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REGIONAL ANALYSIS OF THE NATIONALLY DETERMINED CONTRIBUTIONS IN SUB-SAHARAN AFRICA

Gaps and opportunities in the agriculture and land use sectors

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Krystal Crumpler, Giulia Gagliardi, Zipora Otieno, Mas Dino Radin, Nora Berrahmouni, Sandro Federici, Srijita Dasgupta, Olga Buto, Janek Toepper, Mario Bloise, Mirella Salvatore, Alexandre Meybeck, Julia Wolf and Martial Bernoux

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FOREWORD

The 2022 Intergovernmental Panel on Climate Change (IPCC) Working Group II's Sixth Assessment Report is unequivocal: although sub-Saharan Africa has contributed the least to greenhouse gas emissions, more extreme climate events in the region are increasing in both intensity and frequency than the average changes at the global level. The rate of surface temperature increase has generally been more rapid in the region than the global average. Relative sea level in Africa has increased at a higher rate than the global mean over the last three decades and is projected to continue, contributing to increases in the frequency and severity of coastal flooding. Yields of some staple crops are projected to reduce by between 40-50 percent in a scenario of global warming over 2°C, and the frequency and intensity of heavy precipitation events are also projected to increase almost everywhere in Africa.

Unfortunately, current climate plans are not ambitious enough to keep temperatures to 1.5°C increase above the pre-industrial level as recommended by science and, according to the IPCC Sixth Assessment Report and the United in Science Report (2021), we are heading towards at least 3°C of warming by 2100 unless rapid, sustained, and large-scale measures are implemented to reduce greenhouse gas emissions. The immediate implication of this collective failure is that both the intensity and severity of climate change impacts in developing countries will continue to increase at dangerous rates, more so in sub-Saharan Africa where the majority of people are already the most vulnerable given limited capacities to anticipate, cope and recover from climate impacts.

The Food and Agriculture Organization of the United Nations (FAO) has been at the forefront of promoting and supporting pathways for sub-Saharan African countries to raise their ambition on climate action. Through innovative and powerful initiatives like the Climate Action Enhancement Package (CAEP), the Scaling Up Climate Ambition on Land-Use and Agriculture through Nationally Determined Contributions (NDCs) and National Adaptation Plans (SCALA) programme, the Capacity Building Initiative for Transparency in the Agriculture, Forestry and Other Land Use sectors (CBIT-AFOLU) and many Technical Cooperation Programmes (TCPs), FAO is facilitating knowledge exchange, financial support, capacity development and the development of tools and resources to enable countries to accelerate their progress on implementation of their NDCs in the AFOLU sector. FAO has mobilized support for many countries in the region to implement and update their NDCs. It has brought together different partners, from UN agencies and multilateral development banks to bilateral donors and non-governmental organizations, to align their activities in the agriculture and land use sectors through the Koronivia Joint Work on Agriculture (KJWA), a landmark decision of the United Nations Framework Convention on Climate Change (UNFCCC) that recognizes the unique potential of agriculture in tackling climate change.

This regional analysis of the NDCs in sub-Saharan Africa is an important contribution to the armory of information on first-round NDCs. It provides a synthesis of the representation of the agriculture and land use sectors in the adaptation and mitigation components of countries' NDCs. It also points to important gaps and opportunities for accelerating action and raising ambition in these critical sectors in subsequent NDCs, as well as key challenges and barriers to implementation.

The findings point to the prominence of adaptation priorities in the agriculture and land use sectors of the region noting that all countries promote these measures in their NDCs. FAO is strategically positioned to scale up climate action and provide technical support through notable approaches, such as the Great Green Wall (GGW) Initiative, the African Forest Landscape Restoration Initiative (AFR100) and Climate Smart Agriculture (CSA). A key strategy in this support is to additionally address the main challenges of NDC implementation in the region, which lie primarily in climate finance mobilization, capacity building and scaling up of appropriate technologies.

Achievement of more ambitious NDCs for any given country will require action and innovation on many levels, including the digital transformation of the agricultural sector, which FAO is increasingly keen on

adopting. In 2022, the FAO and the International Telecommunication Union (ITU) unveiled a path-breaking publication on the Status of Digital Agriculture in 47 sub-Saharan African Countries. The report underscored the critical role of digital solutions in meeting the region's food security and nutrition challenges including barriers, gaps, and opportunities. The COVID-19 pandemic also demonstrated the significance of adopting and accelerating digital solutions, especially against overlapping shocks and challenges. I am pleased to state that FAO is stepping up its efforts to develop innovative approaches in many areas, including how ICT can support NDC ambitions and climate action in low and middle-income countries.

FAO remains committed and ready to support member countries in the sub-Saharan Africa in their NDC implementation with an aim toward the transformation to more efficient, inclusive, resilient, and sustainable agrifood systems for better production, better nutrition, a better environment, and a better life, leaving no one behind.

Abebe Haile-Gabriel
Assistant Director-General and Regional Representative for Africa
Regional Office for Africa

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ABBREVIATIONS AND ACRONYMS

AEZ	Agro-Ecological Zone
AFOLU	agriculture, forestry and other land use
BAU	business as usual
COP	Conference of the Parties
COVID-19	coronavirus disease 2019
DECC	Department Energy and Climate Change of the Ministry of Environment, Energy and Climate Change
DRR	disaster risk reduction
ETF	Enhanced Transparency Framework
EWS	Early Warning Systems
FAO	Food and Agriculture Organization of the United Nations
AR5	Fifth Assessment Report
GDP	gross domestic product
GHG	greenhouse gas
INDC	intended nationally determined contribution
IPCC	Intergovernmental Panel for Climate Change
IPPU	Industrial Processes and Product Use
ITCZ	Inter-tropical Convergence Zone
LULUCF	land use, land-use change and forestry
MRV	measurement, reporting and verification
NAP	National Adaptation Plan
NC	national communication
NDC	nationally determined contribution
NGHGI	national greenhouse gas inventory
OCB	Office of Climate Change, Biodiversity and Environment
PoU	Prevalence of Undernourishment

SFDRR	Sendai Framework for Disaster Risk Reduction 2015–2030
AR6	Sixth Assessment Report
SDG	Sustainable Development Goal
SIDS	Small Islands Developing States
SSA	sub-Saharan Africa
TNA	technology needs assessment
UNCCD	United Nations Convention to Combat Desertification
UNFCCC	United Nations Framework Convention on Climate Change
2030 Agenda	2030 Agenda for Sustainable Development

CHEMICAL FORMULAE

CO_2	carbon dioxide
Mt CO2 eq	million tonne of carbon dioxide equivalent
N_2O	nitrous oxide

EXECUTIVE SUMMARY

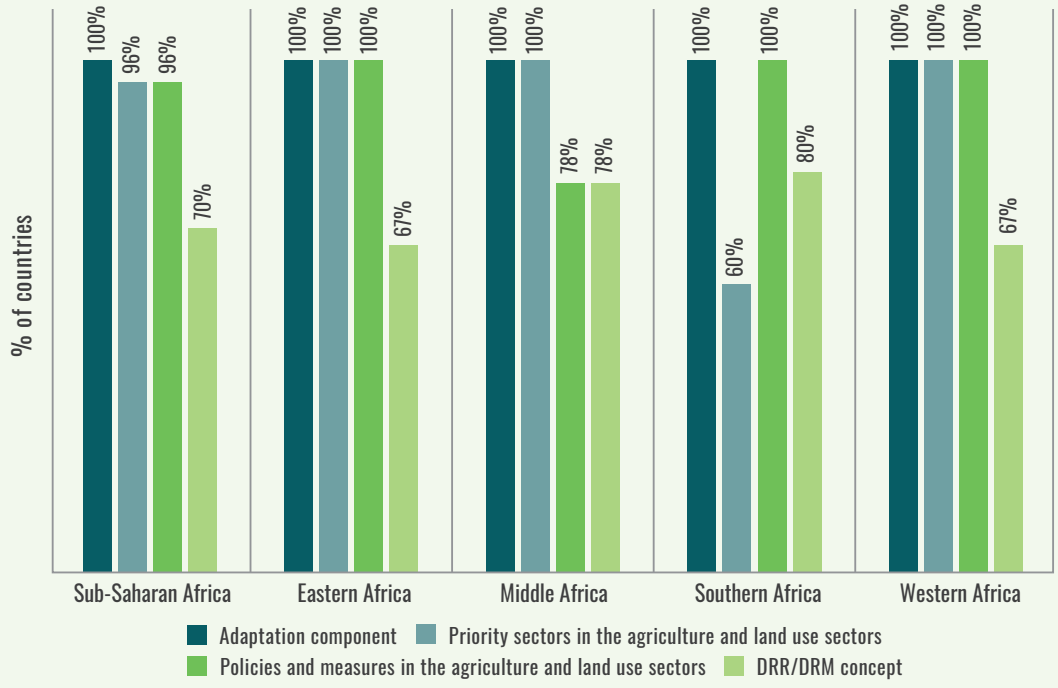
Forty-six out of the 47 countries in sub-Saharan Africa (SSA) submitted a first nationally determined contribution (NDC) to the United Nations Framework Convention on Climate Change (UNFCCC) as of 31 December 2020; South Sudan submitted an intended nationally determined contribution (INDC) back in 2015 but has yet to ratify the Paris Agreement. Seventeen countries[1] in SSA have already submitted a new or updated NDC at the time of publication. For the sake of this publication, first round NDCs were reviewed to provide a synthesis of how the agriculture and land use sectors are represented in the mitigation and adaptation contributions in the region. The analysis points to key gaps and opportunities for enhancing ambition in the agriculture and land use sectors in second round NDCs, as well as challenges and barriers to implementation.

ADAPTATION IN THE NDCs

Adaptation is a clear priority for all countries in SSA – and all but one country (Gabon) include agriculture and land use in their adaptation component (Figure 1). Adaptation priorities converge around the livestock, forestry and crops sector, as well as cross-cutting areas such as water resources and human health. Around one-third of adaptation components include the fisheries and aquaculture sector and ocean and coastal zones.

FIGURE 1.

ADAPTATION COMPONENTS IN THE AGRICULTURE AND LAND USE SECTORS IN THE NDCs IN SSA, BY TYPE AND SUB-REGION



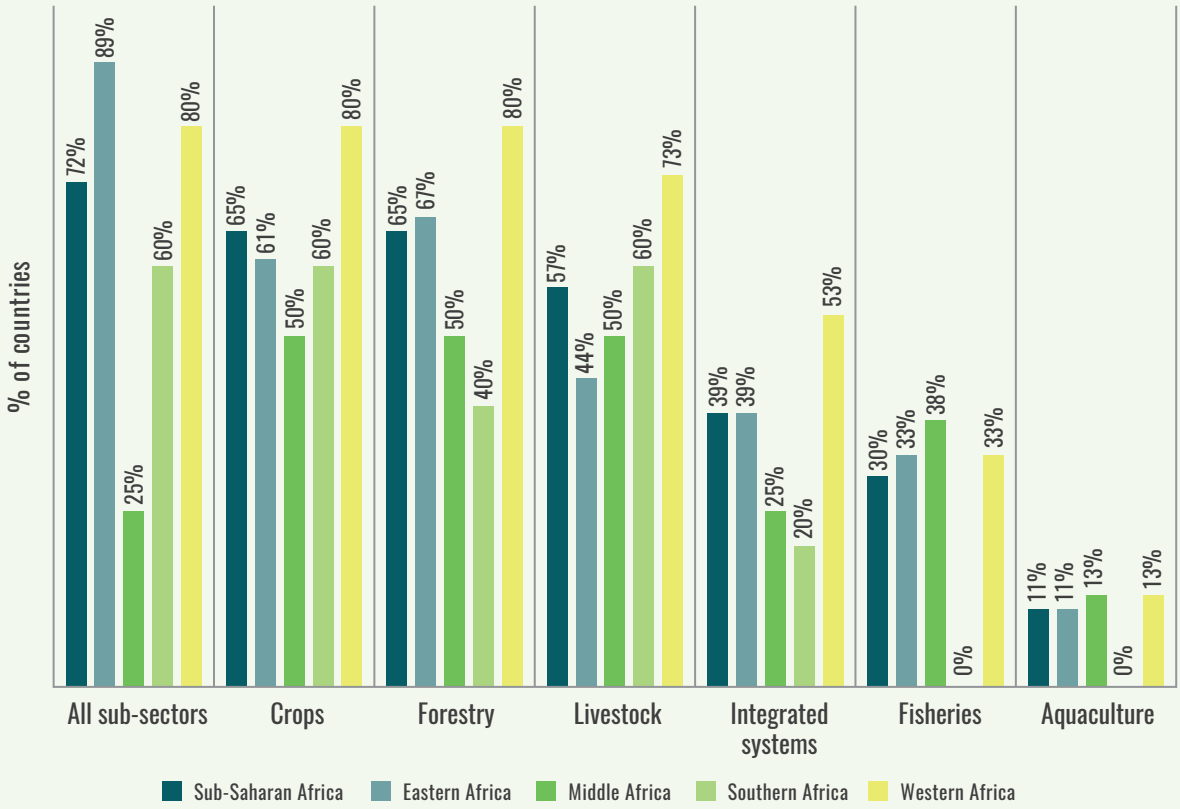
Source: Authors.

[1] Angola, Cape Verde, Ethiopia, Guinea, Kenya, Malawi, Namibia, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Somalia, South Sudan, United Republic of Tanzania and Zambia.

Two-thirds of SSA countries promote adaptation in the crops sector. Plant genetic resource diversification and conservation, such as the adoption of drought-tolerant varieties or intercropping to enhance biodiversity, are frequently promoted adaptation measures. Other priorities include sustainable intensification, improved irrigation and on-farm nutrient and soil management in response to or in anticipation of climate extremes or longer-term changes in climatic variables (**Figure 2**).

FIGURE 2.

ADAPTATION MEASURES IN THE AGRICULTURE AND LAND USE SECTORS IN THE NDCs IN SSA, BY AGRICULTURAL SUB-SECTOR AND SUB-REGION



Source: Authors.

Two-thirds of SSA countries also promote adaptation in the forestry sector, primarily through efforts to reduce forest degradation, as well as afforestation and reforestation, presenting a significant opportunity for synergy with mitigation contributions.

Around half of SSA countries promote adaptation in livestock systems. Animal genetic resources conservation and diversification, such as switching to more heat-tolerant breeds and species, as well as improved animal and herd management practices are frequently promoted.

