthetic values.

**Ecosystem:** The interactive system formed from all living organisms and their abiotic (physical and chemical) environment within a given area.

**Enteric fermentation:** Enteric fermentation is a natural part of the digestive process for many ruminant animals where anaerobic microbes called methanogens, decompose and ferment food present in the digestive tract producing compounds that are then absorbed by the host animal. A resulting by-product of this process is methane.

**Erosion:** The process of removal and transport of soil and rock by weathering, mass wasting, and the action of streams, glaciers, waves, winds and underground water.

**Food and nutrition security:** This exists when all people, at all times have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.

**Greenhouse gases:** The atmospheric gases responsible for causing global warming and climate change. The major GHGs are carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O). Less prevalent but very powerful greenhouse gases are hydro-fluorocarbons (HFCs), perfluorocarbons (PFCs) and Sulphur hexafluoride (SF<sub>6</sub>).

**Index-based insurance:** An insurance product in which the insured in a specified geographical region, receive indemnity payments based on independently observable outcomes/parameters such as temperature, rainfall, vegetation quantity, crop yields among others which are used to determine premiums and payouts.

**Intergovernmental Panel on Climate Change (IPCC):** Established in 1988 by the World Meteorological Organization (WMO) and the UN Environment Programme (UNEP), the IPCC surveys world-wide scientific and technical literature and publishes assessment reports that are widely recognized as the most credible existing sources of information on climate change. The IPCC also works on methodologies and responds to specific requests from the United Nations Framework Convention on Climate Change (UNFCCC) subsidiary bodies.

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**Mitigation:** In the context of climate change, human intervention to reduce the sources or enhance the sinks of greenhouse gases e.g. using fossil fuels more efficiently or electricity generation, switching to solar energy or wind power from fossil fuels for industrial processes and expanding forests and other “sinks” to remove greater amounts of carbon dioxide from the atmosphere.

**Nationally Appropriate Mitigation Actions:** A set of government prioritized actions aimed at reducing or limiting greenhouse gas emissions.

**Payment for Ecosystem Services:** An economic instrument designed to provide positive incentives to users of agricultural land and those involved in coastal or marine management. These incentives are expected to result in continued or improved provision of ecosystem services, which in turn, will benefit society as a whole.

**Public Private Partnerships:** Public Private Partnerships (PPP) are associations between government and the private sector through which private financing is utilized to perform a public function, at a profit to the private sector.

**Resilience:** The ability of a system and its component parts to anticipate, absorb, accommodate, or recover from the effects of a hazardous event in a timely and efficient manner.

**Vulnerability:** The degree to which a system is susceptible to or unable to cope with adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity.

**Watershed:** A topographically delineated area that is drained by a stream system, i.e. the total land area that drains to some point on a stream or river. The watershed is a hydrologic unit that has been described and used as a physical-biological unit and a socio-economic-political unit for planning and managing of natural resources.



# CHAPTER ONE:



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## INTRODUCTION

### 1.1 Background Information

The agriculture sector, comprising of crops, livestock, fisheries, agro-forestry and associated services plays a major role in Kenya's economy. The sector is the largest contributor to Kenya's Gross Domestic Product (GDP), directly contributing about 25% and another 27% indirectly via linkages to agro-based industries and the service sector, giving an overall 52% contribution to GDP (UNEP, 2015).

The crops, livestock and fisheries sub-sectors contribute 77.6%, 19.6% and 2.0% of the Agricultural GDP (AgGDP) respectively, and forestry contributing about 0.8%. The agriculture sector is mainly dominated by small-holder farmers with most production being carried out on farms averaging 0.2–3 ha. This small-scale production accounts for over 75% of the total agricultural output and over 70% of marketed agricultural produce.

The agricultural sector contributes significantly to Kenya's food security, income generation, employment creation and poverty reduction. The sector contributes 60% of the country's income, accounts for over 65% of total exports, provides 60% of total employment, 18% of which is formal (UNEP, 2015).

The agriculture sector is one of the priorities in the economic pillar of Kenya Vision 2030 (GoK, 2007), which aims at achieving an innovative, commercially oriented, modern agricultural sector through institutional reforms, increased productivity, land use transformation, increased access to markets and development of arid and semi-arid lands (ASALs). To respond to the impacts of climate change in agriculture, the sector developed the Kenya Climate Smart Agriculture Strategy (KCSAS) 2017-2026 (GoK, 2017a). The strategy sets out a detailed plan on how to “adapt to climate change, build resilience of agricultural systems while minimizing emissions for enhanced food and nutritional security and improved livelihoods”. This Framework therefore, outlines the envisaged actions towards the implementation of the KCSAS 2017-2026.

#### 1.1.1 Alignment with Relevant National Policies

The Kenya Climate Smart Agriculture Implementation Framework (KCSAIF) is aligned to the Constitution of Kenya 2010 (GoK, 2010a), Kenya Vision 2030 (GoK, 2007), Agricultural Sector Development Strategy 2010-2020 (GoK, 2010b), Climate Change Policy Framework 2015, National Climate Change Response Strategy (NCCRS) (GoK, 2010c), National Climate Change Action Plan 2013-2017 (NCCAP) (GoK, 2013a), Kenya National Adaptation Plan 2015-2030 (GoK, 2016a) and the Kenya Climate Smart Agriculture Strategy 2017-2026 (GoK, 2017a).

The KCSAIF has been prepared to contribute to Kenya's efforts to adapt and build resilience in agriculture and meet the commitments given under the Nationally Determined Contribution (NDC) submitted to the United Nations Framework Convention on Climate Change (UNFCCC).

### 1.2 Methodology

The preparation of KCSAIF was through concerted efforts by the Government of Kenya to mainstream climate change considerations into policies, strategies, programmes and plans. It was developed through a consultative approach of a multi-stakeholder engagement led by the Ministry of Agriculture, Livestock, Fisheries and Irrigation and the Ministry of Environment and Forestry.

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The experts were drawn from relevant Ministries, Departments and Agencies, County Governments, Civil Society Organizations (CSOs), Community Based Organizations (CBOs), Private Sector, Researchers and Academia.

The process involved technical working sessions that were informed by review of the sector's programmes, strategies and plans as well as analysis of options for agricultural sector growth in a changing climate.

A national consultative workshops and a validation workshop were conducted with a wide range of stakeholders engaged including public and private sector, local and international NGOs, academia, farmer organizations, development partners, National and County government representatives among others.

Further consultative sessions were held in six regional circuits with relevant County government's representatives to ensure bottom up approach in development of priority actions for implementation in the framework.



## CHAPTER TWO:



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## SITUATIONAL ANALYSIS

### 2.1 Background

The agricultural sector in Kenya is highly vulnerable to extreme weather events, climatic shocks, climatic changes and variability. Climate change is creating further stresses on food and water supply while further degrading the environment. It is estimated that between 2008 and 2011, drought which is a major climatic hazard in Kenya became more and more frequent and has caused losses of KSh. 699.3 billion (72.2% of total losses) in the livestock sector while the agKSh. 121.1 billion (12.5% of total losses). With the deteriorating climatic conditions primarily due to climate change, the annual growth rate of agricultural “value added” products has been on the decline (GoK, 2015). Extended periods of drought have negatively impacted on livelihood opportunities and community resilience in these areas leading to undesirable coping strategies that damage the environment and impair household nutritional status, further undermining long-term food security

According to the Fifth Intergovernmental Panel on Climate Change (IPCC) Assessment Report of September 2013, the Earth’s temperature has increased by about 0.89°C in the period 1901 to 2012. The Farm Management Handbook of Kenya (Jaetzold et al., 2009) and the Atlas of Kenya’s Changing Environment (UNEP, 2009) indicates that Kenya’s average annual temperatures increased by 1°C between 1960 and 2003. In western Kenya, temperatures rose by 0.5°C between 1981 and 2004 while in the drier parts of the country the temperatures went up by 1.5°C over the same period. These changes have led to a shift of the upper altitudinal limits of Agro-Ecological Zone (AEZ) boundaries. Also, incremental changes in temperature and rainfall patterns are expected to contribute to biodiversity loss and emergence of new pests and diseases.

Changes in the distribution, onset and cessation of rainfall seasons makes it increasingly difficult to plan agricultural operations resulting in lower crop yields in major production zones thus aggravating the food and nutrition insecurity. Frequent water shortages leads to decrease in the reliable cropping days, higher incidence of crop failure, and livestock and fish deaths.

According to the Kenya Second National Communications, the agriculture sector is the largest contributor of greenhouse gas (GHG) emissions (NEMA, 2015). The largest share of emissions (CH<sub>4</sub>) originates from enteric fermentation associated with ruminant livestock, agricultural soils (N<sub>2</sub>O) and manure management. Emissions from agriculture are expected to rise due to increased food demand for the growing population leading to increased encroachment of forests through agricultural expansion. However, policy direction indicates that the focus of emissions management will not be on absolute emissions but on production efficiency, leading to increased output per unit of emission. This can make the agriculture sector be part of the solution to emission reduction if appropriate measures are taken.

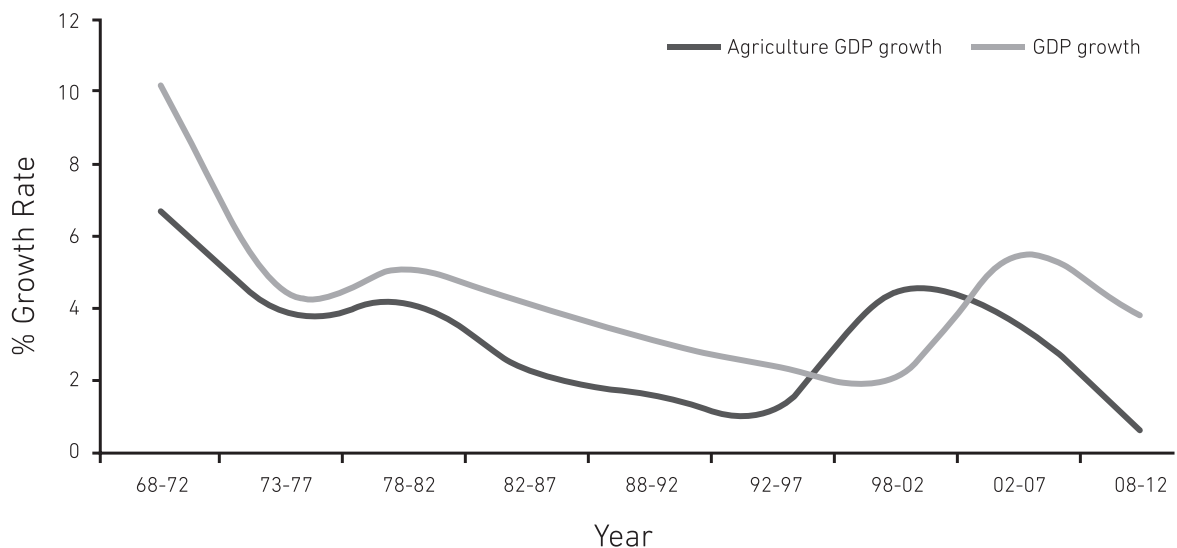
Kenya is classified as a water-scarce country whose natural endowment of freshwater is limited by an annual renewable freshwater supply of only 647 m<sup>3</sup> per capita falling below the World Bank categorization of 1000 m<sup>3</sup> per capita for a water scarce country (WB, 2000). With the increase in the frequency of extreme weather events, water scarcity will increase and the country will need to invest more on water resources management and conservation. Therefore, the country needs to be innovative with water conservation and harvesting technologies that assure safe water access to the Kenyan population for industrial, agricultural and domestic use.

## 2.2 Agricultural Production

Kenya's agriculture system has evolved through socio-political dynamics and reforms some of which have had negative impacts. The introduction of Structural Adjustment Programs (SAPs) in the 1980s which liberalized the input and output markets is one such example. The SAPs opened the markets to forces of demand and supply and therefore affecting prices of most agriculture commodities and quality of agricultural inputs and services.

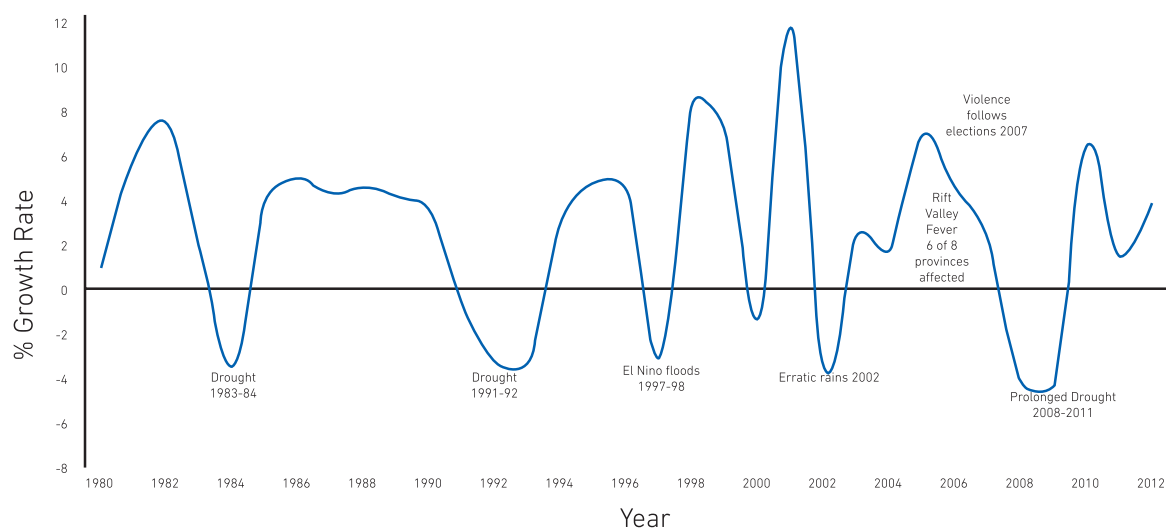
In 2003, the Government of Kenya developed the Economic Recovery Strategy for Wealth and Employment Creation 2003-2007 (ERS) (GoK, 2003) which was successfully implemented. In 2004 the Strategy for Revitalizing Agriculture 2004-2014 (SRA) (GoK, 2004), was developed and implemented as the sector vision to respond to the decline witnessed in the agriculture sector. During the implementation of the ERS, the overall economy recovered from a low growth of 0.5 % in 2002 to 7 % in 2007. Over the same period, the agriculture sector grew at an average rate of 3.9 % with a high growth rate of 7 % in 2005.

During the first Medium Term Plan (MTP) 2008-2012 (GoK 2008), the sector recorded an average annual growth rate of 4.3 % against a target of 7 %. This was mainly due to adverse weather conditions in some years and increased costs of major inputs such as seeds, fertilizer and fuel. The value of agricultural output increased by KSh. 70,550 million per annum between 2008 and 2011 against a target of KSh. 80,000 million per year as set out in Kenya Vision 2030 and ASDS. The growth of the national economy is highly correlated to growth and development in agriculture, indicating the sector's importance for the stimulation of overall economic growth (Figure 1).



**Figure 1: Agricultural GDP growth rate vs national GDP growth rate 1968-2012**  
Source: D'Alessandro (2015)

Figure 2 shows that overtime, negative growth indices have been associated with extreme weather events, whose increasing frequency and magnitude have resulted to decline in agricultural "value-added" products (GoK, 2015). According to the Stockholm Environment Institute (SEI), if climate change in Kenya is not addressed effectively, the economic costs of its impacts are estimated to be 3% of GDP per year by 2030 and possibly 5% by 2050 (SEI, 2009).



**Figure 2: Agricultural growth index and major extreme events in Kenya 1980-2012**  
Source: GoK (2015)

### 2.2.1 Crop production

The three main categories of crops in Kenya include food, industrial and horticultural crops. Food crops include; cereals (maize, wheat, sorghum, rice, millet,); pulses (beans, pigeon peas, cowpeas, chickpea, green grams); and roots and tubers (sweet potato, Irish potato, cassava, arrow root and yam) (GoK, 2010b). The major industrial crops are tea, coffee, pyrethrum, cotton and sugarcane among others. The horticultural crops includes cut flowers, vegetables (tomatoes, cabbage, kales, carrots), fruits (bananas, mangoes, nuts, herbs and spices).

The relative importance of these different agricultural enterprises varies and their spatial and temporal distribution is also varied. Historical data from 1963 to 2012 (GoK, 2016b) shows that average maize and beans acreage has been increasing but yields have stabilized between 1.5 and 2 tons/ha since 1980's. As regards the major industrial crops (tea, coffee, and sugar), the production level has been fairly stable as a result of increased area, but the yields per hectare have been on the decline. This has largely been attributed to changes in climate.

