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# **Abbreviations**

ADA Adaptation Consortium

ASAL Arid and Semi-Arid Land

**CCAFS** Climate Change, Agriculture and Food Security

**CCD** Climate Change Directorate

CGIAR Consultative Group on International Agricultural Research

CIS climate information services
CSA climate-smart agriculture

**FAO** Food and Agriculture Organization of the United Nations

**GEF** Global Environment Facility

GIZ Gesellschaft Für Internationale Zusammenarbeit Gmbh (German development agency)

**GoK** Government of Kenya

INSEFOODS African Center of Excellence in the Sustainable Use of Insects as Food and Feed

**KALRO** Kenya Agricultural and Livestock Research Organization

**KCSAP** Kenya Climate Smart Agriculture Project

KIPPRA Kenya Institute for Public Policy Research and Analysis

**KMAP** Kenya Market-led Aquaculture Programme

KMD Kenya Meteorological Department

**M&E** Monitoring and evaluation

MEL Monitoring, evaluation, and learning

MALF&C Ministry of Agriculture, Livestock, Fisheries and Cooperatives

**MoEF** Ministry of Environment and Forestry

NAP National Adaptation Plan

NCCAP National Climate Change Action Plan

NDC nationally determined contribution

NDMA National Drought Management Authority

**UNFCCC** United Nations Framework Convention on Climate Change

**USAID** United States Agency for International Development

# **Executive Summary**

Kenya's National Adaptation Plan (NAP) 2015–2030—the country's first NAP—was prepared and submitted to the United Nations Framework Convention on Climate Change (UNFCCC) in 2016. The NAP was a critical response to the climate change challenge and helped to operationalise the country's first National Climate Change Action Plan (NCCAP) 2013–2017 and set out priority areas to guide their second, NCCAP 2018–2022. In addition, the NAP guided and was aligned with the country's nationally determined contribution (NDC), which was first submitted to the UNFCCC in 2016 and then updated in 2020. The NCCAP 2018–2022 is the 5-year implementation plan to deliver on the actions in Kenya's NAP and NDC.

This first review of progress made on the implementation of NAP 2015–2030 examines progress in the agriculture sector, which includes the agriculture (crops), livestock, and fisheries sectors. The NAP aimed to enhance the climate resilience of these three sectors and set out aspirational actions to be undertaken in the short, medium, and long terms. This report on progress is a qualitative review of activities undertaken that contribute to achieving the objectives of the NAP process in the agriculture sector. In addition, this review identifies successes and challenges in implementing the NAP and sets out recommendations for future evaluations.

The review demonstrates that a significant number of initiatives have been or are being implemented to deliver on the priority agriculture actions set out in NAP 2015–2030. The enabling environment has been improved with the passing of legislation and the approval of policies and plans at the national and country levels. This includes the Climate Change Act (2016), the NCCAP 2018–2022, Kenya Climate Smart Agriculture Strategy 2017–2026, and Kenya Climate Smart Agriculture Implementation Framework 2018–2027. Four counties have prepared climate-smart agriculture action plans, seven counties enacted County Climate Change Fund legislation, and most of the 47 counties included climate change actions in their County Integrated Development Plans.

The coordination of and reporting on the mainstreaming of adaptation in the agriculture sector is led by the Climate Change Directorate (CCD), Ministry of Environment and Forestry, working in close collaboration with the Ministry of Agriculture, Livestock, Fisheries and Cooperatives and county governments that are responsible for implementing agriculture, livestock, and fisheries initiatives. The Climate Smart Agriculture Multistakeholder Platform, which was established in 2020, helps to coordinate stakeholders.

In the crops sector, initiatives have been implemented to promote Indigenous Knowledge on crops and promote new food habits. The Kenya Climate Smart Agriculture Project played a key role in conducting climate risk assessments and increasing awareness of the impacts of climate change on the agriculture

sector. The promotion of climate-smart agricultural practices to further the goals of NAP 2015–2030 included the development and dissemination of drought-tolerant crops, sustainable land management, improved crop storage facilities, drip irrigation, water pans, and crop insurance. Various programmes built the capacity of and provided loans for the adaptation actions of smallholder farmers, some with an emphasis on women; further, work was undertaken to prepare and disseminate climate information, including localised and down-scaled climate information services and agro-weather forecasts.

In the livestock sector, adaptation initiatives have helped to strengthen land management systems, including improved rangeland management and restoration of degraded lands. Work was undertaken to improve animal feeds and forage, increase their access to water, enhance breeding, and better manage livestock pests and diseases. Initiatives helped to diversity livelihoods, which is a critical action to build climate resilience, including the promotion of agroforestry, beekeeping, and moving from cattle to sheep, camels, and goats. Capacity was built through improved extension services and pasture field schools. A key programme that has assisted pastoralists in the Arid and Semi-Arid Lands is the Hunger Safety Net Programme, which provides cash transfers that increase the ability of pastoralist and other households to cope in times of drought.

Actions in the fisheries sector focused on improving the understanding of climate risks and building the capacity of governments and communities to address these risks. Various programmes helped to scale up climate-smart and sustainable fisheries practices, including the support of fish hatcheries, the establishment of recirculating aquaculture systems, and the bulk manufacture of fish feed.

The implementation of the NAP in the agriculture sector led to positive outcomes, including increased sector coordination, enhanced organisational capacity, improved knowledge, and enhanced policy influence. The national government-led by the CCD and Ministry of Agriculture, Livestock, Fisheries and Cooperatives—and county governments were instrumental in spearheading these actions and for mainstreaming adaptation across their plans, programmes, and budgets. The Government of Kenya was successful in attracting international finance for adaptation actions that included grant financing through the financial mechanism of the UNFCCC, including the Green Climate Fund, Adaptation Fund, and Global Environment Facility, and grant funds and concessional loans from multilateral and bilateral partners, such as the World Bank and the governments of Germany, the United Kingdom, and the United States. The international public funding has been directed toward irrigation projects, sustainable land management, enhancing the climate resilience of pastoralists, and promoting climatesmart agriculture, among other initiatives.

This review demonstrates that many adaptation activities have been implemented in the agriculture sector in Kenya. While this is a laudable achievement, work is still needed to improve or maintain agricultural production in a changing climate because Kenya has had limited success in increasing smallholder production, with climate change being a key challenge (Kenya Institute for Public Policy and Analysis, 2020). The NAP did not include indicators for the priority actions, and baseline data were

not collected. As such, this review was not able to accurately track progress on the NAP actions. Future evaluations will need a greater focus on examining the outcomes and results to help the government and citizens to understand whether adaptation actions are leading to the expected result of reduced climate vulnerability and enhanced climate resilience in the agricultural, livestock, and fisheries sectors.

#### Recommendations

The recommendations set out considerations for the future monitoring, evaluation, and learning of Kenya's NAP process.



Monitor progress on the NAP through the NCCAP annual progress reports, which track the implementation of priority actions set out in the NCCAP.



Identify and prepare stories/case studies of significant change to better understand the outcomes and benefits of adaptation actions, particularly at the local and community levels.



Focus future NAP reviews on evaluation and learning, to enable the government to understand whether and how the sector is adapting to address the impacts of climate change and to use this learning to inform policy and decision making.



Track finance for adaptation, beginning with international public finance, to better understand value for money and which investments result in the best adaptation outcomes.



Formulate some high-level conclusions in line with the Least Developed Countries Expert Group technical guidelines that recommend that reviews of the NAP process consider how climate change adaptation is integrated into development planning.



Align the next evaluation of the NAP with an updated climate and vulnerability risk assessment that will help to provide information on what has changed and the impact of adaptation actions.



Prioritise a review of gender issues and how adaptation actions are taken up by or impact women, children, and vulnerable groups.



Build on the good and robust monitoring, evaluation, and learning work undertaken by development partners to track adaptation results in their projects.



Explore methodologies to measure adaptation outcomes that draw on existing information. This could include tracking extreme weather events and comparing this information to higher-level indicators that are already collected for other purposes, such as agricultural production and payouts under the Hunger Safety Net Programme.



Use existing institutional structures and processes in future reviews of the NAP, such as those established by the CCD to review the implementation of the NCCAP and the Climate Smart Agriculture Multistakeholder Platform. In addition, the NAP review could build on the processes established to track the implementation of progress on the Sustainable Development Goals, the Convention on Biological Diversity, and the Sendai Framework for Disaster Risk Reduction.



# Introduction

Photo: Freepik

Kenya prepared its National Adaptation Plan (NAP) 2015–2030—the country's first NAP—and submitted it to the United Nations Framework Convention on Climate Change (UNFCCC) in 2016 (Government of Kenya [GoK], 2016c). The NAP was a critical response to the climate change challenge and helped to operationalise the country's National Climate Change Action Plan (NCCAP) 2013–2017, its first, and set out priority areas to guide its second, NCCAP 2018–2022 (GoK, 2013, 2018). In addition, the NAP guided and was aligned with the country's nationally determined contribution (NDC), which was first submitted to the UNFCCC in 2016 and then updated in 2020 (GoK, 2015, 2020).

The aim of this review is to describe the progress made on and the extent of implementation of NAP 2015–2030 in the agriculture sector, which includes the agriculture (crops), livestock, and fisheries sectors. Kenya's NAP aimed to enhance the climate resilience of these three sectors and set out aspirational actions to be undertaken in the short, medium, and long terms. This report on progress is a qualitative review of activities undertaken that contribute to achieving the objectives of the NAP process in the agriculture sector. In addition, this review identifies successes and challenges in implementing the NAP and sets out recommendations for future evaluations.

The NAP set out aspirational actions and provided guidance on priorities to 2030, and did not include indicators. The NCCAP 2018–2022 set out the implementation plan for the NAP and included indicators that would be tracked for the 5-year period. As such, this NAP review complements the NCCAP annual progress reports (see Box 1 and Appendix A) by exploring in detail the progress on the implementation of NAP priority actions

in the agriculture, livestock, and fisheries sectors. Notably, this review does not assess the results and outcomes of these adaptation actions, but it does provide recommendations for assessing results and outcomes in future evaluations.

This review used a combination of research methods—including desk research, interviews, and a survey—to obtain data and information on the status of the implementation of the NAP in the agriculture sector. The approach included a review of the policy framework, institutional arrangements, and coordination mechanisms, and a compilation of information on projects and programmes undertaken in the agriculture, livestock, and fisheries sectors as part of Kenya's NAP process. Experts and analysts from national and county governments, civil society, development partners, and the private sector responded to a survey or were interviewed to provide information on the status of the implementation of NAP 2015—2030 in the agriculture sector; on relevant partners; and on challenges and successes.

Section 2 sets out context and background information. Section 3 provides key information about Kenya's NAP process, and Section 4 reviews the progress made and key activities implemented across the three sectors of agriculture/crops, livestock, and fisheries. Section 5 elaborates on challenges, opportunities, and lessons learned in the implementation of the NAP in the agriculture sector, and Section 6 sets out concluding comments, including recommendations for future reviews of the NAP. Appendix A provides a summary of progress in the food and nutrition security sector as recorded in two NCCAP progress reports. Appendix B includes a list of policies and plans that support the implementation of the NAP.

## BOX 1

#### **NCCAP Progress Reports**

The Ministry of Environment and Forestry (MoEF) is responsible for reviewing progress on the implementation of the NCCAP 2017–2022. The NCCAP is the 5-year implementation plan for Kenya's NAP and NDC.

