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# Greenhouse Gas Emissions in Kenya's Crop Sector: A Policy Analysis Report

**Authors:** Veronica Ndetu, Angela Kioko, Ivy Kinyua, Dorcas Jalang'o, Sylvia Nyawira

ICAT Initiative for Climate Action Transparency

Alliance Bioversity & CIAT

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## DISCLAIMER



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# Abbreviations

| | |
|---|---|
| AMS | Agricultural Marketing Strategy |
| AP | Agricultural Policy |
| ASDS | Agricultural Sector Development Strategy |
| ASTGS | Agricultural Sector Transformation and Growth Strategy |
| BTRs | Biennial Transparency Reports |
| CBOs | Community-Based Organizations |
| CCA | Climate Change Act |
| CCS | Carbon Capture and Storage |
| COP | Conference of the Parties |
| CRMF | Climate Risk Management Framework |
| CSA-MSP | Climate Smart Agriculture Multistakeholder Platform |
| CSAS | Climate Smart Agriculture Strategy |
| ETF | Enhanced Transparency Framework |
| FNC | First National Communication |
| FSP | Food Safety Policy |
| GESI | Green Economy Strategy and Implementation |
| GFIP | Green Fiscal Incentives Policy |
| GHG | Greenhouse Gases |
| ICAT | Initiative for Climate Action Transparency |
| IPCC | Intergovernmental Panel on Climate Change |
| KCSAIF | Kenya Climate Smart Agriculture Implementation Framework |
| KCSAS | Kenya Climate Smart Agriculture Strategy |
| MPG | Modalities, Procedures, and Guiding Principles |
| MRV | Monitoring, Reporting, and Verification |
| NAP | National Adaptation Plan |
| NARSP | National Agricultural Research Systems Policy |
| NASMP | National Agricultural Soil Management Policy |
| NCCAP | National Climate Change Action Plan |
| NCCFP | National Climate Change Framework Policy |
| NCCRS | National Climate Change Response Strategy |
| NDCs | Nationally Determined Contributions |
| NEP | National Environment Policy |

| | |
|---|---|
| NIR | National Inventory Report |
| NLP | National Livestock Policy |
| NPCF | National Policy on Climate Finance |
| SDGs | Sustainable Development Goals |
| SNC | Second National communication |
| UNFCCC | United Nations Framework Convention on Climate Change |

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# Executive Summary

Agriculture accounts for one-third of global greenhouse gas (GHG) emissions, arising from crop and livestock activities, land-use changes, and related processes. Addressing climate change in agriculture necessitates solutions that yield economic benefits, improve livelihoods, and protect the environment.

The United Nations Framework Convention on Climate Change (UNFCCC) requires all Parties to report their GHG emissions and actions to the Conference of the Parties (COP) through national inventories. The Intergovernmental Panel on Climate Change (IPCC) guidelines ensure these inventories are comparable, accurate, and reflective of actual emission changes. Decision 18/CMA.1 established the modalities and principles for the enhanced transparency framework, categorizing reporting methods into tiers based on complexity. For agriculture and land-use sectors, higher-tier methods, which use national data and models, are more accurate but require better understanding and resources.

Kenya is committed to a low-carbon, climate-resilient development pathway. In its second National Communication (SNC), the country developed a GHG inventory for various sectors, with agriculture being the largest emitter at 41%, with methane ($CH_4$) and nitrous oxide ($N_2O$) being 58% and 42% of the total agricultural emissions (see Figure 1). Emissions in the SNC were based on a Tier 1 approach for the crop sub-sector which relies on activity data from agricultural production statistics and global emission factors. Despite the progress made in preparing the inventory, the country struggles to make effective policy decisions for the crop sector or track the impact of mitigation action and transition to higher tiers in accounting for the emissions for crops. Additionally, there is no framework for the continuous collection of accurate and reliable data, nor common protocols and tools for documenting and reporting this data, making it challenging to calculate GHG emissions for crops accurately.

A comprehensive policy package integrating climate change and other government policies is necessary to inform and improve policy design and implementation for mitigation in the agricultural sector. These policies should not only set goals for mitigation actions but also provide mechanisms for tracking progress and gathering the relevant data for GHG accounting and reporting. The Initiative for Climate Action Transparency (ICAT) funded a project to enhance the GHG inventory for Kenya's crop sub-sector. This project assessed the current policy and legal frameworks using an excel template and key indicators adopted from the ICAT agricultural policies toolbox. The validation of the indicators and population of the template was done in a workshop organized by the Alliance of Bioversity and CIAT, including members from the Climate Smart Agriculture-Multi-stakeholder Platform (CSA-MSP).

The analysis revealed several critical gaps in policies supporting GHG inventories and reporting. There is a mismatch between activity data and emissions targets, with most targets focusing on activity data rather than actual emission reductions. Policies often lack specific baselines for the crop sub-sector, making it difficult to attribute GHG emissions to specific mitigation actions. Additionally, there are inadequate mechanisms for deploying the necessary resources for implementation, data collection, and analysis. Insufficient guidance on data sharing between national and county levels leads to discrepancies in meeting national GHG inventory requirements. National policy timelines frequently do not align with international reporting cycles, reducing the effectiveness of GHG inventories. Furthermore, shifting political interests and priorities between national and county governments disrupt policy execution. Lastly, financial constraints hinder the implementation and maintenance of comprehensive monitoring systems, as detailed funding mechanisms for tracking actions and collecting necessary data are missing.

To address these gaps, this report recommends incentivizing mitigation through various policy instruments, establishing a central GHG emissions tracking system, designing mechanisms for coherence in targets and baselines, setting up mitigation action indicators aligned with GHG reduction targets, and developing a policy direction for the GHG inventory process in the crop sub-sector. These recommendations aim to enhance GHG reporting accuracy and support effective decision-making in Kenya's crop sector.

# Introduction

# 1. INTRODUCTION

## 1.1 Climate change and agriculture in Kenya

Agriculture is a key sector for Kenya's economy. However, it has a high dependency on rainfall putting the sector at a high risk largely due to its sensitivity to climate change related impacts. This extreme susceptibility to the changing climatic effects increases the vulnerability of farming systems, thus weakening coping strategies and resilience, and imposes a great risk to the future of most Kenyans. Nonetheless, agriculture is itself a major source of GHG emissions. According to the National Inventory report (NIR) 2015, 41% % of Kenya's total emissions were produced by the agriculture sector, predominantly $CH_4$ from ruminant livestock, e.g. cattle and sheep, and $N_2O$ from animal excreta and nitrogenous fertilizers. Other emissions included; methane ($CH_4$) and nitrous oxide ($N_2O$) from biomass burning, carbon dioxide ($CO_2$) from lime application, direct and indirect $N_2O$ from managed soils and indirect $N_2O$ from manure management as well as $CH_4$ emissions from rice cultivation (see Figure 1). In the NIR, tier 1 reporting was used for the agricultural sector and indicated that the trend in emissions in the Agriculture Forestry and Other Land Use (AFOLU) sector increased by 50 percent between 1995 to 2015. Without mitigation, emissions from agriculture will continue to rise, increasing the sector's share of total emissions. To address agricultural development and the challenges posed by climate change, the Government of Kenya has put in place policies and legal frameworks that aim at enhancing agricultural productivity and building climate-resilient agricultural systems in a low carbon development pathway. Currently, emissions for the crop sub-sector in Kenya are based on the Tier 1 approach which relies on activity data from agricultural production statistics and global emission factors. The policies and legal frameworks however, need to support transitioning of the GHG inventory in agriculture to tier 2 reporting with field based activity data and nationally defined emission factors. This will provide for more accurate and reliable accounting of emissions and sinks, for mitigation actions. Currently the dairy sub-sector is the only sector with an existing tier 2 in the inventory for the agricultural sector.