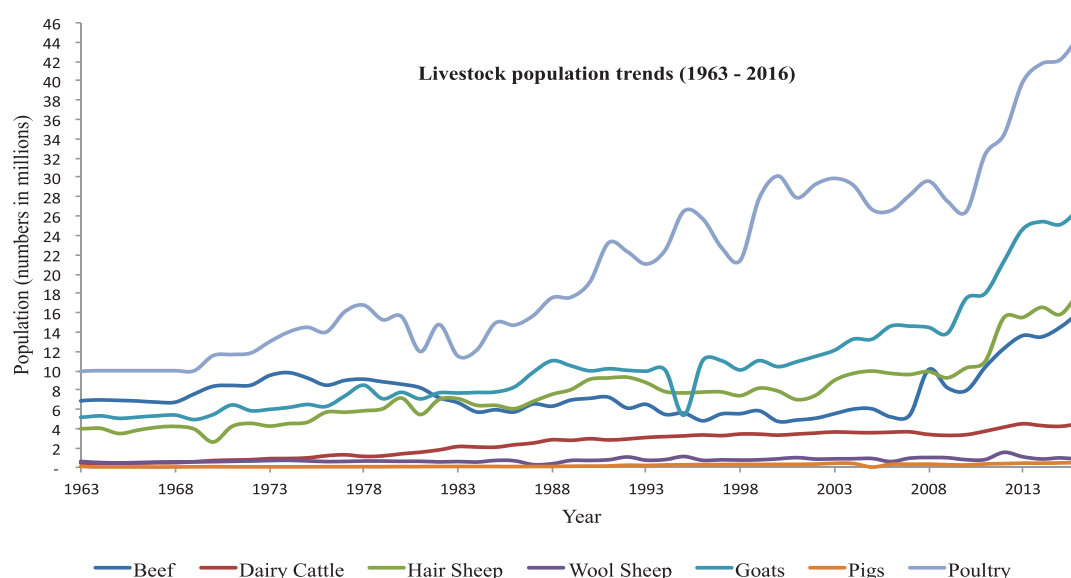
The area under horticultural crops and the value of total production has been on an upward trend with value of horticultural exports growing by an average of 16% rising from KSh. 26.6 Billion in 2002 to KSh. 43.3 Billion in 2006 and to KSh. 65.2 Billion in 2007 (GoK, 2010b). However, the yields of most vegetables have been stagnant, except the indigenous vegetables. Only 10% of Kenya's fresh agricultural produce finds its way into regional and other global markets with most of it being consumed locally. However due to the perishable nature of these products, producers and marketers incur post-harvest losses ranging between 30-75%. This is basically due to poor transport networks, low value addition, insufficient storage and preservation facilities among other factors.

### 2.2.2 Livestock production

The livestock sub-sector employs about 50% of the agricultural labour force and is the main agricultural enterprise for over 10 million Kenyans living in the arid and semi-arid lands (ASALs). The ASALs which are dominantly inhabited by pastoralists, hosts about 70% of the national livestock herd with an estimated value of KSh. 70 Billion accounting approximately 40% of the Agricultural GDP. According to the 2009

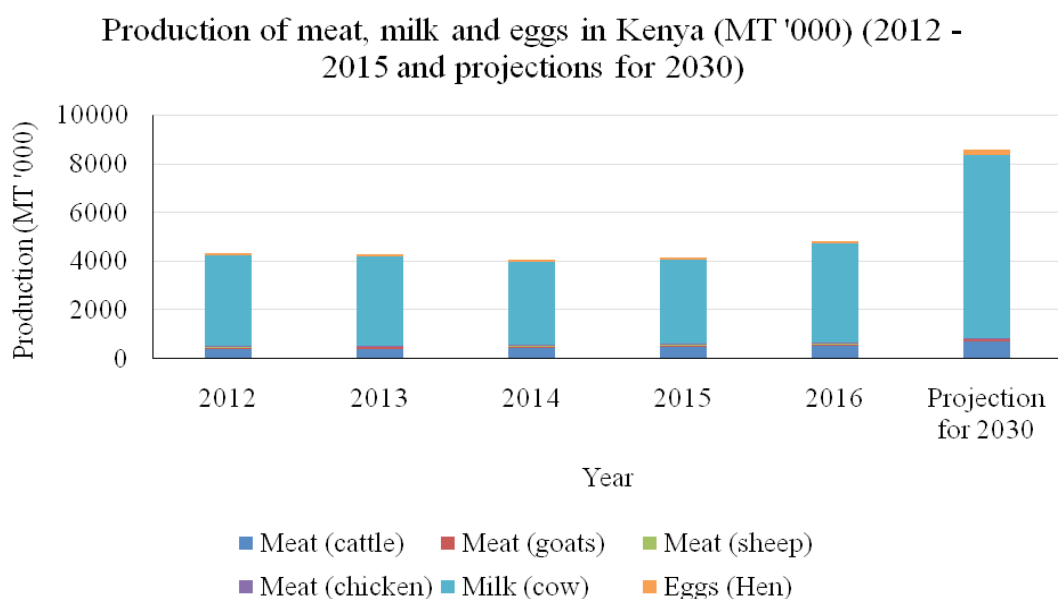
census, the country's livestock population was 17.5 million cattle, 27.7 million goats, 17 million sheep, 3 million camels, 31.8 million poultry, and 1.8 million donkeys while in 2016 the cattle were 20.5 million, goats 26.6 million, sheep 18.9 million, camels 3.2 million, poultry 36.6 million and donkeys 2 million (GoK, 2001).

The livestock population growth in the country is driven by the rapidly increasing demand for livestock products due to increased population growth, urbanization and increasing incomes. The overall livestock population trends (largely based on estimates) across all species has been on the increase between 1963 and 2016 (Figure 3). The evident fluctuations in livestock population is closely related to severe drought events meaning that performance of the livestock sub-sector is highly affected and sensitive to rainfall.



**Figure 3: Livestock population trends from 1963 to 2016**  
Source: Livestock Sector Report (2016)

Due to climate change effect on livestock, emerging livestock such as donkeys, crocodiles, ostrich, quails and guinea fowls are being promoted to bridge animal product deficit which can effectively contribute towards meeting animal protein requirements besides the common livestock value chains. Other significant resilient livestock enterprises are beekeeping and camel production. It is projected that production of livestock products is bound to increase with increasing human population, urbanization and incomes (Figure 4).

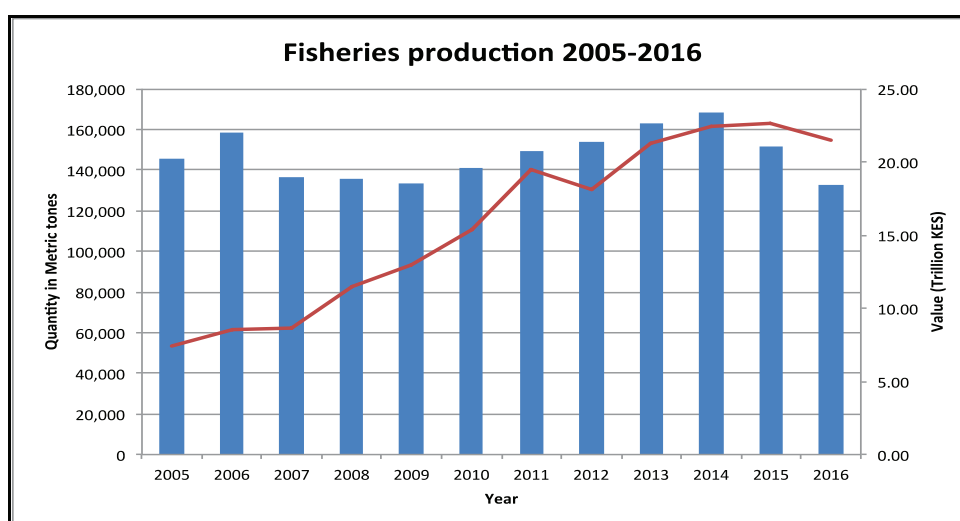


**Figure 4: Production of livestock meat, milk and eggs in Kenya**  
Source: Livestock Sector Report (2016)

The magnitude of livestock production systems in Kenya, ranging from extensive (nomadic) pastoralism, agro-pastoralism (semi-nomadic), mixed crop/livestock farming systems are often changing due to climate change and weather variability.

### 2.2.3 Fisheries and aquaculture production

The fisheries sub-sector plays an important role in the national economy especially in contributing to food and nutrition security, poverty reduction and employment creation. The sub-sector which contributes about 0.5 % of the country's National GDP is categorized into capture and farmed (aquaculture) fisheries. The capture fisheries is mainly composed of freshwater (lakes, rivers and dams) and marine (Ocean). The fresh water species of most economic significance includes the Nile perch and tilapia, the marine water species includes the tuna, billfish, shrimp and saline/marine water-crabs, milk fish, oysters, sea weeds among other species.



**Figure 5: National fish production between 2005 and 2016**  
Source: GoK (2016c)



The farmed fisheries resources include the trout fish in cold water high altitude areas and tilapia, catfish, common carp for warmer water low altitude areas. Figure 5 shows the quantities and monetary value of fish produced in Kenya between 2005 and 2016.

Over the years, climate change has resulted in negative impacts on fish production due to warming of waters bodies, degradation of suitable breeding sites and receding of water levels of major freshwater bodies. The reduced water availability resulting from frequent droughts also limits aquaculture development.

#### 2.2.4 Forests and agroforestry

Statistics shows that forests contributed about 1.4% to Kenya’s GDP in 2014 without including the forestry’s contribution to household wood energy, non-timber products and ecosystem services. However, the forests are threatened by agricultural expansion and unsustainable use of forest resources which have led to increased pressure on forest resources. An analysis of change in forest cover over between 1990 and 2015 revealed an increase in afforestation and agroforestry activities (KFS, 2013). The data shows that land under forest has decreased by 311,000 ha equivalent to 25% loss of forest cover. However, there was a slight increase in forest cover from 6.01% in 2000 to 7.46% in 2015. This is equivalent to an average annual increase of 0.1% (Table 1).

**Table 1: Analysis of forest cover change between 1990 and 2015**

Year	Forest area (*000 ha)	Percent forest cover	Annual change (*000 ha)	Annual change (%)
1990	4,724	7.98		
2000	3,557	6.01	-1,167	-24.7
2005	4,047	6.84	490	13.8
2010	4,136	6.99	89,4	2.2
<b>2015 (projected)</b>	<b>4,413</b>	<b>7.46</b>	<b>276</b>	<b>66.7</b>

**Source: KFS (2013)**

Deforestation and forest degradation is particularly prominent in arid and semi-arid areas where the increasing agricultural activities are claiming virgin forested landscapes. A major challenge in the country is how to harmonize national development and agricultural policies that seek to promote agricultural development while avoiding or mitigating against deforestation and forest degradation and associated greenhouse gas emissions.

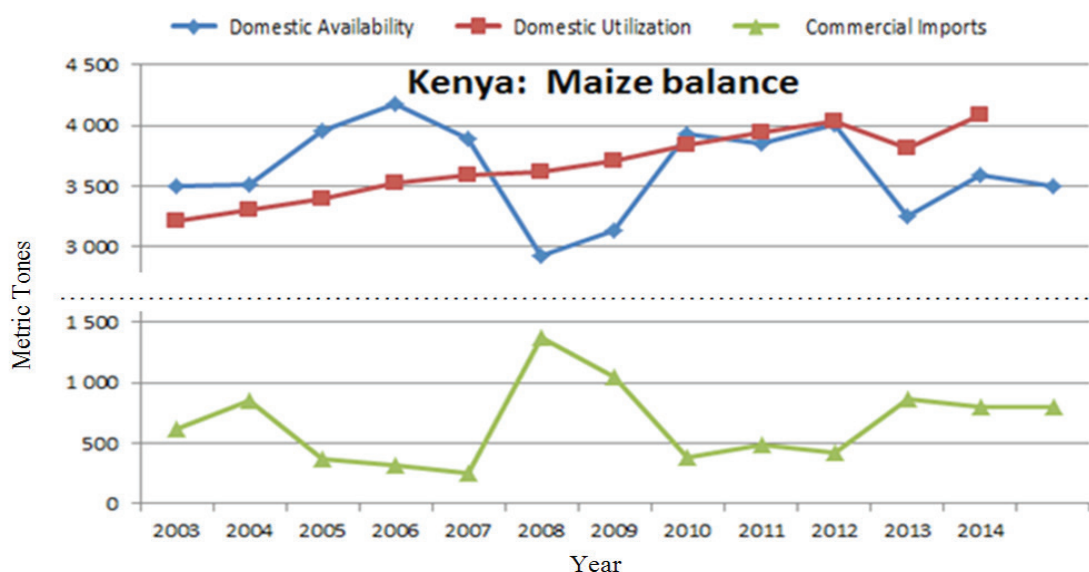
Agricultural intensification, farm forestry and agroforestry have been identified as viable and attractive options to reconcile agricultural development and forest protection. The basic principle is that increased yields per area, increased farm holding products and incomes, access to forest products within the farm holding and on-farm carbon sequestration will reduce the need for more land encroachment into forested areas. Farm forestry is also associated with additional benefits including easy access to forest products, restoration of degraded landscapes, carbon sequestration and strengthening community resilience to climate change. The development of Farm Forestry Rules (GoK, 2009) and the Kenya Climate Smart Agriculture Strategy 2017-26 (GoK, 2017a) provide the appropriate entry points for incentivizing tree-based interventions in agricultural landscapes.

#### 2.2.5 Food consumption and nutrition

Food security exists when people at all times have physical and economic access, sufficient, safe and nutritious food to meet their dietary needs and preferences. In Kenya, crops, livestock and fisheries constitute the people’s basket of food security assets. Most Kenyans live on diets based on staple crops

(mainly maize) that lack in nutrition diversity. Lack of access and availability of adequate and diversified diets results into various forms of nutrition related challenges. In view of this, efforts need to be enhanced to promote foods rich in micronutrients and includes fruits, vegetables, and livestock and fish products.

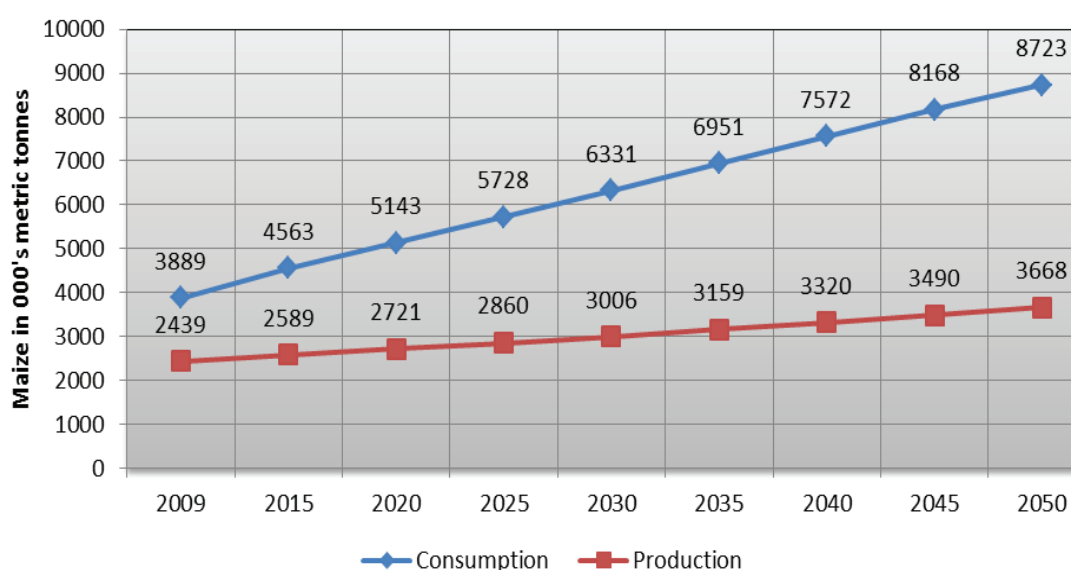
Maize has been the major staple crop for majority of Kenyans. However, its production has been fluctuating over the years, which threatens household food security and income sources (GoK, 2015). The demand of maize in the country has been on the increase exceeding the domestic production. The shortfall in national production is met by maize imports (Figure 6).



**Figure 6: Kenya maize balance sheet between 2008 and 2014**

Source: GoK (2015)

It is projected that the gap between maize production and consumption in Kenya will widen as we approach year 2050 (Figure 7).



**Figure 7: Projected maize production and consumption in Kenya by year 2050**

Source: GoK (2015)

Crops such as wheat, rice, beans, millet, cowpeas, green grams, pigeon peas, sweet potatoes, cassava, cocoyam and yams are also mainly produced for domestic consumption. However, climate change impacts are likely to lead to food deficit and increased food prices. This will reduce affordability of nearly all agricultural commodities, including basic staples and livestock products. Besides, the country's per capita fish consumption increased from 3.2 Kg/person/ year in 2013 to 4.5 Kg/person/year in 2016 (GoK, 2016b).

## 2.3 Policy Environment

Policy reforms are cited as one of the drivers of productivity gains experienced in the agricultural sector. The Government of Kenya has over the years developed policies and strategies to enhance agricultural growth, natural resource management and climate change interventions. These policy reforms substantially improve the economic environment for agriculture through improvements in pricing, trade, exchange rates, institutions and markets. Table 2 summarizes the key policy documents that the government has developed/ratified which are relevant to CSA implementation.