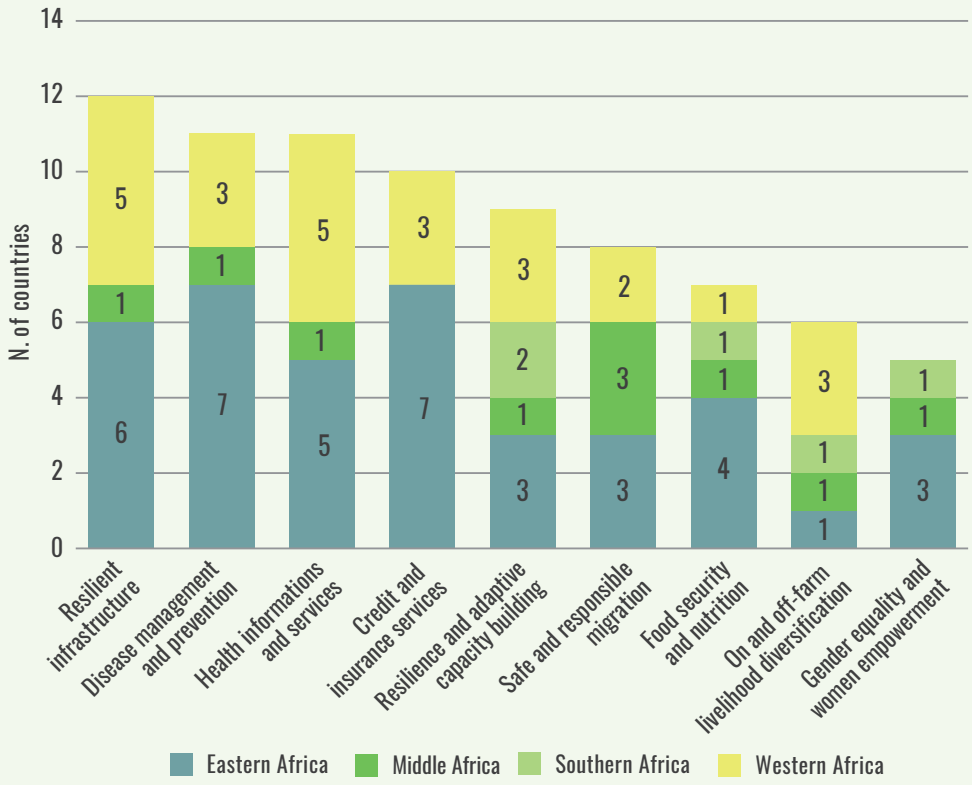
Over three-fourths of SSA countries promote adaptation measures to protect or restore the natural resources base upon witch agriculture systems depend (Figure 2). Practices to improve irrigation coverage and efficiency, water storage and harvesting to smooth availability and conservation and restoration measures to protect water-related ecosystems are prominent amongst adaptation components. Integrated water and land management approaches to conserve, restore and rehabilitate the natural resources base and ecosystem services are also key to adaptation in SSA.

Ninety percent of SSA countries set forth adaptation measures to reduce vulnerabilities and enhance the adaptive capacity and resilience of agricultural-dependent livelihood systems. One-third of adaptation components address health implications of climate change, including health information

and services and disease management and prevention efforts. Around one-quarter include credit and insurance services to strengthen household capacity to cope with climate change impacts and invest in adaptive capacities and disaster preparedness (**Figure 3**).

FIGURE 3.

SOCIOECONOMIC AND WELL-BEING RELATED ADAPTATION MEASURES IN THE AGRICULTURE AND LAND USE SECTORS IN THE NDCs IN SSA, BY TYPE AND SUB-REGION



Source: Authors.

Over one-third of SSA countries promote knowledge and capacity building for climate change adaptation through early warning systems, climate information services and risk and vulnerability assessments. Awareness raising and education efforts, along with research and development in agriculture, also appear amongst adaptation components in the region.

One-third of SSA countries promote climate change adaptation mainstreaming into national and sectoral policies and plans. A few countries however include measures around land tenure and water governance to improve the enabling environment for adaptation.

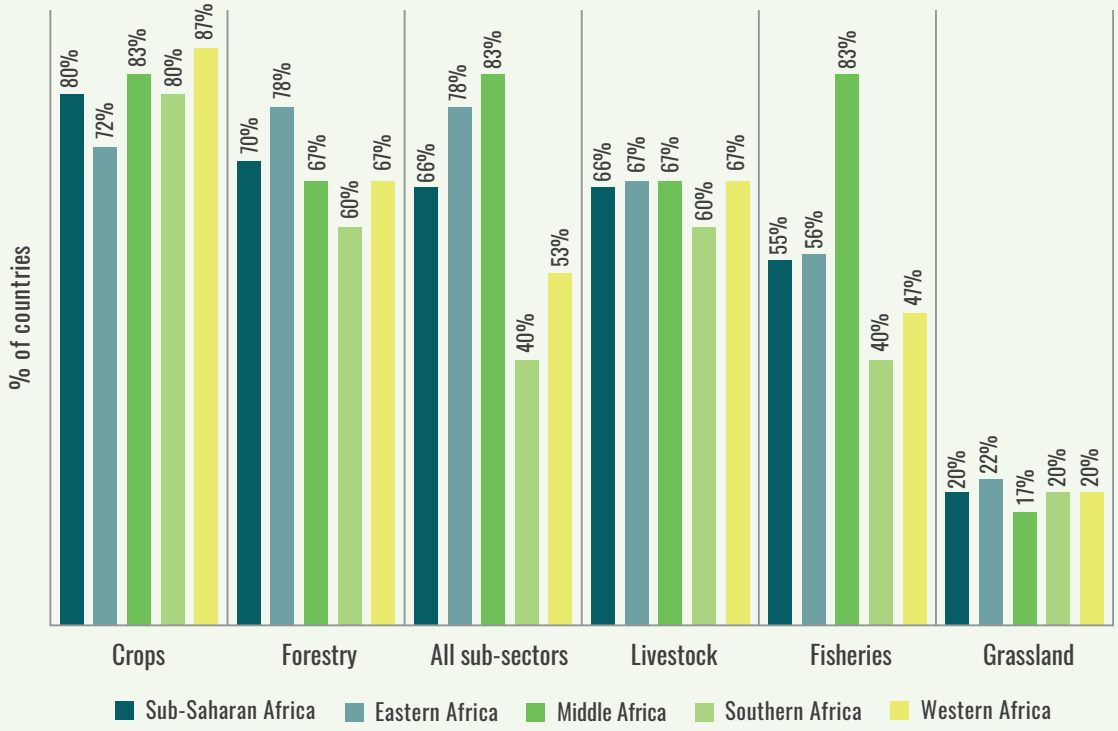
ADAPTATION GAPS IN THE NDCs

All countries in the region make reference to either observed and/or projected climate-related hazards and slow-onset events (Figure 4), especially increases in the frequency and intensity of floods, droughts, extreme storms, wildfire and agricultural pests and non-native species. Water stress, soil erosion and desertification are reported as the most frequent of slow-onset events affecting terrestrial and freshwater ecosystems across the region. Sea level rise, sea surface temperature rise and coastal erosion are amongst the most frequently reported in marine and coastal ecosystems.

Cascading impacts on the crops and forestry sectors are referenced by three-fourths of all SSA countries, particularly changes in primary production and productivity, phenological changes, biodiversity loss, tree mortality and loss, increased incidence of agricultural pests and diseases, and changes in hydrological flows. Two thirds of SSA countries report climate-related impacts in the livestock sector, including heat stress and changes in water availability and quality. Another half report climate-impacts in fisheries, includes changes in species range and distribution as well as mangrove mortality and coastal reef degradation.

FIGURE 4.

CLIMATE-RELATED IMPACTS REPORTED IN AGRO-ECOSYSTEMS IN THE NDCs AND NCs IN SSA, BY SUB-SECTOR AND COUNTRY



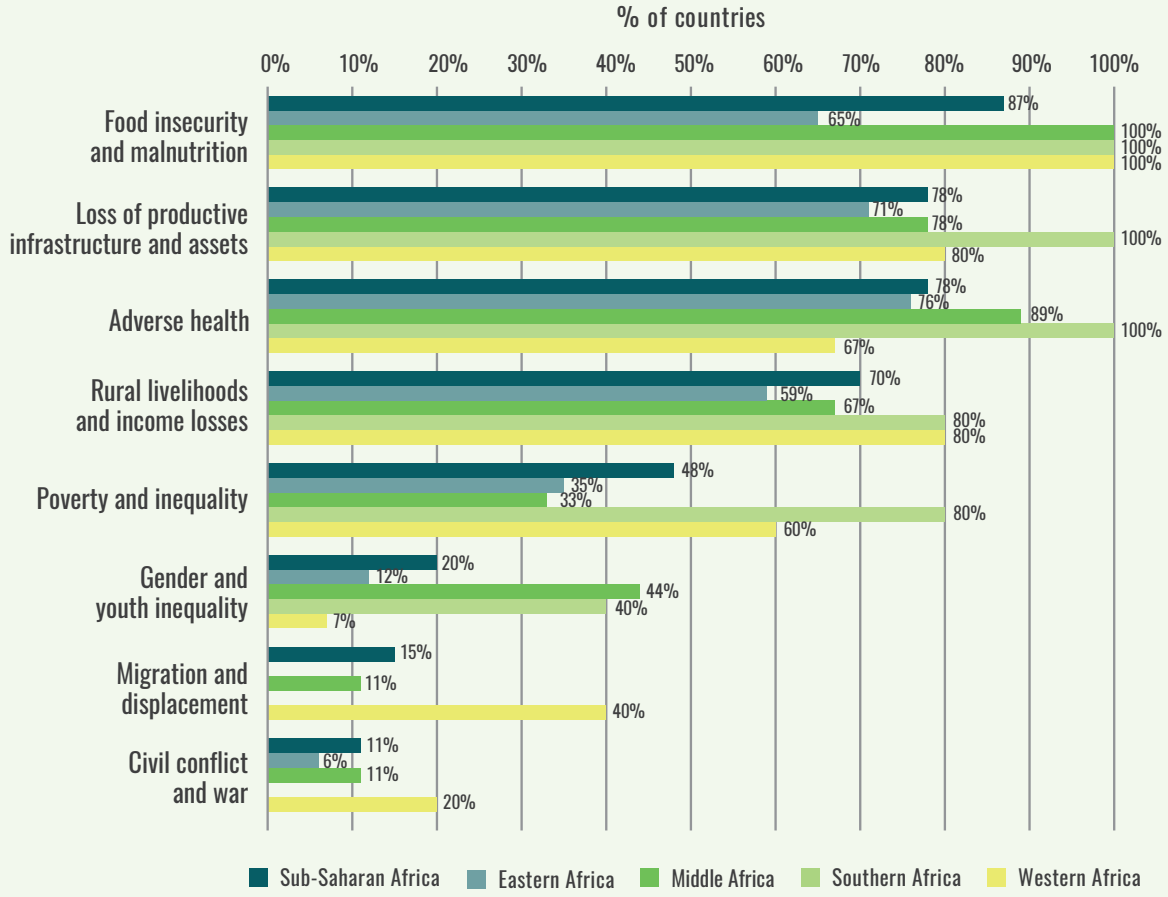
Source: Authors.

Ninety percent of all SSA countries reference increased food insecurity and malnutrition as a climate-related risk. Another three-fourths mention losses in productive resources and assets, loss of income and livelihood security and human health impacts from climate change as a current or future risk. Half report increased poverty and inequality impacts and one-fourth recognize disproportional impacts on women and marginalized groups (**Figure 5**).

A comparative analysis points to gaps in adaptation coverage in response to the types of climate risks reported in all agricultural sub-sectors. In eastern Africa, high adaptation policy gaps emerge around grassland, livestock and fisheries sectors, followed by gaps in the cropping and forestry sectors. In middle Africa, the highest adaptation policy coverage gaps emerge around grasslands, fisheries and cropping systems. In southern Africa, adaptation policy coverage gaps emerge in grasslands, crops, fisheries and forestry sector. In western Africa, moderate adaptation policy coverage gaps emerge in all sub-sectors.

FIGURE 5.

CLIMATE-RELATED RISKS REPORTED IN NDCs AND NCs IN SSA, BY TYPE AND SUB-REGION



Source: Authors.

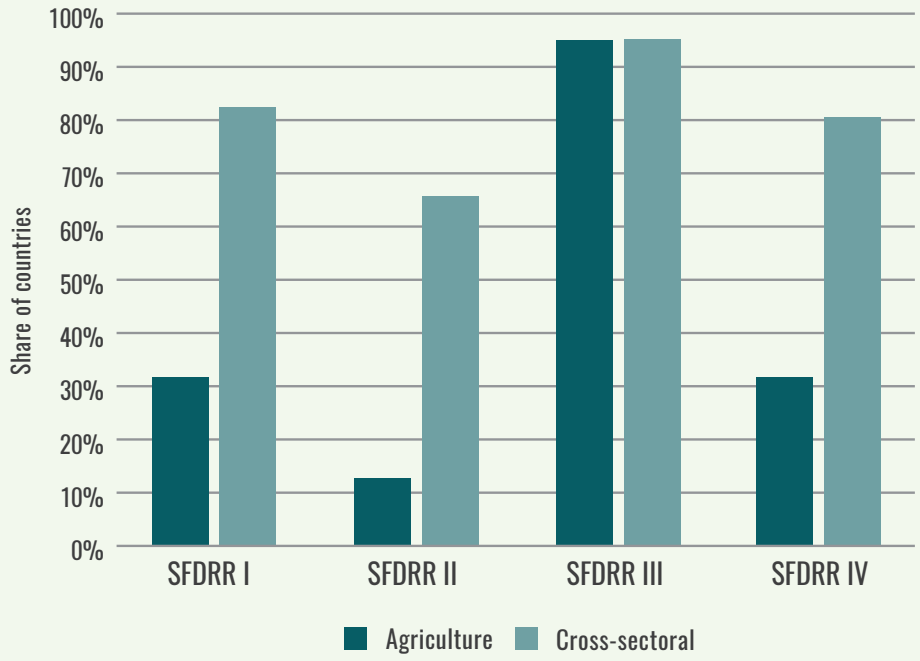
RESILIENCE IN THE NDCs

Over two-thirds of SSA countries explicitly recognize the convergence between adaptation and disaster risk reduction (DRR) and management in agriculture and land use. As countries are affected by incremental climate change and increasingly frequent and severe climate-related disasters, successful climate change adaptation relies to a large extent on the reduction and management of climate-related disaster risks. The analysis finds that all countries in the region promote climate change adaptation measures in the agriculture and land-use sectors in their NDCs that contribute to the Sendai Framework for Disaster Risk Reduction 2015–2030 (SFDRR) (**Figure 6**).

Strengthening national capacities for collection, analysis, and management of high-quality, relevant climatic, meteorological, and socioeconomic data is a priority in the region. Two-thirds of SSA countries indicate the need to strengthen risk governance and institutions in the context of climate change, yet a small share explicitly mention this need for stronger DRR governance mechanisms in the agricultural sector. The discrepancy hints at the persistence of an explicitly cross-sectoral, overarching institutional approach to managing disaster risks and to the disregarded importance to integrate DRR considerations in the sectoral agricultural governance structures.

FIGURE 6.

CROSS-SECTORAL AND AGRICULTURE-SPECIFIC ADAPTATION PRIORITIES IN THE NDCs WITH RELEVANCE TO THE SENDAI FRAMEWORK



Source: Authors.