## 1.2 GHG emission reduction Strategies in Crop Production

The sources of emissions in the crops sub-sector include the application of inorganic fertilizers, tillage, use of on-farm machinery, on-farm manure management, and removal of crop residues which enhances decomposition. These practices contribute to the $N_20$ and $CO_2$ emissions in the atmosphere. In addition, irrigated rice systems contribute to $CH_4$ emissions as deforestation through conversion of forests to agricultural land also releases stored carbon thereby reducing carbon sinks.

Policies designed to reduce emissions in crop production need to include action plans to improve 1) nitrogen fertilizer efficiency-use 2) precision application of nitrogen fertilizers or controlled-release of fertilizers to minimize $N_2O$ emissions 3) conservation tillage practices to reduce soil disturbance during planting 4) management of residues, including planting of cover crops to improve soil health and sequester carbon. 5) Crop Variety Selection (shift to crop varieties or locally adapted species that emit fewer GHGs and considering crop rotations to enhance soil health and reduce emissions) 6) water management to optimize irrigation practices to reduce methane emissions from waterlogged soils (especially in rice production) 7) tree planting on farms (agroforestry), among others.

## 1.3 GHG emissions reporting requirements

The UNFCCC obliges all Parties to report information on their GHG emissions to the Conference of the Parties (COP), and on the steps taken to implement the Convention through national communications (NCs). Article 13 of the Paris Agreement[1] establishes the enhanced transparency framework (ETF) to build mutual trust and confidence and to promote effective implementation. Article 13.7(a) obligates each Party to provide NIR of anthropogenic greenhouse gas emissions by sources and removals by sinks using the IPCC guidelines. The IPCC guidelines provide key concepts to create a common understanding and to ensure that inventories are comparable between countries, do not contain double counting or omissions, and that the time series reflects actual changes in emissions. The guidelines provide approaches and arrangements for sustained updating and maintenance of high-quality and continuous improvement of national GHG inventories. The planning, preparation, coordination, management, and technical oversight of the inventory should be led by the inventory coordinator while the individual sector/source(s) team leaders plan and oversee the inventory preparation for their sector/source(s). In Kenya the Climate Change Directorate of the Ministry of Environment, Climate Change and Forestry coordinates the inventory sector team. The

1 IPCC, 2014: Climate Change 2014: Synthesis Report.

crops sub-sector team is led by Climate Change Unit of the State Department of Agriculture and consists of officers drawn from key units responsible for providing relevant data (e.g. for crops, fertilizer, rice) as well as some representative national research institutions like Kenya Agricultural and Livestock Research Organisation (KALRO).

Decision 18/CMA.1 commits all Parties to submit their first biennial transparency report (BTR) and NIR, by 31 December 2024. The report will bring climate change related information to the attention of national policy makers, relevant institutions, the wider national audience as well as multilateral and bilateral development partners. A greenhouse gas inventory report includes a set of standard reporting tables covering all relevant gases, categories and years, and a written report that documents the methodologies and data used to prepare the estimates. The quality of greenhouse gas (GHG) inventories relies on the integrity of the methodologies used, the completeness of reporting, and the procedures for compilation of data. The MPG has developed standardized requirements for reporting national inventories with tiers representing the level of methodological complexity. For most agriculture and land-use and land use change and Forestry emissions and removals:

- Tier 1 is based on the use of activity data (e.g. agricultural production statistics) and global emission factors.
- Tier 2 follows the same approach but applies nationally defined emission factors.
- Tier 3 involves the use of models and higher order inventory data tailored to national circumstances.

The inventory coordinator and thematic working team members need to understand the GHG categories in the sector, the methodologies, data needs, and other requirements for developing GHG estimates for the sector for the tier 1 and higher tiers.

## 1.4 Status of GHG reporting for the crops sub-sector

Kenya has put in place measures to pursue a low carbon and climate-resilient development pathway to help transform Kenya into a newly industrializing, middle-income country. In its second National communication (SNC)[2], Kenya developed the greenhouse gas inventory on an individual sector basis using the IPCC Revised 1996 Guidelines for National Greenhouse Gas Inventories (Volumes 1, 2 and 3),. Emissions from the crop sub-sector were accounted using a Tier 1 approach. Emissions from the sector are projected to increase from 30 $MtCO_2e$ in 2010 to 35 $MtCO_2e$ in 2030. These are largely driven by livestock methane emissions change and land use. The agricultural low carbon development options have the potential to abate in the order of 5.54 $MtCO_2e$ per year up to 2030. The most significant reduction is identified to be through agroforestry, which has an abatement potential of 4.16 $MtCO_2e$ per year in 2030. Other low carbon development options include conservation tillage and limiting the use of fire in range and cropland management, with abatement potentials of over 1.09 and 0.29 $MtCO_2e$ per year in 2030, respectively. The updated NDC (2020) commits the agriculture sector to achieve the mitigation goal through implementation of climate smart agriculture in line with the Kenya Climate Smart Agriculture Strategy (KCSAS). This emphasises the use of practices and technologies that increase productivity and resilience while minimising GHG emissions.

Although GHG inventories have been taking place every 2 years, there is lack of comprehensive activity data to support estimates of complete GHGs emissions from the crops sector. This is because there lacks a framework for continuous collection of accurate and reliable activity data necessary for the GHG inventory, resulting in incomplete and inaccurate accounting of emissions from the crop sub sector with emissions from key cropping activities not being accounted for. Consequently, this limits the country's ability to make good policy decisions for the crop sub-sector or to track the impacts of mitigation actions implemented in different activities aimed at reducing GHGs emissions. This includes those highlighted in the Nationally Determined Contributions (NDCs). Additionally there is a lack of common protocols and tools for documenting and reporting activity data and calculating GHGs emissions for crops both at the county and the national level.

## 1.5 Rationale for the policy analysis

To respond to the UNFCCC and the Paris Agreement requirements, governments are increasingly focused on implementing policies, legal frameworks and actions that achieve GHG mitigation. Reducing emissions across all sectors and gases requires a portfolio of policies and legal frameworks tailored to fit specific national circumstances. A comprehensive policy package, integrating climate change and other government policies, is necessary to inform and improve policy design and implementation, goal setting and tracking of progress and gathering information for reporting. Demonstrating effective policies can also help in understanding the capacity