**Table 2: Main policies relevant to CSA implementation in Kenya**

Name of Policy/Legal document	Key thematic areas relevant to CSA implementation
Constitution of Kenya 2010	The constitution provides for the right to food security, clean and healthy environment, while emphasizing sustainable and productive management of land resources (e.g. maintenance of 10% tree cover of the country's land cover).
Kenya Vision 2030	The country's development blueprint for 2008-2030 identifies agriculture as a key sector to boost economic growth. It aims to transform smallholder agriculture from low-productivity subsistence activities to an innovative, competitive agricultural sector. The vision is operationalized in a series of five-year Medium-Term Plans (MTPs), where MTP-III (2018-2022) outlines climate smart agriculture interventions.
<b>Agriculture, Livestock and Fisheries</b>	
Agricultural Sector Development Strategy 2010-2020	Provides a framework for transforming agriculture into an innovative, commercially and modern viable sector. Kenya's CAADP commits the government to implementing the common vision of the sector, as described in the Agricultural Sector Development Strategy (ASDS) to address the agricultural development agenda in the country.
Kenya Climate Smart Agriculture Strategy 2017-2026	Recognizes climate change as an emerging issue for food and nutrition security and advocates for adaptation interventions that enhance farming communities' resilience to climate change induced effects. It also recognizes the role of mitigation in addressing climate change.
<b>Environment and Climate Change</b>	
National Climate Change Response Strategy (2010)	The strategy highlights agricultural interventions such as restoration of degraded ecosystems, provision of downscaled weather information, water harvesting for irrigation, protection of natural resource base (soil and water conservation techniques), agricultural waste management, agroforestry, research and dissemination of improved (drought tolerant, salt-tolerant, pest and disease resistant) crops, livestock and fisheries.

Name of Policy/Legal document	Key thematic areas relevant to CSA implementation
National Climate Change Action Plan 2013-2017	The NCCAP identifies climate smart practices that reduce climate vulnerability while reducing emissions and improving agricultural production potential. The practices include; agro-forestry and conservation tillage and management of agricultural wastes, improved management of grazing systems, biogas, livestock diversification, improved breeding of animals, drought tolerant crops, water harvesting, integrated soil fertility management, insurance schemes, price stabilization schemes for livestock, strategic food reserves, and mainstreaming climate change into agricultural extension services.
National Climate Change Framework Policy (2017)	The policy includes statements that enhance climate resilience and adaptive capacity, promote low-carbon growth, and mainstream climate change into planning processes. It notes the potential for the agriculture sector to reduce GHG emissions, enhance resilience and recommends investment to create green jobs.
Climate Change Act (2016)	The Act outlines climate resilience and adaptive capacity to promote low carbon growth, and to mainstream climate change into planning processes while developing incentives to promote climate resilient actions.
National Adaptation Plan (NAP)	The Plan summaries short, medium and long-term actions that enhance resilience in the agriculture, livestock and fisheries value chains.
Nationally Determined Contributions (NDCs)	The NDCs provide a framework in which the Kenya Government commits to reduce GHG emissions by 30% by 2030, compared to business as usual scenario (BAU), in addition to building resilience. The agriculture sector will enhance the resilience and contribute to reduction of GHG emissions by promoting climate smart agriculture.
Sessional Paper No. 3 of 2009 on National Land Policy	The policy encourages efficient and sustainable utilization and management of land and land-based resources for provision of food security.
National Agricultural Research System (NARS) Policy (2012)	The policy points out that concerted efforts must be made to address the country's vulnerability to climate change and other external shocks. It recommends putting in place Virtual Research Platforms to handle emerging and cross-cutting issues that include natural resource and livelihood systems, bioethics, ecosystems resilience, integrated natural resources management and climate change among others. It also mentions that redefined research agenda should give priority to climate change mitigation and adaptation and continue to cover sustainable use and conservation of natural resources (land, forest, flora and fauna) among other priorities.
Livestock Policy 2008/ Sessional Paper No.2	The policy proposes to set up measures to institutionalize and address drought related challenges through adoption of the necessary mitigation interventions. Further, it proposes to create a favorable environment and mechanisms to strengthen capacity of the existing early warning systems and ensure that the operations of such systems are well coordinated to cover all disaster vulnerable areas adequately.

## 2.4 Agricultural Growth and Development

### 2.4.1. Land degradation and declining soil health

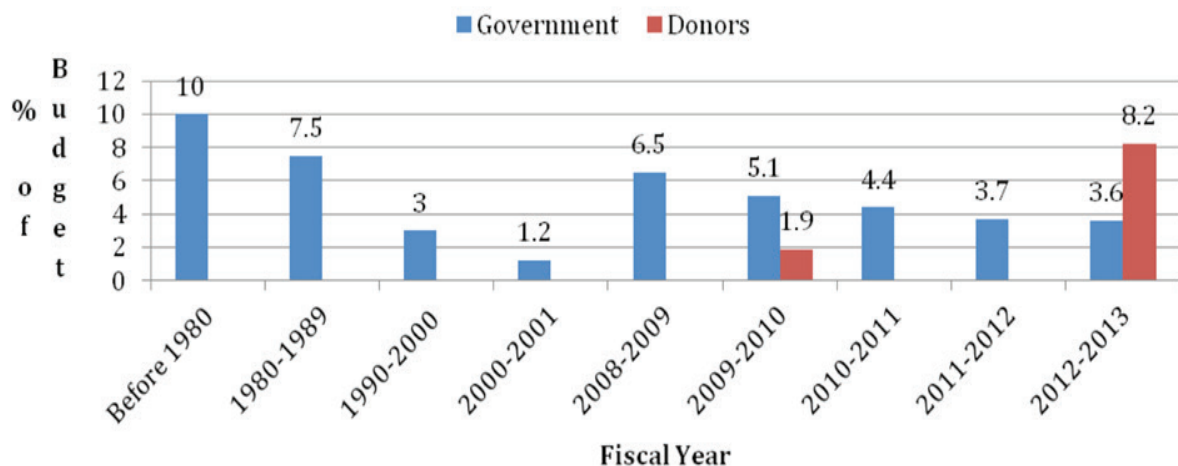
In many parts of the country, demand on land for agricultural development and pressures from a rapidly growing population have led to unprecedented land use changes.

As a result, unsustainable land use is causing land degradation resulting into loss of land productivity. Land degradation (both chemical and physical) manifests itself in many forms such as soil erosion, loss of soil fertility, salinity, reduced vegetation cover, reduced biodiversity and ecosystem services and reduced livestock carrying capacity. The impacts of land degradation are closely linked to poverty and food insecurity.

### 2.4.2. Agricultural finance and investments

Agriculture offers the best prospect for economic growth and development in Kenya given its contribution to the GDP, government revenue and benefits to both urban and rural households. However, available statistics show that attention to the agricultural sector is inadequate in terms of both government budgetary allocation and resource utilization. On average, Kenya spent over 10% of its total government budget on agriculture in the first decade after independence. This declined to an average of 7.5% in the period between 1980 and 1989 and thereafter dropped to 3% in the 1990 to 2000 period, and to 1.2% in 2000/1 then increased to 6.5% in 2008/9.

Budget allocation declined from 5.1% in 2009/10 to 3.6% in 2012/13 (IEA, 2014). Therefore, the budget allocation to agriculture sector falls short of meeting the Maputo Declaration of budget allocation of 10% to the agricultural sector. Overtime time, the development partner's contribution to the domestic expenditure has increased from 1.9% in 2009/10 to 8.2% in 2012/13 to fill the gaps created by budget deficits (Figure 8).



**Figure 8: Proportion of national government and donor contributions to the agriculture sector budget**

Source: IEA (2014)

The private sectors including financial institutions have been supporting investments related to agriculture overtime. However, the agricultural sector is perceived to be high risk hence, there has been low investments by formal financial institutions.

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The total agricultural sector budget allocation decreased from KSh. 56.46 Billion in the financial year (FY) 2014/15 to KSh. 40.57 Billion in FY 2015/16 and increased to KSh. 49.96 Billion in FY 2016/17. The decrease in FY 2016/17 was due to transfer of the Irrigation and Drainage Infrastructure Programme to the Ministry of Water and Irrigation. In terms of actual expenditure, it decreased from KSh. 46.92 Billion in FY 2014/15 to KSh. 36.32 Billion FY 2015/16 then increased to KSh. 41.09 Billion in 2016/17. The overall sector absorption rate was 83% in the FY 2014/15 compared to 90% in the FY 2015/16 and 82% in the FY 2016/17.

The Second Medium Term Investment Plan (MTIP) 2013-2017 (GoK, 2013b) outlines the government's investment strategy for improving the situation through the ASDS 2010-2020 which is aligned to CAADP (GoK, 2010b). In implementing MTIP, the government seeks to prioritize investments across the country's major agro-ecological zones.

### **2.4.3 Extension and agro-weather advisory services**

#### **2.4.3.1 Extension services**

The extension service is one of the critical change agents required in transforming subsistence farming to modern and commercial agriculture in order to promote household food security, improve income and reduce poverty levels. The agricultural extension in Kenya dates back to the early 1900's when the government through the Ministry of Agriculture, Livestock, Fisheries and Irrigation provided the bulk of extension services to both small-scale and large-scale farmers. The most notable success was in the dissemination of hybrid maize technology in the late 1960's and early 1970's.

However, after the implementation of structural adjustment programs (SAPs) in the 1980's, the government support to extension services decreased. To respond to these challenges, the government formulated the National Agricultural Extension Policy (NAEP) in 2001 and subsequently the National Agricultural Sector Extension Policy (NASEP) in 2012 to guide improvements in delivery of extension services. The policies have been implemented through programmes such as the National Agricultural and Livestock Extension Program 2000-2005 (NALEP) and the Agricultural Sector Development Support Programme (ASDSP). NALEP recognized the need to diversify, decentralize and strengthen the provision of extension services to increase their sustainability and relevance to farmers. The overall aim of ASDSP is to support the implementation of the ASDS 2010-20 with a goal of transforming Kenya's agricultural sector into an innovative, commercially oriented, competitive and modern industry that will contribute to poverty reduction, improved food security and equity in rural and urban Kenya.

Through the Constitution of Kenya 2010, the extension services were devolved to the county governments while provision of policy framework, capacity building and standards development remained the mandate of the national government. Farmers in Kenya need a wide range of advisory services to adapt to climate change and take advantage of viable options with manageable levels of risk. The extension services require improvement through public private partnerships for climate smart agriculture practices and technologies. There is therefore need for policy review and development of extension services delivery standards. Thus devolved extension services need to be strengthened, harmonized, standardized, prioritized and streamlined to meet its objectives in service delivery to the farmers.

#### **2.4.3.2 Agro-weather advisory services**

The Kenya Meteorological Department (KMD) provides downscaled weather forecasts which it uses together with other relevant organizations and institutions to develop agro-weather related advisories. These advisories are meant to increase the adaptive capacity of agriculture value chain actors by improving access to information on weather and climate patterns. The expected outcomes include improved farm management capabilities under conditions of climate risks where farmers will plan and manage weather

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risks, maximize productivity and minimize the environmental impacts of farming practices. Some of the tools used are Short Messaging Service (SMS), Interactive Voice Response (IVR), seasonal print bulletins and radio programmes. However, the service encounters challenges related to infrastructure, technology, inadequate dissemination and limited integration of climate information in agricultural research and development.

## 2.5 Context of Climate Smart Agriculture

Climate Smart Agriculture (CSA) offers an excellent opportunity for agricultural growth. It however, requires collaborative actions among the various actors including: National and County Governments, farmers, private sector, civil society organizations (CSOs) and other value chain actors.

The context in which CSA is to be applied in Kenya requires an integrated approach that aims to transform and re-orientate agricultural systems to sustainably; (i) increase productivity; (ii) adapt and build resilience to the likely effects of climate change, and, (iii) reduce and/or remove GHG emissions without compromising productivity.

The CSA objectives are meant to enhance the achievements of national food security and development goals through:

- a) Scaling up/out of proven technologies and practices for resilient livelihoods related to efficient soil and nutrients management, water and on-farm energy resources.
- b) Conservation and sustainable use of agro-genetic resources.
- c) Sustainable intensification of crop, forage, agroforestry, livestock and fisheries production.
- d) Adaptation and mitigation practices in crops, livestock, agroforestry and fisheries production systems.
- e) Efficient management of agricultural commodity value chains.
- f) Identifying opportunities to leverage climate finance for CSA, including social protection and safety nets where economic models are not viable.
- g) Knowledge sharing and effective learning, strengthening key institutions and systems for CSA initiatives.
- h) Mainstreaming CSA elements into national policies and development planning process.



## CHAPTER THREE:



Beekeeping enterprise; a good example for building resilience and income generation



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## FRAMEWORK DESCRIPTION

### 3.1 Introduction

The KCSAIF is designed to address impacts of climate change challenges to agricultural growth and development. The Framework is aligned to the government's commitments and obligations to guide the transition of the country towards a low-carbon climate resilient development pathway.

The Framework aims at supporting the implementation of the KCSAS 2017-2026 whose objectives are to; (i) enhance adaptive capacity and resilience of farmers, pastoralists and fisher-folk to the adverse impacts of climate change; (ii) develop mechanisms that minimize greenhouse gas emissions from agricultural production systems; (iii) create an enabling regulatory and institutional framework; and (iv) address cross-cutting issues that adversely impact CSA.

### 3.2 Goal and Objectives of the Framework

#### Goal

The overall goal of the Framework is to achieve a long-term national low carbon climate resilient development pathway, whilst realizing the development goals of Kenya Vision 2030.

#### Objectives

The Framework has four objectives:

1. To develop a sustainable system for achieving a coordinated, coherent and cooperative governance of climate resilience and low carbon growth in the agricultural sector.
2. To mainstream CSA to support the transformation of Kenya's agricultural sector into an innovative, commercially oriented, competitive and modern industry that contributes to poverty reduction and improved food security in Kenya.
3. To reduce vulnerability of agriculture systems by cushioning them against the impacts of climate change and reduce GHG emissions where possible.
4. To strengthen communication systems on CSA extension and agro-weather issues

### 3.3 Framework Implementation Components

The objectives of the Framework are to be realized through implementation of actions designed around the following four components:

1. Institutional coordination.
2. Agricultural productivity and integration of value chain approach.
3. Building resilience and appropriate mitigation actions.
4. Communication systems on CSA extension and agro-weather issues.

The rationale of each component, sub-components and proposed actions are outlined below.

#### 3.3.1 Component 1: Institutional coordination

##### Rationale

This component supports the establishment of an inclusive institutional framework for improved agricultural sector CSA coordination and harmonization, and an enabling policy and institutional environment for the realization of the CSA objectives in general. The component is designed to strengthen inter-ministerial, national and county governments, private sector and CSOs, development partners and other non-state actor's coordination on CSA related issues.

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It will enable support towards enhancing capacity for cross-sectoral planning, communication within and between ministries, government institutions with different mandates with regard to CSA issues. Further, the component will enable sector institutions to contribute to and take responsibility for sector-wide coordination and implementation for more effective delivery of their CSA related mandates.

The sub-components are:

- Sub-component 1.1: Inter-Ministerial and County Government Coordination.
- Sub-component 1.2: Partnerships with Private Sector and Civil Society Organizations.
- Sub-component 1.3: Programmatic Coordination with Development Partners.
- Sub-component 1.4: Research-Extension Liaison Framework.
- Sub-component 1.5: Climate Smart Agriculture Research Funding.
- Sub-component 1.6: Appropriate CSA Policies, Strategies and Regulations.
- Sub-component 1.7: CSA data collection, information management and dissemination systems.
- Sub-component 1.8: Capacities of institution relevant to CSA at all levels.

### **3.3.1.1 Sub-component 1.1: Inter-Ministerial and County Government Coordination**

This sub-component aims at strengthening the functioning of the KCSAIF at both national and county levels through establishment and operationalization of coordinating institutions and structures. This will help to strengthen the capacity for cross-sectoral planning, enhance communication within and between ministries with different mandates. The expected impacts will be effective coordination among national sector ministries, county governments, development partners and other actors leading to efficiency and increased return on investments.

#### **Summary of Actions:**

- Develop and implement an inter-ministerial communications strategy with respect to inter-ministerial coordination on matters relating to climate smart agriculture.
- Introduce a biannual joint planning and review session between inter-ministerial team and the county government executive and chief officers responsible for agriculture.
- Build capacity of national and county government staff in cross-sectoral planning and implementation.
- Strengthen policy review and analytical capacity at the national and county levels of government.
- Strengthen the planning, implementation, monitoring and evaluation at the national and county levels of government.
- Establish a framework for disseminating CSA programmatic planning and implementation as well as annual reports and studies and receiving feedback at national and county levels of government.
- Annual and biannual Intergovernmental Technical Conference on status of KCSAIF implementation.

### **3.3.1.2 Sub-component 1.2: Government partnerships with private sector and civil society organizations**

The aim of this sub-component is to strengthen and create platforms for partnership for both levels of governments with a broad range of private sector and CSOs and other actors on CSA issues. This will offer incentives to the private sector to invest in CSA and provide a strong linkage mechanism for sharing of information, knowledge and skills. The direct impact of the sub-component will be establishment of a strong platform that will enhance adoption of technological innovations and complementary actions.

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### Summary of Actions:

- Engage the private sector to identify opportunities for increased investments in CSA.
- Organize regular consultative meetings with private sector and CSOs on the planning and implementation of the CSA Framework.
- Identify appropriate incentives to catalyse private sector and CSO investments in CSA activities.
- Develop and publicize country CSA programmes to private sector and CSOs with a view to identifying areas for their collaboration and participation.
- Establish communication channels for consultations between private sector and CSOs in the programmatic planning and implementation of CSA activities at the national and county levels of government.
- Promote CSA to agro-pastoralists, fisher folks and farmer organizations and cooperatives.