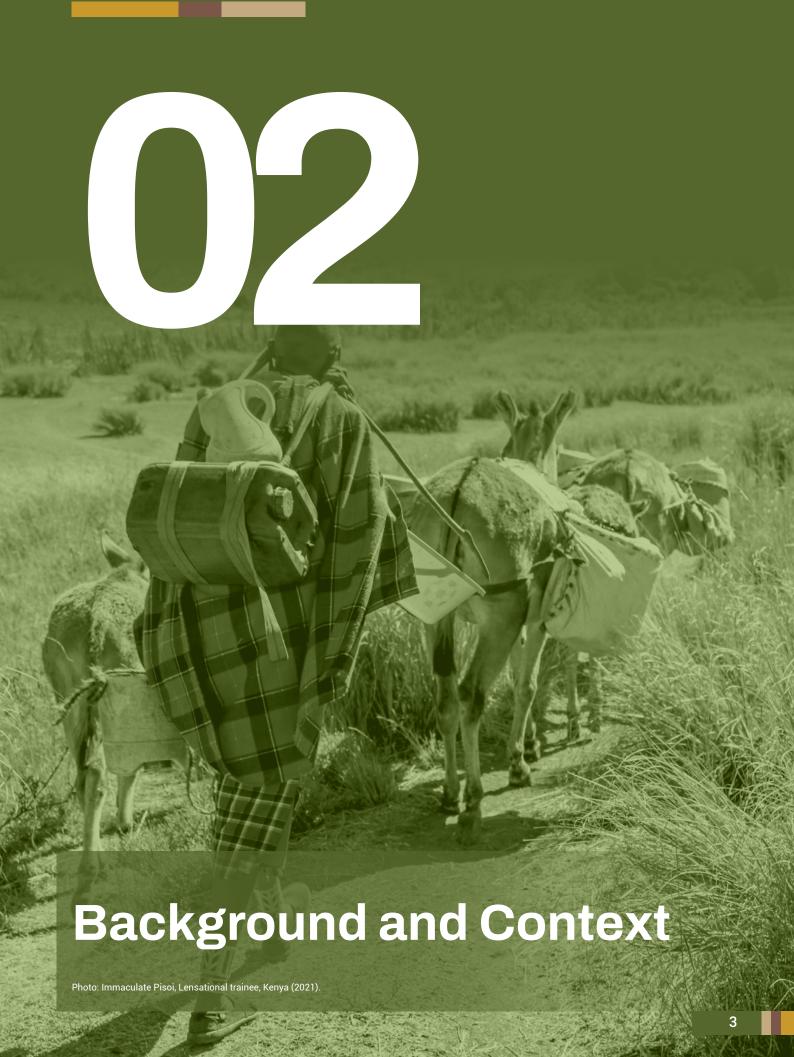
Two progress reports have been published, the first covering the period from July 2018 to June 2019 and the second covering the period from July 2019 to June 2020. The reports on progress were based on submissions from 90 institutions, including national and county governments, the private sector, and civil society.

The reports include an assessment of the implementation of the NCCAP 2018–2022 priority area of food and nutrition security. Significant progress has been made on several actions in this priority area—such as increased water harvesting and storage capacity in the Arid and Semi-Arid Lands (ASALs), increased numbers of farmers

and fishers adopting insurance, the establishment of fishponds, and the provision of support to households to adopt diversified adaptive enterprises. Continued work is needed to achieve the expected results in regard to irrigation, biogas technology, reseeding rangelands, and conservation agriculture. See Appendix A for the expected results and results achieved in the NCCAP priority area of food and nutrition security as of June 2020.

Achievement of the expected results set out in the NCCAP is intended to lead to the outcome of increased or maintained food and nutrition security under a changing climate through the implementation of climate-smart agriculture strategies, improved irrigation, and diversification of livelihoods. These outcomes are consistent with the goals of the NAP to enhance the climate resilience of the agriculture, livestock, and fisheries value chains.

Source: GoK, 2020, 2021.



Kenya is a party to the UNFCCC and its Paris Agreement and recognises that adaptation is a global challenge faced by all, with local, sub-national, national, regional, and international dimensions. Signatories to the Paris Agreement agreed in Section 2.1 (b) to an adaptation goal of "increasing the ability to adapt to the adverse effects of climate change" (UN, 2015, p. 3). Article 7 of the Paris Agreement established a global goal for the adaptation of enhancing adaptive capacity, strengthening resilience, and reducing vulnerability to climate change in the context of the temperature goal of the Agreement. Parties aimed to significantly strengthen national adaptation efforts by engaging in adaptation planning and implementation through various instruments such as NAPs, vulnerability assessments, monitoring and evaluation (M&E), and economic diversification

(UN, 2015, pp. 9–11). In line with the Paris Agreement, Kenya submitted its first NAP to the UNFCCC Secretariat in 2016.

Adaptation is the highest priority for Kenya (GoK, 2015, 2018, 2020), and the NAP sets out priority adaptation actions across 21 government planning sectors, reflective of the mainstreaming approach promoted in Kenya's NAP process that encourages integrating adaptation in planning, budgeting, and implementation at the national and county levels (see Box 2 for a brief description of the NAP process). An understanding of the progress on and outcomes of adaptation actions is needed because climate change poses a serious challenge to Kenya's social and economic development.

# BOX 2

#### The NAP process

The NAP process is a strategic process that enables countries to identify and address their medium- and long-term priorities for adapting to climate change. The NAP process helps countries to become more resilient to the impacts of climate change and to integrate adaptation in development decision making. This nationally driven process involves analysing current and future climate change and assessing vulnerability to its impacts, and then identifying and prioritising adaptation options, implementing these options, and tracking progress and results. The NAP process aims to put in place the systems and capacities needed to make adaptation an integral part of a country's development

planning, decision making, and budgeting. The NAP document is one element of the NAP planning process.

The NAP process and NDC are important elements of Kenya's response to climate change. The adaptation actions in 21 planning sectors in Kenya's NAP and NDC indicate the country's commitments to help achieve the global goals of the Paris Agreement. Kenya's NDC communicates the goals and targets that are envisioned for adaptation over a 5-year period, while the NAP process sets out medium- and long-term priorities and elaborates how adaptation will be planned, implemented, and monitored.

Source: GoK, 2016a, 2020; Hammill et al., 2019.

This review of the progress of implementation of the NAP in the agriculture sector can help Kenya understand whether adaptation actions are helping people and agricultural systems to cope with the effects of climate change (GoK, 2018). Changes in temperature, precipitation patterns, seawater level, and extreme weather events since the NAP was launched in 2016 have led to drought and flooding that have resulted in loss of life, damage to crops, loss of livestock, and destruction of infrastructure, with negative impacts on the country's agricultural production, agriculture-based livelihoods, and food security (GoK, 2021; Koqo et al., 2021).

Farmers and pastoralists in Kenya are impacted by severe drought as well as heavy rains and flooding. The Kenya Meteorological Department (KMD) (2021) reported that Kenya has experienced severe drought since 2016 that has been interrupted by very

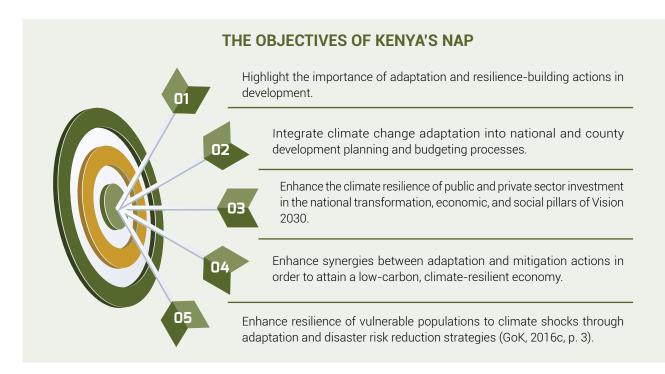
heavy rainy seasons. Heavy rains in 2019 and 2020 created conditions conducive to severe desert locust outbreaks in 2020 and 2021 (Food and Agriculture Organization of the UN [FAO], 2020a, 2020b). Four back-to-back years of low rainfall (2019 to 2022) have resulted in the longest drought in 40 years, leaving 4.2 million Kenyans in need of humanitarian assistance (UN Office for the Coordination of Humanitarian Affairs, 2022). Drought, heavy rains, and desert locust outbreaks have led to dwindling yields and crop failure for smallholder farmers, as well as livestock deaths and poor animal health for pastoralists. The food security situation in the ASALs is the lowest in 15 years, with 4.1 million people experiencing high acute food insecurity in drought-affected areas of Kenya and malnutrition increasing at an alarming rate as of in June 2022 (UN Office for the Coordination of Humanitarian Affairs, 2022).

Kenya's NAP 2015-2030

Photo: Catherine Pilalei, Lensational trainee, Kenya (2021).

The vision of the Kenya NAP 2015–2030 is "enhanced climate resilience toward the attainment of Vision 2030" (GoK, 2016c, p. 3). The NAP aims to "consolidate the country's vision on adaptation supported by macro-level adaptation actions that

relate with the economic sectors and county level vulnerabilities to enhance long term resilience and adaptative capacity" (GoK, 2016c, p. 1). The objectives of Kenya's NAP are listed below.



The NAP 2015–2030 recognises that climate change is a cross-cutting sustainable development issue with economic, social, and environmental impacts. The NAP describes Kenya's national circumstances, focusing on current and future climate trends, reviews the climate hazard and vulnerability analysis, identifies priority actions and budgets in 21 planning sectors, and sets out institutional arrangements for coordination and M&E (GoK, 2016c). The NAP is aspirational and sets out actions that aim to build climate resilience over the medium to long term.

The NCCAP 2018–2022 (and subsequent NCCAPs) is a 5-year implementation plan for the NAP and NDC. The NCCAP sets out priority climate change actions and expected results for 5-year periods. Adaptation actions are aligned with the vision of the NAP to build climate resilience to enable Kenya to attain the goals of Vision 2030 in a changing climate.

The NAP also aligns with existing national frameworks, such as the Climate Change Act of 2016, which is a legal instrument for the management of climate issues in Kenya that requires the development and operationalisation of 5-year national climate change action plans (GoK, 2016b). Kenya has prepared two NCCAPs (2013–2017 and 2018–2022) that serve as implementation plans for the NAP and Kenya's NDC (GoK, 2013, 2018). The NAP and NDC are informed by the national policies on climate change and climate finance (GoK, 2016d, 2017). The NAP and NDC are aligned with and inform the Kenya Climate Smart Agriculture Strategy 2017–2026 (Muchaba et al., 2017). Short descriptions of other policies, plans, frameworks, and strategies that have supported the implementation of NAP activities in the agriculture sector since 2015 are included in Annex B.

# 

Progress on the Implementation of NAP Actions in the Agriculture, Livestock, and Fisheries Sectors

Photo: Catherine Pilalei, Lensational trainee, Kenya (2021)

This section reviews the progress made and key activities implemented across the three sectors of agriculture/crops, livestock, and fisheries.

# 4.1 NAP 2015–2030 Priority Adaptation Actions in the Agriculture, Livestock, and Fisheries Sectors

The NAP set out priority adaptation actions for each of Kenya's 21 planning sectors, including the agriculture (crops), livestock development, and fisheries sectors. For each sector, the NAP

included the overall action and sub-actions to be undertaken in the short, medium, and long terms. Table 1 includes the NAP actions in the three agriculture-related sectors.

Table 1. NAP 2015-2030 agriculture sector priority actions for the short, medium, and long terms

Short term	Medium term	Long term		
Agriculture (crops) –	Enhance the resilience of the agricultural v	/alue chain.		
<ul> <li>Promote Indigenous Knowledge on crops.</li> <li>Increase awareness of climate change impacts on the agricultural value chain.</li> <li>Conduct climate risk and vulnerability assessments of the agricultural value chain.</li> <li>Coordinate and mainstream climate change adaptation into agricultural extension.</li> <li>Promote new food habits.</li> </ul>	<ul> <li>Establish, maintain, and promote the uptake of climate change-related information on agriculture.</li> <li>Develop and upscale specific adaptation actions, such as promotion and bulking of drought-tolerant traditional high-value crops; water harvesting for crop production; index-based weather insurance; conservation agriculture; agroforestry; and integrated soil fertility management.</li> <li>Develop and apply Performance Benefit Measurement methodologies for adaptation and development for the sector.</li> <li>Support adaptation of private sector agricultural value chain actors through capacity-building efforts.</li> </ul>	Promote and implement climate-smart agriculture practices in Kenya.		