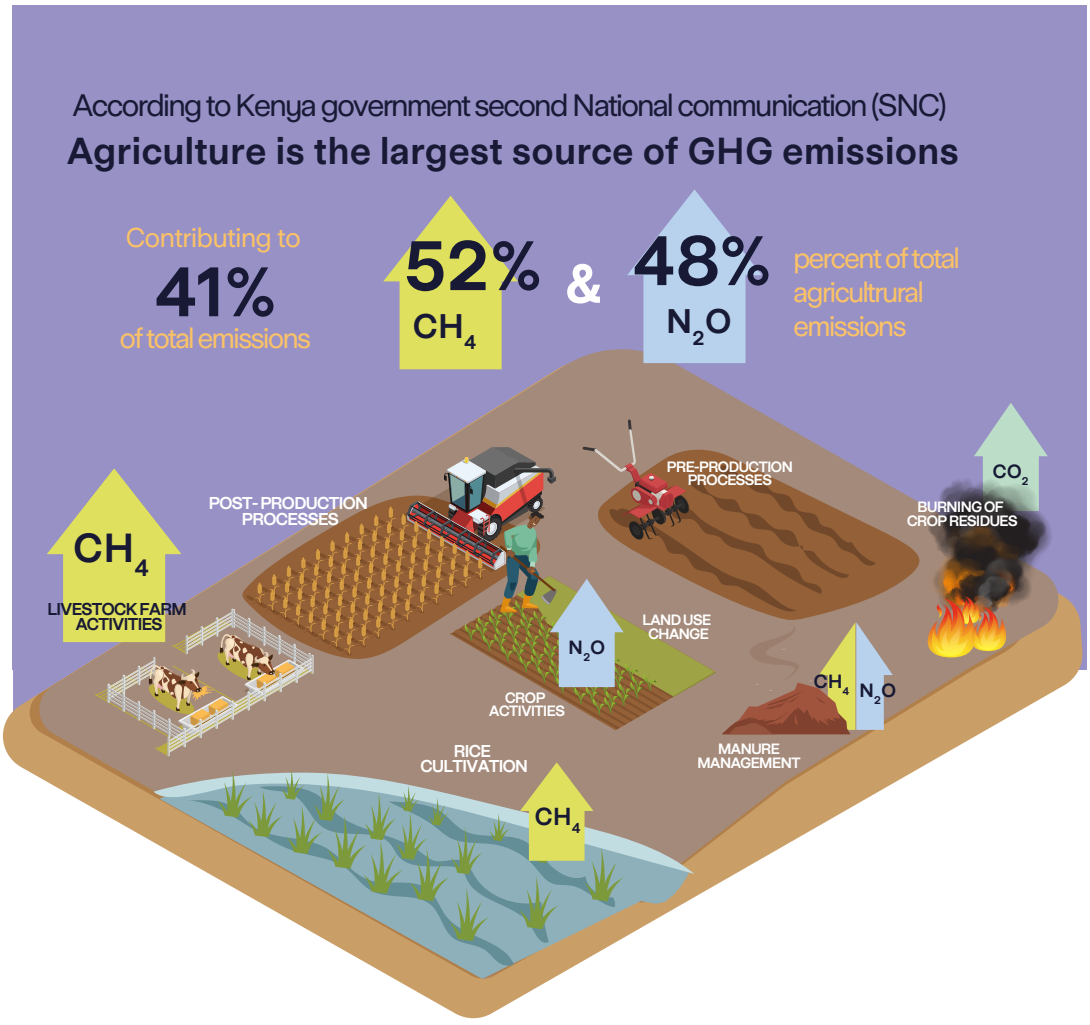
2 https://unfccc.int/resource/docs/natc/kennc2es.pdf

needed to implement climate action as well as attract climate financing. For mitigation actions to be more visible in the agriculture sector, there is a need to account for more specific GHG sources and sinks by transitioning to tier 2 reporting.

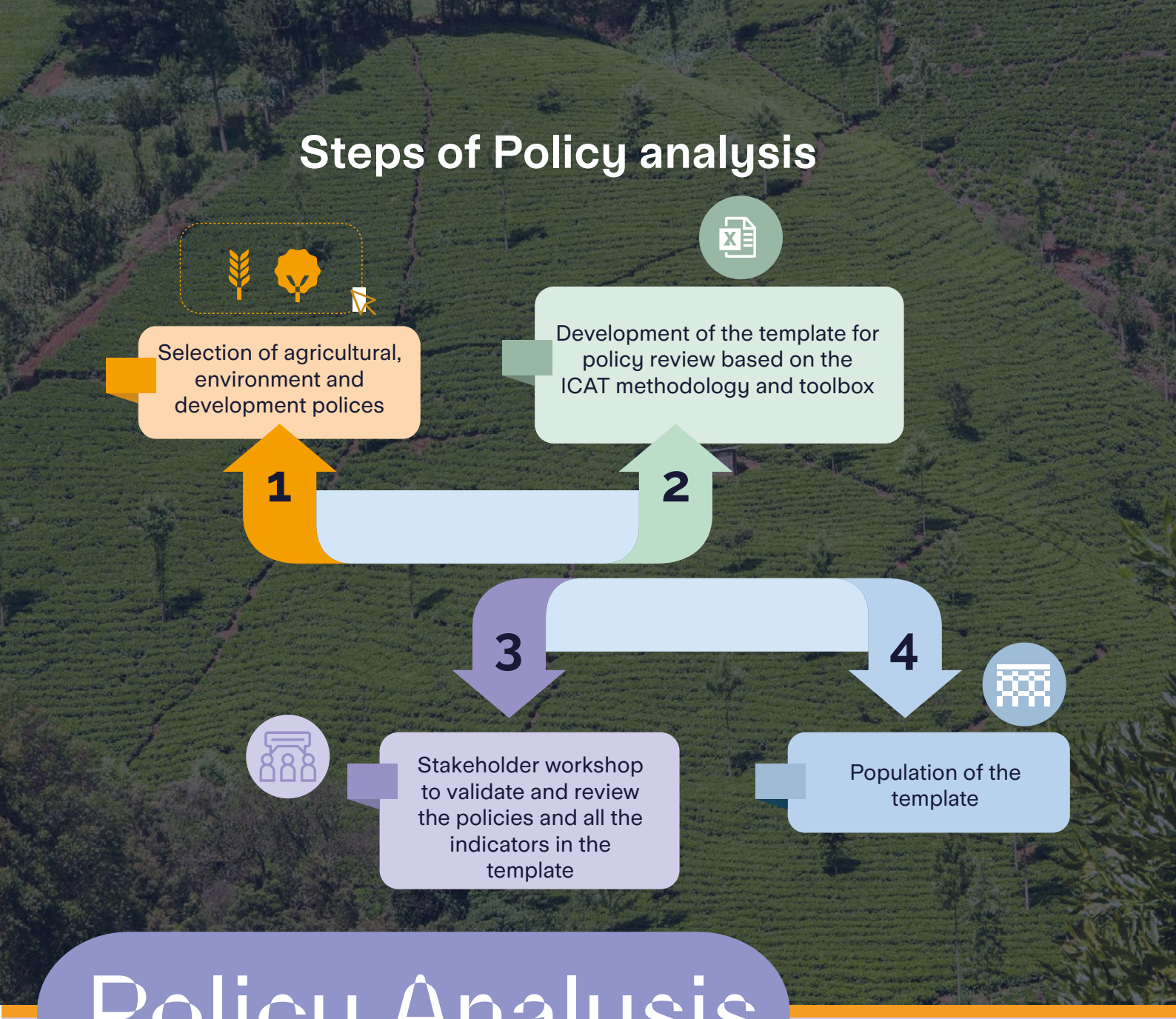
ICAT developed a guide for assessing the GHGs impacts of agricultural policies to help countries with the assessment of the impact of policies designed to reduce greenhouse gas emissions from the agricultural sector. This aims at helping users to identify the key mitigation actions where GHGs impacts need to be monitored, define indicators and data to establish the baseline scenarios for tracking the mitigation options, and define the needed time frames.

The main objective of the ICAT-funded crops sub-sector GHG inventory project in Kenya is to support the process of developing a transparent, accurate, complete, and consistent data management and documentation system for activity data for key emission sources in the crop sub sector. One of the specific project objectives is to assess the extent to which the existing national climate change and agriculture sector policies support the GHG accounting and inventory preparation process. The main focus of this objective is to identify the key mitigation actions for the crop sub-sector included in these policies and access if issues related to the data needed to track these actions in a transparent manner are clearly outlined in the polices. To address this objective, the ICAT methodology and toolbox[3] was applied to assess the policies and identify the key mitigation actions where GHGs impacts need to be monitored, define the key indicators and data needed to establish the baseline scenarios for tracking the mitigation options, and define the needed time frames. In this case the assessment helps gauge if implementation of policy will support the GHG inventory, resource management as well as the social, political, economic, and administrative requirements.

Figure 1: **An illustration showing some of the key land management activities contributing to emissions in the atmosphere**




3 https://climateactiontransparency.org/our-work/icat-toolbox/assessment-guides/agriculture-sector/




# Policy Analysis

# 2.THE POLICY ANALYSIS METHODOLOGY

## 2.1. Scope of policies analysed

The policy analysis focused on policies and legal frameworks both at the national and county level with relevance to agricultural development, environment, and climate change. For the county level, the analysis include policies for only five pilot counties (i.e., Murang'a, Taita Taveta, Makueni, Baringo and Nyamira). The analysis focused on exploring the policies recommending actions that contribute to reducing emissions or provide sinks for GHGs in crop production systems, establish GHG emission baselines and mitigation targets, inventory processes, design/guide institutional implementation, and data and information management roles and mandates .