#### 3.3.1.3 Sub-component 1.3: Programmatic Coordination with Development Partners

To enhance programmatic coordination, the Government of Kenya and development partners will provide a framework for coordinated responses to policy initiatives and development of a harmonized monitoring and evaluation. This will enable the sector to have a shared vision, facilitate priority setting and establish common CSA funding mechanisms.

### Summary of Actions:

- Establish a framework for coordination and collaboration between the two levels of governments and the development partners on programmatic planning and implementation of CSA initiatives.
- Establish a harmonised M&E mechanism and reporting for CSA implementation.
- Establish a joint investment and funding mechanism for CSA in both levels of government.

#### 3.3.1.4 Sub-component 1.4: Research-Extension Liaison framework

The sector experiences fragmented research and extension projects/programmes on CSA. This sub-component aims at establishing mechanisms to coordinate CSA research and extension, and to promote collaboration and networking among public and private research institutions. The direct impact of the sub-component will be efficient research and extension services.

### Summary of Actions:

- Develop an institutional framework for farmer-extension-research and public private partnership engagement to set the research agenda from the grassroots level.
- Establish a platform through which researchers will have regular contacts with stakeholders and other users at the national, county and farm levels.
- Prepare CSA information packages and disseminate them to stakeholders.
- Promote use of Information and Communications Technology (ICT) in disseminating research findings.
- Conduct participatory research work on improved technologies and practices that is informed by needs of users and agro-ecological zones along the value chains.

- Conduct on-farm research into low-cost appropriate technologies and practices and deliver them as packages.
- Build the capacity of extension, producers and other stakeholders in the use of existing/new/improved CSA technologies and practices.
- Support development of private sector input and appropriate CSA technologies outreach and distribution networks.
- Intensify field demonstration, climate field schools, field days, study tours to enhance adoption of existing, new and/or improved CSA technologies and practices.
- Intensify use of ICT and other methods of dissemination.
- Establish systems for research prioritization by counties and other stakeholders.

### 3.3.1.5 Sub-component 1.5: CSA research funding

This sub-component proposes ways of improving research funding for development of CSA technologies and innovations. The expected impact is increased CSA innovations and adoption of appropriate technologies by farmers and other actors.

#### Summary of Actions:

- Sensitize public and private sector to invest in CSA research.
- Incentivize private sector investments in research, development and innovations.
- Establish partnership with development partners to support CSA research.
- Capacity build research institutions on CSA technologies and innovations development.
- Establish coordination systems to steer CSA research efforts and activities.
- Develop an information flow mechanism among CSA research stakeholders.

### 3.3.1.6 Sub-component 1.6: Appropriate CSA policies, strategies and regulations

This sub-component aims at supporting the establishment of an enabling regulatory framework for CSA. The sector has inadequate regulatory framework to provide guidance and incentives for CSA implementation. The expected outcomes will be appropriate sector CSA policies, strategies and regulations that provides enabling environment for climate change response.

#### Summary of Actions:

- Sensitization of stakeholders.
- Review and catalogue policies, strategies and regulations and identify need for revision.
- Support revision and formulation of appropriate policies, strategies and regulations.
- Lobbying for changes/adoption in the policies and regulations.
- Facilitate roll-out of adopted policies, strategies and regulations.
- Domesticate relevant CSA policies, strategies and regulation in counties.
- Develop appropriate policies that enhance production of adequate and diversified food products.
- Develop legislation and systems to protect and cushion small scale farmers and producers from unfair competition from corporate entities.

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### **3.3.1.7 Sub-component 1.7: CSA data collection, information management and dissemination systems**

This sub-component aims at enhancing CSA information and communication systems. There are weak mechanisms for collecting data and information on climate change which make it difficult to track progress, share results and access information on CSA. Under this sub-component, enhanced availability of relevant and harmonized CSA information and communication across the sector will be established.

#### **Summary of Actions:**

- Support strengthening of existing CSA monitoring and evaluation (M&E) and dissemination of information.
- Establish KCSAIF M&E system at all levels, ensuring that it is aligned with the agricultural sector M&E system, National Climate Change Strategy and Action Plan (NCCSAP) M&E system and National Integrated Monitoring and Evaluation Systems (NIMES) as necessary.
- Facilitate development of CSA communication strategy.
- Facilitate establishment of inventory of existing climate change information and communication systems in the agricultural sector and assessment of their appropriateness for different users.
- Facilitate design of agricultural sector climate information management system based on existing systems.
- Collaborate with other service providers in continuous updating of existing agricultural sector climate information systems, and production and distribution of other information materials.
- Facilitate development/strengthening of interactive ICT platforms to provide agricultural sector climate information on value chains, service providers, etc.
- Support up-scaling on the use of mobile telephony in disseminating agricultural sector climate change extension messages and collection of climate data.

### **3.3.1.8 Sub-component 1.8: Strengthening institutional capacities**

The main focus of this sub-component is to strengthen the institutional capacities for implementation of the Framework. The expected outputs are improved performance for efficient and harmonized implementation of CSA among sector institutions.

#### **Summary of Actions:**

- Facilitate capacity needs assessment on CSA issues at national and county levels of government.
- Facilitate development of CSA capacity building approach and plan for the sector which integrates gender and social inclusiveness.
- Facilitate roll-out of capacity building plans and approaches.
- Support training institutions/service providers to develop CSA training programmes relevant to the emerging needs of the counties.

## **3.3.2 Component 2: Agricultural productivity and integration of value chain approach**

### **Rationale**

This component is expected to play a major role in ensuring improved agricultural productivity along the value chains. This is aimed at building resilience of agricultural value chain players through use of adaptive

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technologies and enhanced market linkages. The component will also promote commercialization, food safety and quality control standards along the value chains.

**The specific sub-components are:**

- Sub-component 2.1: Access to and use of adaptive technologies.
- Sub-component 2.2: Increase area under efficient irrigation.
- Sub-component 2.3: Value addition and products development.
- Sub-component 2.4: Competitiveness and markets access for climate smart products enhanced.
- Sub-component 2.5: Food and feed storage and distribution.

**3.3.2.1 Sub-component 2.1: Access to and use of adaptive technologies**

This sub-component aims to enhance adoption of improved and adaptive crop, livestock and aquaculture technologies. The sector experiences low use of improved technologies and practices, use of inefficient technologies and practices, increased incidences of diseases and pests, inadequate access and availability, and low use of integrated water resources management (IWRM). These challenges lead to low agricultural productivity, food and nutritional insecurity, low levels of income and hence high poverty levels. While upholding its overall focus on supporting enhancement of resilient low-carbon agricultural productivity the sub-component will make particular effort to promote a value chain integration approach.

**Summary of Actions:**

- Identify, update, disseminate and upscale existing climate smart agricultural technologies and practices.
- Introduce diversified and improved crop varieties (high yielding, short duration, disease and pest tolerant, high nutritive value, flood tolerant), including indigenous varieties.
- Increase use of integrated soil fertility management practices, including soil testing and soil nutrient management.
- Strengthen surveillance of agricultural inputs trade.
- Improve agricultural mechanization by adopting appropriate machinery and equipment.
- Improve production of indigenous fruits and vegetables.
- Monitor household food security and safety.
- Enhance use of low greenhouse gas emitting crop production technologies and practices.
- Introduce improved exotic livestock breeds and improved indigenous/local adapted breeds.
- Promote adoption of low emission technologies from the livestock value chain.
- Improved nutrition through supplementation, forage and fodder conservation and irrigated pastures and fodder.
- Adequate disease surveillance and disease control and regular vaccination campaigns.
- Increase community managed drug stores through provision of livestock drugs within reach of pastoralists
- Promote livestock value chain diversification.
- Upscale climate smart fish culture technologies.
- Enhance quality control and food safety by relevant institutions along crop, livestock and fisheries value chains.
- Enhance use of low greenhouse gas emitting fish production technologies and practices.
- Promote integrated farming systems comprising crops, livestock, aquaculture and farm forestry.
- Create awareness and capacity build women, youth and venerable groups (WY&VG) on CSA.
- Promote CSA related income generating activities targeted for WY&VG.

- Promote sustainable natural resources management.
- Promote climate smart fish capture technologies.
- Establish gene banks for crops, livestock and fish.
- Intensify surveillance and control of emerging livestock pests and diseases.
- Promote rehabilitation of degraded rangelands.
- Promote sustainable livestock stocking capacity.
- Harmonize livestock vaccinations across the bordering counties and across the international borders.
- Facilitate management of veterinary drug residues, carcasses and agrochemicals.
- Promote efficient use of farm mechanization.
- Promote mechanized and animal powered conservation tillage practices as compared to conventional tillage.
- Promote value addition of farm produce through cottage industries.

### **3.3.2.2 Sub-Component 2.2: Increase area under efficient irrigation**

The sub-component aims at increasing the area under efficient and renewable energy powered irrigation systems as well as improving water resource-use efficiency in existing and new irrigation systems. Some of the climate change challenges the irrigation sub-sector experiences include; inadequate infrastructure development for irrigation, drainage and water storage, low productivity and poor water management. The actions under this sub-component focus on promoting use of green energy in both existing and new irrigation systems as well as enhancing efficient water management practices.

#### **Summary of Actions:**

- Increase use of appropriate renewable energy technologies in irrigation systems.
- Incorporate gravity fed system in abstraction and distribution of water to reduce energy used in irrigation.
- Use of efficient water technologies in irrigation.
- Build technical capacity to establish and maintain renewable energy innovations.
- Increase area under micro-irrigation schemes.
- Ensure water used for irrigation is safe.
- Promote development and dissemination of appropriate efficient small-scale irrigation technological packages.
- Build capacity of extension workers and farmers on participatory irrigation management.
- Build the capacity of water users associations in agricultural water management and their obligations as major beneficiaries.
- Undertake comprehensive management needs assessment of existing large-scale irrigation schemes.
- Conduct studies on the irrigation potential and identify sites in various river floodplains and underground water sources for micro-irrigation systems.
- Provide technical backstopping and training of local artisans on irrigation technologies.
- Integrate the water needs of livestock and fish in all new irrigation designs.

- Design and develop water harvesting and storage structures.
- Climate proof water harvesting, storage structures and infrastructure.
- Enhance waste water management for agriculture.
- Promote development of flood control infrastructure.
- Address issues of siltation of water bodies.

### 3.3.2.3 Sub-Component 2.3: Value addition and products development

This sub-component aims at supporting the development of new safe and commercially viable products for priority value chains in each agro-ecological zone. Most agricultural commodities are sold in their raw form and are thus bulky, of low value and have short shelf lives. There is also no traceability mechanism for produce and products from farm to folk. Value addition will ensure longer shelf life, reduced transaction costs and higher incomes.

#### Summary of Actions:

- Identify and promote existing value addition technologies.
- Incentivize the private sector to invest in agricultural value addition.
- Map county specific value chains for various produce and product's comparative advantage.
- Promote value addition of counties priority value chains.
- Link producers with input suppliers, output markets and service providers along the value chains.
- Promote establishment of structured trading systems at county levels.
- Establish standards and traceability systems for all the new products.
- Undertake market feasibility studies to promote demand for the selected commodities and link them with consumption patterns and preferences/consumer demands.
- Establish regional hubs (a cluster of counties in the same AEZ) for value chain development and backstopping.
- Identify and build capacity of actors in value chain processes.
- Facilitate improved accessibility to financial services.
- Promote, establish and strengthen cooperatives/producer organizations.
- Promote cottage industries for value addition.
- Promote sanitary measures on crops, livestock, fish inputs and their products.
- Strengthen crop, livestock and fish health inspectorate.

### 3.3.2.4 Sub-component 2:4: Competitiveness and markets access for climate smart products

This sub-component aims at achieving increased locally and internationally marketed agricultural outputs and to expand the export markets to include non-traditionally exported agricultural commodities. This will also involve developing and improving grading and standards for agricultural commodities. The sector is faced with a number of challenges which include low levels of local market penetration by smallholder producers; low capitalization of bulk traders; inadequate grading and standardization systems; inadequate awareness of the standards by producers and consumers; limited capacity to fully comply with international sanitary and phytosanitary standards (SPS). Others include inadequate incentives to comply with national, regional and global standards and inadequate mechanisms to cushion small scale producers, prohibitive regulatory and marketing barriers to regional trade and inadequate markets and marketing infrastructure.



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### Summary of Actions:

- Establish the existing storage capacity of agricultural commodities in public and private sector levels with a view to identify gaps and areas that need strengthening.
- Create agricultural commodity hubs through participation of private sector and other stakeholders.
- Facilitate capacity building of farmers on demand and market driven production.
- Design and launch a market promotion program for locally produced commodities.
- Link producer to external niche markets.
- Facilitate capacity building of producers on SPS and international trade.
- Identify, update and adopt appropriate traditional and indigenous food preservation methods.
- Develop branding of Kenya produce for regional and international markets.
- Streamline and harmonize cess fees and levies to enhance access to markets.
- Identify and define the non-traditional agricultural commodities that give comparative advantage.
- Design sustainable programmes to support the certification of smallholders/producers for export markets.
- Facilitate capacity building of farmers on selected non-traditional agricultural commodities.
- Develop and implement grading and standardization systems for agricultural commodities that do not have grades and standards to comply with regional and global requirements.
- Establish mechanisms that promote compliance of Good Agricultural Practices (GAPs).
- Train and empower smallholder producers along value chains on grading and standardization systems.
- Enhance surveillance of imports of counterfeit agricultural products and inputs.
- Strengthen and broaden scope of existing agricultural market information systems

#### 3.3.2.5 Sub-component 2.5: Food and Feed storage and distribution

The sector experiences various challenges which include, high post-harvest losses along value chains, inadequate preservation and storage capacity, food safety issues as result of poor post-harvest handling and storage technologies, inadequate storage skills and marketing infrastructure. This sub-component aims to achieve four objectives namely; (i) reduction of post-harvest losses along agricultural value chains; (ii) enhancing private sector annual storage capacity for agricultural products; (iii) enhancing communities and household capacity to store agricultural produce; and (iv) expanding the strategic food reserve to include all appropriate agricultural products and establish strategic feed/grazing reserves.

### Summary of Actions:

- Invest in appropriate storage facilities and technologies along value chains.
- Train producers, processors and marketers in post-harvest management as well as food safety.
- Provide regular market information to improve distribution of agricultural commodities/food stuffs.
- Facilitate establishment of marketing centres in rural areas with the appropriate infrastructure.
- Link communities in each county by feeder roads to various marketing centres and highways.
- Conduct a survey to identify, update and adopt traditional and indigenous food preservation methods.
- Apply and use appropriate policies to produce adequate and diversified food products.

- Conduct inventory of private sector annual storage capacity with a view to identifying gaps and areas of strengthening.
- Strengthen the warehousing receipt system and link producers to warehousing receipt system in the commodity supply chain.
- Rehabilitate existing warehouses, cold storage facilities and silos and establish public-private-partnerships management.
- Support private sector to invest in food processing (including abattoirs) as well as value addition, including packaging, and branding.
- Facilitate linkages with relevant service providers and markets (inputs and outputs).
- Carry out a survey to identify current household and community capacity to store agricultural produce.
- Enhance farmers' capacity to deal with postharvest pests.
- Support communities and households to store surplus produce.
- Expand the strategic food reserve to include all appropriate agricultural foodstuffs.
- Establish and expand strategic feed/grazing reserves.
- Encourage growing on-farm food security crops that can be harvested regularly (e.g. cassava, sweet potatoes, bananas, yams, arrow roots, etc.).
- Promote safe and effective use of chemicals during storage.
- Support rehabilitation of rangelands through reseeding community lands
- Promote the establishment of meat and fish processing plants in counties for local and export markets.
- Support pasture establishment and management.
- Support regular epidemiological studies on livestock diseases based on climate change trends.
- Establish animal health infrastructure such as laboratories, mobile vehicle/ambulatory units and bio-security and bio-safety structures.

### 3.3.3 Component 3: Building resilience and appropriate mitigation actions

#### Rationale

This component aims at building resilience through adaptation and appropriate mitigation measures. This will be achieved through improved management of natural resource base and development of safety nets along the value chains.

The component will also play a major role in identification and deployment of appropriate measures that minimize GHG emissions in agricultural production systems. The specific sub-components are:

- Sub-component 3.1: Soil health and land degradation.
- Sub-component 3.2: Water and other natural resources.
- Sub-component 3.3: Insurance and other safety nets.
- Sub-component 3.4: Synergies in adaptation and mitigation.

#### 3.3.3.1 Sub-component 3.1: Soil health and land degradation

The objectives of this sub-component are aimed at enhancing adoption of climate smart soil management technologies/practices and rehabilitation of degraded lands. The challenges to be addressed include; nutrient depletion, loss of biodiversity, land degradation, soil erosion, soil acidity and low adoption of CSA technologies and practices. These and other unsustainable land and soil management practices contribute to GHG emissions.

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### Summary of Actions:

- Establish soil and land management knowledge hubs across the country.
- Promote soil and water conservation practices.
- Promote rehabilitation of degraded lands.
- Promote integrated soil fertility management.
- Promote conservation agriculture.
- Support agro-forestry.
- Promote sustainable land management practices.
- Promote sustainable grazing management practices.
- Promote development of innovations and technologies to enhance soil health.