Eighty percent of SSA countries aim to enhance climate-related disaster preparedness for effective response, with one-third acknowledging this need for agriculture specifically. Multiple countries in the region set out intentions to strengthen disaster preparedness by developing or updating contingency plans and/or emergency funds, as well as establishing or strengthening the existing Early Warning Systems (EWS). While many NDCs also highlight progress in the implementation of specific climate change adaptation-DRR projects or programmes, the NDCs do not contain comprehensive evaluations of progress, implementation, and effectiveness of risk governance arrangements.

MITIGATION IN THE NDCs

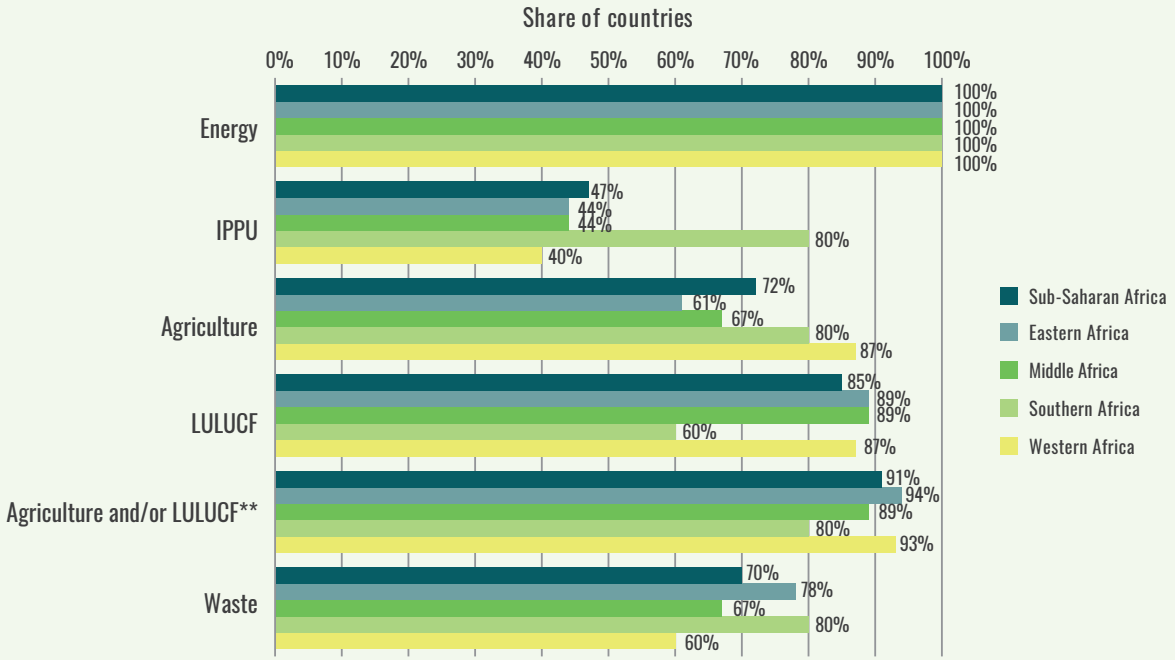
Over 90 percent of countries in SSA include a mitigation contribution in the agriculture and/or land use, land-use change and forestry (LULUCF) sectors – just second in prominence to the energy sector. At the sub-regional level, the share of countries with a mitigation contribution in agriculture and/or LULUCF ranges from 80 percent in southern Africa to 94 percent in eastern Africa (**Figure 7**).

Three-fourths of all countries in SSA include either a greenhouse gas (GHG) target, policy or measure and/or a general commitment to mitigate in the agriculture sector. At the sub-regional level, the share of countries with a mitigation contribution in agriculture ranges from 61 percent in eastern Africa to 87 percent in western Africa.

Eighty-five percent of all countries in SSA include either a GHG target, policy or measure and/or a general commitment to mitigate in the LULUCF sector due to the large potential to restore degraded lands. At the sub-regional level, the share of countries with a mitigation contribution in LULUCF ranges from 60 percent in southern Africa to 89 percent in eastern and middle Africa.

FIGURE 7.

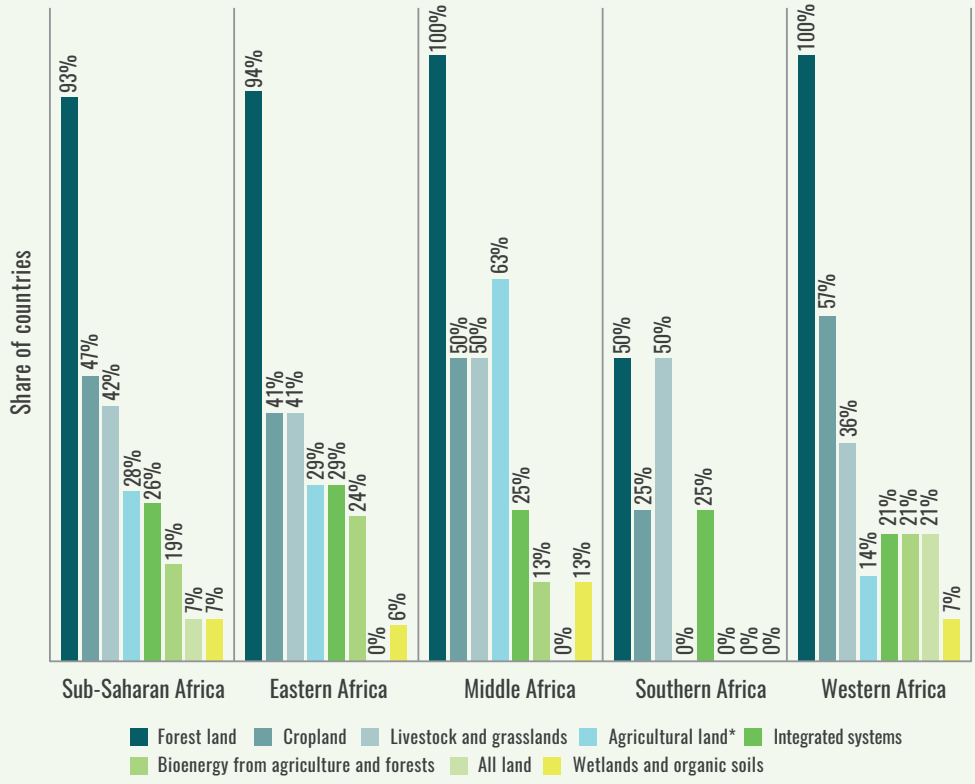
SCOPE OF GENERAL MITIGATION CONTRIBUTIONS IN THE NDCs IN THE SSA REGION, BY SECTOR AND SUB-REGION



Source: Authors.

FIGURE 8.

MITIGATION MEASURES IN THE AGRICULTURE AND LAND USE SECTORS IN THE NDCs IN SSA, BY SUB-SECTOR/LAND USE COVERED AND SUB-REGION



**Agricultural land refers to cropland and grassland.*

Source: Authors.

The forestry sector is the primary focus of sectoral mitigation contributions in the region. Over 90 percent of mitigation contributions in the agriculture and land use sectors promote specific mitigation measures on forest land. Sustainable forest management, afforestation and reforestation and reducing deforestation are prominent amongst the efforts to preserve or enhance carbon sinks in the region.

Around half of mitigation contributions in agriculture and land use focus on croplands. Rice management practices are prominent amongst mitigation contributions in the crops sector to reduce methane and nitrous oxide emissions, as well as improved nutrient and tillage/crop residue management to reduce emissions from agricultural soils.

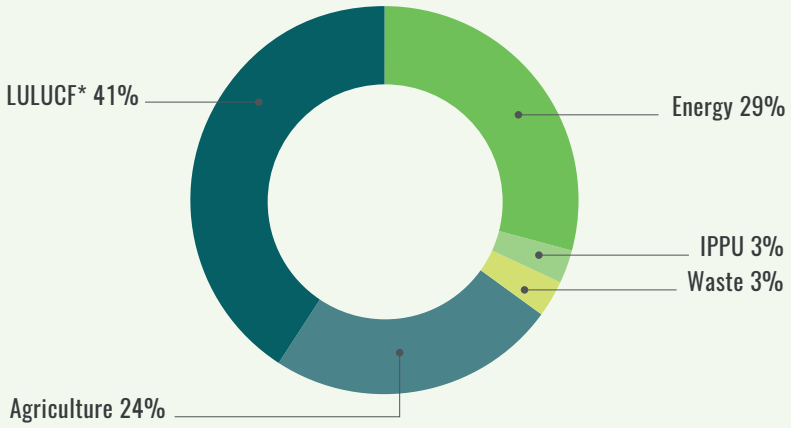
The livestock sector also appears frequently in the mitigation contributions in the region. Almost half of mitigation contributions in the agriculture and land use sectors focus on livestock and grassland systems. Manure management and improved animal breeding and husbandry practices are amongst the most prominent of mitigation efforts to reduce emissions from enteric fermentation and managed soils (**Figure 8**).

MITIGATION GAPS IN THE NDCs

Out of the 3.1 billion tonnes (Gt) of CO_2 eq. of GHG emissions generated in the region each year, agriculture and land use are responsible for almost two-thirds. This share varies at the sub-regional level. Agriculture represents one-quarter of all SSA emissions on average, ranging from 10 percent in southern Africa, to 14 percent in both western and middle Africa and up to 55 percent in eastern Africa. LULUCF holds a 41 percent share of on average in SSA, ranging from 8 percent in southern Africa to 32 percent in eastern Africa, 57 percent in western Africa and 63 percent in middle Africa (**Figure 9**). While the LULUCF sector is a net sink overall, the greatest sources of emissions are nevertheless generated from changes in land use and forestry (**Figure 10**).

FIGURE 9.

GREENHOUSE GAS EMISSIONS PROFILE FOR SSA, BY IPCC SECTOR

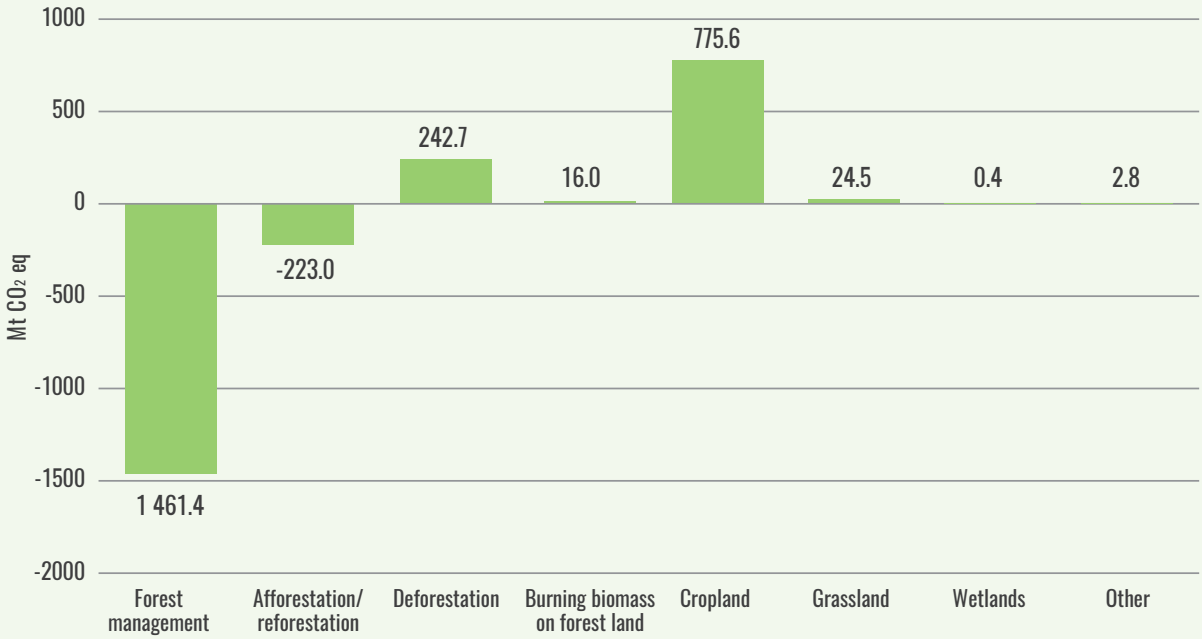


**Excluding removals.*

*Source: Authors. (Refer to **Annex 1**).*

FIGURE 10.

GREENHOUSE GAS EMISSIONS AND REMOVALS PROFILE FOR THE LULUCF SECTOR IN SSA, BY SOURCE AND SINK CATEGORY



Notes: Negative values refer to removals and positive values refer to emissions.

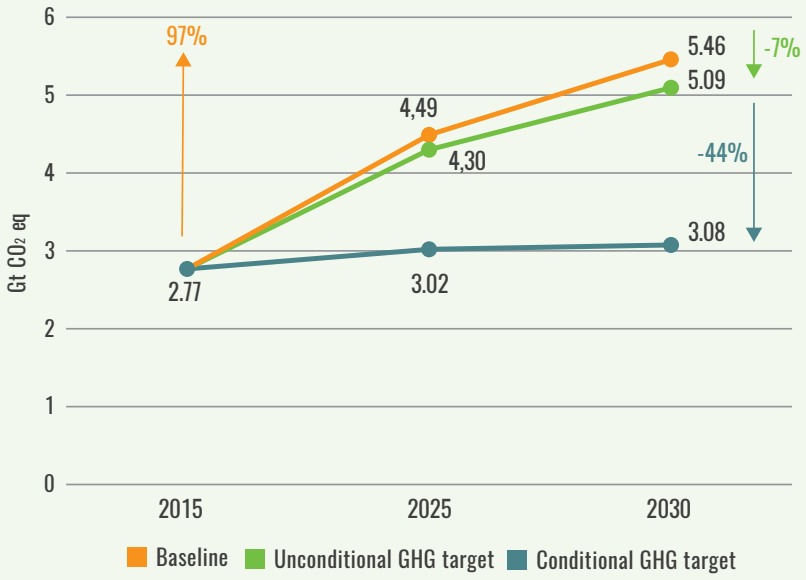
*Source: Authors. (Refer to **Annex 1**).*

Overall net emissions across all sectors are expected to double by 2030, rising from 2.77 to 5.46 Gt of CO_2 eq, without NDC implementation.2 Achieving the GHG emission targets set by 41 countries in the region would imply a reduction of 44 percent as compared to this projection with conditional support – but only 7 percent without. Despite NDC implementation, however, total net emissions are nonetheless expected to rise by around 10 percent compared to the 2015 starting levels (**Figure 11**).

[2] Refer to chapter 4 for description of how NDC baseline and mitigation scenarios were calculated.

FIGURE 11.