Based on this a total of 27 national policies were analysed, grouped into (Figure 2):

1. **Agriculture Development Policies:** the Vision 2030, National Environment Policy, Food Safety Policy 2021), Agriculture Sector Development Strategy 2010-2020, Agricultural Sector Transformation and growth Strategy, Agricultural Policy 2021, National Livestock Policy, National Agricultural Research Systems Policy, Agricultural Marketing Strategy 2023-2032 and Farm Forestry Rules 2009

2. **Environment Policies:** Green Economy Strategy and Implementation Plan 2016-2030, National Agricultural Soil Management policy, Green Fiscal Incentives Policy

3. **Climate Change Policies:** National Climate Change Response Strategy 2010, Kenya National Adaptation Plan I, II and II, Kenya's Updated Nationally Determined Contribution, Climate Change Act 2016 (Amended 2023), "Sessional Paper No. 3 of 2016 on National Climate Change Framework Policy", Climate Risk Management Framework, National Policy on Climate Finance 2016, Kenya Climate Smart Agriculture Strategy 2017-2026, Kenya Climate Smart Agriculture Implementation Framework 2018-2027, Kenya Climate Smart Agriculture (CSA) Monitoring and Evaluation Framework (2021).

Counties have also developed policies to guide them in implementation of their priority actions and in allocation of resources (Figure 3). Just like in the national level government, the county policies were also grouped into those related to development in agriculture, climate change and environmental conservation respectively:

1. **Agriculture and Development Policies:** Murang'a County Third Integrated Development Plan (2023-2027), Murang'a County Agricultural Farm Inputs Subsidy Policy 2022-2032, Makueni (Government of Makueni County Vision 2025, 2021, Makueni County Fiscal Strategy paper, Makueni County Integrated development plan 2018-2022, Makueni County Agriculture and Livestock Policy, 2020, Taita Taveta County Integrated Development Plan III (2023-2027), County Government of Nyamira Ministry of Agriculture, Livestock and Fisheries Strategic Plan, Baringo County Annual Development Plan (2022-2023, Baringo County Integrated Development Plan (2018-2022).

2. **Climate Change Policies:** The Makueni County Climate Change Act 2022, Makueni County Environment and Climate Change Policy, Taita Taveta County Climate Change Bill), Nyamira County Climate Change Action Plan 2023-2028, The Nyamira County Climate Change Bill, 2021).

3. **Environmental Conservation Policies:** Murang'a County Agro-Ecology Policy (2022-2030, The Murang'a County Agroecology Development Act, (2022), Makueni County Forest and Landscape Restoration Implementation Plan 2023-2030, County Government of Nyamira Ministry of Environment, Water, Energy, Mining and Natural Resources Strategic Plan.

Figure 2: **National Agricultural Policies in Kenya from 2001 to 2023**

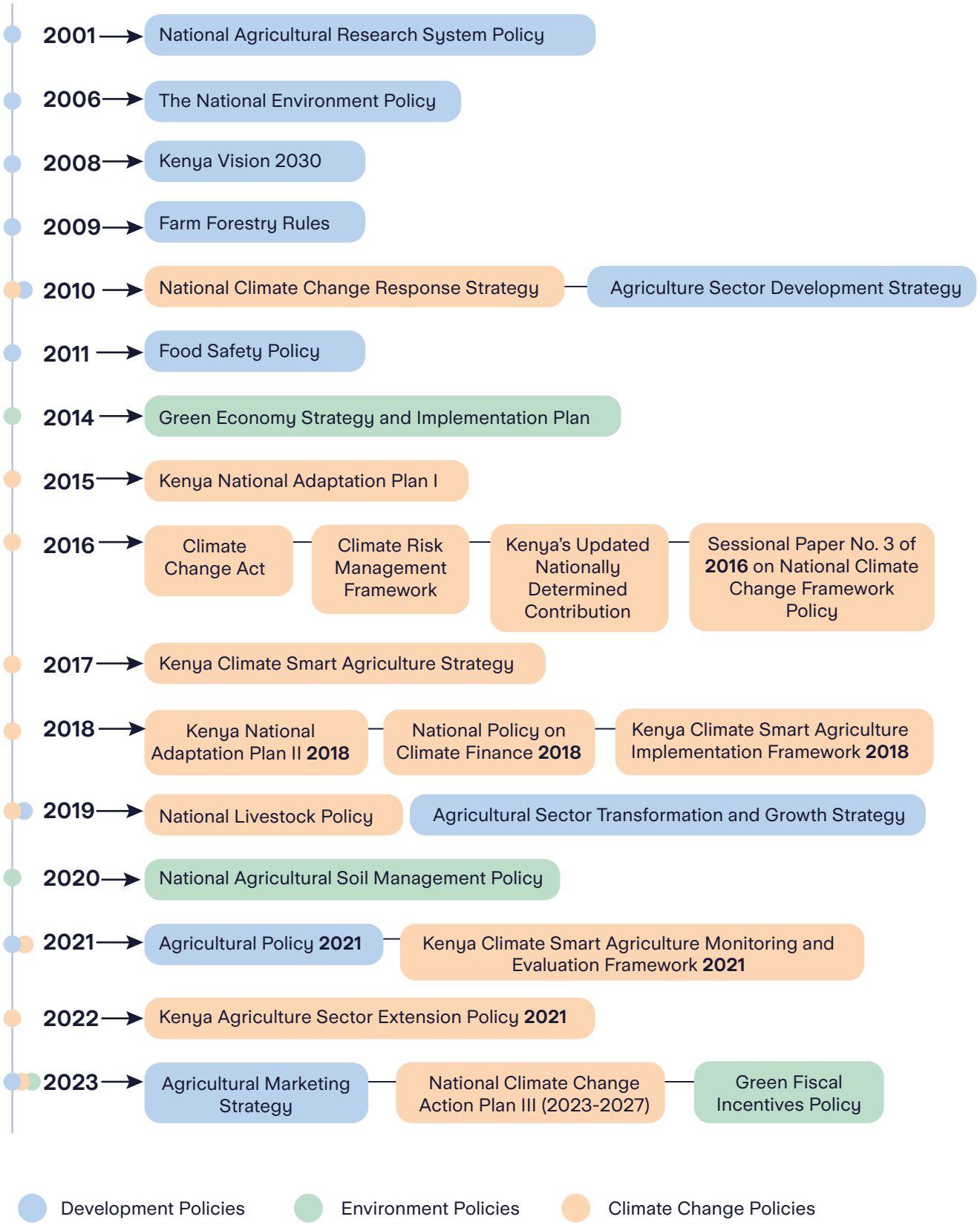
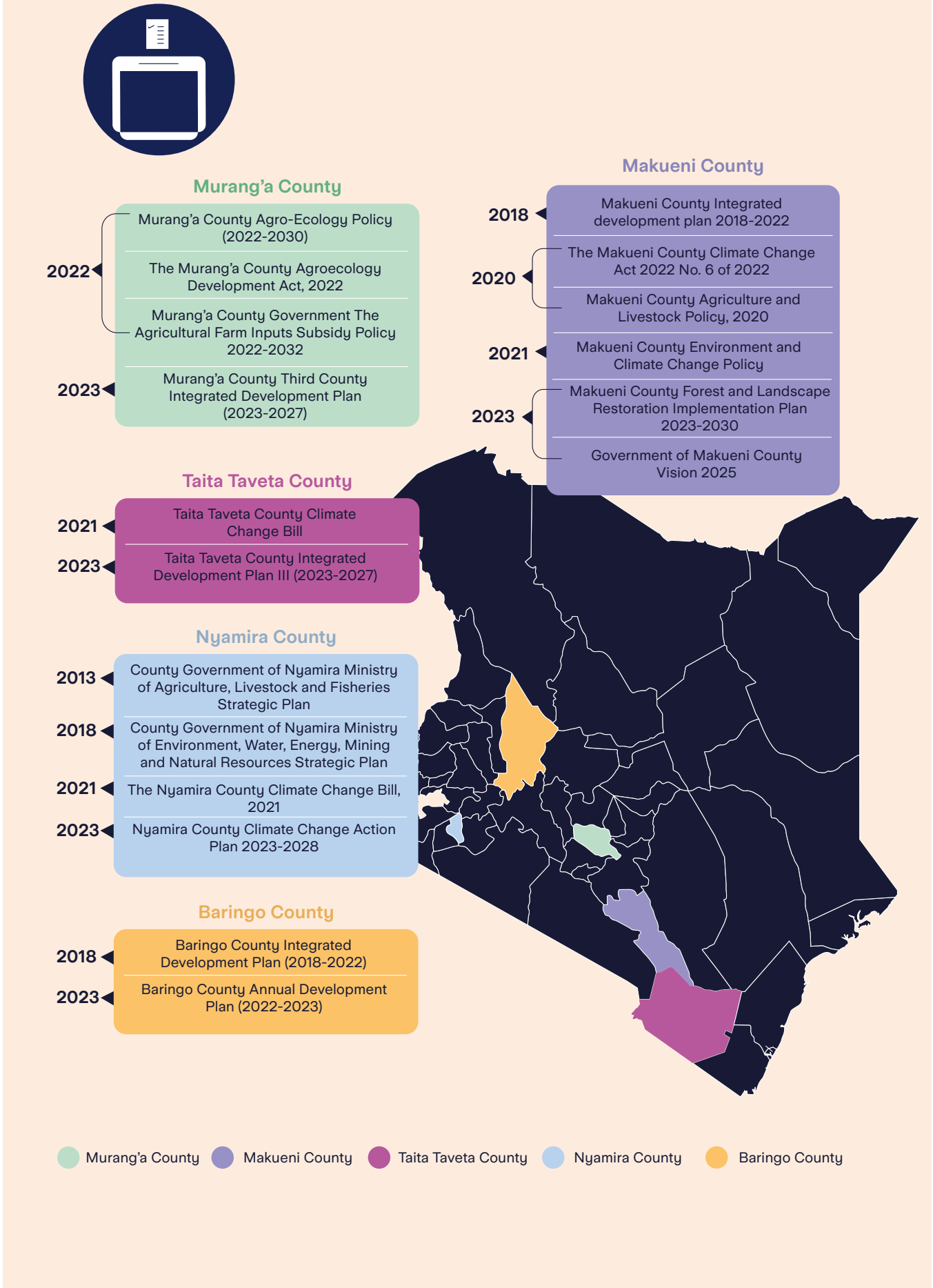