#### Livestock development – Enhance the resilience of the livestock value chain.

- Increase awareness of climate change impacts on the livestock sector.
- Strengthen land-use management systems, including rangeland management, fodder banks, and strategic reserves.
- Conduct capacity building in Indigenous Knowledge, livestock insurance schemes, early warning systems, early action, and livestock management and breeding.
- Develop new feeds.
- Promote livelihood diversification and market access (camels, indigenous poultry, beekeeping, rabbits, emerging livestock—quails, guinea fowls, ostriches, etc.).
- Establish price-stabilisation schemes and strategic livestockbased food reserves.
- Restore degraded grazing lands.
- Enhance selection, breeding, and management of animals to adapt to climate change.
- Promote climate-smart agriculture.

#### Fisheries – Enhance the resilience of the fisheries value chain.

- Undertake risk and vulnerability assessment of the fisheries value chain.
- Enhance capacity of the Ministry of Agriculture, Livestock, Fisheries and Cooperatives and the Kenya Marine Fisheries Institute on the impacts of climate change on fisheries, fishing communities, and the private sector.
- Upscale sustainable aquaculture initiatives.
- Develop and implement a pilot project on climate-resilient fish species and the related value chain.
- Strengthen monitoring capacity and capability to prevent overfishing and unauthorised exploitation in the inland waters and Exclusive Economic Zone.
- Promote the up-scaling of climate-resilient strategies/ technologies in fisheries and climateresilient fish varieties.
- Expand the fishing zones in both inland and coastal waters.

Source: GoK, 2016c, pp. 37-39.

# 4.2 Progress on NAP 2015–2030 Implementation in the Agriculture Sector

This section documents the progress made in the implementation of actions in the three sectors. There are overlaps among the short- and medium-term adaptation actions; as such, general descriptions are provided for each action that is not delineated by timelines.

This review of the implementation of the NAP builds on the information included in the Second Implementation Status Report of the NCCAP 2018–2022 that provides an overview of the progress made toward the expected results as of

June 2021, as reported by national government ministries, departments, and county governments. The results for the agriculture sector, included in Appendix A, underlie this report on progress on the NAP. This progress report on the NAP goes beyond those results to provide a more thorough assessment of how Kenya is addressing climate vulnerability and building adaptive capacity in the agriculture sector.



#### 4.2.1 Enhance the Resilience of the Agricultural Value Chain

### **Sub-Action 1:** Promote Indigenous Knowledge on crops.

Progress has been made to promote and apply Indigenous Knowledge, which has been shown to enhance the resilience of smallholder farmers and communities to the impacts of climate change. Practical applications of Indigenous Knowledge have been observed in regard to climate forecasts, crop handling practices and management, animal health and diseases, and animal breeding systems. The use of Indigenous Knowledge

in the agriculture sector has been documented in the literature (see Box 3). These studies indicate that Indigenous Knowledge has not been fully integrated into agricultural systems in Kenya, and indicate the need for programmes and policies to promote Indigenous Knowledge on crops and climate, which could contribute to improved prediction of weather and weather events, increased crop productivity, and improved food security.

# BOX 3

# Studies on Indigenous Knowledge on crops and climate change in Kenya

- Ojwang et al. (2021) explored the value of the African Women's Indigenous Knowledge on Food Security that examines the experiences of women farmers in Homa Bay County, highlighting its contribution to food security and noting the need for appropriate government policy to promote women's Indigenous Knowledge for food security in rural households.
- Apraku et al. (2021) and Amwata and Nyariki (2021) reported
  that local residents' Indigenous Knowledge (e.g., predicting
  seasonal weather and rainfall, preserving grains for planting
  purposes) and traditional farming support systems helped
  to reduce the impacts of climate change on their agricultural
  activities. They recognised the need to merge local knowledge
  with modern science to help farmers cope with climate
  change.
- Muthee et al. (2019) noted that Indigenous Knowledge has helped people live sustainably and recommended awareness creation for smallholder farmers.
- Kilungu & Moronge (2019) studied the role of Indigenous Knowledge practices on sustainable ecological conservation in Machakos County. The study established that Indigenous culture, technology, and policy frameworks played a significant

- role in sustainable ecological conservation. It noted the need to enhance Indigenous cultural beliefs and science; improve Indigenous education; encourage custodians of Traditional Knowledge to provide training; use Indigenous tools to enhance sustainable land use and natural resource conservation; and preserve and disseminate Indigenous Knowledge on environmental conservation and land use.
- Kereto et al. (2022) established that the use of Indigenous technical knowledge to manage and protect livestock among the Maasai has enabled them to sustain high-quality breeds of livestock for food security and income as well as environmental protection. Indigenous technical knowledge systems should be mainstreamed in agricultural extension programmes.
- Oboko et al. (2016) found that Indigenous Knowledge enhanced agricultural productivity and highlighted the importance of knowledge management systems for Indigenous Knowledge in the agriculture sector. They noted the importance of indigenous crop production, including sorghum, which is more tolerant to unpredictable weather.

# Sub-Action 2: Increase awareness on climate change impacts on the agricultural value chains.

Various projects and groups have carried out awareness-raising sessions with farmers. Examples of these interventions are listed below:

- Farmer field school programmes through the Ethical Tea Partnership supported over 100,000 tea farmers to better understand the impacts of climate change and to plant over half a million drought- and frost-resistant tea clones (Ethical Tea Partnership, 2018, 2019).
- The Climate Resilient Agribusiness for Tomorrow project provided training and demonstrations for smallholder farmers to build knowledge and skills in climate change adaptation and resilience solutions, such as using improved seeds, soil and water management, and post-harvest handling (SNV, 2022).
- The Climate Smart Agriculture Training of Trainers' Manual was developed in 2021 under the Kenya Cereals Enhancement Programme—Climate Resilient Agricultural Livelihoods to provide a comprehensive guide for extension officers, service providers, and lead farmers on how to successfully produce cereals and pulses in Kenya in the face of climate change (Esilaba et al., 2021).
- Farmer field school groups provided training on climate adaptation through the Agricultural Climate Resilience Enhancement Initiative (see Box 4).

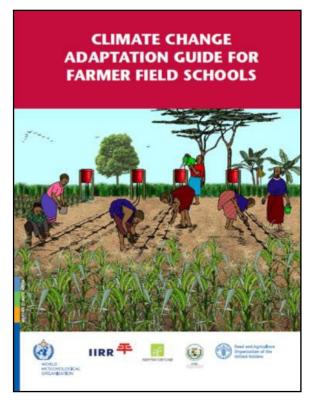
# BOX 4

#### **Agricultural Climate Resilience Enhancement Initiative**

The World Meteorological Organization, FAO, and the Intergovernmental Authority on Development provided a grant of USD 6,800,000 for Ethiopia, Kenya, and Uganda. In Kenya, the initiative focused on improving adaptive capacity and resilience to climate variability and change among targeted farmers, agro-pastoralists, and pastoralist communities in Taita Taveta County through

- Twenty-two farmer field-school groups with 30 members, which provided training on adaptation.
- Localised seasonal climate information and advisories in Kiswahili, including weekly and 10-day forecasts.
- A training session on participatory community mobilisation and planning processes for agricultural extension and national meteorological services staff.
- Engagement of media partners as key stakeholders to support the dissemination of climate information to broader stakeholders. A Climate Information Media Action Plan identified the different media partners and their roles in the dissemination of climate information and has resulted in a surge of climate reporting in the county.

Source: Gichangi and Gatheru, 2018.

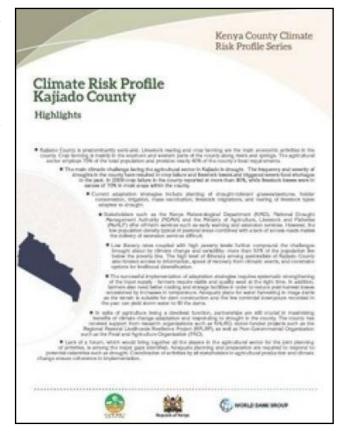


# **Sub-Action 3:** Conduct climate risk and vulnerability assessments of the agricultural value chain.

Various projects, programmes, and academics have conducted climate risk and vulnerability assessments of agricultural value chains, which have contributed to an improved understanding of climate impacts on various crops. These assessments include the following:

- Climate and vulnerability analysis of the milk and sweet potato value chains in Nyandarua, Kakamega, Siaya, and Bungoma counties, which contributed to improved agricultural extension programmes (Alliance of Biodiversity International, International Center for Tropical Agriculture, Consultative Group on International Agricultural Research, Research Program on Climate Change, Agriculture, and Food Security, & Deutsche Gesellschaft für Internationale Zusammenarbeit [GIZ] Gmbh, 2019).
- An assessment of the possible impacts of climate variability and change on the growth and performance of maize in five agro-ecological zones of Embu County, which determined that impacts are largely negative in the low potential zones and that strategies can be adopted to adapt maize cultivation to climate change (Gummadi et al., 2020).
- An assessment of the areas of Kenya suitable for green gram production in a changing climate, which determined that the northern and eastern parts of the country will not be suitable for green gram production in the future because of temperature increases and that northeast Kenya will not be suitable because of inadequate rainfall (Mugo et al., 2020).
- The Kenya Climate Smart Agriculture Project (KCSAP), through a USD 250 million concessional loan provided by the World Bank, supported the development of climate risk profiles for agriculture at the national level and for 31 counties. The profiles provided an analysis of the underlying

causes of climate vulnerability, adaptation strategies, and existing off-farm services for managing climate risk. These profiles identified priority needs and guided Climate-smart Agriculture (CSA) investments in counties (Consultative Group on International Agricultural Research [CGIAR] Research Program on Climate Change, Agriculture and Food Security [CCAFS], 2020).



# **Sub-Action 4:** Coordinate and mainstream climate change adaptation into agricultural extension.

Various initiatives contributed to improved agricultural extension programmes, such as CGIAR-CCAFS research programmes and the KCSAP project, which mobilised about 3,690 lead farmers to scale up community-based extension and developed training manuals and training programmes for county extension staff, service providers, community-based facilitators, and lead farmers (GoK, 2022). Those trained are expected to disseminate the

training to beneficiaries in the targeted smallholder farming, agropastoral, and pastoral communities in the 21 project counties. Kenya Agricultural and Livestock Research Organization's [KALRO's] Technology, Innovations and Management Practices include web and mobile applications that provide advice for farmers and extension workers on improved and climate-smart agricultural practices (KALRO, 2022).

#### Sub-Action 5: Promote new food habits.

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# **BOX5**

# Examples of research projects promoting the production of edible insects.

The **GREEINSECT Project** (2014–2018) investigated the use of edible insects as a new, sustainable, and inclusive component of the food and feed sector in Kenya. The project experimented with the production of termites and crickets and contributed to the development of standards for insect production. In 2022, 90 farmers were actively growing crickets in Kenya including Mixa in Kisumu, Kakuma cricket farm, and Athi River cricket farm.

The African Center of Excellence in the Sustainable Use of Insects as Food and Feed (INSEFOODS) was established at the Jaramogi Oginga Odinga University of Science and Technology with the support of the World Bank in 2017. It supports the development of insects for the food and feed sector through research and training. The INSEFOODS project aims to achieve long-term food and nutritional security by using insects as a cost-effective, reliable, and sustainable source of protein and other nutrients for food and feeds.

Source: University of Copenhagen, 2019; INSEFOODS, 2022.