#### 3.3.3.2 Sub-component 3.2: Water and other natural resources

This sub-component aims at enhancing integration of CSA practices towards conservation and rehabilitation of water catchment areas, increasing tree cover, and conservation of fisheries resources. The key challenges addressed include degradation of water catchment areas, soil erosion, siltation, pollution of water bodies, eutrophication, low tree cover in agricultural areas, forest degradation and deforestation, loss of biodiversity, land use change and resource use conflict and encroachment.

### Summary of Actions:

- Promote CSA practices that enhance sustainable natural resources management.
- Promote integrated watershed management.
- Establish a natural resources inventory.
- Establish a monitoring, reporting and accounting mechanism on land use and natural resources.
- Identify, gazette and conserve fish breeding areas and nursery grounds.
- Facilitate the rehabilitation of fish breeding sites/grounds.
- Facilitate restocking of water bodies with fish fingerlings.
- Promote bee keeping and other non-wood forest products that contribute to forest conservation.
- Promote integrated rangeland management.
- Promote incentives for ecosystem management e.g. payment for ecosystem services.
- Develop and implement management plans for ecosystems in order to encourage sustainable use of natural resources.
- Establish public private partnerships (PPP) in conservation of water and natural resources.
- Promote sustainable fish harvesting regime in fresh waters.
- Develop climate smart riverine and dam fisheries.
- Conserve riparian area with the aim of controlling invasive species.
- Protect and restore water catchment areas through afforestation and reforestation.

#### 3.3.3.3 Sub-component 3.3: Insurance and other safety nets

The objectives of this sub-component are aimed at increasing crop, livestock and fisheries index-based insurance and establishing a safety net mechanism for residual loss and damage. The sector increasingly experiences vulnerability due to risks related to climate change. There is need to develop mechanisms for risk transfer and management; knowledge dissemination on importance of agricultural insurance and safety nets.

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### Summary of Actions:

- Develop and implement innovative index-based agricultural insurance packages for crop, livestock and fisheries value chains.
- Invest in the agro-meteorological infrastructure to support index-based agricultural insurance.
- Enhance the capacity of various actors to deliver innovative crop, fisheries and livestock index-based insurance packages.
- Raise awareness within the insurance industry on climate risks and communicate actions and opportunities in the agricultural sector.
- Establish and strengthen climate risk appropriate safety nets.
- Develop insurance legislations within the agricultural sector.
- Construct vulnerability maps to support targeting of food security and emergency preparedness interventions.
- Establish a National Seed Emergency stock.

#### 3.3.3.4 Sub-component 3.4: Synergies in adaptation and mitigation

The agriculture sector is a source of GHG emissions with enteric fermentation accounting for the highest proportion. However, some adaptation actions have mitigation co-benefits such as increased soil carbon having beneficial effects on soil fertility. The objective of this sub-component is to promote adaptation interventions and appropriate mitigation that leads to reduced GHG emissions intensity from the agriculture sector without compromising productivity. It will also promote development of accounting systems on agricultural emissions.

### Summary of Actions:

- Promote adoption of low cost climate smart technologies that minimize GHG emission and enhance removals.
- Promote low cost green energy for the agriculture sector.
- Promote efficiency in livestock production systems.
- Promote efficiency in paddy rice management.
- Promote appropriate livestock manure management.
- Promote formulation of feeds and feeds additives that improve efficiency and reduce enteric fermentation.
- Promote production of rain-fed rice to reduce emissions from paddy rice production systems.
- Develop and implement agricultural sector Nationally Appropriate Mitigation Actions (NAMAs).
- Promote adaptation actions that have mitigation co-benefits.
- Minimize use of fires in rangelands and croplands management.
- Promote use of energy efficient technologies in production, harvesting, processing and transportation of agricultural inputs and products.
- Develop a national carbon accounting (NCA) system including establishment of monitoring, reporting and verification (MRV) infrastructure in the agriculture sector.
- Undertake capacity building on measurement of GHGs emissions; management of inventory system; data collection, reporting and verification in the agriculture sector.

- Conduct energy audits of CSA practices.
- Promote production of climate smart alternative livelihoods.
- Promote climate smart practices that contribute to reduction of emissions from deforestation and forest degradation.

### 3.3.4 Component 4: Communication systems on CSA extension and agro-weather issues

#### Rationale

This component aims at strengthening and mainstreaming communication systems on CSA, extension and agro-weather issues among stakeholders in the agriculture sector. In addition, the component will promote generation, access and enhanced application of CSA knowledge among value chain actors. Further, the component will support strengthening of systems for timely provision of climate forecasts to different value chain stakeholders.

The sub-components are:

Sub-component 4.1: CSA knowledge generation and dissemination.

Sub-component 4.2: Extension on climate information services and agro-weather advisories.

#### 3.3.4.1 Sub-component 4.1: CSA knowledge generation and dissemination

There is inadequate information, knowledge generation and management as well as limited understanding of the CSA concept. The objectives of this sub-component are: (i) to enhance generation and dissemination of CSA technologies and innovations along the value chains; (ii) to document, package, and disseminate best CSA practices and technologies; (iii) to establish functional national and county CSA knowledge and information management systems; and (iv) to strengthen and maintain CSA knowledge networks and partnerships.

#### Summary of Actions:

- Enhance the capacities of private sector service providers and farmer-based organizations to support farmers' adoption of existing/new/improved CSA technologies and practices.
- Develop and integrate the CSA concept into national extension system.
- Advocate for integration of CSA in formal education systems.
- Support undertaking of genetic characterization and conservation of indigenous livestock breeds, crops, fisheries and forestry.
- Promote genetic improvement of key crops, livestock, fisheries and forestry to enhance adaptability.
- Support development and adoption of climate smart innovative agricultural products.
- Mobilize resources and institute competitive grant scheme for CSA research.
- Undertake a CSA knowledge mapping, audit and analysis.
- Establish and develop gender sensitive CSA knowledge at the community, county and national levels.
- Support capacity building of different stakeholders in CSA along the agricultural value chain at the national, county and local levels.
- Establish a robust CSA knowledge platforms.

- Identify, document and integrate indigenous and conventional CSA knowledge.
- Support dissemination of improved CSA technologies and practices.
- Disseminate and update CSA information materials to support and inform policies, planning and agricultural advisory services.
- Strengthen CSA knowledge and information sharing partnerships/networks/forums.
- Establish a surveillance system for crops, livestock and fisheries pests and diseases arising from climate change effects.
- Build the capacity of extension, producers and other stakeholders in the use of existing/new/improved CSA technologies and practices.
- Intensify field demonstration/field days/study tours to enhance adoption of existing/new/improved CSA technologies and practices.
- Undertake training needs assessment for CSA.
- Develop information that promote production of emerging climate smart crops, livestock, fish and forestry enterprises.
- Conduct on-farm research into low-cost appropriate technologies and practices.

#### **3.3.4.2 Sub-component 4.2: Extension on climate information services and agro-weather advisories**

The objectives of this sub-component are: (i) to increase agro-climate information services and timely-use of agro-weather products; and (ii) to enhance and upscale early warning systems and contingency plans for climate change adaptation. Limited weather infrastructure, inadequate climate information services and agro-weather advisories hinder agricultural planning and farm management decision making. Further, there is limited integration of climate information in agricultural research.

#### **Summary of Actions:**

- Strengthen weather forecasting to inform decision making in agriculture.
- Strengthen integration of indigenous knowledge with scientific weather knowledge.
- Develop and upscale appropriate climate/weather infrastructure.
- Develop climate risk contingency plans at national, county and community levels.
- Downscale weather forecasts to various localities to promote the appropriate climate/weather services.
- Institutionalize pre-season, in-season and post-season community weather scenario planning and agro-weather monitoring.
- Strengthen integration of climate information into agricultural research.
- Strengthen production of downscaled efficient Early Warning Systems.



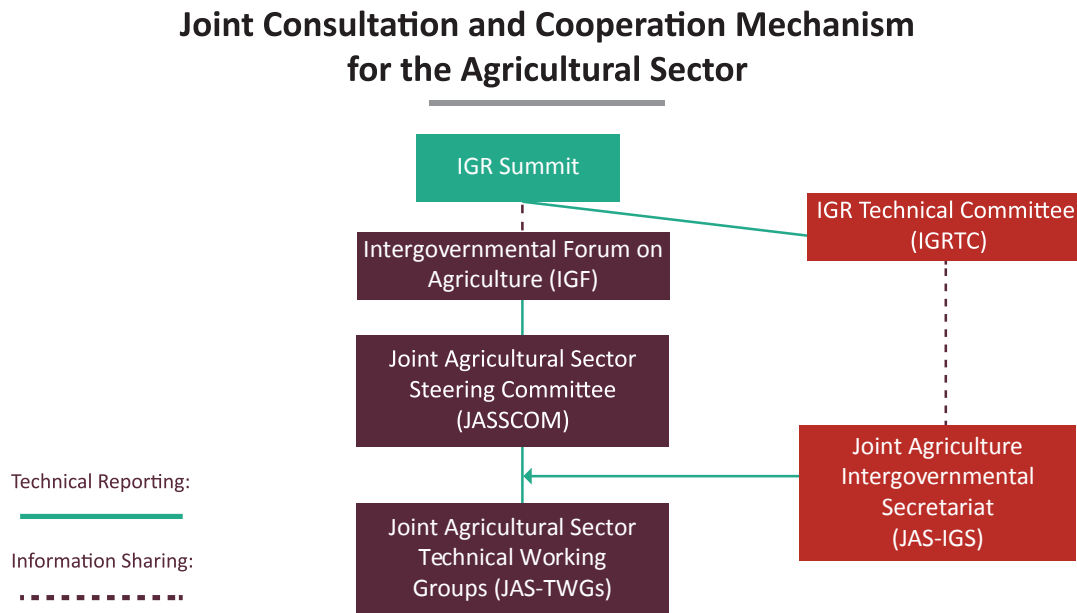
## CHAPTER Four:



## COORDINATION AND IMPLEMENTATION MECHANISM

### 4.1 Coordination

This Framework will be implemented within the Joint Consultation and Cooperation Mechanism for the Agricultural Sector (JCCMAS) which is in line with Intergovernmental Relations Act 2012 (Figure 9).



**Figure 9: Technical reporting and information sharing through the Joint Consultation and Cooperation Mechanism for the Agricultural Sector**

#### 4.1.1 Intergovernmental Forum on Agriculture (IGF)

The IGF which is convened by the Cabinet Secretary (CS) responsible for agriculture and irrigation and co-chaired by Chair of the Council of Governors will be expected to provide a platform for CSA stakeholder's consultations and cooperation. It will also approve and make recommendations on the CSA programmes, strategies, plans and performance monitoring instruments.

#### 4.1.2 The Joint Agriculture Sector Steering Committee (JASSCOM)

This committee will provide regular direction for sector transformation initiatives agreed between the two levels of government and makes follow-up of IGF meetings. It will also oversee the functioning of the Joint Agriculture Sector Intergovernmental Secretariat (JAS-IGS) and the Joint Agriculture Sector Technical Working Groups (JAS-TWGs). The committee will be expected to ensure that CSA decisions and resolutions approved by IGF are circulated and implemented by relevant entities within the two levels of government.

#### 4.1.3 Joint Agriculture Sector Technical Working Groups (JAS-TWGs)

The JAS-TWGs will aim at providing a uniform platform for intergovernmental technical consultation based on the principle of equitable representation at the two levels of government to enhance its effectiveness. It is expected that implementation of the CSA Framework will be aligned within the six JAS-TWGs. These JAS-TWGs will be expected to deliberate on CSA issues in the areas of responsibility of each working group. They will also prepare and submit CSA reports and resolutions to the Joint Agriculture Sector Steering Committee.



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#### **4.1.4 Climate Change Units (CCUs)**

The Climate Change Act 2016 Section 15 provides for public entities to coordinate mainstreaming of climate change issues into sectoral strategies, plans, programmes and projects. Further the Act requires that each state department and National government public entity to establish a CCU. The CCUs will be charged with coordinating implementation of CSA activities at the national and county levels. The units will be expected to communicate decisions of JAS-TWGs to implementing entities. Further, they will be expected to provide technical support to the management and CSA implementing stakeholders including reporting.

### **4.2 Linkages and Partnerships with other Key Actors**

The interventions of KCSAIF will be implemented under pluralistic and partnership-based principles. In addition, relevant partners will provide inputs towards defined interventions among them national and county agriculture departments, other government organizations, research institutes, farmer organizations, private sector organizations and CSOs.

The relevant Ministries, Departments and Agencies (MDAs) at the two levels of government are expected to support the implementation of various components of the Framework. They will be responsible for mainstreaming and upscaling CSA across their functions and processes including consideration in performance contracting. They will be expected to play a key role in provision of an enabling policy environment, provision and mobilization of resources and technical expertise for implementation of the KCSAIF. The farmer organizations consisting of cooperatives and farmer groups will be key in identification, prioritizing and implementation of agriculture interventions. They will be expected to play a major role in awareness creation, community and resource mobilization, coordination of investments and partnerships among stakeholders for implementation of the KCSAIF.

The private sector is a strategic partner in the agriculture sector development and is therefore expected to participate in implementation of the KCSAIF. The private sector will facilitate/support value chain development, provision of business and services through entrepreneurship investments, input supply, provision of credit and insurance services among others. Through PPP mechanisms, the private sector will engage with both levels of government to implement specific aspects of interest/specialization in KCSAIF.

The Civil Society Organizations (CSOs) will play an important role in advocacy, capacity building and support implementation of CSA interventions. The research institutions and academia will be key in technology development, validation and evaluation, capacity building and strategic input support.

The development partners are significant players in promoting CSA and to a larger extent low carbon resilient agriculture. They will be expected to support financing and resource mobilization, technical expertise and capacity building. Further, the development partners will assist in building networks that enhance access to global climate finance to support CSA.

### **4.3 Implementation of KCSAIF**

After the launch of KCSAIF, some key actions necessary to facilitate its implementation will be carried out. These include sensitization of stakeholders, prioritization of actions at both national and county levels as well as resources mobilization for implementation of the prioritized actions. The capacity of stakeholders on CSA will need to be enhanced and the necessary links for implementation of the framework at national, county and community levels will be established. A monitoring and evaluation (M&E) framework including MRV will be developed and implemented throughout the implementation period through participatory approaches by all relevant stakeholders at the various levels. All activities to

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be implemented including monitoring and reporting for the KCSAIF will be coordinated by the National and County Ministries/Departments of Agriculture and Irrigation CCUs who will be reporting through the JASSCOM.

#### **4.3.1 Monitoring, Evaluation and Reporting**

The aim of the KCSAIF M&E framework will be to guide coordinated and efficient data collection, analysis, use and provision of information that will provide indications of impact, outcomes and outputs. The monitoring will measure CSA achievements at the activity and output levels while the evaluation will measure achievements at the outcomes and impact levels. The M&E will be carried out by the two levels of government together with other relevant stakeholders spearheaded by the climate change units. The M&E plan will be agreed upon between the national and county governments through the JASSCOM thematic working group on monitoring, evaluation and communication which will also be responsible for the design and implementation of the M&E system.

The M&E will be based on Logical Framework Approach (LFA) and will be aligned to the sector M&E framework. Some specific key indicators are presented in the KCSAIF log frame (Annex I) which the climate change units will be expected to adopt in addition to developing others for presentation to the technical working group (TWG) for consideration and approval. Wherever possible, data will be disaggregated by gender to allow for social inclusivity principle in CSA interventions. This will be done on quarterly basis and the JAS-TWG monitoring, evaluation and communication will coordinate data analysis and consolidation of reports.

The KCSAIF envisages that evaluation will be done at various levels as follows:

- (i) Baseline surveys to collect baseline data on vulnerability levels and low-carbon development path way in the implementation of CSA actions. This survey will provide information base against which CSA activities will be monitored and assessed for effectiveness during implementation and after the activities. The analysis of baseline data will be disaggregated per county for assessing the effects and impacts across gender and other social economic aspects.
- (ii) Mid-term (five years) review aimed at evaluating the relevance, effectiveness and efficiency of implementation of the KCSAIF against indicators in the log frame. The review will assess the implementation approaches, strategies, organizational set up and partnership arrangements. The review will make recommendations for the remaining period largely to help enhance implementation and improve performance. The review will also consider technical aspects of resilience and low-carbon development in KCSAIF.
- (iii) Terminal (ten years) evaluation will be conducted at the end of the Framework period to analyze impacts and learning experiences.

#### **4.3.2 Reporting**

The climate change units will be responsible for preparing relevant reports on the progress of implementation of the KCSAIF approved work plans. The reports will also include assessment of processes, results and outcomes and analysis of factors affecting progress during the reporting period. The reports from CCUs will be presented to the JAS-TWGs which will facilitate preparation of intergovernmental CSA reports for presentation to the JASSCOM. The JASSCOM will review and adopt the reports before forwarding them to the IGF for endorsement and for submissions as provided for in the Intergovernmental Relations Act and Kenya Climate Change Act 2016. The frequency of the reporting will be annual or as may be required.

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### 4.3.3 Quality Assurance

Quality assurance will ensure that standards set for implementation and management of the implementation framework are adhered to in order to achieve the desired results.

The KCSAIF management structure comprising committees as contained in the JASSCOM will provide advisory role in supporting interventions that ensure quality assurance. The activities in the logical framework will provide the basis for development of a tool against which quality assurance will be based.