ECONOMY-WIDE GHG EMISSION SCENARIOS "WITH" AND "WITHOUT" NDC IMPLEMENTATION IN SSA

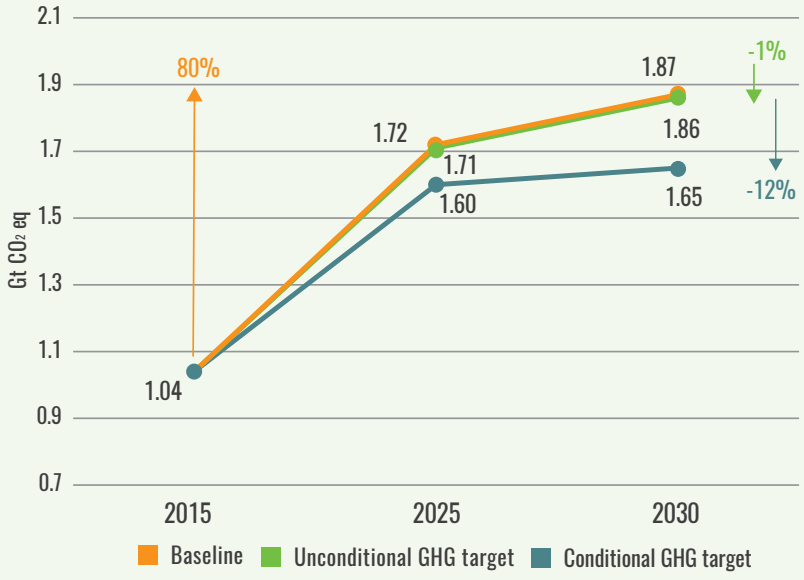


Source: Authors.

Agricultural emissions are expected to rise by around 80 percent in 2030 compared to 2015 level, rising from 1.04 to 1.87 Gt of CO_2 eq., without NDC implementation.[3] Achieving the GHG emission targets set forth in the sector by 16 countries in the region would imply a reduction of 13 percent as compared to this projection with conditional support – and 1 percent without. Despite NDC implementation, however, total net emissions are nonetheless expected to rise by around 60 percent compared to the 2015 starting levels **(Figure 12)**.

FIGURE 12.

AGRICULTURE GHG EMISSION SCENARIOS "WITH" AND "WITHOUT" NDC IMPLEMENTATION IN SSA



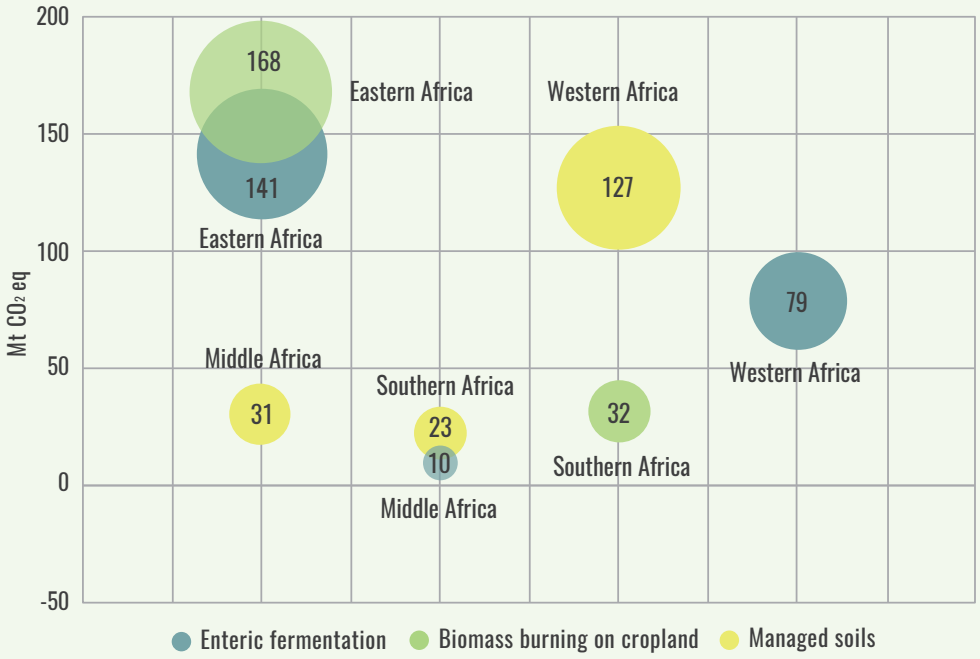
Source: Authors.

[3] Refer to chapter 4 for description of how NDC baseline and mitigation scenarios were calculated.

Currently, significant GHG hotspots in agriculture emerge around emissions from biomass burning on cropland in eastern Africa (168 Mt CO_2 eq), **managed soils** in western Africa (127 Mt CO_2eq), **and enteric fermentation** in eastern Africa (141 Mt CO_2eq) and western Africa (79 Mt CO_2eq), amongst others **(Figure 13)**.

FIGURE 13.

GHG HOTSPOTS IN THE AGRICULTURE SECTOR IN SSA, BY SUB-REGION



Notes: In the figure, the size of the bubble is proportionate to the amount of CO_2 eq.

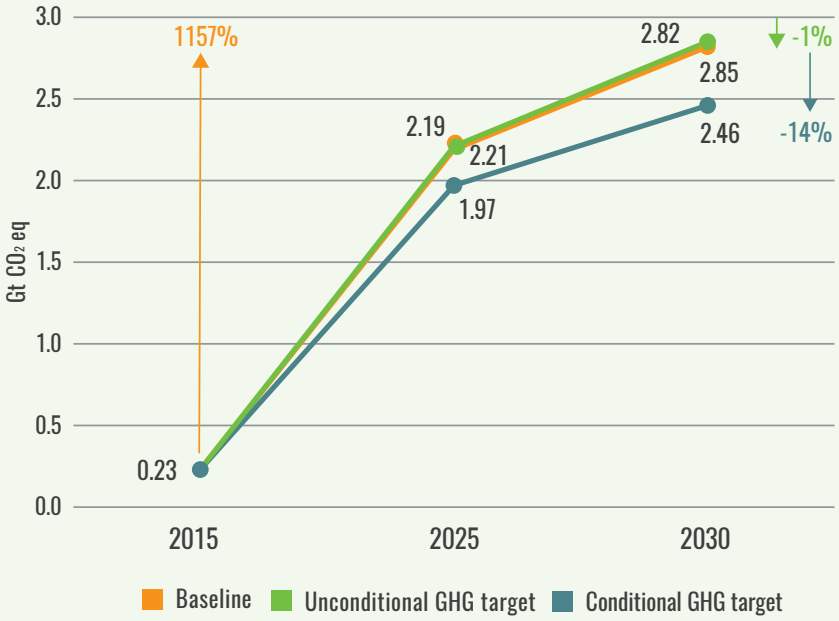
*Source: Authors. (Refer to **Annex 1**).*

Net emissions in the LULUCF sector are expected to rise by around tenfold by 2030 compared to 2015 levels, rising from 0.23 to 2.82 Gt of CO_2 eq., without NDC implementation.[4] Achieving the GHG emission targets set forth in the sector by 15 countries in the region would imply a reduction of 14 percent as compared to this projection with conditional support – and 1 percent without. Despite NDC implementation, however, total net emissions are nonetheless expected to rise by around ninefold compared to the 2015 starting levels (**Figure 14**).

[4] Refer to chapter 4 for description of how NDC baseline and mitigation scenarios were calculated.

FIGURE 14.

GHG EMISSION SCENARIOS FOR THE LULUCF SECTOR "WITH" AND "WITHOUT" NDC IMPLEMENTATION IN SSA

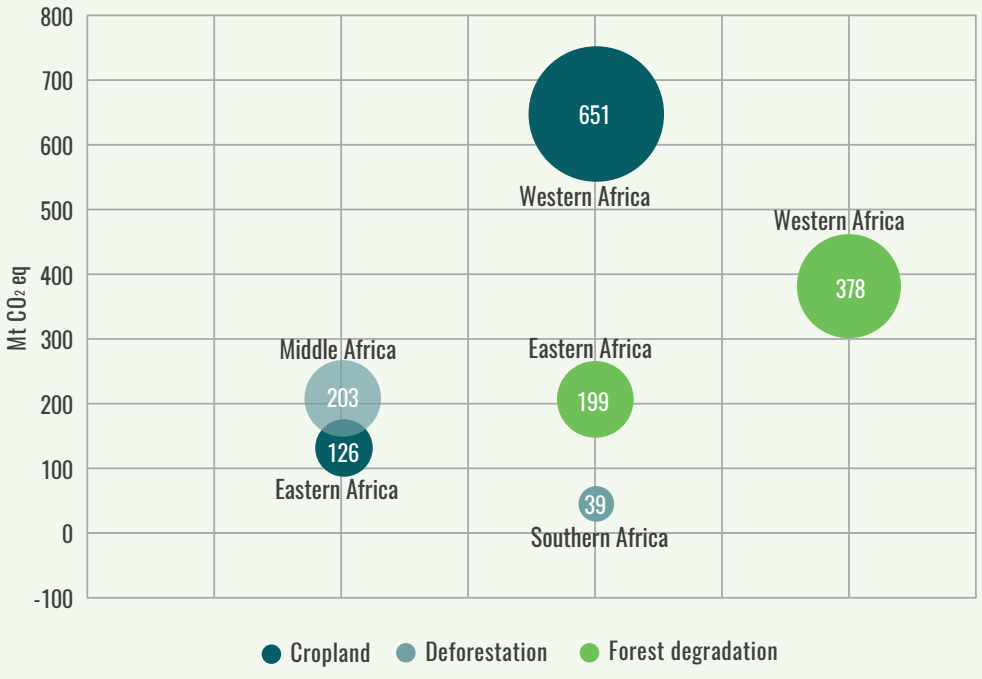


Source: Authors.

Currently, GHG hotspots in LULUCF emerge around emissions from cropland in western Africa (651 Mt CO_2eq), **forest degradation** in western Africa (378 Mt CO_2eq) and in eastern Africa (199 Mt CO_2eq), **and deforestation** in middle Africa (203 Mt CO_2eq), amongst others (**Figure 15**).

FIGURE 15.

GHG HOTSPOTS IN THE LULUCF SECTOR IN SSA, BY SUB-REGION

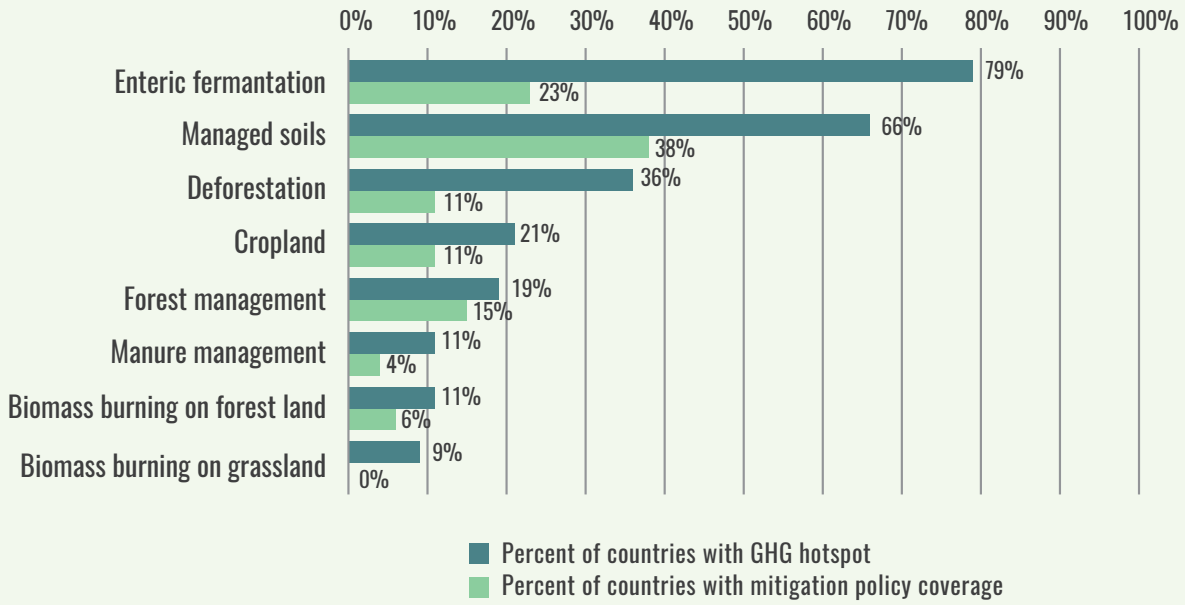


*Source: Authors. (Refer to **Annex 1**).*

A comparative analysis points to gaps in mitigation coverage in response to emissions from enteric fermentation, managed soils and deforestation across SSA, amongst others (Figure 16). For instance, almost 80 percent of countries in SSA have a GHG hotspot related to enteric fermentation, yet only around 25 percent include a mitigation measure aiming to improve feeding or breeding practices. In eastern Africa, significant mitigation policy coverage gaps are found around emissions from enteric fermentation, deforestation and cropland. Around 80 percent of countries in the sub-region have a GHG hotspot related to enteric fermentation, yet only around 30 percent include a mitigation measure aiming to improve feeding or breeding practices. In middle Africa, significant mitigation policy coverage gaps are found around emissions from deforestation. For instance, around one-third of countries in the sub-region have a GHG hotspot related to deforestation, yet none of them include a mitigation measure aiming to reduce deforestation or promote conservation. In southern Africa, significant mitigation policy coverage gaps are found around emissions from managed soils and deforestation, followed by manure management and biomass burning on pastures. For instance, three out of five countries (60 percent) in the sub-region have a GHG hotspot related to deforestation, yet only one country (20 percent) includes a mitigation measure aiming to reduce deforestation or promote conservation. In western Africa, significant mitigation policy coverage gaps are found around emissions from enteric fermentation and managed soils. For instance, over 90 percent of countries in the sub-region have a GHG hotspot related to enteric fermentation, yet only around 13 percent include a mitigation measure aiming to improve feeding or breeding practices.

FIGURE 16.

NDC MITIGATION POLICY COVERAGE GAP ANALYSIS FOR THE AGRICULTURE AND LAND USE SECTORS IN SSA



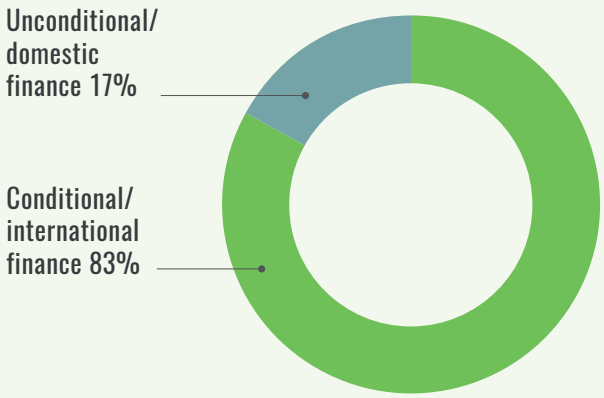
Source: Authors.