Figure 3: **Climate and agricultural policies in five counties in Kenya**



## 2.2. Indicators selection and template population

An excel template was developed with key indicators relevant for assessing the relevance of the policy in supporting GHGs emissions reduction and reporting for the crop-subsector. Development of the template was guided by the ICAT methodology and toolbox and subjected to refinement and validation in a stakeholder workshop spearheaded by Alliance of Bioversity and CIAT and the Climate Smart Agriculture Multi Stakeholder Platform (CSA-MSP) technical working group on policy.

The final indicators selected included the type of policy instrument, objectives, the detailed crop interventions, reference GHG emissions, intended level of mitigation, status of the policy and custodian, date of implementation, implementing strategy/ mechanisms, MRV procedures, the key indicators for policy tracking and the linkage to other policies (Table 1). During the workshop, the participants also populated the template with the relevant information by subjecting each of the policies to the indicators.

Table 1: **List of the key indicators included in the policy analysis in this study**

| Indicators | Description |
|---|---|
| Instrument | Initiatives to promote and regulate agricultural policy. These are mechanisms through which policy decisions are translated into actions (e.g., voluntary agreements or actions, trading programs, subsidies and incentives, regulations, and standards, etc.). |
| Policy objectives | The intended goals and objectives that the policy seeks to achieve. |
| Specific crop interventions | Refers to targeted measures and/actions aimed at promoting improvements or addressing issues related to the crop subsector. They aim at achieving specific objectives and outcomes in the agricultural sector (e.g., crop diversification, pest management, climate-smart agricultural practices). |
| Baseline emissions | The reference emissions to be used in quantifying the impacts of the policy on greenhouse gases (GHGs) emissions once implemented. |
| Intended level of mitigation to be achieved and/or target level of other indicators | The target amount of emissions to be reduced or removals to be enhanced as a result of the policy, both annually and cumulatively over the life of the policy (or by stated date); and/or the target level of key indicators (such as hectares of land to conserve) |
| Status of the policy | The current condition, position, or state of implementation of a particular policy (i.e., adopted, planned, or implemented). |
| Custodian of the policy | The entity responsible for overseeing, implementing, and maintaining the policy. |
| Date of Implementation | The specific point in time when a policy officially comes into effect and its provisions start being applied. The date marks the beginning of the policy's operational phase. |
| Implementing strategy/ mechanisms | The specific plans, approaches and actions designed to put a policy into practice. |
| Monitoring, reporting and verification procedures | These are procedures designed to systematically track the progress of policy implementation, report on outcomes, and verify whether the intended objectives are being achieved. |
| Policy Key Performance Indicators | Metrics that indicate the state or level of a policy's performance. |
| Policy link to global reporting | The connection between a specific policy and broader international reporting frameworks or agreements. |

## Key Indicators included in this policy analysis study

Instrument

Policy objectives

Specific crop interventions

Baseline emissions


Intended level of mitigation to be achieved


Status of the policy

Custodian of the policy

Date of Implementation

Implementing strategy

Monitoring, reporting and verification procedures

Policy KPI's

Policy link to global reporting

# Results

# 3. RESULTS

**Policy landscapes:** Agriculture being one of the key sectors in Kenya, has had a number of policies developed that are aimed at guiding the sector towards ensuring food, nutrition and economic growth. These polices have been developed in the period between 2001 to 2023. In addition, policies have been put in place to guide the mainstreaming of climate change into the country's development functions including in the agriculture sector. Environment related policies seek to address the issues of natural resources and land management upon which agriculture depends and is likely to degrade. The findings of the analysis are as tabulated in annex 1 and summarized below.

**Policy instruments:** The analysis established that a majority (23 national and 10 counties policies out of 27 and 19, respectively) of the policies were found to be development and deployment instruments. This means that they are aimed at spurring agricultural development at the national and county level. Four national policies, i.e., the Climate Change Act (CCA), the Green Fiscal Incentives Policy (GFIP), the Farm Forestry Rules and the Food Safety Policy were grouped as regulations and standards. Three counties had also developed climate change acts which were also grouped as regulatory instruments. These regulatory instruments provide legal direction in addressing climate change, environmental protection, and food safety challenges both at national and county levels.

The national Agricultural Marketing Strategy (AMS) 2023-2032) and The Agricultural Farm Inputs Subsidy Policy 2022-2032 for Murang'a county were grouped as trade and subsidies instruments. The AMS guides in maintaining modern market infrastructure for efficient marketing of agricultural produce, facilitating compliance to produce and products standards while, the Murang'a farm inputs policy aims at improving the delivery of subsidised farm inputs.

The NDC is categorised as an information instrument and is a critical component of the country's climate mitigation strategy. It communicates how the country intends to contribute to implementation of the Paris agreement by committing to abate GHG emissions by 32% by 2030 relative to the BAU scenario of 143 $MtCO_2eq$. The total Emission Reduction Potential is 86 $MtCO_2e$ by 2030, with the agricultural expected to contribute to a reduction of 9.7 $MtCO_2e$. Only one relevant research policy was analysed, i.e., the National Agricultural Research policy, was analysed while no county was found to have a research policy.