### 4.3.4 Budget

The KCSAIF investments are aligned with sector investment priorities and linked to climate vulnerability and priority areas. The total base case budget requirement to implement the programme is KSh. 167.31 Billion up to the year 2027 (Table 3). These resources will be mobilized from the national funding sources, bilateral and multilateral development partners in climate finance, Adaptation Fund, Green Climate Fund and from the private sector. All funds shall be audited in accordance with the specific financial management agreements with major reference to Climate Finance Policy (GoK, 2017b).

**Table 3: KCSAIF ten year budget summary**

Component/Sub-component	2018-2022	2023-2027	Total Budget (Billions KSh.)
Institutional coordination	14.72	14.72	29.44
Agricultural productivity and integration of value chains approach	25.76	26.99	52.75
Building resilience and associated mitigation actions	14.72	14.72	29.44
Communication systems on CSA, extension and agro-weather issues	20.24	20.24	40.48
Monitoring and evaluation (M&E)	7.60	7.60	15.20
<b>Total</b>	<b>83.04</b>	<b>84.27</b>	<b>167.31</b>

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Dairy Cattle grazing in Nyandarua

## CHAPTER FIVE: ANNEXES



Dorper sheep grazing in Laikipia

## Annex 1: Kenya CSA Implementation Framework Result-Based Log Frame

NARRATIVE SUMMARY	INDICATORS	MEANS OF VERIFICATION	RISKS AND ASSUMPTIONS
<p><b>OVERALL GOAL:</b></p> <p>The overall goal of the framework is to achieve a long-term national low carbon climate resilient development pathway, whilst realizing the development goals of Kenya Vision 2030.</p>	<p>G1: Climate change adaptation investments in the agricultural sector.</p> <p>G2: Total agricultural sector GHG emissions.</p> <p>G3: GHG emissions per unit of agricultural sector GDP.</p> <p>G4: Renewable energy investments in the agricultural sector.</p> <p>G5: Proportion of climate resilient households</p>	<ul style="list-style-type: none"> <li>• Medium Term Plans (MTPs)</li> <li>• CSA interventions</li> <li>• Impact assessments and surveys</li> <li>• Agriculture sector MRV reports</li> <li>• Economic survey reports</li> <li>• Sector reports on renewable energy investments</li> </ul>	<ul style="list-style-type: none"> <li>• Political will and support</li> <li>• Functional governance and coordination systems in the sector</li> <li>• Stable macroeconomic environment for investments</li> </ul>
<p><b>MAJOR OUTCOMES:</b></p>			
<p>Component 1: Institutional Coordination: An inclusive institutional framework for improved CSA coordination and harmonization established.</p>	<p>C1(a): Functional CSA institutional coordination mechanisms</p> <p>C1(b): Proportion of agriculture sector budget committed to CSA</p> <p>C1(c): CSA policies and strategies at both levels of governance</p>	<ul style="list-style-type: none"> <li>• CSA baseline survey and M&amp;E reports</li> <li>• Sector budgets and expenditures reports</li> </ul>	<ul style="list-style-type: none"> <li>• Agricultural sector partners willingness to support the framework</li> <li>• Political and socio-economic stability is sustained in the country</li> <li>• Capacity on policy development and implementation available.</li> </ul>
<p>Component 2: Agricultural Productivity and Integration of Value Chain Approach: CSA mainstreamed to increase productivity, competitiveness and commercialization of agriculture</p>	<p>C2 (a): Outputs: production, products, yields, and value</p> <p>C2 (b): Quantity and value of produce and products marketed</p> <p>C2 (c): Value chain actors in the agricultural sector adhering to market standards</p> <p>C2 (d): Value chains with comparative advantage along agro-ecological zones</p>	<ul style="list-style-type: none"> <li>• CSA baseline survey</li> <li>• M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>• Appropriate CSA technologies will be developed and introduced.</li> <li>• National and county government policies will support the emerging value chain organizations</li> <li>• Changes in market prices of agricultural inputs and production energy remain sustainable.</li> <li>• Access to finance for value chain actors to adopt appropriate CSA technologies</li> </ul>

NARRATIVE SUMMARY	INDICATORS	MEANS OF VERIFICATION	RISKS AND ASSUMPTIONS
<p>Component 3: Building resilience and appropriate mitigation actions: Sustainable management of natural resource base and development of safety nets along value chains improved.</p>	<p>C3 (a): Proportion of GHGs emissions sequestered / abated from adaptation and mitigation practices C3 (b): Type of resilience building actions with mitigation co-benefits C3 (c): Type of CSA investments relevant to NRM C3(d): Type of value chain based safety nets</p>	<ul style="list-style-type: none"> <li>• Sector MRV reports</li> <li>• CSA baseline survey</li> <li>• M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>• All-inclusive selection criteria for green innovations will be applied.</li> <li>• Political good will to sustainably implement NRM</li> </ul>
<p>Component 4: Communication systems on CSA extension and agro-weather issues: Communication systems on CSA, extension and agro-weather issues strengthened and mainstreamed.</p>	<p>C4 (a): Functional CSA, extension and agro-weather communication systems</p>	<ul style="list-style-type: none"> <li>• CSA stakeholders reports</li> <li>• Management Information Systems platforms</li> <li>• CSA baseline survey M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>• Relevant institutions and partners will collaborate in CSA extension and agro-weather service provision.</li> <li>• Suitable communication systems the most vulnerable and the poor will be developed.</li> </ul>
<b>OUTCOMES:</b>			
<b>Outcome 1: An inclusive institutional framework for improved CSA coordination and harmonization established</b>			
<p>Outcome 1.1: Inter-Ministerial and County Government Coordination improved</p>	<p>1.1.1. Functional Inter-Ministerial coordination mechanism for CSA 1.1.2. Functional sector Intergovernmental Coordination mechanism that integrates CSA 1.1.3 Budget allocation for CSA coordination mechanism</p>	<ul style="list-style-type: none"> <li>• Sector CSA reports</li> </ul>	<ul style="list-style-type: none"> <li>• Departments in the agricultural sector at both levels cooperate</li> <li>• Adequate funding for the coordination mechanism.</li> </ul>

NARRATIVE SUMMARY	INDICATORS	MEANS OF VERIFICATION	RISKS AND ASSUMPTIONS
Outcome 1.2: Partnerships with private sector and civil society organizations strengthened	1.2.1 Engagement platforms with private and CSOs in CSA 1.2.2. Proportion of agricultural sector public, private and CSOs value chain actors involved in CSA activities	<ul style="list-style-type: none"> <li>M&amp;E reports</li> <li>Platform engagement reports</li> </ul>	<ul style="list-style-type: none"> <li>High participation of the private sector and / or civil society will result high impact</li> <li>Actors willing to share their resources and information</li> </ul>
Outcome 1.3: Programmatic Coordination with Development Partners strengthened	1.3.1: Joint agricultural sector CSA programming and financing mechanism in place 1.3.2. Proportion of development partners funding CSA	<ul style="list-style-type: none"> <li>Joint Projects / Programmes developed</li> <li>M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>Development partners join and support agricultural sector institutions' CSA coordination efforts</li> </ul>
Outcome 1.4: Research-Extension Liaison strengthened	1.4.1: Functional CSA based research – extension platforms 1.4.2: CSA technologies developed and packaged for adoption by agricultural sector value chain actors	<ul style="list-style-type: none"> <li>M&amp;E reports</li> <li>Research-Extension platforms</li> <li>Technologies packages</li> </ul>	<ul style="list-style-type: none"> <li>Actors willing to share resources and information</li> <li>Technologies developed with end users in mind</li> <li>Actors interested in cooperation in CSA research and extension liaisons</li> </ul>
Outcome 1.5: Research funding for CSA improved	1.5.1: CSA technologies developed 1.5.2: Actors involved in CSA research	<ul style="list-style-type: none"> <li>M&amp;E reports</li> <li>Research publications</li> </ul>	<ul style="list-style-type: none"> <li>Funds released on time for planned research activities</li> <li>Actors are willing to undertake CSA research</li> </ul>
Outcome 1.6: Appropriate CSA policies, strategies and regulations reviewed, developed and rolled out	1.6.1: Policies, strategies and regulations relevant to CSA in use at both levels of governments.	<ul style="list-style-type: none"> <li>M&amp;E reports</li> <li>Policies and strategies documents</li> </ul>	<ul style="list-style-type: none"> <li>Lengthy policy and strategy development process</li> </ul>
Outcome 1.7: CSA data collection, information management and dissemination systems strengthened	1.7.1: Functional systems for CSA data and information management 1.7.2: Actors using CSA data and information management systems.	<ul style="list-style-type: none"> <li>M&amp;E reports</li> <li>Feedback report from users</li> </ul>	<ul style="list-style-type: none"> <li>The system will provide valid and valuable information for different value chain actors</li> <li>The systems will provide appropriate CSA information for different conditions.</li> </ul>



NARRATIVE SUMMARY	INDICATORS	MEANS OF VERIFICATION	RISKS AND ASSUMPTIONS
Outcome 1.8: Capacities of institutions relevant to CSA at all levels strengthened	1.8.1: Sector institutions at national and county levels delivering on CSA 1.8.2: Sector institutions at national and county levels with capacities to deliver CSA.	<ul style="list-style-type: none"> <li>M&amp;E reports</li> <li>Sector institutions reports</li> </ul>	<ul style="list-style-type: none"> <li>Sector institutions will prioritize CSA</li> <li>Sector institutions will have resources to undertake CSA</li> </ul>
<b>Outcome 2: CSA mainstreamed to increase productivity, competitiveness and commercialization of agriculture</b>			
Outcome 2.1: Access to and use of adaptive technologies enhanced	2.1.1: Types of adaptive technologies in use along value chains 2.1.2: Value chain actors using adaptive technologies 2.1.3: Agricultural enterprises on which adaptive technologies are applied	<ul style="list-style-type: none"> <li>M&amp;E reports</li> <li>Baseline surveys on adaptive technologies and agricultural enterprises</li> </ul>	<ul style="list-style-type: none"> <li>Inventory of appropriate CSA adaptive technologies.</li> </ul>
Outcome 2.2: Area under efficient irrigation increased	2.2.1: Proportion of acreage under efficient and renewable energy powered irrigation systems increased 2.2.2: Proportion of producers undertaking efficient irrigated agriculture	<ul style="list-style-type: none"> <li>Baseline survey</li> <li>M&amp;E reports</li> <li>NIB Reports</li> </ul>	<ul style="list-style-type: none"> <li>Farmers and sector stakeholders are willing to invest in efficient irrigation infrastructure</li> </ul>
Outcome 2.3: New products developed and value addition of commodities enhanced	2.3.1: Types of green agricultural produce/products 2.3.2: Green agri-businesses	<ul style="list-style-type: none"> <li>Baseline surveys</li> <li>M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>Private sector and other stakeholders invest in green growth</li> <li>Greening agri-businesses will be cost effective</li> </ul>
Outcome 2.4: Competitiveness and markets access for climate smart produce/products enhanced	2.4.1: Marketed climate smart commodities 2.4.2: Climate smart agri-businesses 2.4.3: Actors in climate smart agri-business	<ul style="list-style-type: none"> <li>Market surveys reports</li> <li>M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>Investors responds to opportunities and incentives provided for green growth</li> <li>Adequate supporting legislation for green growth</li> <li>Adequate capacity for green growth development will be available</li> </ul>

NARRATIVE SUMMARY	INDICATORS	MEANS OF VERIFICATION	RISKS AND ASSUMPTIONS
Outcome 2.5: Food and feed storage and distribution improved	<ul style="list-style-type: none"> <li>2.5.1: Climate smart food/ feed storage and distribution technologies in use</li> <li>2.5.2: Actors using climate smart food /feed storage and distribution technologies and practices</li> </ul>	<ul style="list-style-type: none"> <li>• Baseline survey</li> <li>• M&amp;E reports</li> <li>• Market surveys reports</li> </ul>	<ul style="list-style-type: none"> <li>• Legal framework on food /feed storage distribution and safety exists</li> <li>• Willingness of the actors to form linkages</li> </ul>
<b>Outcome 3: Sustainable management of natural resource base and development of safety nets along value chains improved</b>			
Outcome 3.1: Soil health improved and degraded lands rehabilitated	<ul style="list-style-type: none"> <li>3.1.1: Climate smart soil fertility management practices</li> <li>3.1.2: Producers adopting climate smart soil management practices.</li> <li>3.1.3: Climate smart soil management practices up-scaled.</li> <li>3.1.4: Area of degraded land rehabilitated</li> </ul>	<ul style="list-style-type: none"> <li>• Environmental sector reports</li> <li>• Baseline survey</li> <li>• M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>• Affordable climate smart technologies are availed</li> <li>• Land tenure systems will support rehabilitation of degraded lands</li> <li>• Willingness to cooperate by stakeholders</li> </ul>
Outcome 3.2: Water and other natural resources conserved	<ul style="list-style-type: none"> <li>3.2.1: Integrated water resource management plans</li> <li>3.2.2: Ecosystem management plans</li> <li>3.2.3: Area under natural resources conserved</li> <li>3.2.4: Number of water harvesting structures and volume of water harvested</li> <li>3.2.5: Public Private Partnerships in Natural Resources Management</li> </ul>	<ul style="list-style-type: none"> <li>• Baseline survey</li> <li>• M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>• Grievance solving mechanisms will be in place</li> </ul>
Outcome 3.3: Insurance and other safety nets enhanced	<ul style="list-style-type: none"> <li>3.3.1: Types of index –based insurance products</li> <li>3.3.2: Types of safety nets services</li> <li>3.3.3: Value chain actors using index-based insurance services</li> <li>3.3.4: Value chain actors accessing different safety nets services</li> </ul>	<ul style="list-style-type: none"> <li>• Sector reports on insurance and safety nets</li> <li>• Baseline survey</li> <li>• M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>• Safety nets services will be in place</li> </ul>

NARRATIVE SUMMARY	INDICATORS	MEANS OF VERIFICATION	RISKS AND ASSUMPTIONS
Outcome 3.4: Synergies in adaptation and mitigation promoted	3.4.1: Functional GHG accounting system in place 3.4.2: Climate smart interventions with adaptation and mitigation benefits 3.4.3: Value chain actors adopting green interventions with adaptation and mitigation	<ul style="list-style-type: none"> <li>• Sector reports</li> <li>• Baseline survey</li> <li>• M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>• GHG accounting system will be developed and availed for use.</li> <li>• Value chain actors willingness to invest in climate smart interventions</li> </ul>
<b>Outcome 4: Communication systems on CSA, extension and agro-weather issues strengthened and mainstreamed</b>			
Outcome 4.1: CSA knowledge generation and dissemination enhanced	4.1.1: Institutions generating CSA knowledge 4.1.2: Information and knowledge management system 4.1.3: Service providers disseminating CSA knowledge 4.1.4: Value chain actors using CSA information	<ul style="list-style-type: none"> <li>• Institutional reports</li> <li>• Baseline survey</li> <li>• M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>• Operational information and knowledge management system in place</li> </ul>
Outcome 4.2: Extension on climate information services and agro-weather advisories enhanced	4.2.1: Climate smart information and agro-weather services and products 4.2.2: Extension service providers communicating climate smart information and agro-weather services 4.2.3: Value chain actors using climate information smart and agro-weather services and products	<ul style="list-style-type: none"> <li>• Sector extension reports</li> <li>• Agro-weather and seasonal planning reports</li> <li>• Baseline survey</li> <li>• M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>• Context specific climate information is aggregated and timely availed to users</li> </ul>

NARRATIVE SUMMARY	INDICATORS	MEANS OF VERIFICATION	RISKS AND ASSUMPTIONS
<b>Outcome 1.1: Inter-Ministerial and County Government Coordination improved</b>			
Output 1.1.1: A joint platform for collaboration between ministries responsible for agriculture, livestock, fisheries, irrigation, environment, forestry, water, land, planning, devolution and finance established and strengthened	<ul style="list-style-type: none"> <li>1.1.1.1 Inter-ministerial, inter-departmental (MIDAs) committees</li> <li>1.1.1.2 Inter-governmental coordination mechanism (JCCMAS)</li> <li>1.1.1.3 Joint sector/intergovernmental CSA programming mechanism (JAS-TWGs)</li> </ul>	<ul style="list-style-type: none"> <li>• Institutions and departmental reports</li> <li>• Baseline survey</li> <li>• M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>• Established mechanism (JCCMAS) and committees are functional and stable</li> </ul>
<b>Outcome 1.2: Partnerships with private sector and civil society organizations strengthened</b>			
Output 1.2.1: A platform for private sector and CSOs engagement with national and county governments established and strengthened	<ul style="list-style-type: none"> <li>1.2.1.1 Structured framework for private sector and CSOs engagement at both levels</li> <li>1.2.1.2 No. and types of functional CSA partnerships</li> </ul>	<ul style="list-style-type: none"> <li>• Partnership agreements/ MoUs</li> <li>• Baseline survey</li> <li>• M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>• A functional partnership platform exist</li> <li>• Provide funding for CSA partnership activities</li> </ul>
<b>Outcome 1.3: Programmatic Coordination with Development Partners strengthened</b>			
Output 1.3.1: Coordination and Collaboration between National / County Governments and Development Partners strengthened	<ul style="list-style-type: none"> <li>1.3.1.1: Joint National / County Governments -Development Partners on CSA programming mechanism</li> <li>1.3.1.2: No. and types of partnerships between national, counties and development partners</li> <li>1.3.1.3: No. of CSA programmes jointly developed and coordinated</li> </ul>	<ul style="list-style-type: none"> <li>• Sector projects / programmes, reports</li> <li>• Baseline survey</li> <li>• M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>• Joint mechanism for coordinating for CSA programmes</li> </ul>