SUPPORT NEEDS FOR NDC IMPLEMENTATION

Around three-fourths of countries in SSA quantify the amount of finance needed for NDC implementation, which is estimated at 2.25 trillion USD. Based on those counties with disaggregate information on climate finance needs, around 3.73 billion USD (17 percent) of the 2.25 trillion USD is "unconditional" to international support or planned to be sourced domestically. On the other hand, 1.89 trillion USD (83 percent) of the 2.25 trillion USD is "conditional" to international financial support (**Figure 17**).

FIGURE 17.

AVERAGE SHARE OF UNCONDITIONAL AND CONDITIONAL CLIMATE FINANCE FOR NDC IMPLEMENTATION IN SSA

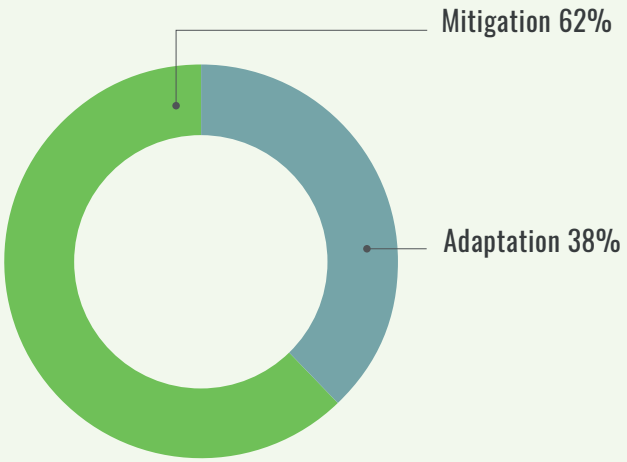


Source: Authors.

Despite the overwhelming need to reduce the region's vulnerability to climate change and enhance adaptive capacity and resilience, only one-third of total climate finance on average is earmarked for adaptation. The climate finance flows will have to be better aligned to the region's adaptation goals. This starts with sufficient capacity to cost mitigation and adaptation measures. Around half of NDCs disaggregate between unconditional and conditional finance needs and mitigation and adaptation needs (**Figure 18**).

FIGURE 18.

AVERAGE SHARE OF MITIGATION AND ADAPTATION FINANCE NEEDS FOR NDC IMPLEMENTATION IN SSA



Source: Authors.

Technology development and dissemination to strengthen the uptake and scaling up of climate change adaptation and mitigation technologies in agriculture remains a major hindrance to progress in SSA. There is a call for the development and dissemination of priority agricultural technologies, including on-farm technologies, natural resources management technologies, genetic resources conservation and diversification technologies, bioenergy efficiency and renewable energy and climate information services.

Half of all SSA countries point to capacity building needs for NDC implementation in the agriculture and land use sectors. Many reference climate change knowledge transfer and skill development for climate change adaptation and mitigation as a priority capacity building area, noting that there is a general lack of knowledge and skills to undertake technical assessments and understand the impacts of climate change in this sector. Around one-third of SSA countries point to gaps in organizational performance and capabilities for climate action, including the lack of technical experts to conduct climate change programmes, as well as insufficient domestic capacity for project development to mobilize climate finance. Less than ten percent of countries identified the need for enabling conditions, such as economic and regulatory policies in support of NDC implementation.

CLARITY, TRANSPARENCY AND UNDERSTANDING OF NDCs

Enhancing the clarity, transparency and understanding of NDCs can enhance the effectiveness of implementation and attract international support. Developing countries are encouraged under the Paris Agreement to adopt an economy-wide GHG target over time. One-fourth of SSA countries include a GHG target covering all Intergovernmental Panel for Climate Change (IPCC) sectors but rather the majority cover either one or multiple sectors. All cover the energy sector.

While almost all SSA countries include a mitigation contribution in the agriculture and/or LULUCF sectors, only one-third communicate a quantified GHG emission reduction target. Around half of the mitigation policies and measures referenced in the sector are associated with a quantified outcome or output indicator. Quantifying targets and measures can improve the transparency of mitigation communications as well as facilitate implementation and reporting processes.

Similarly, only 13 percent of adaptation measures referenced are associated with quantifiable outcome or output indicators. There is an increasing expectation that moving from descriptive to evaluative metrics can strengthen the effectiveness of implementation, monitoring and evaluation of adaptation and learning.

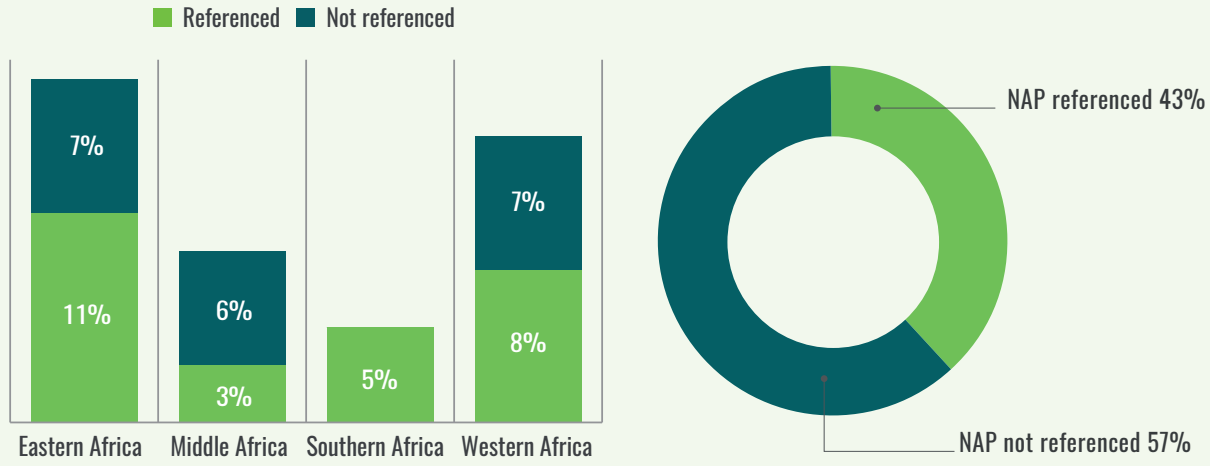
PLANNING PROCESSES FOR NDC IMPLEMENTATION

Around 90 percent of SSA countries include information on the processes behind NDC formulation and implementation in their NDCs, particularly on the types of domestic institutional arrangements and coordination mechanisms that have been established or are planned. Many countries provide information on NDC and sectoral focal points, stakeholder engagement processes and cross-sectoral coordination mechanisms set up between the NDCs and other key policy processes, such as the National Adaptation Plans (NAPs).

Around half of all countries in the region make a reference to the relationship between the NDC and the NAP[5] process – the majority of which mention that their NAP is under development. Around one-quarter of those countries communicate that their NAP is the primary adaptation communication. In light of the emerging trend by which countries are aligning NDC and NAP processes, particularly around the agriculture and water sectors(UNDP and UNFCCC, 2019), it is expected that the next round of NDCs will not only evidence those efforts, but enhanced coordination will improve the efficiency and effectiveness of implementation (**Figure 19**).

FIGURE 19.

REFERENCE TO THE NAP PROCESS IN THE NDCs IN SSA, BY NUMBER AND SHARE OF COUNTRIES



Source: Authors.

Over half of all SSA countries include information on domestic implementation mechanisms and monitoring systems, such as monitoring and evaluation of NDC implementation and establishing systems for tracking and reporting adaptation and mitigation progress. Only two countries reference the development of an NDC implementation plan.

Thirty percent of SSA countries make reference to a monitoring and evaluation system to track adaptation progress. Twenty percent communicate that a measurement, reporting and verification system (MRV) system is in place to track mitigation progress.

One-third of SSA countries include information on policy coherence and budget mainstreaming in support of NDC implementation. Others reference national funds set up as a mechanism for mobilizing finance from public and private sources to support NDC implementation.

Few countries include information on knowledge and data generation as a basis for NDC formulation and priority setting. Engagement in international policy processes is also seldom represented in the NDCs yet enhanced cooperation is an indicator of the enabling environment for NDC implementation.

[5] As of 31 December 2020, only Burkina Faso, Cameroon, Ethiopia, Kenya and Togo have submitted a NAP to the UNFCCC.

CONVERGENCE WITH SUSTAINABLE DEVELOPMENT AND GREEN RECOVERY

The COVID-19 pandemic has laid bare the vulnerabilities, inequalities and inefficiencies in our food systems (UN, 2020a). With first responses redirecting flows of domestic and international resources to mitigate the immediate impacts of the pandemic on global health, the economic downturn and food supply, building the longer-term resilience of communities and ecosystems to climate change and future risks should be the cornerstone of any sustainable recovery programme.

Thus, there is an unprecedented opportunity to ensure that recovery plans in the region are aligned with low-emissions and climate resilient development, particularly in the agricultural sector and overall food systems, which sustain a significant share of the region's population and economy. Leveraging synergies between the climate change agenda and sustainable development in the context of green recovery can not only optimize limited resources but also improve the efficiency of coordination, planning and budgeting. The analysis highlights the strong convergence between the climate change adaptation and mitigation priorities in the agriculture and land use sectors and the Sustainable Development Goals (SDGs), particularly SDG 15.3 "Restore degraded land and combat desertification," SDG 2.3 "Assure agricultural productivity for the marginalized," SDG 12.2 "Efficient use of natural resources," SDG 1.4 "Equal access of vulnerable to all types of resources" and SDG 1.5 "Resilience of the poor to climate events."

TABLE 1.

NDC SUMMARY TABLE FOR THE SUB-SAHARAN REGION

FAOSTAT COUNTRY NAME	MITIGATION IN AGRICULTURE	MITIGATION IN LAND USE, LAND-USE CHANGE AND FORESTRY	ADAPTATION IN AGRICULTURE AND LAND USE	DRR IN AGRICULTURE AND LAND USE	GENDER REFERENCED	CO-BENEFITS REFERENCED	SDGs REFERENCED	NAP REFERENCED	LOSS AND DAMAGE REFERENCED
EASTERN AFRICA									
BURUNDI	✓	✓	✓		✓				
COMOROS	✓	✓	✓	✓	✓				
DJIBOUTI	✓		✓	✓				✓	
ERITREA	✓	✓	✓	✓	✓	✓		✓	
ETHIOPIA	✓	✓	✓	✓	✓	✓			
KENYA	✓	✓	✓	✓	✓	✓		✓	
MADAGASCAR	✓	✓	✓	✓		✓		✓	✓
MALAWI	✓	✓	✓	✓	✓				✓
MAURITIUS	✓	✓	✓	✓	✓	✓			
MOZAMBIQUE		✓	✓	✓				✓	
RWANDA		✓	✓	✓		✓			
SEYCHELLES					✓			✓	
SOMALIA		✓	✓	✓	✓	✓			
SOUTH SUDAN		✓	✓	✓	✓				
UGANDA	✓	✓	✓	✓	✓	✓	✓	✓	
UNITED REPUBLIC OF TANZANIA		✓	✓	✓		✓			
ZAMBIA	✓	✓	✓	✓	✓	✓			✓
ZIMBABWE		✓	✓	✓	✓	✓		✓	

MIDDLE AFRICA									
ANGOLA		✓	✓	✓	✓	✓			
CAMEROON	✓	✓	✓	✓	✓	✓			
CENTRAL AFRICAN REPUBLIC	✓	✓	✓	✓		✓			
CHAD	✓	✓	✓	✓	✓	✓			
CONGO	✓	✓	✓						
DEMOCRATIC REPUBLIC OF THE CONGO	✓	✓	✓					✓	
EQUATORIAL GUINEA	✓	✓	✓						
GABON		✓	✓						
SAO TOME AND PRINCIPE			✓	✓		✓			
SOUTHERN AFRICA									
BOTSWANA	✓		✓			✓		✓	
LESOTHO	✓	✓	✓	✓	✓		✓		
NAMIBIA	✓	✓	✓	✓		✓		✓	
SOUTH AFRICA	✓	✓	✓		✓	✓		✓	
SWAZILAND			✓	✓	✓	✓	✓	✓	
WESTERN AFRICA									
BENIN	✓	✓	✓		✓	✓	✓		
BURKINA FASO	✓	✓	✓	✓	✓	✓		✓	
CAPE VERDE	✓	✓	✓						
CÔTE D'IVOIRE	✓	✓	✓	✓	✓	✓		✓	✓
GAMBIA	✓	✓	✓	✓	✓				✓
GHANA	✓	✓	✓	✓	✓	✓			
GUINEA	✓	✓	✓	✓	✓				
GUINEA-BISSAU		✓	✓	✓					
LIBERIA			✓	✓	✓			✓	
MALI	✓	✓	✓	✓	✓			✓	
NIGER	✓	✓	✓	✓	✓	✓		✓	✓
NIGERIA	✓	✓	✓	✓	✓	✓			
SENEGAL	✓	✓	✓	✓	✓	✓		✓	
SIERRA LEONE	✓	✓	✓	✓	✓	✓		✓	✓
TOGO	✓	✓	✓	✓		✓			

**Agriculture and land use sectors include crops, livestock, forestry, fisheries and/or aquaculture.*

Source: Authors.

INTRODUCTION

BACKGROUND

The Paris Agreement constitutes a landmark achievement in the international response to climate change, as developed and developing countries alike committed to do their part in the transition to a low-emission and climate-resilient future. The Agreement seeks to limit global warming to below a 2°C rise above pre-industrial levels and pursue efforts to stay within 1.5°C, as well as sets a global goal on adaptation within the context of sustainable development. Underpinning the Agreement are the nationally determined contributions (NDCs),[6] representing the main national policy framework, under the United Nations Framework Convention on Climate Change (UNFCCC), by which Parties communicate their commitments to mitigate national greenhouse gas (GHG) emissions and adapt to the impacts of climate change, as well as report on either support needed or provided.

The success of the Paris Agreement rests upon the enhanced ambition of Parties to progressively revise and strengthen their respective mitigation and adaptation plans over time (UNFCCC, 2015).[7] The Paris Agreement requires each Party to prepare, communicate and maintain successive NDCs that it intends to achieve. Being an iterative process, Parties are requested to "communicate by 2020 a new nationally determined contribution and to do so every five years thereafter" (Decision 1/CP.21). In 2023, the first global stocktake agreed upon under the Paris Agreement (Article 14) will assess whether the collective set of commitments and climate action is consistent with the goal of limiting the increase in the global average temperature to 2°C (UNFCCC, 2015).[8] The outcome of the global stocktake is intended to inform Parties in updating and enhancing, in a nationally determined manner, their actions and support in accordance with the relevant provisions of this Agreement, as well as in enhancing international cooperation for climate action.

The tracking of NDC implementation will take place under the Enhanced Transparency Framework (ETF),[9] which provides a foundation for building mutual trust and confidence (UNFCCC, 2015). The so-called "Paris Rulebook" requires Parties to report reliable, transparent and comprehensive information on GHG emissions, climate actions and support, with built-in flexibility for developing countries under the principle of common but differentiated responsibilities and respective capabilities (UNFCCC, 2018).[10]

Linked to the Paris Agreement and NDCs are the 17 Sustainable Development Goals (SDGs) of the 2030 Agenda, which sets out a vision for a hunger-free, more equitable, sustainable, peaceful and resilient world in 2030. Closing the emissions gap while safeguarding food security and pulling millions out of extreme poverty can only be achieved in a context of sustainable development, and sustainable development can only be achieved if coupled with a low-emissions and climate-resilient future.