**Policy objectives:** The objectives of most of the policies are broad, focusing on national and sector development but they also address aspects of climate change adaptation, mitigation, and risk management. Policies addressing climate change have clear objectives on adaptation and mitigation and facilitate uptake of technologies that support low carbon, and climate resilient development and improved efficiency and reduced emissions intensity. They propose development of mechanisms that minimize greenhouse gas emissions from agricultural production systems, protecting and conserving biodiversity, reducing tillage to help minimize soil disturbance, promotion and management of agro-forestry, among many other interventions. To further build resilience, increase farm productivity and reduce emissions, the policy objectives aim at ensuring 10% of farmland is under the right tree species and varieties, soil conservation on cropland, and protection of wetlands and riparian areas. Whereas most of the policies recommend actions to be undertaken to respond to climate change and reduce GHG emissions, the Kenya Climate Smart Agriculture (CSA) Monitoring and Evaluation Framework has an objective that supports reporting climate action in the agriculture sector through development of guidelines, capacity building on data collection and reporting tools, as well as enhancing institutional arrangements through the climate change units. On climate finance, the Green Fiscal Incentives Policy provides financial interventions for transitioning to a desired low-carbon climate-resilient green development pathway through a range of investments and regulatory fiscal mechanisms including taxes, subsidies and expenditure programs. Of the county policies, only Makueni's county Fiscal policy commits the county to allocate finance to increase agricultural productivity through adoption of appropriate and modern technologies; reduction of post-harvest losses and enhancing agro-processing while mainstreaming climate change and social inclusivity. The other counties do not have specific fiscal policies.

**Mitigation adaptation:** Twelve of the national policies and four of the county policies were found to address both mitigation and adaptation; one national policy addressed mitigation alone, while two national policies and one county policy addressed adaptation alone (See Annex 1). Policies with mitigation objectives mainly targeted supporting the adoption of emission reduction technologies. Some of the highlighted technologies included agroforestry, minimum tillage, manure management, efficient rice production technologies and increasing

the area under rain fed rice production, and integrated soil nutrient management. The climate change related county policies only state intentions to address climate change through both adaptation and mitigation but did not give specific strategies for addressing mitigation.

**Crop specific mitigation level or activity targets indicators:** Eight (8) national policies were found to have agriculture mitigation targets but did not all provide crops-specific targets (See Annex 1). None of the county policies had activity indicators for mitigation or GHG emissions reduction. The updated NDC (2020) sets a total emission reduction potential of 9.7 MtCO2e by 2030 for the agricultural sector, while the KCSAS targets reducing sectoral emissions to 30 $MtCO_2e$ relative to the business-as-usual trajectory projection of 37 $MtCO_2e$ in 2026. The NCCAP II targeted to reduce agricultural GHG emissions by 2.61 $MtCO_2e$ by 2022 through agroforestry, minimum tillage systems, manure management, putting 50% of 30,000 hectares of rice production into efficient production technologies and increasing the area under rain-fed rice production from 400 hectares to 600 hectares by 2022. While there is a national adaptation communication report providing achievements regarding adaptation, there is no report for mitigation and no GHG inventory has been done to establish the level of achievement. The NCCAP III projects 3% emissions reduction to be in the agricultural sector by putting 2,500,000 ha under integrated soil nutrient management, planting farm trees on 200,000 ha, and increasing farm area under various conservation agriculture practices from 53,200 ha to 100,000 ha. The Farm Forest Rules, the Agriculture Policy and GESIP target to put 10% of any agricultural land under trees. How much GHG emissions these specific management activities will remove or abate from the crops systems is however not given by any of the policies. County policies too do not provide activities or targets for targets for mitigation and GHG emissions reduction and national policies do not assign any targets to the counties but give national figures.

**Greenhouse Gas Emissions Baselines:** Seven national policies provide quantitative baseline figures, but the figures are drawn from the first national communication (FNC)[4] with no specific baselines figure based on progressive GHG inventories for agriculture or crops sub-sector. County policies have not addressed GHG emissions and the national policies do not have any county baselines.

**Identification of clear roles and institutional mandates on GHG inventories:** The policies that identified clear roles and spelt out the roles for implementation of each specific policy include ministries, departments and agencies at both national and county level, non-governmental organizations (NGOs), private sector, research and academic institutions, community-based organizations (CBOs), media, and multi-disciplinary teams of crop and environment experts. However, the policies do not provide clear roles and institutional mandates as regards the GHG inventory process.

**Monitoring, reporting and verification (MRV) procedures:** A good number of the policies (11 national and 10 county) provide for monitoring and evaluation (M&E) as well as MRV procedures by assigning the relevant ministries, departments and agencies the role to develop and operationalise M&E institutions and functions. The NCCAP III specifically assigns the Climate Change Directorate (CCD) with support from NEMA, KFS, KNBS and State Departments the role of establishing a functional system for Kenya's GHG inventory and an MRV system for tracking mitigation for NDC reporting by 30th June 2027. For the agriculture sector, KCSAIF recommends the development of an MRV, the CSAM&F and the CSA reporting tool to provide the M&E mechanism for the sector.

**Implementing strategy/ mechanisms:** These have been posted on government online platforms for easy access by implementers and other interested parties. Most of them have provided in their structure, strategies like sensitization, capacity building and training of stakeholders, development of legal incentives, implementation plans, budget provisions, M&E systems as well as assigning of responsibilities among other strategies. The only challenge is that there are no spelt -out consequences for failure to implement and hence the strategies remain in the documents without commitment for implementation. It was also noted that in their content, most of the policies did not make specific reference to the target mitigation or GHG inventory except for the Climate Change Act (amended) 2023, which proposes to set regulations and incentives for carbon credits. Counties that have uploaded their climate change policies (Makueni, Taita Taveta and Nyamira) have outlined some strategies to implement climate actions although they were not specific to mitigation and GHG emissions reduction. The strategies include; integration of climate change action into other county policies like the CIDP; establishment of county Climate Change Funds to facilitate county

4 https://unfccc.int/sites/default/files/resource/Kenya%20INC.pdf

climate change programs and projects; county climate change governance structures i.e. Steering Committees, County Climate Change Directorates, etc; County Climate Information Services & Climate Data Access; and multi-stakeholder participation processes to ensure diverse perspectives, expertise, and interests are represented in decision-making processes. Murang'a and Baringo counties did not have any climate change policy uploaded online

**Policy Key Performance Indicators:** Although a good number of the national and county policies had key performance indicators, only the NCCAP2, the NCCAP3, KCSAS, KCSAIF, CSAM&EF had indicators relevant to GHG inventories. Some key indicators include GHG emissions per unit of agricultural sector GDP, total agricultural sector GHG emissions, proportion of GHGs emissions sequestered/abated from adaptation and mitigation practices, type of resilience building actions with mitigation co-benefits, climate smart agribusinesses, climate smart soil fertility management practices, area of degraded land rehabilitated, climate smart information, agro-weather services and products, and actors using climate smart storage facilities and technologies.

**Link/relationship to global reporting:** All national policies addressing climate change are linked and make reference to the UNFCCC, Kyoto protocol, Paris Agreement, and ETF. The ASTGs is linked to the Malabo declaration, while other development policies like the vision 2030 and Agriculture Policy are more linked to the SDGs. Some but not all the county policies are linked to the UNFCCC, and the ASTGs.

# Discussions

# 4. DISCUSSIONS

Most policies at both national and county level are related to development and deployment which provide for necessary actions along the whole agricultural value chain from production to consumption/ disposal. The overarching national and county climate change acts provide the general legal framework required for deployment of resources, institutional arrangements in implementation and reporting climate action. Since Kenya has prioritized adaptation with mitigation as a co-benefit, specific regulations guiding mitigation and GHG emissions have not been of major focus. However, with increased national interest in carbon markets, the national Climate Change Act (amended in 2023) has provided for development of regulations and incentives for carbon trading including in the agriculture sector. To enhance support on GHG reporting the national need to provide guidance in reducing emissions as well as proving means for tracking and reporting progress. From this analysis, the current policies have strengths, gaps and various opportunities for supporting GHG emissions reductions in the crops -sub-sector.