Examples of initiatives to promote new food habits are briefly described below:

The Plantation Establishment Livelihood Improvement Scheme piloted in Murang'a County enhanced the climate resilience and food security of communities by integrating traditional vegetables such as black nightshade, amaranth, and cowpeas into cropping systems (Ngure et al., 2020).

The Accelerated Value Chain Development Program increased production of orange-fleshed sweet potatoes, leading to improved nutrition status and improved farm incomes from the sale of surplus production (see Box 6).

The Accelerated Value Chain Development Program also assisted with the introduction of improved varieties of sorghum, groundnut, green gram, finger millet, pearl millet, pigeon pea, and cowpea that helped farmers get higher yields and thereby enhanced food security and increased income for their households. For example, the new green gram variety and good farming techniques improved yields from two bags (200 kg) per acre to six bags (600 kg) per acre (International Crops Research Institute for the Semi-Arid Tropics, 2020).

# BOX 6

#### Accelerated Value Chain Development Program: Orangefleshed sweet potato

The 2-year (2016–2018) initiative supplied about 62,250 households with varieties of sweet potatoes, trained 35,000 farmers in orange-fleshed sweet potato production, and introduced the commodity to urban and local markets through traders' orientation and free samples.

The activities resulted in increased cultivation and greater availability of sweet potatoes in markets. The outcomes included income generation and health improvement resulting from increased consumption of sweet potatoes at the household level. By the end of the project, the mean dietary diversity score of women of reproductive age had increased by 17% from the baseline, while that of children aged 6–23 months had increased by 14% among sampled households.

Source: International Potato Center, 2019.

# **Sub-Action 6:** Establish, maintain, and promote the uptake of climate change-related information on agriculture.

Interventions at the national, county, and local levels have improved access to information on climate change and agriculture. At the national level, the following have been achieved:

Climate Change Resource Centre – established in 2015 as a national platform to identify science and technologies that support decision making on climate change in key economic sectors, including agriculture.

Kenya Climate Information Portal, with sections for children and youth – launched in 2018 as a one-stop repository of climate change information in Kenya.

National Climate Diagnostic Laboratory – established under the KMD to improve climate knowledge and information management. KMD improved its climate observation network, including the installation of automated weather stations and upgrading of existing weather stations (GoK, 2018). Significant work has been undertaken to improve climate information services (CIS) and agro-weather forecasts.

The National Drought Management Authority (NDMA) produces and disseminates early warning bulletins on drought (see Box 7).

County Climate Change Fund legislation was enacted in seven counties (Garissa, Isiolo, Kitui, Makueni, Tharaka Nithi, Vihiga, and Wajir) by the end of 2021. These counties committed to allocating 1% to 2% of their development budgets to the climate change fund. These funds have supported the establishment of CIS for more than 2 million users across five counties (Adaptation Consortium [ADA], 2022; Murphy & Orindi, 2017).

ADA assisted a total of 15 counties between 2016 and 2021 to develop and operationalise their CIS guides to help farmers and actors make sound decisions on climate risk management in agriculture in regard to daily and seasonal forecasts and agro-advisories (ADA, 2022).

# BOX7

#### NDMA: Early warning systems and climate information services

The NDMA is mandated to coordinate matters related to drought risk management. Activities related to climate change information included

- Production and dissemination of 46 monthly national and 552 monthly county drought early warning bulletins for the year 2019/2020. A further 12 consolidated monthly national drought early warning bulletins were produced and disseminated.
- Upgrading of 154 existing weather stations and establishment of new agro-automated weather stations—including 17 agromet and 17 hydro-met stations. In addition, 10 automatic hydro-met stations in Nzoia Basin were refurbished.

From 2018 to 2020, a total of 2,562,503 people used daily, weekly, and monthly climate information and seasonal forecasts. In 2019/2020, climate information reached 1,011,583 users. In the same time period, 3,468 flood early warning advisories on extreme weather events were disseminated to communities to help them cope with floods.



National Drought Management Authority
Baringo County
Drought Early Warning Bulletin for February 2022

FEBRUARY EW PHASE

Early Warning Phase Classification

Source: NDMA, 2022b

Various programmes promoted the sharing of climate information in the agriculture sector, including

Decentralised Climate Information Services for Decision-making in Western Kenya, 2018–2020 – assisted KMD to develop and deliver demand-led and decentralised services in the counties of Kakamega, Siaya, Kisumu, and Trans Nzoia. Through radio, SMS messaging, and the internet, the project was able to reach up to 400,000 households across Kenya (Weather and Climate Information Services for Africa, 2018).

KALRO developed, tested, and commissioned a Market Information System in July 2020 that covered 47 counties and tracked information from 61 crops, 28 livestock varieties, and 62 fisheries markets. The Big Data system included data services for crop/livestock selection, suitability mapping, and modelling. The system included a farmer database of 647,967

farmers, and a call centre/interactive voice recording system was commissioned. KALRO used the information to produce and disseminate integrated weather and market agro-advisories that are translated into local languages and Kiswahili in 45 rural counties (MoA-INFO, 2020).

A CSA training manual was developed under the Kenya Cereals Enhancement Programme—Climate Resilient Agricultural Livelihoods to guide practitioners on the production of cereals and legumes in the face of climate change. The Indepth Research Institute and Accelerating Impacts of CGIAR Climate Research for Africa programme prepared manuals to train professionals from counties, communities, civil society, government, and academics on adaptation, CSA, and CIS (CGIAR, 2022).

#### **Sub-Action 7:**

Develop and upscale specific adaptation actions—promotion and bulking of drought-tolerant traditional high-value crops; water harvesting for crop production; index-based weather insurance; conservation agriculture; agroforestry; and Integrated soil fertility management.

Several projects and initiatives have developed and upscaled adaptation actions. Examples of these projects are listed below, with additional information available in the NCCAP progress reports and the document *Projects and Programmes that Promote the Implementation of NAP 2015–2030 in the Agriculture Sector* (MoEF, 2022).

- Scaling up Sustainable Land Management and Agro-Biodiversity Conservation to Reduce Environmental Degradation in Small Scale Agriculture in Western Kenya, implemented by the Alliance for a Green Revolution in Africa, together with the Global Environment Facility (GEF), UN Environment Programme, KALRO, and three county governments (Kakamega, Nandi, and Vihiga), aimed at restoring the productivity of farmlands through sustainable land management.
- Trans Nzoia County provided improved crop storage facilities, including the distribution of 10,000 hermitic bags for grain storage and three grain-storage warehouses. This led to a reduction in pre- and post-harvest losses of 8.12% against an annual target of 5%.
- Twelve thousand drip irrigation kits were installed in different parts of the country.
- The Crop Insurance Programme was launched in March 2016 and targeted farmers with less than five acres of land who were mainly growing maize and wheat crops in 14 ASAL counties (Acre Africa, 2020). By the end of 2021, the Crop Insurance Programme was being implemented in 39 counties, and 1.5 million smallholder farmers were covered by crop insurance. As of December 2021, over KES one billion had been paid out as compensation to about 41,000 farmers. Eight companies provided crop insurance in 2021, compared to one in 2016.

- KALRO, for example, led partnerships from 2017 to 2020 that developed several drought-tolerant and disease-resistant varieties, including five coffee varieties; 150 cereal crop varieties; 80 root and tuber crop varieties; and 35 varieties of pulses (see Box 8).
- The CGIAR Research Program: Dryland Cereals and Grain Legumes (2017–2021) helped to introduce new varieties that increased the productivity, profitability, resilience, and marketability of nutritious grain legumes (chickpea, cowpea, pigeon pea, groundnut, lentil, and soybean) and cereals (sorghum, pearl millet, and finger millet) grown in semi-arid and sub-humid dryland agro-ecologies.
- The Drought Resilience and Sustainable Livelihoods Programme, financed by the Adaptation Fund, benefited 168,000 households (968,787 persons).
- Nineteen water pans were completed, benefiting 49,648 individuals and 209,799 livestock from 6,097 households.
   Five irrigation schemes were under development in West Pokot, Isiolo, Marsabit, and Turkana in 2022.
- KALRO promoted CSA practices and technologies to upscale the production of crops across 10 value chains; led adaptive research projects on crops, livestock, and socioeconomics; and produced improved seeds for key crops.
- The Kenya Small-Scale Irrigation and Value Addition Project was implemented in 11 counties to enhance smallholder agricultural productivity and food and nutrition security while promoting increased participation of women and youth.

# BOX8

#### NDMA: Early warning systems and climate information services

The number of crop varieties of selected staple foods has grown over the years. Maize has the highest number of varieties, and there is growing interest in the development of traditional high-value

food crop varieties such as sorghum, finger millet, and cassava as shown in Table 2. Many of these varieties were developed to address the need for drought-tolerant crops.

Table 2. Number of new varieties released in the market for selected cereals and root crops in Kenya from 2015 to 2020

Crops	Number of new varieties released in the market					
	2015	2016	2017	2018	2019	2020
Maize (Zea mays)	36	24	33	11	13	12
Sorghum (Sorghum bicolour)	-	17	1	4	1	-
Cassava						
Finger millet (Eleusine corocana)	1	3	-	3	1	-
Rice (Oryza sativa)		8	-	-	-	-
Wheat (Triticum aestivum)	-	7	1	2	2	-
Sweet potatoes (Ipomoea batatas)	4	-	-	-	4	

Source: Kenya Plant Health Inspectorate Service, 2020.

# Sub-Action 8: Develop and apply performance benefit measurement methodologies for adaptation and development for the sector.

The Climate Change Directorate (CCD), MoEF, has taken steps to measure the performance and benefits of adaptation actions in the agriculture sector (Mutimba et al., 2018). These efforts include the development of two reports on the progress of implementation of the NCCAP that included a review of actions and progress to achieve the expected results in the agriculture and food security priority area (see Appendix A). In addition, the CCD developed a registry of adaptation actions and published a compendium of climate change success stories (GoK, 2016a). The work of the CCD to M&E adaptation action in the agriculture sector is informed by inputs from MALF&C that tracks progress on the implementation of activities to achieve

the aims of the Kenya Climate Smart Agriculture Strategy 2017–2026 (GoK, 2017a).

The KCSAP is working toward improved M&E of adaptation actions, including the establishment of the Project Management Information System, establishment of an M&E team, conducting a baseline survey, and manual collection of data on progress at the national level. In addition, KCSAP will contribute to the improved tracking of adaptation actions and results in the agriculture sector through the Multistakeholder Platform, which is tasked with the development of an M&E framework for monitoring progress on CSA (GoK, 2022).

# Sub-Action 9: Support adaptation of private sector agricultural value chain actors through capacity-building efforts.

Many of the projects and programmes listed above include capacity-building efforts for private sector actors, from smallholder farmers to aggregators to providers of agricultural supplies. For example, KCSAP provided capacity building to 261,000 farmers and 151 producer organisations in regard to integrated soil fertility management strategies, water harvesting,

and irrigation technologies (GoK, 2022). The Accelerated Value Chain Development project, funded by United States Agency for International Development (USAID), trained more than 144,000 farmers in good agricultural practices for higher productivity and effective post-harvest handling techniques.

#### 4.2.2 Enhance the Resilience of the Livestock Value Chain

In the livestock subsector, climate change impacts—such as high temperatures, drought, unreliable rainfall, and flooding—have presented challenges for farmers and pastoralists, and have contributed to migration with livestock, loss of livestock, loss of crops, including livestock feeds, and frequent famines. This section provides an overview of adaptation actions in the livestock sector.

A key programme that has assisted pastoralists in the ASAL counties is the Hunger Safety Net Programme, which provides cash transfers to households impacted by drought. In 2019–2020, NDMA disbursed KES 3.3 billion under the programme through six regular cash transfer cycles to 100,532 households, of which 66% were headed by women. The cash transfers increase the ability of households to cope in times of drought (NDMA, 2022a).