NARRATIVE SUMMARY	INDICATORS	MEANS OF VERIFICATION	RISKS AND ASSUMPTIONS
Output 1.3.2: Joint country CSA programme funding mechanism established	<p>1.3.2.1: Joint National / County Governments – Development Partners CSA program financing mechanism</p> <p>1.3.2.2: Amount of funding allocated to CSA program coordination from governments and Development Partner sources</p> <p>1.3.2.3: No. of Development Partners jointly funding CSA projects/ programmes</p>	<ul style="list-style-type: none"> <li>• Sector Development partners reports</li> <li>• Sector projects / programmes reports</li> <li>• Baseline survey</li> <li>• M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>• Prudent utilizations of resources allocated to CSA projects/ programmes</li> </ul>
<b>Outcome 1.4: Research-Extension Liaison framework strengthened</b>			
Output 1.4.1: Functional Research – Extension - Linkage established	<p>1.4.1.1. Functional climate smart research extension linkage mechanism</p> <p>1.4.1.2. No. and types of functional climate smart research extension partnerships at all levels</p> <p>1.4.1.3. No. and type of CSA technologies packages disseminated to actors at all levels</p>	<ul style="list-style-type: none"> <li>• Sector reports</li> <li>• Baseline survey</li> <li>• M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>• Operational CSA Research/Extension linkages in place</li> </ul>
Output 1.4.2: Market-led CSA adaptive research and participatory extension programmes enhanced	<p>1.4.2.1: No. and types of functional market-led, adaptive CSA research along the value chain</p> <p>1.4.2.2: No. of issues-based CSA adaptive research</p> <p>1.4.2.3: No. and types of appropriate adaptive CSA technological packages developed</p> <p>1.4.2.4: No. and type of improved CSA technologies and practices</p>	<ul style="list-style-type: none"> <li>• Research output reports</li> <li>• Baseline survey</li> <li>• M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>• Demand for market-led , issue based CSA adaptive research</li> </ul>

NARRATIVE SUMMARY	INDICATORS	MEANS OF VERIFICATION	RISKS AND ASSUMPTIONS
<b>Outcome 1.5: CSA research funding improved</b>	1.5.1.1: Proportion of budget of agricultural sector allocated to CSA research 1.5.1.2: No. and type of CSA research innovations funded by partners	<ul style="list-style-type: none"> <li>Sector reports</li> <li>Partner funding reports</li> <li>M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>Adequate funding will be availed for CSA research innovations and development by partners</li> </ul>
<b>Sub-Outcome 1.6: Appropriate CSA policies, strategies and regulations reviewed, developed and rolled out</b>			
Output 1.6.1: Appropriate climate smart policies, strategies and regulations developed, reviewed and implemented.	1.6.1.1: No and types of CSA polices, strategies and regulations prepared and rolled out 1.6.1.2: No and types of CSA implementation frameworks developed and in use	<ul style="list-style-type: none"> <li>Policies, strategies and regulations documents</li> <li>M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>Policies, strategies and regulations passed by relevant authorities at the national and county levels in good time.</li> </ul>
<b>Outcome 1.7: CSA data collection, information management and dissemination systems strengthened</b>			
Output 1.7.1: CSA M&E system established	1.7.1.1: No of CSA M&E systems established 1.7.1.2: Functional CSA M&E systems	<ul style="list-style-type: none"> <li>M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>Harmonizing CSA M&amp;E systems</li> </ul>
Output 1.7.2: CSA information management systems strengthened	1.7.2.1: Number of CSA information and communication systems 1.7.2.2: Type of CSA information and communication systems in use	<ul style="list-style-type: none"> <li>Communication strategy documents</li> <li>Baseline surveys</li> <li>M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>Service providers and partners avail and package climate smart information</li> <li>Mechanism for Information security in place</li> </ul>
<b>Outcome 1.8: Capacities of institutions relevant to CSA at all levels strengthened</b>			
Output 1.8.1: Capacity of institutions relevant to CSA strengthened	1.8.1.1: No. and type of CSA relevant institutions with improved capacity	<ul style="list-style-type: none"> <li>M&amp;E reports</li> <li>Institutions reports</li> <li>Training reports</li> <li>Procurement plans and reports</li> </ul>	<ul style="list-style-type: none"> <li>Stakeholders not adhering to policies and legislations</li> </ul>

NARRATIVE SUMMARY	INDICATORS	MEANS OF VERIFICATION	RISKS AND ASSUMPTIONS
<p><b>Outcome 2.1: Access to and use of adaptive technologies enhanced</b></p> <p>Output 2.1.1. Adoption of improved adaptive technologies for crops enhanced</p>	<p>2.1.1.1: No. and type of CSA adaptive technologies for crops in use</p> <p>2.1.1.2: No. and type of CSA adaptive technologies for crops developed and piloted</p> <p>2.1.1.3: No of Public Private Partnerships involved in promotion of improved CSA adaptive technologies for crops.</p>	<ul style="list-style-type: none"> <li>• Baseline surveys</li> <li>• Sectors reports</li> <li>• Research Publications</li> <li>• M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>• Adoption of improved adaptive technologies by value chain actors</li> <li>• Partnerships will be effective</li> </ul>
<p>Output 2.1.2. Adoption of improved adaptive technologies for livestock enterprises enhanced</p>	<p>2.1.2.1: No. and type of improved CSA adaptive technologies for livestock enterprises in use</p> <p>2.1.2.2: No. and type of improved CSA adaptive technologies developed and piloted for livestock enterprises</p> <p>2.1.2.3: No of Public Private Partnerships involved in promotion of improved CSA adaptive technologies for livestock enterprises</p>	<ul style="list-style-type: none"> <li>• Baseline surveys</li> <li>• Sectors reports</li> <li>• Research publications</li> <li>• M&amp;E reports</li> </ul>	
<p>Output 2.1.3. Adoption of improved adaptive technologies for capture and culture fish enhanced</p>	<p>2.1.3.1: No. and type of improved CSA adaptive fish technologies in use</p> <p>2.1.3.2: No. and type of improved CSA adaptive fish technologies developed and piloted</p> <p>2.1.3.3: No. of PPP involved in promotion of improved CSA adaptive fish technologies</p>	<ul style="list-style-type: none"> <li>• Baseline surveys</li> <li>• Sectors reports</li> <li>• Research publications</li> <li>• M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>• Inclusion of all value chain actors in piloting and scaling up of improved adaptive fish technologies</li> </ul>

NARRATIVE SUMMARY	INDICATORS	MEANS OF VERIFICATION	RISKS AND ASSUMPTIONS
<b>Outcome 2.2: Area under efficient irrigation increased</b>			
Output 2.2.1: Area under efficient and renewable energy powered irrigation systems increased	2.2.1.1: Acreage under efficient and renewable energy powered irrigation systems 2.2.1.2: No. of farmers using efficient and renewable energy powered irrigation systems	<ul style="list-style-type: none"> <li>• Sector reports</li> <li>• Baseline survey</li> <li>• M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>• Renewable sources of energy and technologies are available to stakeholders</li> </ul>
Output 2.2.2: Application of efficient water use adaptive technologies in existing and new irrigation systems improved	2.2.2.1: No. and type of appropriate efficient irrigation technological packages promoted 2.2.2.1: No. and type of appropriate efficient irrigation technological packages in use 2.2.2.3: No. of Water Users' Associations with capacity in efficient irrigation water management	<ul style="list-style-type: none"> <li>• Sector reports</li> <li>• Baseline survey</li> <li>• M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>• Private sector, CSOs and county government's commit to promote and avail water resource-use efficient adaptive technologies</li> <li>• Capacity to purchase adaptive irrigation technologies</li> </ul>
<b>Outcome 2.3: New products developed and value addition of commodities enhanced</b>			
Output 2.3.1: Development of new commercially viable products (crops, livestock and fisheries) supported	2.3.1.1: No. and type of CSA value addition technologies innovated and piloted 2.3.1.2: No. and type of CSA value addition technologies in use 2.3.1.3: No. and type of suitable non-traditional export product	<ul style="list-style-type: none"> <li>• Sector reports</li> <li>• Baseline survey</li> <li>• M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>• Value chain actors will support CSA value addition innovation, development and commercialization.</li> </ul>
Output 2.3.2: Suitable value chains in each agro-ecological zone selected and developed	2.3.2.1: No. and type of suitable pilot value chains for identified 2.3.2.2: No. and type of actors along selected suitable value chains 2.3.2.3: No. and type of products from the selected suitable value chains	<ul style="list-style-type: none"> <li>• Sector reports</li> <li>• Baseline survey</li> <li>• M&amp;E reports</li> <li>• Labeled products</li> </ul>	<ul style="list-style-type: none"> <li>• Actors will cooperate in the development of suitable value chains</li> </ul>



NARRATIVE SUMMARY		INDICATORS	MEANS OF VERIFICATION	RISKS AND ASSUMPTIONS
<b>Outcome 2.4: Competitiveness and markets access for climate smart produce/ products enhanced</b>				
Output 2.4.1: Marketed climate smart commodities	<p>2.4.1.1: Quantity and value of climate smart products marketed</p> <p>2.4.1.2: No. and types of producers marketing climate smart products</p> <p>2.4.1.3: No. and types of CSA producers with functional market linkages</p>	<ul style="list-style-type: none"> <li>Market survey reports</li> <li>Marketing contracts</li> <li>Baseline survey</li> <li>M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>Market stability</li> </ul>	
Output 2.4.2: Export of non-traditional agricultural commodities by producers increased	<p>2.4.2.1: Quantity and value of non-traditional CSA products exported by producers</p> <p>2.4.2.2: No. and type of producers exporting non-traditional CSA products</p> <p>2.4.2.3: No. and types of producers exporting non-traditional CSA products with functional market linkages</p>	<ul style="list-style-type: none"> <li>Market survey reports</li> <li>Marketing contracts</li> <li>Baseline survey</li> <li>M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>Smallholder producers have access to export markets for non-traditional CSA products</li> </ul>	
Output 2.4.3: Grading and standardization systems for CSA commodities developed	<p>2.4.3.1: Functional grading and standardization systems for CSA commodities in place</p> <p>2.4.3.2: No. and type of smallholder producers adopting grading and standardization systems</p> <p>2.4.3.3: Functional CSA commodities traceability mechanism in place</p>	<ul style="list-style-type: none"> <li>Grading and standardization manuals</li> <li>Traceability guidelines</li> <li>Market survey reports</li> <li>Baseline survey</li> <li>M&amp;E reports</li> <li>Compliance certificates</li> </ul>	<ul style="list-style-type: none"> <li>Grading and standardization systems are enforced.</li> <li>Small scale producers adopt grading and standardization systems</li> </ul>	
<b>Outcome 2.5: Food and feed storage and distribution improved</b>				
Output 2.5.1: Post harvest losses along agricultural value chains reduced	<p>2.5.1.1: Quantity and value of post-harvest losses reduction across the value chain</p> <p>2.5.1.2: Actors using climate smart storage facilities and technologies</p> <p>2.5.1.3: No. and type of climate smart storage facilities and technologies in use</p>	<ul style="list-style-type: none"> <li>Sector reports</li> <li>Baseline surveys</li> <li>M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>Availability of climate smart post-harvest technologies</li> <li>Value chain actors have skills in post-harvest technologies</li> </ul>	

NARRATIVE SUMMARY	INDICATORS	MEANS OF VERIFICATION	RISKS AND ASSUMPTIONS
Output 2.5.2: Private sector storage capacity for agricultural products enhanced	2.5.2.1: Private sector storage capacity for agricultural produce/products 2.5.2.2: Type of warehousing receipt systems in place 2.5.2.3: No. and type of producers linked to warehousing receipt system 2.5.2.4: No. and type of warehouse receipting service providers 2.5.2.5: Proportion of storage facilities using green energy	<ul style="list-style-type: none"> <li>Public and private Sector reports</li> <li>Baseline surveys</li> <li>M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>Capacity of private sector to invest in storage facilities</li> <li>Availability of climate smart storage facilities</li> </ul>
Output 2.5.3: Communities and household capacity to store agricultural produce enhanced	2.5.3.1: No. of households sustainably storing agricultural produce 2.5.3.2: No. and type of communities adopting climate smart storage facilities 2.5.3.3: No. and types of climate smart storage facilities at household and community level	<ul style="list-style-type: none"> <li>Sector reports</li> <li>Baseline surveys</li> <li>M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>Climate smart storage technologies are available</li> </ul>
Output 2.5.4: Strategic food reserve expanded to include appropriate agricultural products and strategic feed/grazing reserves established	2.5.4.1. Strategic reserve capacity for climate smart agricultural products 2.5.4.2. Amount and type of strategic food reserves 2.5.4.3. Amount and type of strategic feed/grazing reserves	<ul style="list-style-type: none"> <li>Sector reports</li> <li>Baseline surveys</li> <li>M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>Policies on strategic food and feed reserves developed and implemented</li> </ul>

NARRATIVE SUMMARY	INDICATORS	MEANS OF VERIFICATION	RISKS AND ASSUMPTIONS
<p><b>Outcome 3.1: Soil health improved and degraded lands rehabilitated</b></p> <p>Output 3.1.1: Climate smart integrated soil fertility management technologies and practices adopted</p>	<p>3.1.1.1. No. and type of climate smart integrated soil and water management technologies in practice</p> <p>3.1.1.2. No. of farmers adopting climate smart integrated soil and water management technologies</p> <p>3.1.1.3. No. and type of private sector service providers on climate smart integrated soil and water management technologies</p> <p>3.1.1.4. No. and type of farmers' organizations supporting climate smart integrated soil and water management technologies</p>	<ul style="list-style-type: none"> <li>• Sector reports</li> <li>• Baseline surveys</li> <li>• M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>• Climate smart integrated soil and water management technologies are available</li> </ul>
<p>Output 3.1.2: Sustainable land management and rehabilitation of degraded lands enhanced</p>	<p>3.1.2.1: Mechanisms for addressing land management and rehabilitation of degraded lands</p> <p>3.1.2.2: No. and type of initiatives on land management and rehabilitation of degraded lands</p> <p>3.1.2.3: Area of degraded land rehabilitated</p>	<ul style="list-style-type: none"> <li>• Sector reports</li> <li>• Baseline surveys</li> <li>• M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>• Willingness and active participation of stakeholders in land management and rehabilitation of degraded lands</li> </ul>
<p><b>Outcome 3.2: Water and other natural resources conserved</b></p>			
<p>Output 3.2.1: Water and other natural resources conserved</p>	<p>3.2.1.1: No. and type of climate smart water conservation measures in place</p> <p>3.2.1.2: No. and type of climate smart forests/ecosystem conservation measures</p> <p>3.2.1.3: No. and type of value chain actors adopting climate smart water and forests/ecosystem conservation measures</p>	<ul style="list-style-type: none"> <li>• Water resources management plans</li> <li>• Forest/Ecosystem management plans</li> <li>• Sector reports</li> <li>• Baseline surveys</li> <li>• M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>• Climate smart water and natural resources conservation technologies are available</li> </ul>

NARRATIVE SUMMARY	INDICATORS	MEANS OF VERIFICATION	RISKS AND ASSUMPTIONS
<p>Output 3.2.2: Integration of climate smart practices in conservation and rehabilitation of water catchment areas enhanced</p>	<p>3.2.2.1: Mechanisms for climate smart integrated watershed management  3.2.2.2: No. and type of agroforestry practices integrated in watershed management plans  3.2.2.3: No. and type of climate smart soil and water conservation measures integrated in watershed management plans  3.2.2.4: No. and type of climate smart biodiversity conservation measures integrated in watershed management plans  3.2.2.4: No. and type of climate smart PPPs supporting climate smart integrated watershed management  3.2.2.5: No. and type of climate smart rangeland management practices integrated in the watershed management plans  3.2.2.6: No. and type of business plans for watershed management plans  3.2.2.7: No. and type of non-traditional livelihood opportunities linked to the integrated in the watershed management plans</p>	<ul style="list-style-type: none"> <li>• Watershed management plans</li> <li>• Ecosystem management plans</li> <li>• Sector reports</li> <li>• Baseline surveys</li> <li>• M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>• Stakeholders adopt integrated watershed management plans</li> </ul>

NARRATIVE SUMMARY	INDICATORS	MEANS OF VERIFICATION	RISKS AND ASSUMPTIONS
Output 3.2.3: Production of freshwater aquaculture, marine fisheries and inland fisheries from rivers and lakes increased	3.2.3.1: Quantity of capture fish produced by type 3.2.3.2: No. and type of value chain actors practicing climate smart capture fisheries management practices 3.2.3.3: No. of fisher folks adopting climate smart stock and fishing management practices 3.1.2.4: No. of climate smart fish breeding sites	<ul style="list-style-type: none"> <li>• Sector reports</li> <li>• Baseline surveys</li> <li>• M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>• Availability of climate smart capture and aquaculture management technologies</li> </ul>
<b>Outcome 3.3: Insurance and other safety nets enhanced</b>			
Output 3.3.1: Crop, livestock and fisheries innovative index-based insurance increased	3.3.1.1: No. and type of climate smart innovative index-based insurance in use 3.3.1.2: No. and type of actors involved in provision of climate smart innovative index-based insurance 3.3.1.3: No. and type of value chain actors using climate smart innovative index-based insurance	<ul style="list-style-type: none"> <li>• Sector reports</li> <li>• Baseline surveys</li> <li>• M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>• Insurance packages for all value chain are availed</li> </ul>
Output 3.3.2: CSA safety nets enhanced	3.3.2.1: Mechanism for climate smart safety nets management 3.3.1.2: No. and type of CSA safety net services 3.3.1.3: No. and type of actors using CSA safety net services	<ul style="list-style-type: none"> <li>• Sector reports</li> <li>• Baseline surveys</li> <li>• M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>• Stakeholders not adhering to the safety nets mechanism</li> </ul>