## 4.1. Policy strengths in supporting GHG inventories and reporting

Most of the existing policies recognize the changing climate, the need to adapt, and mitigate climate change. This ensures that strategies are not only focused on reducing emissions but also on building resilience to climate impacts. The policies also acknowledge the twin role of agriculture as both affected by climate change and a significant source of GHG emissions allowing for the development of targeted interventions. This dual focus helps in designing policies that are more relevant and effective for the agricultural sector, which is crucial for Kenya's economy and food security.

The interventions in some of the key policies generally provide key performance indicators related to mitigation and GHG emission reduction in agriculture and the crops sub-sector. For example, the NCCAPs and the CSA monitoring and evaluation framework, provide specific mitigation action targets, clear implementation mechanisms, including roles and mandates, and MRV procedures for most of the policies at national and county level. The framework sets a clear procedure for monitoring climate action in the agriculture sector. There is clear linkage of the climate-related national policies to the relevant global and regional agreements although that link is only in a few of the county policies. All national climate change policies align to the Kenya vision 2030, which implements the SDGs, while the county policies align to their county development plans, which are the county development instruments.

To enhance reporting on GHG emissions in the crops sub-sector through the use of tier 2 reporting, there will be a need for guidance to collect data on the interventions proposed in the policies that include area under paddy rice, conservation tillage practices, fertilizer use, irrigation and mechanization among other practices. Agricultural machinery, among others, provides for collection of data for GHG reporting at tier 2.

Kenya's policies and legal frameworks align with international and regional commitments, such as the UNFCCC, the Malabo Declaration, AU climate strategy, SDGs, Updated NDC and GESIP. This alignment ensures that national efforts contribute to global and regional climate objectives, strengthening Kenya's position in international climate action and reporting. Kenya has also established clear legal mandates and standards through policy and legal frameworks like the Climate Change Act. Such regulations provide a basis for GHG reporting, ensuring compliance and standardization in data collection and verification processes. Localized policy formulation and implementation is another significant strength. county-level policies, such as the Murang'a County Agro-Ecology Policy (2022-2030) and the Makueni County Climate Change Act 2022, align local actions with national climate goals. This localized approach ensures that climate strategies are relevant to local contexts and effectively executed, promoting accurate GHG inventory efforts at the county level.

## 4.2. Gaps in policies supporting GHG inventories and reporting

Kenya's agricultural policies and legal frameworks have the potential to address and report on GHG emissions, but several critical gaps hinder their effectiveness:

1. **Mismatch between Activity Data and Emissions Targets:** Most of the targets and indicators remain at the level of the activity data and not the level of emissions reduced or abated. The analysed data indicators only appear at the outcome level and are not matched with specific activity targets. This creates a gap in matching activities with the GHG emissions objectives.

2. **Lack of Specific Baselines**: Many policies provide general baselines but lack specific baselines for the crop sub-sector and other relevant sectors. This makes it challenging to accurately attribute GHG emissions to specific crop mitigation actions.

3. **Inadequate Resource Deployment Mechanisms**: Policies like the Climate Smart Agriculture-Monitoring & Evaluation (CSA-M&E) and the National Climate Change Action Plan (NCCAP) II and III outline institutional arrangements for reporting on mitigation. However, they lack clear mechanisms for deploying financial, human, and other resources needed for implementation, data collection, and analysis.

4. **Insufficient Guidance on Data Sharing:** While the GHG inventory is conducted at the national level, counties are responsible for data collection. Both levels of government lack guidance on data and information sharing, leading to discrepancies in meeting national GHG inventory requirements. Policies do not provide incentives or the right mechanisms for county governments or stakeholders to supply data, resulting in gaps in data management and availability.

5. **Policy Time Frame Misalignment:** National policy timelines often do not align with international reporting cycles required by agreements like the Paris Agreement, causing discrepancies in data submission. Inconsistent enforcement and compliance, varying timelines across government ministries, and rigid policy cycles further undermine the effectiveness of GHG inventories and reporting systems.

6. **Political and Administrative Inconsistencies:** Shifting political interests and priorities between national and county governments disrupt the consistency and effectiveness of policy execution. Varying enforcement timelines between government levels create inconsistencies in data collection and reporting.

7. **Financial Constraints:** Adequate funding is essential for implementing and maintaining comprehensive monitoring systems. However, while most policies have clear objectives, they lack detailed funding mechanisms for tracking their implementation. Although Kenya's National Climate Change Action Plan (NCCAP) outlines mitigation actions for the crop sub-sector, it does not specify how these actions will be funded or how the necessary data for tracking the Nationally Determined Contributions (NDC) tracking will be collected. In addition, the framework for the tools needed for transparent reporting and tracking of GHGs emissions as well as the capacity building procedures at both county and national level are not well considered in the existing policies and frameworks. This gap in financial planning hinders the effective monitoring and reporting of GHG emissions.

# 5. RECOMMENDATIONS

a. **Incentivise climate action and GHG inventory:** Policy instruments on taxes and charges, trading programmes, voluntary agreements/actions, subsidies and incentives relating to mitigation may be necessary to incentives GHG inventory.

b. **Tracking of policy achievements and meeting of GHG commitments:** To ensure institutions take responsibility, there is need for a central tracking system to ensure that there is a monitoring and evaluation and communication system that ensures that implementation of each policy is tracked and communicated, and implementers are held accountable.

c. **Transparency:** To enhance transparency coherence, targets and indicators in policies need to be informed by clearly established baselines. There is a need to establish baselines for specific key emissions sources and sinks in the crops sub-sector so that decisions on improvements are informed by progressive and past inventory reports. Although there is evidence of ambition to implement climate actions by the number of policies, there are no targets for specific interventions within the crops sub-sector rather, targets are given in the form of what the whole of the crop sub sector is intended to achieve. There is a need for specific mitigation targets for the specific intervention areas to enable stakeholders to know the expected emission reduction/abetment emanating from their interventions.

d. **Mitigation target indicators:** M&E and MRV in policies need to give clear and specific baselines, targets and indicators to enable tracking of progress for implementation of specific interventions, especially in the crops sub-sector.

e. **Roles and mandates** – Although a number of the policies provide clear mandates, roles and data flows for general implementation of the policy, there is a need for policy direction on GHG inventory processes in the crops-sub-sector at both levels of government, including to provide and assign personnel for specific roles to ensure seamless and continuous data collection, as well as modelling and validation for GHG reporting which integrates other existing data management processes for efficient resources management to ensure improved inventories and reporting, especially when transitioning to tier 2 reporting.

# Annexes

## Annex 1: Policies and indicators used in the analysis

Table 2: **Summary of National policies across the different indicators used in the analysis**