# **Sub-Action 1:** Increase awareness of climate change impacts in the livestock sector.

Several interventions enhanced awareness about the impacts of climate change in the livestock subsector in Kenya. A key action was the integration of climate change in the 2019 draft livestock policy, which reflected an improved understanding of climate impacts and possible adaptation options. The International Center for Tropical Agriculture, in collaboration with the GoK, developed climate risk profiles for 33 counties that identified the main climatic hazards, analysed vulnerabilities

and risks posed by the hazards on the respective agricultural value chains, including livestock, and identified adaptation options (CGIAR-CCAFS, 2020).

The Kenya Agricultural Observatory Platform developed by KALRO provides accessible information for farmers on weather and agronomics. This enables farmers to better predict rainfall and weather to make more informed farming decisions (KALRO, 2021).

# Sub-Action 2: Strengthen land-use management systems, including rangeland management, fodder banks, and strategic reserves.

In 2019–2020, about 1,959 ha of rangelands were reseeded and 52,075 ha of degraded land reclaimed (GoK, 2021). In addition, pasture field schools were established in the ASAL counties to develop pasture grass and produce high-yielding forage pastures. Training was conducted in various counties on animal husbandry practices, and emergency feed was distributed. Examples of land-use management projects are listed below, with additional information available in the NCCAP progress reports and the document *Projects and Programmes that Promote the Implementation of NAP 2015–2030 in the Agriculture Sector* (MoEF, 2022).

- The Regreening Africa project (2017–2022) accelerated the scaling-up of restoration activities using locally appropriate techniques such as farmer-managed natural regeneration, tree planting, and other forms of agroforestry, along with the development of agroforestry value chains.
- The Central Rift Farmer Managed Natural Regeneration Scale-Up Project (2018–2021) revitalised and preserved rangelands through diversified livelihoods and improved natural resource management and use in Isiolo, Laikipia, Marsabit, and Samburu.
- The Participatory Rangeland Management Project contributed to improved tenure security for 85,629 ha, increased women's participation in rangelands governance and management, and promoted participatory processes for planning and management.
- The Agro-Pastoral Field School in Mandera County, supported by FAO, trained over 300 pastoralists through hands-on learning methods for producing, managing, and utilising pasture.

 County governments in Isiolo, Marsabit, and Samburu conducted awareness-raising campaigns on the implementation of the Community Land Act (2016), which resulted in a rangelands management policy in Samburu County and an amended spatial plan that incorporated pastoralism and pasturelands in Baringo County.

# Sub-Action 3: Conducting capacity building in Indigenous Knowledge, livestock insurance schemes, early warning systems, early action, and livestock management and breeding

Various government and development partners helped to build the capacity of pastoralists. The Initiative for Sustainable Landscapes strengthened the capacity of local communities to implement comprehensive grazing management. In total, 47,327 ha of degraded forests within rangelands were restored, 366,288 ha of wildlife habitats conserved, 11,146 ha of rangelands rehabilitated, and 1,959 ha of rangelands reseeded (GoK, 2021).

Livestock insurance was launched in Kenya in October 2015. As of December 2021, approximately 18,012 households were covered for 90,060 head of cattle in eight ASAL counties (Isiolo, Turkana, Mandera, Wajir, Marsabit, Tana River, Garissa, and Samburu) with payouts for compensation estimated at KES 1.2 billion (GoK, 2021).

Capacity building of pastoralists in pasture management and recommended stocking rates have contributed to better management of livestock and an increase in the size and value of livestock herds. Early warning systems increase the capacity of pastoralists to manage pastures and grazing lands by monitoring forage conditions and their implications for animal production. These systems include the Predictive Livestock Early Warning System; early warning bulletins through NDMA; and climate risk profiles and vulnerability assessments of pastoral areas in Baringo, Kajiado, Wajir, Marsabit, and Turkana.

Extension advisory services have been established for cattle breed improvement. For example, crosses of Zebu and Boran species ensure higher carcass weights that lead to better prices for beef at the market. The crossbreeds also mature faster, which reduces the age between birth and market.

#### Sub-Action 4: Develop new feeds.

Total annual feed production in Kenya rose by 30% from 2015 to 2018 to a total of 900,000 tonnes in 2018 (Larive International, 2020). KALRO reported that Kenya developed over 15 improved fodder varieties of forage legumes, and grass cultivars were developed and distributed to farmers (GoK, 2022). Farmers in Kitui and Makueni have introduced new feeds to maintain their livestock herds by utilising acacia pods (Ngaa), dry leaves of various trees, pawpaw stem, and tree bark (Kosgei & Muange, 2018).

The Climate Smart Brachiaria program introduced improved Brachiaria grass varieties that had been tested and recommended for use in dairy-farming systems (Gonzalez et al., 2016). In April 2021, KALRO released four Brachiaria grass cultivars for commercialisation that will see milk production increase by between 15% and 40% annually (Ndirangu, 2021). Pastoral communities have established seed banks to provide sustainable economic benefits for local women and to restore the endemic grass species.

#### **Sub-Action 5:**

Promote livelihood diversification and market access (camels, Indigenous poultry, beekeeping, rabbits, emerging livestock – quails, guinea fowls, ostriches, etc.).

Livelihood diversification is a strategy to enhance climate resilience. Diversification can involve moving from cattle to sheep, camels, and goats and shifting to Indigenous poultry and beekeeping. For example, the Kenya Livestock Commercialization

Project assisted women and youth in diversifying products and moving toward small ruminants, Indigenous chicken, and beekeeping (International Fund for Agricultural Development, 2020)

# **Sub-Action 6:** Establish price-stabilisation schemes and strategic livestock-based food reserves.

ASAL counties have taken action to increase their strategic feed reserves for livestock, particularly to deal with prolonged dry spells. For example, in 2017–2018, Kajiado County established three sites for strategic feed reserves; constructed a pit silo at the Kajiado demonstration farm; procured 1,600 kg of pasture seeds for three fenced sites; acquired two sets of hay-harvesting

equipment and constructed hay barns; and formed and trained 70 community-based hay-production groups (GoK, 2021).

In 2021, NDMA allocated about 75,000 bags (50 kg) of livestock feed to Wajir, Samburu, Tana River, Isiolo, Marsabit, Garissa, Mandera, and Lamu counties to cushion pastoralists' livelihoods (NDMA, 2021).

#### Sub-Action 7: Restore degraded grazing lands.

Initiatives by KALRO and development partners have contributed to the reseeding of grasslands and planting of fodder for better feeding and restoration of the rangelands (CGIAR-CCAFS, 2020). KALRO is providing three types of grasses to increase

pasture availability and promote rangeland restoration. In 2019–2020, about 1,959 ha of rangelands was reseeded and 52,075 of degraded land reclaimed (GoK, 2021).

# **Sub-Action 7:** Enhance selection, breeding, and management of animals to adapt to climate change.

Improved selection and breeding help to increase livestock resilience and disease resistance. Strategies include artificial insemination, replacing local cattle with crossbreeds, and herd diversification. From 2017 to 2021, significant progress was made in the breeding of drought-tolerant and disease-resistant animals through extension advisory services, including 20,000 improved Sahiwal bulls, 700 superior Boran bulls, and 1,000 heifers of a Boran-Friesian crossbreed (GoK, 2022).

The management of livestock pests and diseases improved with regular surveillance and advisory services from sub-county teams, the development of animal-health diagnostic kits, and the equipping of six veterinary labs with disease diagnostic equipment. The national government and the FAO helped to enhance the response to disease and pest outbreaks by distributing 13 million doses of vaccines in 2019–2020, which were used to vaccinate 10,086,752 head of cattle and 1,940,234 sheep and goats (CGIAR-CCAFS, 2020).

#### 4.2.3 Enhance the Resilience of the Fisheries Value Chain

Kenya's fishing industry contributes about 0.5% of the national GDP and about 2% of the national export earnings, employing over 60,000 fishers in inland freshwater and marine fisheries (Almubarak et al., 2018). Adaptation actions in the sector

aim to address the issue of dwindling catches and rising sea water levels. Kenya has a growing freshwater aquaculture subsector that requires support to boost productivity as the climate changes.

# Sub-Action 1: Undertake risk and vulnerability assessment of the fisheries value chain.

An improved understanding of the impacts of climate change on the sector is needed to guide adaptation action. Various projects have supported the development of risk and vulnerability assessments, including

- The Kenya Marine Fisheries and Socio-Economic Development project, which carried out a climate and hazard risk assessment to identify future climate change impacts on coastal assets and communities and to raise awareness of adaptation options for fisheries sector (World Bank, 2021).
- The Stop Illegal Fishing project carried out an assessment of risk in Kenya's marine fisheries to inform a strategic approach to monitoring, control, and surveillance planning (Stop Illegal Fishing, 2018).

# Sub-Action 2: Enhance the capacity of the MALF&C and Kenya Marine Fisheries Institute on the impacts of climate change on fisheries, fishing communities, and the private sector.

Capacity building in the fisheries subsector ranged from short-term courses and academic courses to training offered through workshops. Training was conducted for youth and fish farmers, and several universities, such as Moi and South Eastern Kenya University, integrated climate change into their curricula and have organised training for local communities and county experts on different aspects of climate change and fisheries. Examples of the capacity-building interventions include

 Achieving Coral Reef Fishery Sustainability in East African Biodiversity and Climate Refugia Centers—a project that recruited 1,000 young people for a 3-week training in 2022 on responsible fishing; various approaches and applications of deep-sea fishing practices and technologies, including fishing gear; competence in handling disasters at sea; and enhancing employability in the deep-sea fishing industry (Kosqei & McClanahan, 2022).

- Glow 9: Emerging Frontiers for the African Great Lakes, Kisumu-49 conference participants were trained in 2019 on emerging issues in the lake region, including on adaptation to climate change (Glow 9, 2019).
- Over 300 fish farmers from Siaya, Kisumu, Vihiga, and Kakamega were trained in 2019/2020 on best management practices and smart aquaculture strategies to increase production and productivity with a minimum carbon footprint (Munguti et al., 2021).

#### Sub-Action 3: Upscale sustainable aquaculture initiatives.

Various programmes have helped to scale up climate-smart and sustainable fisheries practices and technologies, including the following:

The State Department for Fisheries, Aquaculture and the Blue Economy upgraded the Sagana culture farm into a national research and training centre with a holding capacity of over 200,000 breeding stocks and trained and authenticated over 162 hatchery operators to produce high-quality fish seeds (Obiero et al., 2019).

The national government has supported fish farmers in forming cluster groups to bulk-manufacture fish feeds. The support includes the provision of cottage fish-feed pelletising machines and technical officers teaching farmers about formulations of homemade fish-feed rations (Aquaculture Association of Kenya, 2019).

The Unga feeds company has started a dedicated line for fish-feeds production (Seaboard Overseas and Trading Group, 2017).

Eight recirculating aquaculture systems were established in Kenya by 2021. The Kamuthanga Farm received an EcoMark Africa certification—the first fish farm to receive such accreditation in Africa. For the period 2016 to 2019, the total production from recirculating aquaculture systems was estimated at an average of 200 tonnes per year. These systems have helped farmers reduce the grow-out period of tilapia to market size from 8 months in traditional ponds to 4 months while reducing the amount of water required for production by 20% (FoodTechAfrica, 2019).

Raceways/flowthrough systems commonly used to produce rainbow trout. Between 2016 and 2020, six commercial raceways/flowthrough systems were established in the Mount Kenya region for rainbow trout production (see Box 9).

Establishment of aqua shops in five counties in western Kenya (Kakamega, Kisumu, Vihiga, Busia, and Kisii) to provide local smallholders with inputs and technical advice on best aquaculture practices (Farm Africa, 2021).