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[6] Intended nationally determined contributions (INDCs) are converted into NDCs when a Party submits an instrument of ratification, accession, or approval to join the Paris Agreement. For the purpose of this document, the INDCs and NDCs are collectively referred to as NDCs.

[7] Article 4.2 of the Paris Agreement.

[8] Article 14 of the Paris Agreement.

[9] Article 13 of the Paris Agreement.

[10] Modalities, procedures and guidelines for the transparency framework for action and support referred to in Article 13 of the Paris Agreement (FCCC/CP/2018/L.23).

The agriculture (AG) and land use (LU) sectors[11] feature prominently in first-round NDCs, with up to 89 percent of countries including the sectors in their mitigation contributions and up to 98 percent in their adaptation components (FAO, 2016a). As such, the Food and Agriculture Organization of the United Nations (FAO) has a critical role to play in supporting its Member Countries to leverage the mitigation and adaptation potential in the agriculture and land use sectors and harness synergies with sustainable development.

OBJECTIVE

FAO recognizes that its goals to eliminate hunger, food insecurity and malnutrition; reduce rural poverty; and make agriculture, forestry and fisheries more productive and sustainable, cannot be fulfilled without decisive action on climate change (FAO, 2013). Building on its longstanding leadership as a provider of technical knowledge and expertise on sustainable food and agriculture systems, FAO is committed to supporting member countries prepare for and respond to the adverse impacts of climate change. FAO's Climate Change Strategy outlines its commitment to enhancing countries' institutional and technical capacity to plan and implement NDCs; to improving the integration of food security, agriculture, forestry and fisheries within the international climate agenda; and to strengthening the coordination and delivery of FAO's work (FAO, 2017a).

It is with this in mind that FAO developed a series of NDC analyses to better understand current priorities, barriers and support needs specific to the agriculture and land use sectors. At the Conference of the Parties (COP) 22, FAO launched its first global analysis of the NDCs, evidencing the significant role of the agriculture and land use sectors (FAO, 2016a). In 2016, FAO assessed the main challenges countries face when moving from NDC planning to implementation and identified five priority areas for international support (FAO, 2016b). To date, several sector-specific NDC analyses have been developed at the regional level, namely for eastern Africa (FAO, 2017b), central Asia and eastern Europe (FAO, 2019a), Asia (FAO, 2020c), the Pacific (FAO, 2020d) and the Caribbean (FAO, 2020e).

This report provides a unique, sector-specific synthesis of the NDCs submitted by countries in sub-Saharan Africa (SSA). It summarizes the substantial contributions already put forward by countries, opportunities for further action and the gaps, barriers and needs that will need to be addressed if the Agriculture and land use sectors in the SSA are to raise mitigation and adaptation ambitions. The findings of this report will help FAO Members to reflect on their progress in advancing toward NDC implementation of their Agriculture and land use priorities, as well as illustrate potential areas for enhancing mitigation and adaptation ambition in future NDCs. The analysis also helps to clarify the links between the NDCs from the region and the 2030 Agenda and the Sendai Framework for Disaster Risk Reduction 2015–2030 (SFDRR). Finally, the report serves as a guide to FAO, and other organizations in the region, to design targeted, evidenced-based support programmes that support Member Countries to fill current implementation gaps and scale up climate action in the agriculture and land use sectors.

For the purpose of this document, the agriculture and land use sectors encompass all assets (natural, economic, social and human) and activities (production, aggregation, processing, distribution and consumption) related to crops, livestock, forestry and fisheries and aquaculture systems, and the outputs of those systems, including environmental and socioeconomic outcomes (for example food security and nutrition) at the individual, community, national and global level.

[11] For the purpose of this document, the 'agriculture and land use sectors' comprise crops, livestock, fisheries and aquaculture, and forestry.

The report is divided into six chapters:

Chapter 1 describes the methodological approach, scope and data underpinning the analysis.

Chapter 2 provides an overview of the regional and sub-regional trends driving emission trajectories, climate vulnerabilities, adaptive capacities and food security and nutrition outcomes in the region.

Chapter 3 provides a synthesis of how agriculture and land use are featured within the NDCs at the country and regional level. It also summarizes the types of barriers to implementation and support needs reported in the sector, as well as the types of policy processes that countries have set up to facilitate NDC formulation, implementation and tracking.

Chapter 4 presents an analysis of the adaptation and mitigation contributions presented in the agriculture and land use sectors, pointing to potential policy gaps and opportunities for enhancement under future NDC revision cycles.

Chapter 5 assesses the alignment between climate actions in the agriculture and land use sectors and the 2030 Agenda for Sustainable Development, National Adaptation Plans and the Sendai Framework for Disaster Risk Reduction.

Chapter 6 presents concluding remarks.

CHAPTER 1

CHAPTER

1

METHODOLOGY

1.1 GEOGRAPHIC SCOPE

In this report, the SSA region[12] refers to 47 countries and member states supported by the FAO Regional Office for Africa: Burundi, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Madagascar, Malawi, Mauritius, Mozambique, Rwanda, Seychelles, Somalia, South Sudan, Uganda, United Republic of Tanzania, Zambia, Zimbabwe in eastern Africa; Angola, Cameroon, Central African Republic, Chad, Congo, Democratic Republic of Congo, Equatorial Guinea, Gabon, Sao Tome and Principe in middle Africa; Botswana, Lesotho, Namibia, South Africa, Swaziland in southern Africa; and Benin, Burkina Faso, Cape Verde, Cote d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo in western Africa (UNSD, 2020). The assignment of countries or areas to specific groupings is for statistical convenience and does not imply any assumption regarding political or other affiliation of countries or territories by the UN.

1.2 DATA

The report synthesises the data contained in 46 NDCs and 1 INDC (South Sudan)[13], representing 47 non-**Annex 1** countries, submitted to the UNFCCC as of 31 December 2020. Supplemental data was also sourced from official national documents submitted to the UNFCCC, including national communications (NCs), biennial update reports and technology needs assessments (TNAs), as of 31 December 2020. Refer to **Annex 1** for a list of all national documents analysed.

[12] The terminology used in this report to designate the sub-Saharan region and its sub-regions is aligned with the United Nations Statistics Division.

[13] It is noted that South Sudan ratified the Paris Agreement in February 2021.

1.3 METHODS

In order to accommodate for the diversity of NDCs in terms of scope, format and level of detail, FAO developed a common framework for synthesizing the NDCs in the agriculture and land use sectors (Crumpler ***et al.***, 2020). The framework breaks down the NDCs into five main pillars and sub-components specific to the agriculture and land use sectors. The framework's architecture was developed based on a global stocktaking of NDC content and alignment with internationally standardized terminology in the realm of agriculture, land use and climate change. It provides a baseline structure for measuring and comparing NDC content, including mitigation and adaptation priorities and targets, barriers, support needs and planning processes, at the country level and across countries over time.

The methodology adopted to construct the various GHG emissions scenarios based on NDC data and the methodology behind the mitigation and adaptation analyses in this report is fully detailed in FAO (2021).

CHAPTER 2

CHAPTER

2

REGIONAL CIRCUMSTANCES

2.1 CLIMATE, CLIMATE CHANGE AND AGRICULTURE

With diverse climatic zones including desert, semiarid, equatorial, and tropical, SSA is divided into four sub-regions namely eastern Africa, southern Africa, middle Africa, and western Africa. In eastern Africa, the climate is equatorial with year-round high temperatures in addition to rainfall that is highly affected by the Inter-tropical Convergence Zone (ITCZ) and complex weather patterns such as El Niño and La Niña (WMO, 2013). With its arid and semi-arid climates, droughts are not uncommon in the Horn of Africa with the northern coastline of Somalia receiving up to 50 mm in annual rainfall (WB, undated). However, the Technical Summary of the Intergovernmental Panel for Climate Change (IPCC) Sixth Assessment Report (AR6) has projected medium confidence for rainfall to likely reduce in the western part of eastern Africa while expecting an increase in the eastern part (IPCC, 2021a). In the same report, the eastern Africa region observed a medium confidence of a west-to-east pattern of decreasing-to-increasing precipitation (IPCC, 2021b). Climatic variations like these exacerbate existing vulnerabilities and affect socioeconomic growth and recovery of the sub-region, which are further compounded by the desert locust outbreaks and the uncertainties caused by the COVID-19 pandemic. Since 2019, the Horn of Africa has been experiencing the worst desert locust crisis in over 25 years and has seen the swarm plaguing neighbouring countries and even reaching across southwest Asia, affecting a total of 42 million people globally (FAO, 2020b).

Surrounded by the Indian and Atlantic Ocean, southern Africa has a warm-temperate humid climate in the southern side, a subtropical and tropical climate further to the northern, while towards the western, there is the Kalahari Desert with its semi-arid climate. The IPCC Sixth Assessment Report (AR6) projected a decrease in the frequency of tropical cyclones making landfall in this sub-region in the 1°C, 2°C and 3°C global warming scenarios however there is medium confidence for overall increasing intensities (IPCC, 2021b). Furthermore, the likelihood of severe droughts in this sub-region is expected to increase by 100 percent even under a low emissions scenario (IPCC, 2021b).

Middle Africa is known to be the wettest in SSA categorised by its tropical climate and is similarly influenced by the ITCZ (WMO, 2013). Additionally, the sub-region is also home to the Congo Basin, which is an important ecological area valued for its high biodiversity and ecosystem services- including carbon sequestration, regulating water environments, and as a source of livelihood for the population (FAO and UNEP, 2020).

Western Africa is characterised by wet and dry seasons with more desert-like conditions in the northern area known as the Sahel, and more tropical climate towards the southern and western side of the sub-region. However, the sub-region experienced high climate variability notably during the 1930-1960 wet period, followed by the droughts from 1970-1980 then finally with the return of rainfall in the 1990s that saw the 'Greening of the Sahel' (IPCC, 2014a). Notwithstanding, there is medium confidence for the Western Sahel subregionto experience a decreased rainfall whereas an increase is projected along the Guinea Coast subregion (IPCC, 2021a). Overall, SSA is among the regions that are most vulnerable to climate change despite having the lowest contribution to global GHG emissions, accounting for less than 4 percent of the world's total at 0.8 metric ton per capita (WB, 2020).

The impacts of climate change on the SSA continent can be observed in the increased frequency and severity of floods, rainfall, storms, heat-waves, droughts, rising sea levels and exacerbates ongoing threats such as land degradation, air pollution, biodiversity loss, rising sea levels, coastal erosion, soil erosion, desertification, and forest degradation (IPCC, 2014a). Other resulting consequences include an increase in water scarcity, spread of climate-sensitive diseases, and a decline of agriculture production affecting both food security and livelihoods (IPCC, 2014a). Furthermore, there has been a warming trend in SSA since the 1960s (IPCC, 2014a) with the AR6 reiterating that the rate of surface temperature increase is generally accelerated in this continent compared to the global average (IPCC, 2021b). Furthermore, statistics from the FAO shows an increase in mean temperature of 1.5 °C across all sub-regions with Namibia and Guinea-Bissau registering higher than 1.5 °C (FAO, 2020a). Under a 1.5 °C global emissions scenario, increased intensity and frequency of heavy precipitation and corresponding flooding are projected in most regions in Africa with high confidence (IPCC, 2021b). Additionally, the AR6 reports that there is medium confidence for increased severity in agricultural and ecological droughts in western, central and southern Africa (IPCC, 2021b). Likewise, relative sea-level rise has been increasing around Africa and is likely to virtually certain to continue with high confidence (IPCC, 2021b).

Based on the high emissions scenarios, most of Africa will experience a 2°C rise in average temperatures by mid-21st century and a 4°C rise by the late 21st century beyond the temperature threshold agreed upon internationally at the Paris Agreement (CDKN, 2015).

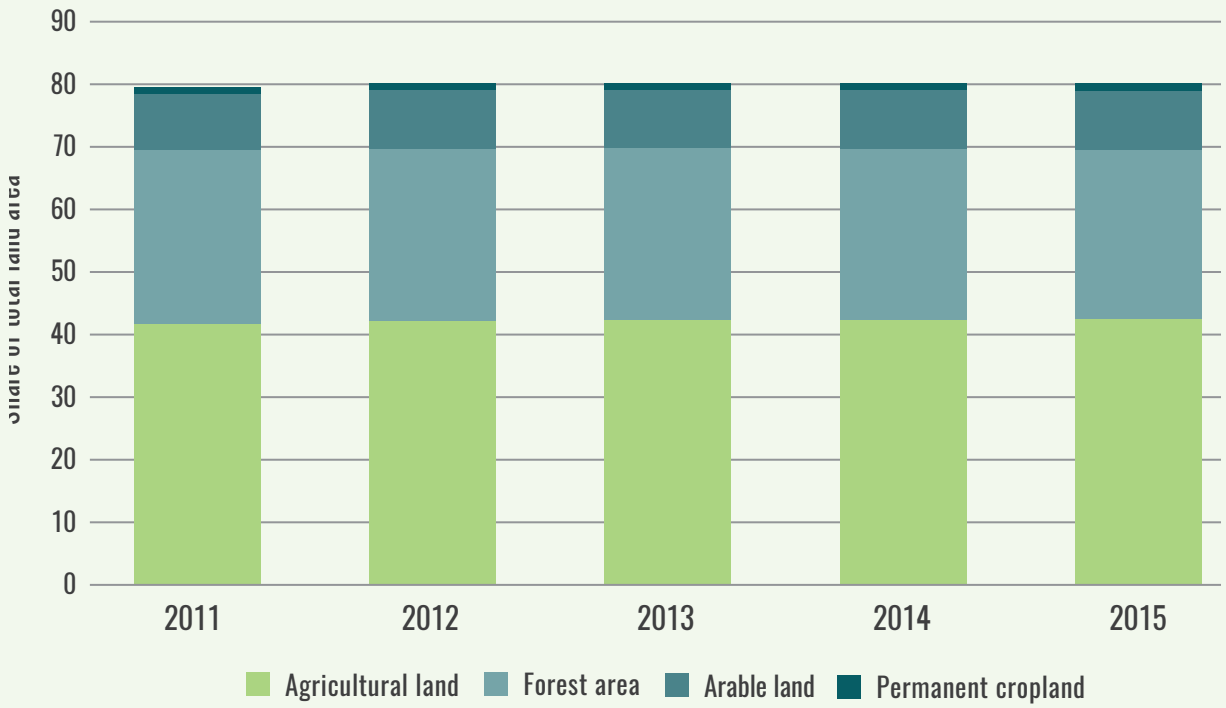
The total land area in SSA is 24,555 million ha, of which 13 percent is the world's arable land (FAO, 2016c). Over a 5-year period from 2011-2015, there has been a slight increase of 0.7 percent and 0.5 percent in agricultural land and arable land respectively in SSA and a drop in forest area, whereas the percentage of permanent cropland was unchanged (**Figure 20**). However, this also suggests that deforestation could be one of the reasons for the increase in the other variables. Collectively, 7 percent of the world's forest area is in eastern and southern Africa while western and central Africa contain 8 percent of the total (FAO, 2020b). According to the Global Forest Resources Assessment 2020 (FRA2020), SSA accounted for the highest net loss of forest area globally across all sub-regions in the last decade, with four SSA countries ranking among the top ten (Democratic Republic of the Congo, Angola, United Republic of Tanzania and Mozambique).