| Subject of analysis | Option/ Category | No. of policies | Policies in alignment |
|---|---|---|---|
| Policy instrument | Development and deployment | 15 | National Climate Change Response Strategy 2010 (NCCRS), Kenya National Adaptation Plan 2015-2030 (NAP), National Climate Change Framework Policy (NCCFP), Climate Risk Management Framework (CRMF), National Policy on Climate Finance 2016 (NPCF), Agricultural Policy 2021 (AP), National Livestock Policy (NLP), National Agricultural Soil Management Policy (NASMP), The National Environment Policy (NEP), Kenya Vision 2030, National Climate Change Action Plan (NCCAP) II, National Climate Change Action, Kenya Climate Smart Agriculture Strategy 2017-2026 (KCSAS), Kenya Climate Smart Agriculture Implementation Framework 2018-2027 (KCSAIF), Agricultural Sector Development Strategy (ASDS) |
| | Regulations and standards | 4 | Climate Change Act (CCA), Green Fiscal Incentives Policy (GFIP), Farm forestry Rules, The Food Safety Policy |
| | Information instrument | 1 | Nationally Determined Contributions (NDCs) |
| | Research | 1 | National Agricultural Research Systems Policy (NARSP) |
| | Trade Subsidies and Incentives Policy | 1 | Agricultural Marketing Strategy 2023-2032 (AMS) |
| Mitigation or adaptation policies | Both mitigation and adaptation | 12 | National Climate Change Response Strategy 2010, National Climate Change Action Plan II, National Climate Change Action Plan III 2023-2027, Kenya's Updated Nationally Determined Contributions, Climate Change Act, National Climate Change Framework Policy, Kenya Climate Smart Agriculture Strategy (CSAS), Kenya Climate Smart Agriculture Implementation Framework, Kenya Climate Smart Agriculture Monitoring and Evaluation Framework, Agricultural Policy 2021, National Agricultural Soil Management Policy, Green Economy Strategy and Implementation Plan (GESIP) |
| | Mitigation alone | 1 | Green Fiscal Incentives Policy |
| | Adaptation alone | 2 | Kenya National Adaptation Plan 2015-2030, Climate Risk Management Framework. |
| | Neither mitigation nor adaptation) | 6 | National Policy on Climate Finance, Agricultural Sector Development Strategy, Agricultural Sector Transformation and Growth Strategy, National Agricultural Research Systems Policy (NARSP), Agricultural Marketing Strategy (AMS) 2023-2032, Food Safety Policy 2021(FSP) |

| Subject of analysis | Option/ Category | No. of policies | Policies in alignment |
|---|---|---|---|
| Providing intended level target of mitigation | With targets | 8 | National Climate Change Action Plan II, National Climate Change Action Plan III 2023-2027, Kenya's Updated Nationally Determined Contributions, Green Fiscal Incentives Policy, Kenya Climate Smart Agriculture Strategy, Kenya Climate Smart Agriculture Monitoring and Evaluation Framework, Agricultural Policy 2021, Green Economy Strategy and Implementation |
| Greenhouse Gas Emissions Baseline tCO2e/ha | With Baselines | 7 | National Climate Change Action Plan II, National Climate Change Action Plan III 2023-2027, Kenya's Updated Nationally Determined Contributions, Climate Change Act 2016(Amended 2023), National Climate Change Framework Policy, Kenya Climate Smart Agriculture Strategy, Kenya Climate Smart Agriculture Monitoring and Evaluation Framework |
| Clear roles and Institutional mandates on GHG Inventory | Identify roles and mandates | 11 | National Climate Change Response Strategy 2010, National Climate Change Action Plan II, National Climate Change Action Plan III 2023-2027, Kenya's Updated Nationally Determined Contributions, Green Fiscal Incentives Policy, Kenya Climate Smart Agriculture Strategy, Kenya Climate Smart Agriculture Implementation Framework, Kenya Climate Smart Agriculture Monitoring and Evaluation Framework, Agricultural Policy 2021, National Livestock Policy, National Agricultural Soil Management Policy |
| Monitoring, reporting and verification procedures | Provide procedures | 11 | Kenya National Adaptation Plan 2015-2030, National Climate Change Action Plan II, National Climate Change Action Plan III 2023-2027, Climate Risk Management Framework, Kenya Climate Smart Agriculture Strategy, Kenya Climate Smart Agriculture Implementation Framework, Kenya Climate Smart Agriculture Monitoring and Evaluation Framework, Agricultural Sector Development Strategy, Agricultural Marketing Strategy, Green Economy Strategy and Implementation, Kenya Vision 2030 |
| Implementing strategy/ mechanisms | Policy accessible websites | 27 | All |

| Subject of analysis | Option/ Category | No. of policies | Policies in alignment |
|---|---|---|---|
| Key Performance Indicators | Available | 12 | Kenya National Adaptation Plan 2015-2030, National Climate Change Action Plan II, National Climate Change Action Plan III 2023-2027, Climate Risk Management Framework, Green Fiscal Incentives Policy, Kenya Climate Smart Agriculture Strategy, Kenya Climate Smart Agriculture Implementation Framework, Kenya Climate Smart Agriculture Monitoring and Evaluation Framework, Agricultural Sector Development Strategy 2010-2020, Agricultural Marketing Strategy, Green Economy Strategy and Implementation, Kenya Vision 2030 |
| Link/ relationship to global reporting | UNFCCC reporting, Malabo declaration, SDGs | 12 | National Climate Change Action Plan III 2023-2027, Kenya's Updated Nationally Determined Contributions, Climate Change Act, National Policy on Climate Finance, Green Fiscal Incentives Policy, Kenya Climate Smart Agriculture Strategy, Kenya Climate Smart Agriculture Implementation Framework, Kenya Climate Smart Agriculture Monitoring and Evaluation Framework, Agricultural Sector Transformation and Growth Strategy, Agricultural Policy 2021, National Livestock Policy, National Agricultural Soil Management Policy, Agricultural Sector Transformation and Growth Strategy(ASTGS) |

Table 3: **Summary of County policies across the different indicators used in the analysis**

| Subject of analysis | Option/Category | No. of policies | Policies in alignment |
|---|---|---|---|
| Policy instrument | development and deployment | 10 | Murang'a County Agro-Ecology Policy (2022-2030), Murang'a County Third County Integrated Development Plan (2023-2027) , Government of Makueni County Vision 2025, 2021 Makueni County Fiscal Strategy paper, Makueni County Agriculture and Livestock Policy (2020), Taita Taveta County Integrated Development Plan III (2023-2027) , County Government of Nyamira Ministry of Agriculture, Livestock and Fisheries Strategic Plan, Nyamira County Climate Change Action Plan 2023-2028, Baringo County Annual Development Plan (2022-2023), Baringo County Integrated Development Plan (2018-2022) |
| | Regulations and standards | 3 | The Makueni County Climate Change Act 2022 No. 6 of 2022, Taita Taveta County Climate Change Bill, The Nyamira County Climate Change Bill, 2021 |
| | Information instrument | 1 | Climate Risk Profile Baringo County |
| | Trade<br><br>Subsidies and Incentives Policy | 1 | Murang'a County Government Agricultural Farm Inputs Subsidy Policy 2022-2032 |
| Mitigation or adaptation policies | Both mitigation and adaptation | 4 | Makueni county Climate change Bill, Taita Taveta county climate change Bill, Nyamira county climate change action plan, Nyamira county climate change Bill |
| | Adaptation alone | 2 | Murang'a county agroecology policy, Baringo county climate risk profile, |
| | Neither mitigation nor adaptation) | 8 | Murang'a County Third County Integrated Development Plan (2023-2027) , Government of Makueni County Vision 2025, 2021 Makueni County Fiscal Strategy paper, Makueni County Agriculture and Livestock Policy, 2020, Taita Taveta County Integrated Development Plan III (2023-2027) , County Government of Nyamira Ministry of Agriculture, Livestock and Fisheries Strategic Plan, Nyamira County Climate Change Action Plan 2023-2028, Baringo County Annual Development Plan (2022-2023), Baringo County Integrated Development Plan (2018-2022) |

| Subject of analysis | Option/Category | No. of policies | Policies in alignment |
|---|---|---|---|
| Providing intended level target of mitigation | | With targets | 4 |
| Clear roles and Institutional mandates on GHG Inventory | | Identify roles and mandates | 3 |
| Monitoring, reporting and verification procedures | | Provide procedures | 10 |
| Implementing strategy/ mechanisms | | Policy accessible websites | 15 |
| Key Performance Indicators | | Available | 10 |
| Link/relationship to global reporting | | UNFCCC reporting, Malabo declaration, SDGs | 8 |

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ICAT Initiative for Climate Action Transparency


Initiative for Climate Action Transparency

UN Campus
Platz der Vereinten Nationen 1
Bonn 53113
Germany

icat@unops.org

+49 228 815 0317

https://climateactiontransparency.org/

Twitter @ICATClimate