The NCCAP progress report highlighted progress on the construction of fishponds and installation of fish cages (GoK, 2021).

# **BOX 9**

#### Market-led Aquaculture Programme



The Kenya Market-led Aquaculture Programme (KMAP) led to improvements for fishers, including

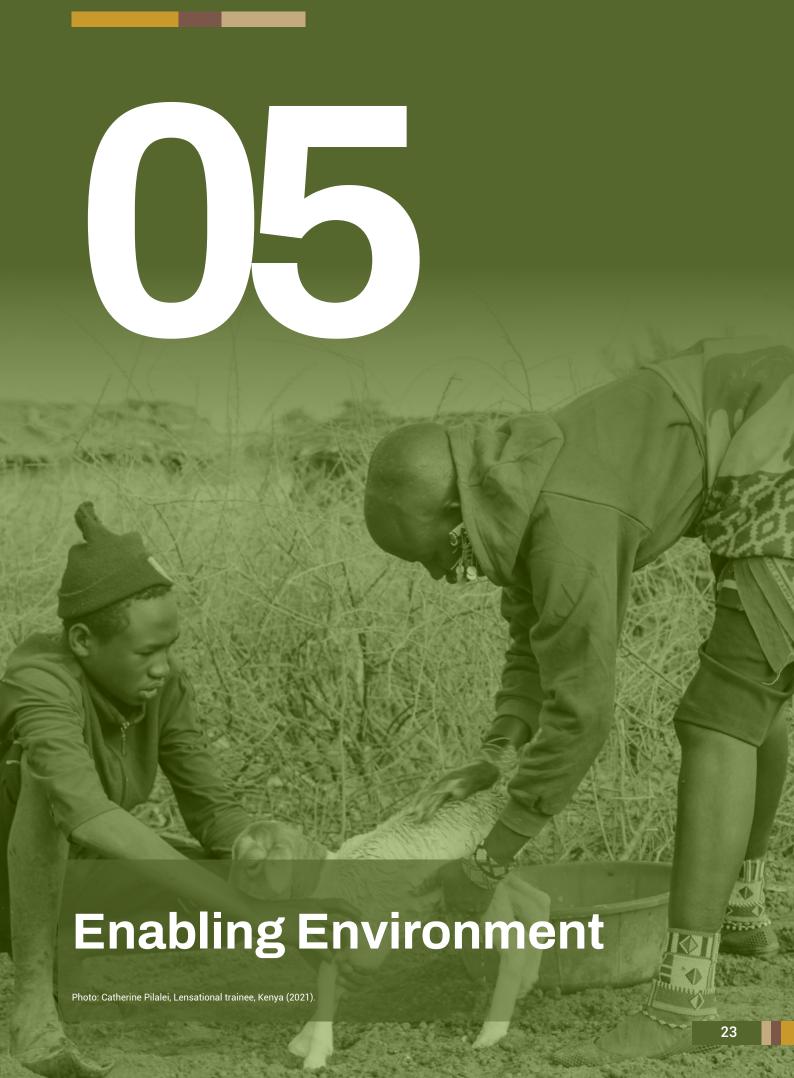
- Successfully lobbied for the enactment of a bill that introduced an aquaculture inputs (feeds and fingerlings) cost-sharing system between fish farmers and the County Government of Kakamega to boost aquaculture production in the county.
- Contributed to the discussions that led to the removal of the 5% fisheries levy on imported feeds.

- Provided technical and market engagement training to 1,114 fish farmers between 2016 and 2018.
- Reached over 6,713 fish farmers through trade fairs, electronic learning platforms, and peer-to-peer learning between 2016 and 2019.
- Increased the productivity of tilapia farmers by 97% from a 2016 baseline of 0.31 kg/m² to 0.61 kg/m² in 2019.
- Increased the productivity of catfish farmers from 0.14 kg/ m² in 2016 to 0.82 kg/m² in 2019.
- Trebled annual production of both tilapia and catfish from 249 Mt per year in 2016 to 912 Mt annually in 2019.
- Overall revenue for fish-farming enterprises grew by 16% from 2016 to 2019, with 62% of the farmers reporting increased fish-farming revenues. In 2019, 77% of KMAP fish farms were profitable, with a gross margin of over 70%.
- KMAP farms were employing a total of 2,794 people per production cycle at the end of the project in 2019.

Source: Farm Africa, 2021.

# Sub-Action 4: Develop and implement a pilot project on climate-resilient fish species and the related value chain.

While there have been pilot projects that aimed to increase fish farmers' production, no projects were identified that specifically focused on climate-resilient fish species.



The GoK has developed **policies**, **plans**, **frameworks**, **and strategies** since 2015 that facilitate the implementation of the NAP in the agriculture sector. Some are specific to climate change, while others encourage adaptation action consistent with the government's goal to mainstream adaptation in policies, legislation, and strategies. Appendix B includes short descriptions of relevant policies and strategies, and the main documents are briefly described below.

The Climate Change Act, 2016 promotes a mainstreaming approach that integrates climate change considerations into all sectors, including agriculture, and into county policies and programmes. The act mandates the preparation of national climate change action plans. The National Climate Change Action Plan 2018–2022 includes a priority action area of increasing food and nutrition security by enhancing the productivity and resilience of agricultural systems. The action plan calls for improving crop productivity through the implementation of climate-smart actions; improving crop productivity by increasing the acreage under irrigation; increasing productivity in the livestock sector through the implementation of priority climate-smart actions; and enhancing productivity in the fisheries sector through the implementation of priority climate-smart actions and diversifying livelihoods to adjust to a changing climate.

The Kenya Climate Smart Agriculture Strategy 2017–2026 addresses climate vulnerability and building resilience to extreme weather events, and introduces climate smart agriculture practices, including adaptation actions. The Kenya Climate Smart Agriculture Implementation Framework 2018–2027 identifies actions to enhance agricultural productivity; build resilience and associated mitigation co-benefits through CSA; integrate value chains; improve agricultural and agro-weather advisory services; and improve institutional coordination.

The coordination of and reporting on the mainstreaming of adaptation in the agriculture sector is led by CCD, MoEF, working in close collaboration with MALF&C, which is responsible for implementing agriculture, livestock, and fisheries initiatives.

The coordination and tracking of adaptation actions in the agriculture sector are supported by the National Conservation Agriculture Task Force, which was established in 2015. This multistakeholder consortium offers advice on conservation agriculture activities; analyzes and publicises the results of activities with the view to create awareness and promote technology; monitors and disseminates information on conservation agriculture and CSA activities; monitors research and studies; and provides a link between national, regional, and international conservation agriculture networks.

The Climate Smart Agriculture Multistakeholder Platform was established in 2020 to coordinate all stakeholders in the CSA arena, share information, and encourage collaboration. It is hosted and coordinated by the Climate Change Unit of MALF&C. Achievements include the preparation of member profiles to increase understanding of the mandate of the different organisations (see Multi Stakeholder Platform on Climate Smart Agriculture, 2020).

The GoK engages with development partners to finance and implement adaptation measures in the agriculture sector. This includes the multilateral development banks that provide concessional loans and technical grants (World Bank and African Development Bank) and bilateral partners that provide financial and technical assistance for adaptation mainly through grant funds, such as USAID, UK Aid, and the Dutch and German development organisations (SNV and GIZ). UN specialised agencies (such as the FAO, UN Development Programme, and UN Environment Programme) act as implementing entities to manage financial support and deliver technical assistance for adaptation priorities. Many of the grant funds delivered through UN agencies are provided by developed countries through the financial mechanism of the UNFCCC that delivers financial support to Kenya through the Green Climate Fund, Adaptation Fund and GEF.



Photo: Esther Tinayo, Lensational trainee, Kenya (2021).

Significant progress has been made in implementing the priority activities set out in Kenya's NAP in the agriculture, livestock, and fisheries sectors. While this review of implementation provides evidence of several projects and initiatives, additional

work is needed to understand the outcomes and impact of these adaptation actions. This section identifies challenges and successes in the implementation and the M&E of the NAP.

#### 6.1 Successes

A survey of 51 experts in the agriculture sector from government, civil society, and the private sector identified positive outcomes of NAP implementation (see Table 2). When asked about the contribution of the NAP in the agriculture sector, about 76% remarked on enhanced sector coordination. The respondents commented on the coordination role of the CCD; MALF&C's Multistakeholder Platform, which brings together key stakeholders

from government, civil society, and the private sector; and the efforts made by CCD and MALF&C to work in a coordinated and cooperative manner to address adaptation in the agriculture sector. The level of coordination could be improved, particularly between the national and county governments, including through the provision of support to cascade national frameworks to the county level.

Table 3. Survey responses – What was the contribution of the NAP in the agriculture sector?

Responses to open-ended question: What was the contribution of the NAP in the agriculture sector?	Number of responses, out of a total 51 responses
Enhanced sector coordination	39 (76%)
Improved knowledge	26 (51%)
Enhanced organisational capacity	25 (49%)
Enhanced policy influence	24 (47%)
Increased technology advancement	18 (35%)
Increased financing	10 (20%)
Reduced bureaucratic processes	6 (12%)

Source: 2021 survey undertaken by D. Amwata.

About half of the respondents highlighted that the NAP **process improved knowledge and enhanced organisational capacity.** Respondents expected that the Multistakeholder Platform would play a key role going forward in regard to data collection and improved tracking and monitoring of NAP implementation in the agriculture sector.

In regard to **enhanced policy influence**, respondents highlighted the work to mainstream climate change in the agriculture activities prioritised in County Integrated Development Plans and the important role of County Climate Change Funds in financing adaptation actions. Four counties (Kajiado, Nakuru, Nyeri, and Taita Taveta) have prepared CSA action plans, and Kisumu County has appointed a climate change officer.

Smaller numbers of survey respondents noted that the implementation of the NAP led to increased technology advancement, increased financing, and reduced bureaucratic processes.

The review of activities in the agriculture, livestock, and fisheries sectors in Section 4 demonstrates that significant progress has been made to implement the NAP. The national governmentled by the CCD and MALF&C—and county governments were instrumental in spearheading these actions and in mainstreaming adaptation across their plans, programmes, and budgets. The GoK received grant financing through the financial mechanism of the UNFCCC, including the Green Climate Fund, Adaptation Fund, and GEF. In addition, the government received grant funds and concessional loans from multilateral and bilateral partners such as the World Bank, USAID, UK aid, GIZ, and others). The international public funding has been directed toward irrigation projects, enhancing the climate resilience of pastoralists, and sustainable land management. Considerable progress was made in generating evidence on climate change and its impacts in the agriculture sector, improving access to CIS, providing loans for smallholder farmers to invest in resources to increase climate resilience, and establishing insurance schemes for smallholder farmers.

### 6.2 Challenges

This review has demonstrated that many adaptation activities have been implemented in the agriculture sector in Kenya. While this is a laudable achievement, work is still needed to improve or maintain agricultural production in a changing climate, to better understand and report on the impacts of adaptation actions in the agriculture sector, to assess the impacts of

adaptation actions on women and vulnerable groups, and to understand the financial flows for adaptation actions. The main challenges to promoting monitoring, evaluation, and learning (MEL) of the NAP process in the agriculture sector are briefly discussed below.



#### Improving and/or maintaining agricultural productivity in a changing climate

Despite successful implementation of adaptation actions in the agriculture sector, many local communities remain or are more vulnerable to impacts of climate change. The Kenya Institute for Public Policy Research and Analysis (KIPPRA) reported in 2020 that "Kenya has had rather limited success in increasing smallholder agricultural production by enhancing productivity and competitiveness, despite numerous agricultural programmes that have been implemented to achieve this goal" (p. 96). KIPPRA noted this is due to several challenges, including climate change, which has led to droughts, floods, and outbreaks of pests and disease. Other factors include small land holdings, low adoption of technology and innovation, and low investment in the sector by both the public and private sectors (KIPPRA, 2020).