Soil quality and productivity in SSA is generally low with poor nutrient-retention accelerated by continued land degradation and deforestation (FAO and ITPS, 2015). However, fertilizers are not economically viable to adopt across the board.

The drylands accounted for as much as 72 percent of the degraded lands of SSA with overgrazing as the cause for half of the degradation. Despite having low soil fertility, the sub-humid zone of mainly southern and middle Africa countries is able to grow food and cash crops due to the adequate amount of rainfall (FAO and ITPS, 2015). The humid zone in mostly central and western Africa have similar strongly weathered soils but are not suitable for livestock farming due to the threat of the tsetse fly (FAO and ITPS, 2015). On the other hand, the highland zone in mostly eastern Africa have a high potential to adopt crop-livestock farming (FAO and ITPS, 2015).

FIGURE 20.

DISTRIBUTION OF LAND IN SSA, BY TYPE



Source: World Bank. 2020. World Bank Open Data. In: The World Bank [online]. Washington DC. [Cited 7 January 2020]. https://data.worldbank.org/

As much as 95 percent of crop production in SSA is rain-fed (FAO, 2011a), and the region also has the lowest use of irrigation methods at only 4 percent (ZEF, 2019). However, Koo ***et al.*** asserts that the main constraints to irrigation are due to a lack of investment in water resources management (ZEF, 2019). Overall productivity of rain-fed agriculture also depends on quality of soil, water, access to mechanization, and market viability (FAO, 2011a). Similar to the difficulty of adopting fertilizer use, irrigation methods remain largely a costly solution among farmers in SSA. This points towards a need for more integrated and sustainable approaches in the management of water, soil and crop respectively. Almost half of the population of SSA (roughly 400 million people) rely on groundwater as their primary source of water, but only 20 percent of it is used for irrigation (IWRA, 2018). A study of 13 countries in SSA found that Zambia, Ghana, Mali, Mozambique, Nigeria, Rwanda, Tanzania and Uganda to be among those with the highest potential for groundwater irrigation (IWRA, 2018). The water sector has the potential for poverty reduction and improved agricultural productivity; however, it remains largely underdeveloped in SSA. Globally, SSA has the lowest water withdrawal with the average person withdrawing less than 130 m^3 which is also highly determined by income level (FAO, 2020f). Additionally, the region also has the world's lowest level of access to safe drinking water affecting more than 300 million people (FAO, 2020f). The time and arduous labour spent on water collection, along with the health and sanitation risks, especially in rural communities, add to their struggle to maintain good health. About 5 percent of the population (or 50 million people) live in areas with water scarcity, areas that tend to have either severe droughts or lack of irrigation (FAO, 2020f). Likewise, water scarcity contributes to the region's poverty, social insecurity, and hunger.

The impacts of land degradation and overexploitation of natural resources due to human activities combine with and exacerbate existing vulnerabilities to climate change, which in turn further threaten the livelihoods and well-being of the 1.08 billion people living in SSA. The region already faces the multi-faceted challenge of increasing agricultural productivity, while at the same time protecting and restoring its natural ecosystems and resource base, and improving human welfare, in the face of climate change. This calls for the adoption of more resilient and sustainable agro-ecosystems in the face of climate change and other risks (FAO, 2011b).

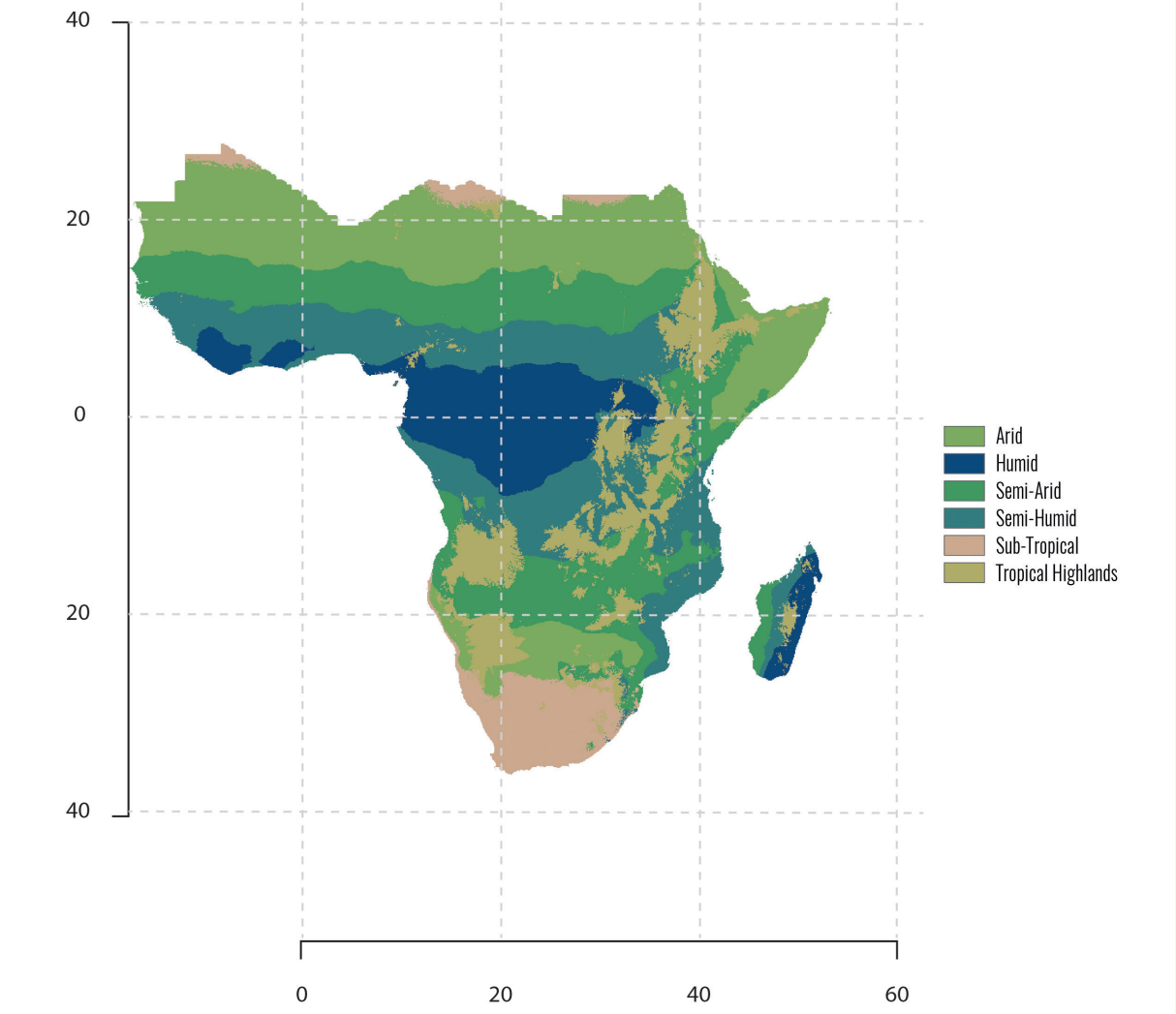
2.2 FARMING SYSTEMS

One characteristic feature of African agriculture is that it is very diverse, including within every country. This diversity stems in part from the vast array of agroecological zones (AEZs) that result in a rich mosaic of farming systems, each with a mixture of trees, crops, livestock, fish and livelihoods. Despite this rich diversity, one common feature stands out: the continent is predominantly dry. The drylands make up approximately half of the continent's land surface, accounting for about 75 percent of the area used for agriculture and holding about 425 million people- approximately 50 percent of the continent's population (AFD and WB, 2016).

The most important agroecological zones in SSA are: moist sub-humid and humid zones, accounting for 38 per cent of SSA land; dry sub-humid areas covering 13 per cent; and the arid and semi-arid areas covering 43 per cent of SSA land (**Figure 21**).

FIGURE 21.

AGROECOLOGICAL ZONES IN SSA



Notes: The boundaries and names shown and the designations used on these map(s) do not imply the expression of any opinion whatsoever on the part of FAO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers and boundaries. Dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

Source: International Food Policy Research Institute Harvestchoice. 2015. Agro-Ecological Zones for Africa South of the Sahara. Harvard Dataverse. https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/M7XIUB.

According to the International Food Policy Research Institute (2015), African farming systems can be classified into fifteen farming classes (**Figure 22**). These farming systems are shaped by a combination of factors including predictable long-term trends (for example population growth, human capital), unpredictable factors (for example climatic or economic shocks) and development interventions (for example projects/programmes, market opportunities, science, new technologies or policy changes). The farming systems are heterogeneous and dynamic and evolve in complex ways (Dixon *et al.*, 2019).

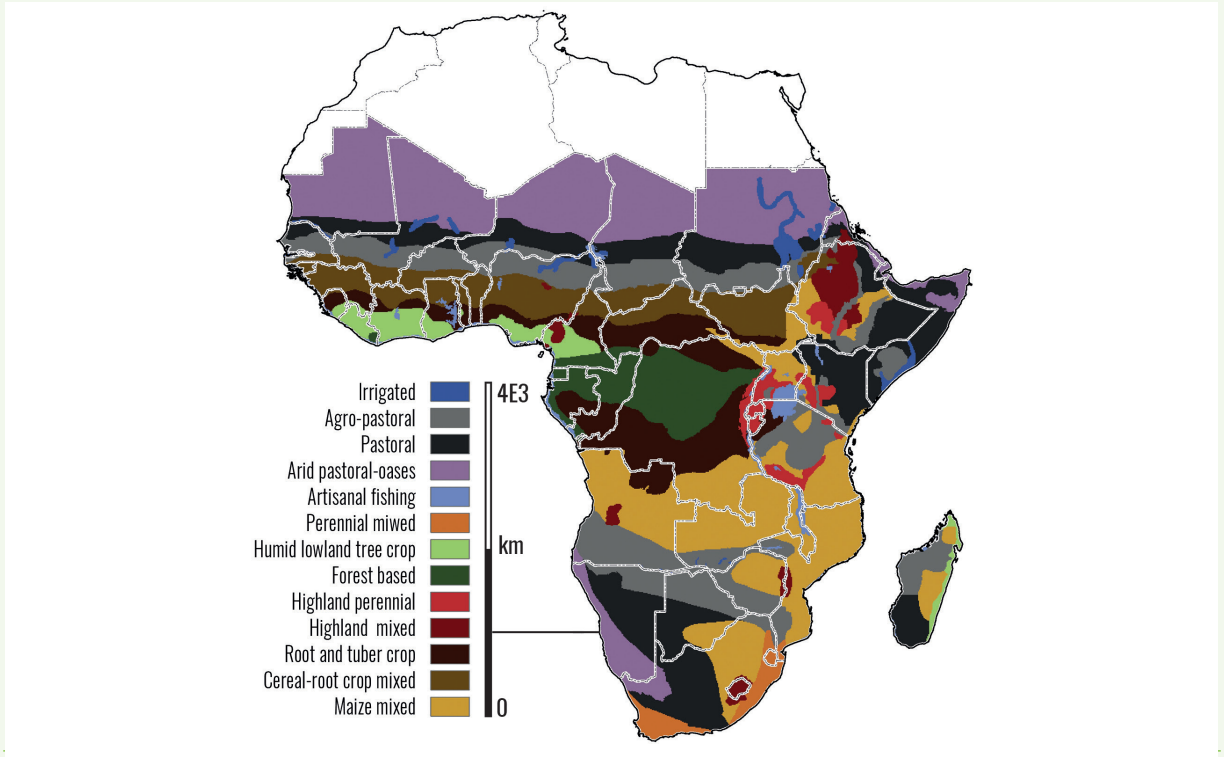
Although each farming system is important in terms of its livelihood and ecological benefits, only five are discussed in this review due to their prominence in African agriculture: (a) maize mixed, (b) arid pastoral-oases, (c) pastoral, (d) agropastoral and (e) root and tuber crop (Vidigal, Romeiras and Monteiro, 2019).

2.2.1 Maize mixed

Maize mixed is inarguably the most prevalent farming system, occupying 18 percent of SSA land (**Figure 22**). Almost 100 million rural people rely on this system, of whom 58 million live on less than USD 1.25 a day. These people make up 23 percent of the total rural poor in SSA (Husmann, Abiodun and Virchow, 2015). For this reason, maize mixed farming system has by far the best prospects for poverty reduction and agricultural growth in Africa. It is mainly rain-fed and practiced in the humid and sub-humid agroecological zone of eastern, central and southern Africa and integrates livestock, trees, cash and food crops. Off-farm income is also a common phenomenon and augments farm income. Although maize dominates the crop area, other crops such as groundnuts, oil seeds, cotton, sorghum, pulses and millet are also grown. However, considering the projected temperature increase and reduced precipitation over SSA, the sustainability of this farming system remains a major concern and calls for urgent action in water and nutrient management.

FIGURE 22.

AFRICAN FARMING SYSTEMS



Notes: The boundaries and names shown and the designations used on these map(s) do not imply the expression of any opinion whatsoever on the part of FAO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers and boundaries. Dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

Source: Harvest Choice, 2017.

2.2.2 Arid pastoral and oases

The second major farming system is the arid pastoral and oases which covers 62 percent of the arid AEZ, approximately 16 percent of the land area in SSA and 40 percent of western Africa (**Table 2**). The system is found in northern Africa, the northern regions of the Sahelian countries (Mauritania, Mali, Niger, Chad, Sudan), eastern Africa (Ethiopia, Eritrea, Djibouti, and Somalia), and parts of southern Africa (Angola, Namibia and South Africa).

It is composed of extensive pastoralism and scattered oasis farming. The cultivated area is only 0.04 percent of the farming system's total area (Dixon *et al.*, 2019). The oases are cultivated using irrigation techniques. The most important agricultural crops are fruit trees and vegetables. Fodder crops are also grown. The arid pastoral component of the system is characterized by extensive livestock production on wide portions of land surrounding oases. Small ruminants (mainly goats) and camels are reared due to their hardiness to higher temperatures and sporadic rainfall.

Traditionally, this farming system was mainly practiced on oases in the northern of the Sahara, but climate and socioeconomic changes are creating an emerging trend in the Sahelian zones with oases becoming a place for retreat, resilience, and refuge.

TABLE 2.