NARRATIVE SUMMARY	INDICATORS	MEANS OF VERIFICATION	RISKS AND ASSUMPTIONS
<b>Outcome 3.4: Synergies in adaptation and mitigation promoted</b>			
Output 3.4.1: GHG emissions intensity from the agriculture sector reduced without compromising productivity	3.4.1.1: No. and type of adaptive technologies that minimize GHG emission and enhance carbon sequestration 3.4.1.2: No. and type of value chain actors using adaptive technologies that minimize GHG emission and enhance carbon sequestration	<ul style="list-style-type: none"> <li>• Sector MRV reports</li> <li>• Baseline surveys</li> <li>• M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>• Availability of carbon accounting and measurement, reporting and verification expertise</li> </ul>
Output 3.4.2: Resilience building adaptation technologies that have mitigation as co-benefits promoted	3.4.1.3: Agriculture sector carbon accounting and measurement, reporting and verification system in place 3.4.2.1: No. and type of resilience building adaptation technologies with mitigation as co-benefits 3.4.2.2: No. and type of actors using resilience building adaptation technologies that have mitigation as co-benefits	<ul style="list-style-type: none"> <li>• Sector reports</li> <li>• Baseline surveys</li> <li>• M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>• Resilience building technologies with mitigation as co-benefits are available.</li> </ul>
<b>Outcome 4.1: CSA knowledge generation and dissemination enhanced</b>			
Output 4.1.1: CSA knowledge and innovations along the value chain generated	4.1.1.1: No. and type of CSA knowledge and innovations generated 4.1.1.2: No. and type of actors generating CSA knowledge and innovations	<ul style="list-style-type: none"> <li>• Sector reports</li> <li>• Baseline surveys</li> <li>• Innovation reports</li> <li>• M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>• Funds for climate smart agriculture research will be available.</li> </ul>
Output 4.1.2: CSA knowledge and information management systems at all levels established	4.1.2.1: Functional national, county and community CSA knowledge and information management systems 4.1.2.2: No. and type of actors using CSA knowledge and information management systems	<ul style="list-style-type: none"> <li>• Sector reports</li> <li>• Baseline surveys</li> <li>• System manuals</li> <li>• KIM System</li> <li>• M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>• National and county policies support acquisition, storage and sharing of CSA knowledge and information</li> </ul>

NARRATIVE SUMMARY	INDICATORS	MEANS OF VERIFICATION	RISKS AND ASSUMPTIONS
Output 4.1.3: Best CSA practices documented, packaged and disseminated	<p>4.1.3.1: No. and type of participatory trials and demos for CSA practices</p> <p>4.1.3.2: No. and type of CSA practices documented</p> <p>4.1.3.3: No. and type of CSA practices packaged and disseminated</p>	<ul style="list-style-type: none"> <li>• Sector reports</li> <li>• Baseline surveys</li> <li>• Knowledge documents</li> <li>• M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>• Existence of strong stakeholder linkages</li> </ul>
Output 4.1.4: CSA knowledge products for multimedia and training produced, packaged, updated and communicated	<p>4.1.4.1: No. and type of multimedia CSA knowledge products</p> <p>4.1.4.2: No. and type of CSA knowledge training packages</p>	<ul style="list-style-type: none"> <li>• Baseline surveys</li> <li>• M&amp;E reports</li> <li>• CSA knowledge packages</li> </ul>	<ul style="list-style-type: none"> <li>• Multimedia and training institutions will support CSA knowledge</li> </ul>
	4.1.4.3: No. and type of actors involved in CSA knowledge products production, packaging, updating and communication		
Output 4.1.5: CSA knowledge networks and partnerships strengthened	<p>4.1.5.1: Mechanism for strengthening CSA knowledge and information sharing</p> <p>4.1.5.2: Type of CSA information sharing technology tools</p> <p>4.1.5.3: No. and type of CSA knowledge partnerships</p> <p>4.1.5.4: No. and type of public-private-partnerships for CSA knowledge management in place</p>	<ul style="list-style-type: none"> <li>• Baseline surveys</li> <li>• Partnership platforms</li> <li>• M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>• Willingness by partners to collaborate in CSA knowledge and information sharing</li> </ul>

NARRATIVE SUMMARY	INDICATORS	MEANS OF VERIFICATION	RISKS AND ASSUMPTIONS
<p><b>Outcome 4.2: Extension on climate information services and agro-weather advisories enhanced</b></p> <p>Output 4.2.1: Delivery of extension services on climate smart information and agro-weather advisories enhanced</p>	<p>4.2.1.1: Mechanism for downscaling forecasted weather to various localities</p> <p>4.2.1.2: No. and type of appropriate climate smart weather services and products</p> <p>4.2.1.3: Pre-season agro weather advisories integrated into extension service systems approaches</p> <p>4.2.1.4: No. and type of actors using agro-weather products</p> <p>4.2.1.5: Monitoring system for in-season and post-season agro-weather review</p>	<ul style="list-style-type: none"> <li>• Baseline surveys</li> <li>• Downscaled weather reports</li> <li>• Agro-weather advisories</li> <li>• M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>• Availability of precise downscaled weather information</li> </ul>
<p>Output 4.2.2: Early warning systems and contingency plans for climate change response strengthened</p>	<p>4.2.2.1: Functional early warning systems</p> <p>4.2.2.2: No. of functional contingency plans</p> <p>4.2.2.3: Efficient mechanisms for disseminating early warning information</p> <p>4.2.2.4: Number and type of value chain actors using early warning information</p>	<ul style="list-style-type: none"> <li>• Baseline surveys</li> <li>• Early warning documents</li> <li>• M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>• Actors will invest in early warning systems</li> </ul>



NARRATIVE SUMMARY	INDICATORS	MEANS OF VERIFICATION	RISKS AND ASSUMPTIONS
Output 4.2.3: Disaster and climate risk preparedness and mitigation practices for the most vulnerable livelihood identified and disseminated	<p>4.2.3.1: No. and type of disaster and climate risk preparedness and mitigation practices for the most vulnerable livelihood</p> <p>4.2.3.2: No. and type of most vulnerable groups adopting disaster and climate risk preparedness and mitigation practices</p>	<ul style="list-style-type: none"> <li>• Baseline surveys</li> <li>• Sector reports</li> <li>• M&amp;E reports</li> </ul>	<ul style="list-style-type: none"> <li>• Stakeholders to prioritize the most vulnerable groupings</li> </ul>
Output 4.2.4: Adoption of improved CSA technologies and practices by value chain enhanced	<p>4.2.4.1: No. and type of improved CSA technologies and practices</p> <p>4.2.4.2: No. and type of value chain actors adopting improved CSA technologies and practices</p>	<ul style="list-style-type: none"> <li>• Baseline surveys</li> <li>• M&amp;E reports</li> <li>• Sector reports</li> </ul>	<ul style="list-style-type: none"> <li>• Affordability of CSA technologies and practices</li> </ul>

## Annex 2: Ten year KCSAIF investment plan and budget (2018-2027)

Component/Sub-component	2018-2022	2023-2027	Total Budget (Billions KSh.)	
<b>1.0 Institutional Coordination</b>				
1.1:Inter-Ministerial and County Government Coordination	1.84	1.84	3.68	
1.2:Partnerships with private sector and civil society organizations	1.84	1.84	3.68	
1.3:Programmatic Coordination with Development Partners	1.84	1.84	3.68	
1.4: Research-Extension Liaison framework	1.84	1.84	3.68	
1.5: CSA research funding improved	1.84	1.84	3.68	
1.6:Appropriate CSA policies, strategies and regulations reviewed, prepared and rolled out	1.84	1.84	3.68	
1.7:CSA data collection, information management and dissemination systems supported	1.84	1.84	3.68	
1.8:Capacities for institutions relevant to CSA at all levels strengthened	1.84	1.84	3.68	
<b>Sub-total</b>	<b>14.72</b>	<b>14.72</b>	<b>29.44</b>	
<b>2.0 Agricultural Productivity and Socially Inclusive Value Chain Integration</b>				
2.1:Access to and use of adaptive technologies enhanced	5.52	5.52	11.04	
2.2:Area under efficient irrigation increased	3.68	3.68	7.36	
2.3:New products developed and value addition of commodities enhanced	3.68	4.91	8.59	
2.4:Competitiveness and markets access for climate smart produce/ products enhanced	5.52	5.52	11.04	
2.5:Food and feed storage and distribution improved	7.36	7.36	14.72	
<b>Sub-total</b>	<b>25.76</b>	<b>26.99</b>	<b>52.75</b>	
<b>3.0 Enhancing Resilience and Associated Mitigation Co-benefits</b>				
3.1:Soil health improved and degraded lands rehabilitated	3.68	3.68	7.36	
3.2:Water and other natural resources conserved	5.52	5.52	11.04	
3.3:Insurance and other safety nets enhanced	3.68	3.68	7.36	
3.4:Synergies in adaptation and mitigation enhanced	1.84	1.84	3.68	
Sub-total	14.72	14.72	29.44	
<b>4.0 Communication Systems on CSA Extension and Agro-weather issues strengthened and mainstreamed</b>				
4.1: CSA knowledge generated and disseminated	11.04	11.04	22.08	
4.2: Extension on climate info services and agro-weather advisories enhanced	9.20	9.20	18.40	
Sub-total	20.24	20.24	40.48	
<b>5.0 Monitoring &amp; Evaluation</b>	<b>Sub-total</b>	<b>7.60</b>	<b>7.60</b>	<b>15.20</b>
<b>TOTAL</b>	<b>83.04</b>	<b>84.27</b>	<b>167.31</b>	

## Annex 3:

### Team of Experts involved in development of the KCSAIF 2018-2027

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## Annex 4:

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## Annex 5:

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## Annex 6: Team of Experts that finalised KCSAIF

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## Annex 7: Lists of participants in County consultations

List of Participants in County Consultations: Venue Kitui – 8th to 12th June 2016 (Lamu, Wajir, Mandera, Tana River, Garissa Counties)

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46.	Naphtaly Odhoch	Meteorology - Nyamira	Director
47.	Michael Lochampa	Livestock-Nyamira	Animal Production
48.	David Munyi	Agriculture-Nyamira	Director
49.	Philip K. Ruto	Fisheries- Nyamira	Director
50.	Oliver Agado	Irrigation- Nyamira	Irrigation Engineer

**List of Participants at Embu Venue – 20th to 23rd March 2017 (Nairobi, Marsabit, Kirinyaga, Meru, Isiolo, Samburu, Tharaka Nithi, Muranga, Nyeri, Samburu Counties)**

No.	Name	Institution/County	Job Title
1.	Walter Mugambi	Agriculture-Tharaka Nithi	County Chief Officer
2.	Robin Mbae	MALF-CCU	Deputy Director
3.	Veronica Ndetu	MALF-CCU	Principal Agricultural Officer
4.	Davies Mukwabi	MALF-CCU	Senior Fisheries Officer
5.	Lucy Ng'ang'a	MALF-CCU	Chief Agricultural Officer
6.	Rose Akombo	MENR-KFS	Assistant Director
7.	Benjamin Kibor	MALF-CCU	Principal Livestock Production
8.	Peter Karani	MALF-SDA	Driver
9.	Joab Osumba	FICCP(DFiD)	Consultant
10.	Zipora Otieno	FAO-KE	Technical Coordinator
11.	Phylis Obayo	FAO-KE	Operations Assistant
12.	James Gakuo	Fisheries-Nyeri	Principal Fisheries Officer
13.	Eric Wetende	Livestock-Nairobi City	Assistant Director
14.	Jared Bogita	Fisheries-Marsabit	Assistant Director
15.	Julius Gitu	Agriculture-Marsabit	Director
16.	Moses Lengarite	Livestock-Marsabit	Director
17.	Ephraim Nderu	Livestock-Kirinyaga	Senior Assistant Director
18.	Ann Kimotho	Fisheries-Kirinyaga	Assistant Director
19.	Raymond Ng'etich	Fisheries-Meru	Senior Fisheries Officer
20.	Felix Muthomi	Fisheries-Isiolo	Assistant Director
21.	Njeru Ndwiga	Agriculture-Samburu	Principal Agricultural Officer
22.	Simon Lepakiyo	Fisheries- Samburu	Fisheries Officer
23.	Stephen Gichunge	Fisheries-Tharaka Nithi	Assistant Director

No.	Name	Institution/County	Job Title
24.	Joseph Ngari	Agriculture-Isiolo	Assistant Director
25.	Rachel Kamau	Fisheries-Nairobi City	Principal Fisheries Officer
26.	Peter Nyamora	Livestock-Murang'a	Senior Assistant Director
27.	Dr. Lucy Kareithi	Livestock-Tharaka Nithi	Assistant Director
28.	Elizabeth Njau	Agriculture-Nairobi City	Principal Agricultural Officer
29.	John Rauni	Fisheries-Murang'a	Principal Fisheries Officer
30.	Ruth Mwangi	Livestock-Nyeri	Deputy Director
31.	Ephantus Mwangi	Agriculture-Nyeri	Deputy Director
32.	Judith Katumo	Agriculture-Samburu	Principal
33.	Benson Muriithi	Agriculture-Kirinyaga	Deputy Director
34.	David Mululu	Agriculture-Tharaka Nithi	Assistant Director
35.	Dr. Joseph Muriira	Veterinary-Isiolo	Assistant Director
36.	Ibrahim Hassan	Environment-Marsabit	Environment Officer
37.	Evans Mwiti	Livestock-Meru	Chief Livestock Production
38.	Murigi Kahiu	Agriculture-Murang'a	Chief Agricultural Officer

**List of Participants in County Consultations: Venue Naivasha 27th - 30th March 2017  
(Nyandarua, Baringo, Bomet, Laikipia, Kajiado, Kiambu, Embu, Narok and Nakuru Counties)**

No.	Name	Institution/County	Job Title
1.	Veronica Ndetu	MALF-CCU	Principal Agricultural Officer
2.	Davies Mukwabi	MALF-CCU	Senior Fisheries Officer
3.	Rose Akombo	MENR-KFS	Assistant Director
4.	Benjamin Kibor	MALF-CCU	Principal Livestock Production
5.	Peter Karani	MALF-SDA	Driver
6.	Joab Osumba	FICCP(DFiD)	Consultant
7.	Zipora Otieno	FAO-KE	Technical Coordinator
8.	Phylis Obayo	FAO-KE	Operations Assistant
9.	Lucy Ng'ang'a	MALF-CCU	Chief Agricultural Officer
10.	Irene Wambugu	Livestock -Nyandarua	Principal Livestock Production
11.	Richard Bundotich	Livestock-Baringo	Assistant Director
12.	Joel Maina	Agriculture-Baringo	Assistant Director
13.	Patrick Too	Agriculture-Bomet	Director
14.	Felix Lagat	Fisheries-Bomet	Director
15.	Dickson Ogwai	Fisheries-Baringo	Director
16.	Dr. Daniel Ndung'u	Livestock-Laikipia	Director
17.	Jamin Rutto	Agriculture-Narok	Chief Agricultural Officer
18.	Elizabeth Mwangi	Agriculture-Laikipia	Director
19.	Peterson Njue	Fisheries-Laikipia	Director
20.	Silvester Karinge	Irrigation-Nyandarua	Chief Irrigation Officer

No.	Name	Institution/County	Job Title
21.	Daniel Nyagaka	Agriculture-Kajiado	Assistant Director
22.	Benson Siangot	Fisheries-Kajiado	Senior Assistant Officer
23.	Duncan Swiwa	Livestock-Kajiado	Assistant Director
24.	Evans Kiplagat	Livestock-Bomet	Assistant Director
25.	Anne Koimbori	Agriculture-Kiambu	Director
26.	Olive Theuri	Fisheries-Kiambu	Principal Fisheries Officer
27.	Dr. Philip Ndarua	Livestock-Kiambu	Director
28.	Zachary Murimi	Livestock-Embu	Senior Assistant Director
29.	Justin Ireri	Fisheries-Embu	Assistant Director
30.	Benard Kimeto	Livestock-Narok	Principal Livestock Production
31.	Vincent Kinyua	Fisheries-Narok	Principal Fisheries Officer
32.	John Nyaga	Agriculture-Embu	Assistant Director
33.	Jackson Kamau	Fisheries-Nyandarua	Principal Fisheries Officer
34.	Mathew Ngila	Fisheries-Nakuru	Principal Fisheries Officer
35.	Michael Reuben	Livestock-Nakuru	Director
36.	Grace Kirui	Agriculture- Nakuru	Director
37.	Margaret Mwaniki	Agriculture-Nyandarua	Assistant Director



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