The Kenya Food Security Outlook for June 2022 to January 2023 reported that the Kenya Food Security Steering Group determined in May 2022 that 4.1 million Kenyans in the ASALs are acutely food insecure. The long rains in 2022 marked the fourth below-average season across most of eastern Kenya, which led to declines in livestock productivity and crop production. Below-average and poorly distributed long rains in 2022 resulted in below-average planted area and crop failure in at least five counties. Poor livestock-body conditions have resulted from limited regeneration of rangeland resources and below-average forage and water resources in the pastoral areas (Famine Early Warning System Network, NDMA, & World Food Programme, 2022).

The frequency and severity of climatic shocks and stresses are expected to increase (KIPPRA, 2020), meaning that effort is needed to better understand what adaptation actions are actually helping Kenyans cope with the impacts of climate change and what adaptation actions provide the best value for money.



#### Lack of indicators that underlie the MEL of the NAP

The NAP 2015–2030 did not include indicators for the priority sub-actions, and baseline data was not collected. As such, this review was not able to accurately track progress on the NAP actions. However, the review was able to report on the implementation of actions and projects that were aligned with the sub-actions set out in the NAP. The information in this NAP review is complementary to the NCCAP annual progress report that tracks progress toward achievement of NCCAP adaptation targets (see Appendix A and GoK, 2021). Going forward, the review of the NAP could focus on evaluation and learning, helping to determine whether adaptation actions have helped Kenyans to cope with the impacts of climate change through reduced climate vulnerability and improved adaptive capacity.



#### Understanding the impacts of adaptation actions on women, children, and vulnerable groups

This review of the progress of the implementation of the NAP in the agriculture sector does not adequately address gender considerations or impacts on vulnerable groups. Women are critical players in the agriculture sector; also, women, children, and vulnerable groups are particularly susceptible to food insecurity and are negatively impacted by declines in crop, livestock, and fisheries productivity. Future reviews should consider gender issues and how adaptation actions are taken up by or impact vulnerable groups.



#### Understanding and accounting for emerging climate hazards and risks

Climate change continually presents new challenges for Kenyans. Emerging pests and diseases that are influenced by climate change and that negatively impact crops, livestock, and fisheries may not be adequately addressed in the actions set out in the NAP 2015–2030. For example, the World Bank estimated agricultural losses in Kenya of about USD 1.5 billion from the locust invasion in 2019–2020 (Dalberg Advisors, 2020). This points to the need for flexible and responsive adaptation planning and budgeting to address emerging and unexpected climate vulnerabilities and risks.



#### Tracking the flow of financial resources for adaptation actions

This review of progress on the implementation of the NAP did not attempt to calculate the flows of finance for adaptation actions in the agriculture sector. More attention is needed to track financial flows for adaptation at the national, county, and community/local levels. Such information is critical to understand which adaptation actions have the greatest impact at the least cost (value for money) and to understand the amounts and flows of both domestic and international finance for adaptation.







# Measure progress on the NAP through the NCCAP annual progress reports, which monitor the implementation of priority actions for a 5-year period

The annual reports on the implementation of progress on NCCAP priority actions can serve as the monitoring reports on the implementation of the NAP. This recommendation can apply to all 21 sectors in the NAP.



#### Focus future NAP reviews on evaluation and learning

Future reviews of the NAP could focus on outcomes and results to enable the government to begin to understand whether adaptation actions are leading to the expected results of enhanced climate resilience in the agricultural, livestock, and fisheries value chains and how to use this information to inform policy and decision making. Future evaluations could start with an overview of what is known from the NCCAP progress reporting and then focus on exploring whether Kenya is adapting to climate change. These evaluations could attempt to answer questions around how the implementation of priority adaptation actions has decreased climate vulnerability and improved adaptive capacity. For example, are people (farmers/pastoralists/fishers) and systems better able to cope with climate change? Has climate change been mainstreamed in the different subsectors? What are the significant changes that have occurred in the agriculture sector as a result of the implementation of priority adaptation actions? Is agricultural production being maintained as the climate changes? How can this learning be used to inform policy and planning as well as the updating of the NAP and NCCAP?



#### Assess the impacts of adaptation actions on women, children, and vulnerable groups

This review of the progress on the implementation of the NAP in the agriculture sector does not adequately address gender considerations or impacts on vulnerable groups. Women are critical players in the agriculture sector; and women, children, and vulnerable groups are particularly susceptible to food insecurity, and are negatively impacted by declines in crop, livestock, and fisheries productivity. Future reviews should consider gender issues and how adaptation actions are taken up by or impact vulnerable groups.



#### Formulate some high-level conclusions on the objectives of the NAP process

The Least Developed Countries Expert Group (2012) technical guidelines for the NAP process recommend that reviews of the NAP process consider how climate change adaptation is integrated into development planning. In Kenya, this could include a review of how climate change is mainstreamed in national policies and plans, such as medium-term plans, as well as in County Integrated Development Plans. The Tracking Adaptation and Measuring Development framework has been applied in Kenya (Karani et al., 2014) and potentially could be modified to help measure progress in managing adaptation.



#### Explore methodologies to measure adaptation outcomes that draw on existing information

This could include the tracking of extreme weather events (see, for example, KMD, 2021) and comparing this information against higher-level indicators that are already collected for other purposes, such as the Sustainable Development Goals. These indicators may include crop, livestock, and fisheries production; livestock deaths; number of food-insecure people; payouts under the Hunger Safety Net Programme; livestock trekking distances from grazing lands to water; and daily household milk production.



#### Identify and prepare stories/case studies of significant change

Understanding the outcomes and benefits of adaptation actions requires exploration of results at the local level. Stories of change and case studies could be used to explore local-level action and could explore such questions as Who/what changed as a result of adaptation action? How did the NAP process contribute to this change? Why is this change important?



#### Consider tracking of finance for adaptation

Improved tracking of finance for adaptation in the adaptation sector could help the government understand value for money and which investments result in the best adaptation outcomes. The initial focus could be on international public finance.



#### Use existing institutional structures and processes in future reviews of the NAP

The CCD has established institutional structures to review implementation of the NCCAP, and work is underway at the national level to operationalise the integrated Monitoring, Reporting and Verification Plus system, which will include the collection and analysis of information on resilience building in agriculture and other sectors, and at the county level (GoK, 2013). Future reviews of the NAP should build on and use these processes. In addition, the NAP review could build on the processes to track the implementation of progress on the Sustainable Development Goals, the Convention on Biological Diversity, and the Sendai Framework for Disaster Risk Reduction. The CSA Multistakeholder Platform and the work of the MALF&C to track progress on the Kenya Climate Smart Agriculture Implementation Framework 2018–2027 also provide information that will strengthen the reporting progress on adaptation in the sector.



#### Align the evaluation of the NAP with an updated climate and vulnerability risk assessment

The climate risk assessments undertaken in the agriculture sector between 2016 and 2019 under the KCSAP can contribute to a baseline against which progress on adaptation can be reviewed. Preparation of a climate risk and vulnerability assessment in the agriculture sector in a timeline that corresponds to the next review of the NAP could provide information on what has changed and the impact of adaptation actions. This update could inform the prioritisation of adaptation actions to be included in the updated NCCAP and updated NAP.



#### Build on the good and robust MEL work undertaken by development partners

Development partners have invested in MEL systems, and it would be prudent to review how these MEL systems report on adaptation outcomes and impacts. One example is the evaluation of the Partnership for Resilience and Economic Growth, funded by USAID, that measured the impact of activities implemented under the programme on household resilience and well-being outcomes in the face of shocks and stressors, including drought in nine ASAL counties (Agricultural Cooperative Development International/Volunteers in Overseas Cooperative Assistance, 2022). Another example is the FAO-UN Development Programme joint evaluation of the integrating agriculture into NAPs project that determined that the project developed capacities and created an enabling environment that improved adaptation monitoring, planning, and budgeting in the agriculture sector (FAO, 2021a). The methodologies and information of development partners' projects potentially could feed into future evaluations of the outcomes of the implementation of Kenya's NAP.





# Appendix A. NCCAP 2018–2022: Status of Implementation in the Priority Area of Food and Nutrition Security

Table A1. Actions, Expected Results, and Results Achieved as of June 2020 in the Priority Area of Food and Nutrition Security

Actions	Expected results by 30 June 2023	Results achieved as of June 2020 (cumulative)
Improve crop productivity through implementation of Climate-smart Agriculture (CSA) interventions	<ul> <li>Number of institutions/value chain actors and households harvesting water for agricultural use/production increased to 500,000.</li> <li>Agricultural pre- and post-harvest losses reduced from 40% to 15%.</li> <li>Number of beneficiaries accessing climate-oriented crop insurance increased from 280,000 to 350,000 farmers.</li> <li>Number of farmers accessing subsidies for appropriate agricultural inputs increased from 239,000 to 311,300.</li> <li>Number of households and acreage under sustainable land management increased for agricultural production:         <ul> <li>Support for the reclamation of 60,000 ha of degraded land.</li> <li>Areas under integrated soil nutrient management increased by 250,000 acres.</li> <li>Farm area under conservation agriculture increased to 250,000 acres, incorporating minimum/no tillage.</li> <li>Total area under agroforestry at farm level increased by 200,000 acres.</li> </ul> </li> </ul>	<ul> <li>196,391 actors harvested water.</li> <li>8.12% reduction in pre- and post-harvest losses.</li> <li>382,929 farmers accessed climate-oriented crop insurance.</li> <li>134,808 farmers accessed appropriate agricultural inputs.</li> <li>52,075 ha of degraded lands reclaimed.</li> <li>Area under soil nutrient management increased by 10,286 acres.</li> <li>Area under conservation agriculture increased by 20,050 acres.</li> </ul>
2. Increase crop productivity through improved irrigation	<ul> <li>Acreage under irrigation increased from 202,000 to 486,000 ha.</li> <li>Production efficiency from irrigated fields increased from 50% to 90%.</li> </ul>	<ul> <li>Area under irrigation increased by 4,933 ha.</li> </ul>
Improve productivity in the livestock sector through the implementation of CSA interventions	<ul> <li>Improved productivity of pastoralists:         <ul> <li>10,000 ha of rangelands reseeded in 23 ASAL counties.</li> <li>Annual ASAL's water harvesting and storage increased by 25%, from 16 to 20 million M³ via small dams and water pans, and 700 M³ through large multipurpose dams.</li> <li>Animal disease control and surveillance improved.</li> </ul> </li> <li>Number of customers/beneficiaries/farmers accessing climate-oriented livestock insurance increased from 18,000 to 105,750.</li> <li>Efficiency in dairy management improved for 267,000 households.</li> <li>Manure management improved through the adoption of biogas technology by 80,000 households and at least 200 abattoirs.</li> </ul>	<ul> <li>1,969 ha of rangelands reseeded.</li> <li>Annual ASALs water harvesting and storage capacity improved by 1,130,000 M³ as a result of the construction of 38 water pans, six subsurface dams and 73 bore holes and shallow wells in 11 ASAL counties.</li> <li>Over 10,086,752 head of cattle were vaccinated in 30 counties in 2019/2020.</li> <li>13 million doses of vaccines given in 2018–2019.</li> <li>18,012 farmer households insured 90,060 head of cattle.</li> <li>1,297 households adopted improved management of manure.</li> </ul>
4. Improve productivity in the fisheries through	<ul><li>Insurance packages piloted and developed for the fisheries subsector.</li><li>Aquaculture production increased:</li></ul>	<ul> <li>41,496 fishers adopted insurance products for the sector.</li> </ul>

Actions	Expected results by 30 June 2023	Results achieved as of June 2020 (cumulative)
implementation of CSA interventions	<ul> <li>Number of cages for fish farming increased from 3,450 to 8,000.</li> <li>Number of fishponds increased by 16,000.</li> <li>Number of farmers using low-carbon (reticulating) aquaculture systems increased from 20 to 180.</li> </ul>	<ul> <li>793 fish farming cages established.</li> <li>11,300 fishponds established.</li> <li>Number of farmers using low-carbon (recirculating) aquaculture systems increased by 140.</li> </ul>
5. Diversify livelihoods to adjust to a changing climate	<ul> <li>At least 521,500 households supported to adopt diversified adaptive enterprises/value chains for sustained livelihoods and nutrition security.</li> <li>Small-scale farmers, pastoralists, and fisher communities supported to transition to specialised and market-oriented output in 13 priority value chains, including drought-tolerant value chains.</li> </ul>	<ul> <li>292,106 households supported to adopt diversified adaptive enterprises.</li> <li>Over 67,175 farmers, 90,000 pastoralists, and 250 fishers supported to transition to specialised and market-oriented outputs.</li> </ul>
6. Enabling Action – technology and knowledge management	<ul> <li>Number of counties developing and implementing climate information services (CIS) plans increased from 9 to 47.</li> </ul>	<ul> <li>15 counties have CIS plans (63% of the national target).</li> <li>Three counties (Kwale, Narok, and Siaya) developed Integrated Climate Risk Management Plans.</li> </ul>

Source: Government of Kenya, 2021, pp. 12–13.



# Appendix B. Legislation, Policies, and Plans That Support Implementation of the National Adaptation Plan 2015–2030

The government has developed policies, plans, legal frameworks, and strategies that facilitate the implementation of the National Adaptation Plan (NAP) in the agriculture sector. Some are specific to climate change, while others encourage adaptation action consistent with the government's goal to mainstream adaptation in policies, legislation, and strategies.

Table B1 includes short descriptions of these policies and strategies, which are categorised into general policies and strategies at the national level; plans, policies, and strategies on climate change; and lastly those policies and plans that are specific to the agriculture, livestock, and fisheries sectors.

Table B1. Policies, plans, strategies, and legal frameworks that support the implementation of Kenya's NAP 2015-2030

Policies, plans strategies, and legal frameworks	Contribution to NAP 2015 implementation	
General national policies, plans, and strategies		
Kenya Vision 2030	Contributes through the flagship projects that aim to build resilience to climate change through access to high-quality, drought-tolerant, and early-maturing seeds in semi-arid areas; livestock insurance schemes; and development and rehabilitation of water harvesting and irrigation infrastructure.  https://vision2030.go.ke/	
Green Economy Strategy and Implementation Plan 2016-2030	Integrates NAP actions in themes 2 and 3. Theme 2 focuses on building resilience and promoting livelihood diversification of vulnerable communities through the use of local and Indigenous Knowledge, use of drought-tolerant crops, and mainstreaming of disaster risk management in agriculture through early warning systems. Theme 3 emphasises sustainable natural resource and land management and practices that enhance agricultural productivity and resilience to climate change, including the use of Indigenous Knowledge. Examples include soil water conservation and conservation agriculture.  https://www.unep.org/switchafricagreen/resources/report/green-economy-strategy-and-implementation-plan-2016-2030-kenya	
Big Four Agenda (2018–2022)	<ul> <li>Focuses on enhancing national food production and increasing food security by</li> <li>Increasing land under agriculture by 700,000 acres (including idle arable land) through public—private partnerships to produce more crops</li> <li>Encouraging the use of locally blended fertiliser on a 50/50 basis and implementing liming</li> <li>Providing incentives for technologies to reduce post-harvest losses from 20% to 15%.</li> <li>https://big4.delivery.go.ke/</li> </ul>	
Land Policy Sessional Paper No. 1 of 2017 on National Land Use Policy	<ul> <li>Outlines measures to be put in place to address the challenges of climate change. Those relevant to agriculture include the following: <ul> <li>Identify and map disaster-prone areas.</li> <li>Strengthen the capacity of institutions involved in analysis and mitigation of climate change trends.</li> <li>Build and strengthen research capacity on climate change and related environmental issues.</li> <li>Promote land-use practices that increase climate resiliency and reduce effects of climate change.</li> <li>Prioritise land use for climate change mitigation activities.</li> <li>Mainstream climate change curriculum in national education and values.</li> <li>Integrate initiatives that will address issues of climate change and disaster management.</li> <li>Develop disaster-awareness programmes that sensitise the communities on best land-use practices that incorporate disaster mitigation and climate change adaptation and preparedness.</li> </ul> </li></ul>	

https://repository.kippra.or.ke/xmlui/handle/123456789/489

Policies, plans strategies, and legal frameworks	Contribution to NAP 2015 implementation
National Spatial Plan (2015–2045)	Contributes to the NAP through its disaster preparedness in all disaster-prone areas and improves the capacity for adaptation to climate change, including the agriculture sector. The plan recognises the Agriculture, Fisheries and Food Authority Act (2013) that promotes and conserves soils and fertility for sustainable agriculture and optimisation of land use, which promotes resilience of the adaptation in the agriculture sector.  https://vision2030.go.ke/publication/kenya-national-spatial-plan-2015-2045/
National Climate Change Action Plan 2018–2022	Focuses on increasing food and nutrition security by enhancing productivity and resilience of the agricultural systems. This is achieved through improving crop productivity through the implementation of climate-smart actions; improving crop productivity by increasing the acreage under irrigation; increasing productivity in the livestock sector through implementation of priority climate-smart actions; and enhancing productivity in the fisheries sector through implementation of priority climate-smart actions and diversifying livelihoods to adjust to a changing climate. <a href="https://www.kenyamarkets.org/wp-content/uploads/2019/02/NCCAP-2018-2022-Onlinepdf">https://www.kenyamarkets.org/wp-content/uploads/2019/02/NCCAP-2018-2022-Onlinepdf</a>
National Climate Change Framework Policy, 2016	<ul> <li>Establishing and maintaining an effective and efficient institutional framework to mainstream climate change responses in agriculture and into integrated planning, budgeting, decision-making, and implementation, at both the national and county levels</li> <li>Reducing vulnerability to the impacts of climate change by building adaptive capacity, enhancing climate change resilience, and strengthening capacities for disaster risk reduction.</li> <li>https://repository.kippra.or.ke/handle/123456789/493</li> </ul>
Climate Change Act, 2016	Adopts a mainstreaming approach that integrates climate change considerations into all sectors and in County Integrated Development Plans. It establishes the National Climate Change Council (chaired by His Excellency the President), which is responsible for overall coordination and advisory functions. The act also establishes the Climate Change Fund—a financing mechanism for priority climate change actions and interventions. The former recognises sub-national county governments as key implementers. The act established the National Climate Change Directorate to coordinate climate action across sectors, mandated sub-national governments (counties) to mainstream climate change, and launched a National Climate Change Fund to increase finance for climate action.  http://kenyalaw.org/kl/fileadmin/pdfdownloads/Acts/ClimateChangeActNo11of2016.pdf
Kenya's Nationally Determined Contribution, 2015 and 2020	Recognises adaptation as a priority of the country; and clearly stipulates Kenya's commitment to enhance resilience to climate change by mainstreaming adaptation into the Medium-Term Plans and County Integrated Development Plans and implementing adaptation actions. These will be achieved across activities targeting early warning systems, climate-proofing infrastructure, reducing flood and drought risks, and protecting natural assets such as forests, mangroves, sea grass, and coral ecosystems. Some of these programmes have mitigation co-benefits. The total estimated cost of adaptation actions up to 2030 is USD 43,927 million. 90% of the adaptation cost will require international support in the form of finance, investment, technology development and transfer, and capacity building, while 10% will be from domestic sources.  https://unfccc.int/sites/default/files/NDC/2022-06/Kenya%27s%20First%20%20NDC%20%28updated%20version%29.pdf
Climate Risk Management Framework (2017)	Priority areas that implement NAP actions include building capacity at the national and county level for integrated climate risk management; analysis of the level of exposure, vulnerability to disasters, and capacity at the local scale; involving communities at risk and considering gender and marginalised groups; mobilising resources for climate risk management; mainstreaming climate risk management into agriculture-sector programmes, plans, and activities; enhancing research and dissemination of information about agricultural climate risk management; and creating platforms for sharing lessons and good practices on integrated climate risk management.  https://climate-laws.org/geographies/kenya/policies/a-climate-risk-management-

Policies, plans strategies, and legal frameworks	Contribution to NAP 2015 implementation
	<u>framework-for-kenya</u>
National Climate Finance Policy (2017)	Ensures that climate finance is available for actions in key sectors, including the Big Four agenda, such as agriculture and food security.
	https://www.fao.org/faolex/results/details/en/c/LEX-FAOC190011/
National Disaster Risk Management Policy (2017)	Focuses on disaster risk reduction and responses, which are critical for adaptation. https://repository.kippra.or.ke/xmlui/handle/123456789/559
Kenya's Disaster Risk Financing Strategy (2018- 2022)	Stipulates mechanisms for financing disaster risk reduction and responses that are closely related to adaptation, especially in agriculture.  Available on request from The National Treasury
Kenya Climate Smart Agriculture Strategy 2017–2026	Addresses vulnerability and building resilience to extreme weather events and unsustainable land and water management. It promotes the following actions: access to reliable climate/weather information to inform decisions of actors on crops, livestock, and fisheries value chains; crop varieties, livestock and fish breeds and tree species that are adapted to varied weather conditions and tolerant to pests, diseases, and droughts; technology development, dissemination, and adoption; diversification of enterprises and alternative livelihoods; early warning and response strategies; and resolution of natural resource use conflicts.  https://www.undp.org/kenya/publications/kenya-climate-smart-agriculture-strategy-2017-2026
The Agricultural Sector Transformation and Growth Strategy (2019–2029)	Supports the implementation of the NAP through activities that aim to increase the incomes of smallholder farmers through the adoption of new technologies such as solar-driven irrigation, artificial insemination, cultivation of high-value crops, and enhanced creation of small and medium enterprises along the sweet potato, dairy, and other prioritised value chains. It proposes a subsidy programme that focuses on selected inputs through e-vouchers and helps poor farmers by improving their access to inputs. <a href="https://wrsc.go.ke/resources/publications/42-agricultural-sector-transformation-and-growth-strategy-2019-2020">https://wrsc.go.ke/resources/publications/42-agricultural-sector-transformation-and-growth-strategy-2019-2020</a>
Kenya Climate Smart Agriculture Implementation Framework 2018–2027	Aims to enhance agricultural productivity, build resilience and associated mitigation cobenefits through climate-smart agriculture; integrate value chains; improve and sustain agricultural and agro-weather advisory services; and improve institutional coordination. https://www.undp.org/kenya/publications/kenya-climate-smart-agriculture-implementation-framework
National Water Master Plan 2030	Calls for irrigation-development programmes and financing to build infrastructure and well-equipped human resource capacity for sustainable operations and management. https://wasreb.go.ke/national-water-master-plan-2030
National Livestock Policy 2019 (draft)	Identifies measures to enable the livestock sector to enhance its contribution to food and nutritional security, provide raw materials for agro-based industries, and contribute to improved livelihoods in the country. <a href="https://repository.kippra.or.ke/handle/123456789/483">https://repository.kippra.or.ke/handle/123456789/483</a>
Fisheries Management and Development Act, 2016 (No. 35 of 2016)	Provides for the conservation, management, and development of fisheries and other aquatic resources to enhance the livelihoods of communities that depend on fishing. <a href="http://kenyalaw.org:8181/exist/kenyalex/actview.xql?actid=No.%2035%20of%202016">http://kenyalaw.org:8181/exist/kenyalex/actview.xql?actid=No.%2035%20of%202016</a>



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