FARMING SYSTEMS IN SSA, BY SUB-REGION AND AGROECOLOGICAL ZONE

FARMING SYSTEMS	SSA %	SUB-REGION %				AGROECOLOGICAL ZONE (%)					
		E.A	M.A	S.A	W.A	ARID	HUMID	SEMI-ARID	SUB-HUMID	SUB-TROPICAL	TROPICAL HIGHLANDS
IRRIGATED	0.9	0.8	0.1	0.1	2.1	1.7	0.0	2.2	0.0	0.0	0.1
AGROPASTORAL	**15.3**	20.2	10.7	16.5	14.4	6.0	1.7	47.9	3.8	0.3	18.7
PASTORAL	**15.5**	21.0	3.3	40.4	10.9	27.5	1.9	19.4	1.7	36.1	12.8
ARID PASTORAL & OASES	**17.1**	3.1	10.8	13.7	40.1	62.5	0.0	0.0	0.0	32.8	2.4
ARTISANAL FISHING	2.0	3.9	1.3	0.0	1.9	0.3	3.6	1.3	5.2	0.0	0.6
PERENNIAL MIXED	1.6	0.3	0.0	11.3	0.0	0.0	0.0	1.3	0.5	15.2	0.5
HUMID LOWLAND TREE CROP	2.9	1.3	1.9	0.0	6.8	0.0	14.2	0.0	4.1	0.0	0.0
FOREST BASED	6.0	0.0	20.1	0.0	0.2	0.0	41.6	0.0	0.9	0.0	0.1
HIGHLAND PERENNIAL	1.9	5.6	0.8	0.0	0.0	0.0	1.1	0.1	1.2	0.0	11.5
HIGHLAND MIXED	2.2	5.3	1.1	2.1	0.2	0.0	0.7	0.4	1.1	3.1	12.2
ROOT & TUBER CROP	9.8	0.8	27.0	0.0	5.4	0.0	30.0	0.0	25.0	0.0	2.4
CEREAL ROOT CROP MIXED	7.2	0.6	6.7	0.0	18.0	0.0	0.0	8.8	24.6	0.0	0.6
MAIZE MIXED	**17.7**	36.9	16.4	15.8	0.0	2.0	5.3	18.6	31.9	12.5	38.0

Source: Adapted from Vidigal, P., Romeiras, M. & Monteiro, F. 2019. Crops Diversification and the Role of Orphan Legumes to Improve the sub-Saharan Africa Farming Systems. https://doi.org/10.5772/intechopen.88076

2.2.3 Pastoralism

Pastoralism ranks third in terms of prominence and is practised in the dry semi-arid and desert environments. It occupies 488 million ha (43 percent) of Africa's land mass. This farming system involves extensive livestock production as the primary source of livelihood and covers 36 countries, stretching from the Sahelian West to the rangelands of eastern Africa, the Horn of Africa and the nomadic zones of southern Africa. An estimated 268 million people inhabit this system (FAO, 2018). 7 percent and 0.2 percent of total land is under crop cultivation and irrigation respectively (Dixon *et al.*, 2019). As a matter of fact, pastoralism plays an important role in African economies by supplying millions of livestock to both domestic and international markets through trade networks that link local, regional and international markets. The pastoral farming system includes four geographically defined sub-systems which are equivalent in size but differ in human and livestock population densities namely, Sahelian, eastern African, southern African and northern African. The Sahelian and eastern African have the highest human and livestock

population densities while southern Africa has the lowest. The Sahelian, northern and southern sub-systems experience unimodal rainfall, while bimodal rainfall is experienced in eastern Africa (Vrieling, De Leeuw and Said, 2013).

There is evidence showing that pastoralism is rapidly declining and transforming into agropastoralism owing to a myriad of challenges, but key ones include government policy to sedentarise pastoralists (Davies and Hatfield, 2007; Degen, 2011; Meir, 2019) and to turn pastureland to cultivated land (Kamara, Swallow and Kirk, 2004), severe environmental conditions, mainly droughts (Allen A. Degen and Weisbrod, 2004; IIED, 2002) and armed conflicts, including cattle rustling, which interfere with pastoralist lifestyle by limiting their mobility (Dixon *et al.*, 2019). Despite these challenges, pastoral communities have developed strategies to enhance their resilience and reduce their vulnerability. The primary risk aversion strategy involves mobility to divert livestock to better pastures and water, although protracted, recurrent conflicts and insecurity in pastoral areas inhibit the deployment of this strategy. Other strategies include destocking and changing species for instance, cattle to camels. An amalgamation of these strategies helps secure the livestock resource base that bolsters pastoral livelihoods.

2.2.4 Agropastoral farming

The agropastoral farming system accounts for 15.3 percent of Africa's land mass. Agropastoralism essentially entails crop farming as the main subsistence activity, but animal husbandry is an integral part of the household economy. This farming system extends over 443 million ha in the semi-arid regions of northern Africa, the Sudano-Sahelian belt stretching across western and middle Africa as well as eastern and southern Africa. It is the dominant farming system in twenty-five African countries with an estimated 193 million inhabitants, half of whom are extremely poor. Approximately 98.4 million people are engaged in agriculture and 15 percent of the total land area is cultivated (Dixon *et al.*, 2019).

Unlike the pastoral system where crop production is low, crops and livestock are almost of equal importance in this system. Sorghum, millet, cowpeas and groundnuts are the main crops grown but with low marketable surplus due to low adoption of new technologies mainly occasioned by their perceived risks and low profitability. Common challenges for the farming system include climate change, and land tenure constraints especially for women who are the backbone of agriculture and produce over 80 percent of farm produce. Despite being a major challenge, increased urbanization has resulted in the development of domestic and international markets and increased monetization of the food system. Other important challenges include high cost of agricultural inputs and increased competition between cropping and pastoral activities.

Transforming and sustaining the agropastoral farming system will entail system-, institutional- and technology-oriented interventions that integrate enabling policies, value addition, marketing and micro-financing.

2.2.5 Root and tuber crops

Root and tuber crop accounts for 9.8 percent of Africa's landmass. It is practiced in western and middle Africa on 236 million ha. Around 112 million people inhabit this farming system, of whom over 50 percent live on less than USD 1.25 per day (Dixon *et al.*, 2019). This farming system is very diverse and complex, and pervaded by the characteristic root and tuber crops (yam, cocoyam, cassava, sweet potatoes), which are complemented by tree crops (such as cocoa, cashew, rubber, oil palm) and cereals (mainly, maize, millet and sorghum). Crop production is mainly subsistence in nature, but semi-commercial farming also exists. Due to its high biomass productivity coupled with its proximity to major urban centres and export ports, and suitability for commercial farming, this farming system has significant potential to lift many rural farmers out of poverty. Underdeveloped markets, crop diseases and declining soil fertility are the most widely cited challenges of this farming system. Achieving increased productivity and sustainable livelihoods will require market-oriented intensification using high-yielding and disease-resistant varieties, and integrated soil fertility management technologies complemented by agricultural diversification. Intensification and diversification interventions will require increased research and extension, development of the transport and market infrastructure, creation of enabling policies, public-private partnerships and capacity development at all levels.

2.2.6 Agroforestry

Due to its climate, livelihood and environmental benefits, a palpable re-emergence of interest in agroforestry has been observed in SSA in recent times with more countries embedding it in their revised NDCs and sectoral policies and programs. In many cases, these measures are aimed at addressing severe degradation and declining soil fertility. A few countries have stepped up their efforts by putting in place more concrete measures such as agroforestry legislation and policies, and comprehensive agroforestry strategies and action plans. Kenya, for instance, has enacted a Farm Forestry law which requires that 10 percent of all farms be covered with trees and further initiated the development of an agroforestry strategy. In Niger, the implementation of the Forest Code has tremendously expanded the practice of farmer-managed natural regeneration to over 7 million hectares of cropland (World Agroforestry, 2019). Ethiopia is close to finalizing an agroforestry strategy while Ghana has an agroforestry policy that dates back to 1986. A more recent example is in Rwanda where the Government developed and adopted an Agroforestry Strategy and Action Plan (2018-2027).

Despite a high concentration of agroforestry research in Africa and empirical evidence confirming its benefits, agroforestry practices have not expanded accordingly. For instance, the proportion of agroforestry in SSA is estimated to be 29 percent of the agricultural land, compared to 50 percent in southeast Asia, central America, and southern America (Agroforestry Network, 2018). During the first decade of the 21st century, the global tree cover on agricultural land increased with 3 percent. The corresponding increase in sub-Saharan Africa was around 1 percent only (World Agroforestry Center, 2014). One of the major barriers to wider implementation in Africa is fragmentation and ineffective coordination among government institutions and stakeholders dealing with the different elements of agroforestry (agriculture, forest, natural resources, and climate change). Other important barriers include lack of widespread understanding of the benefits of agroforestry, under-developed tree seed supply systems, lack of land tenure among smallholder farmers, inadequate extension and advisory services, market, and policy constraints (USAID, 2013).

To promote large-scale adoption of agroforestry, African governments will need to put in place appropriate incentives and policies, remove barriers to land access and tree tenure, secure property rights, promote access to markets, establish seed sources and nurseries to meet demand, address capacity needs and improve extension service provision to smallholder farmers.

2.2.7 Climate change impacts on farming systems in sub-Saharan Africa (SSA)

As a known threat multiplier, climate change exacerbates the existing challenges experienced by farming systems in Africa. Climate change may lead to a breakdown of major farming and food systems in the continent with desertification expected to amplify this issue. The change in composition of farming systems from mixed crop-livestock to more livestock dominated systems may occur as a result of reduced length of growing season for annual crops and increases in the frequency and prevalence of failed seasons (Philip Thornton ***et al.***, 2010). Transition zones, where livestock farming is projected to replace mixed crop-livestock systems by 2050, include the western African Sahel and coastal and mid-altitude areas in eastern and south-eastern Africa (Jones and Thornton, 2009). Estimated yield losses for major cereal crops across sub-Saharan Africa show a drop of 22 percent by mid-century (Shlenker and Lobell, 2010). According to the Fourth Assessment Report (IPCC, 2007) of the IPCC, the area of arid and semi-arid land in Africa could increase by 5-8 percent (60-90 million hectares) by 2080s, with the population at risk of increased water stress reaching an estimated 350-600 million by 2050. Additional risks that could be exacerbated by climate change include greater erosion and reduction in yields for major crops by up to almost 50 percent by 2100 (Blanc, 2012). Due to yield deficiencies, crop net revenues in some countries could fall by almost 90 percent by 2100, with small-scale farmers being the worst affected (Behnin, 2006). Fisheries will be particularly affected due to changes in sea temperatures that could decrease trends in productivity by 50-60 percent. Without significant efforts to reverse this trend, climate change and land degradation will lead to disrupted farming systems and food chains, threatened livelihoods and exacerbated stresses for conflict and displacement. Multiple stressors of poverty, poor infrastructure and governance will aggravate this tenuous situation.

2.3 DEMOGRAPHICS AND RURAL ECONOMY

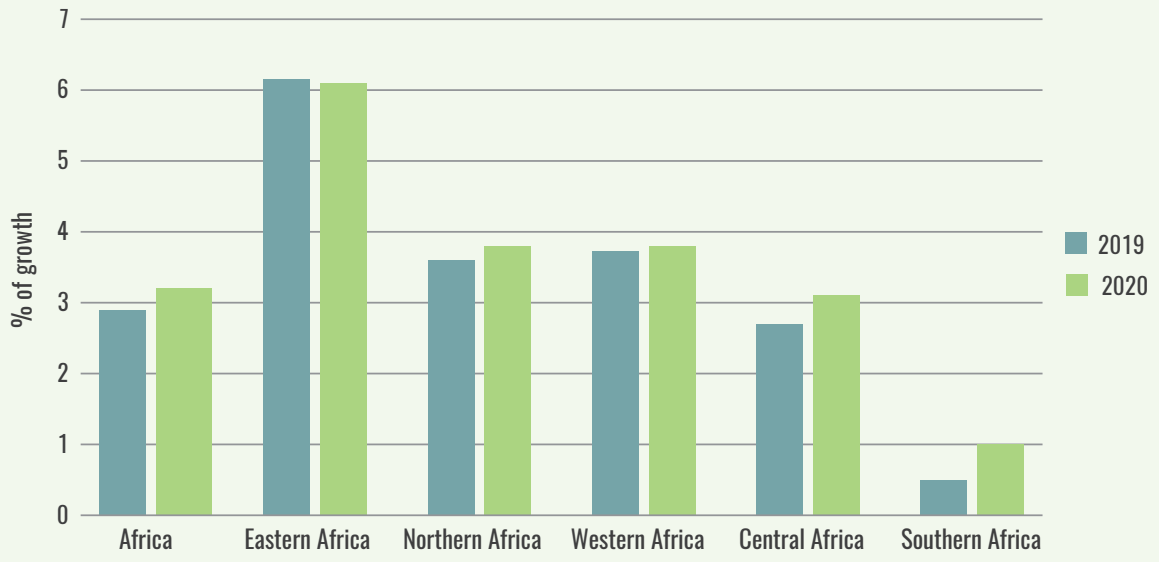
In 2020, Africa's population was 1.3 billion, making it the second most populous continent after Asia (4.6 billion) (UN DESA, 2019). However, Africa outpaces all other regions of the world in population growth. During the past four decades, population grew at about 2.5 percent per annum (UN DESA, 2019), more than double that of southern Asia (1.2 percent) and Latin America (0.9 percent). According to UN projections, Africa's population will reach 1.7 billion in 2030 and 2.5 billion in 2050. This translates to a projected annual growth rate of 4.9 percent between 2020 and 2030 and 4.7 percent between 2030 and 2050. This rapid population growth is due to rising life expectancy and declines in mortality rates, particularly of children. If the current trends continue, Africa will account for almost 20 percent of the world population in 2030 (from the current 17 percent) and above 25 percent in 2050 (UN DESA, 2019).

Evolving in tandem with exponential population growth is a unique demographic context characterized by a burgeoning youth population-unmatched in the rest of the world. According to the UN Department of Economic and Social Affairs (UNDESA), Africa is considered the world's youngest continent with about 60 percent of its population being under the age of 25 (UN DESA, 2019). Majority of these live in the rural areas where poverty is prevalent. Out of the 20 youngest nations in the world, 19 are in Africa. In 2020, the median age in Africa was 19.8 (compared to 30 in Asia). By 2100, Africa's youth population could be equivalent to twice Europe's entire population. While the imminent youth bulge presents a powerful opportunity for reaping demographic dividends, it also presents significant risks. Poverty, youth unemployment, underemployment, lack of social security, educational opportunities and inclusive governance are expected to worsen due to climate change, which will likely lead to a rise of conflicts and insecurity unless urgent concrete measures are taken to avert the risks. In fact, many countries are already grappling with these challenges.

An in-depth analysis of sub-regional trends reveals that eastern Africa has the highest population (369 million) followed by western Africa (368 million), southern Africa (177) and middle Africa (144.6 million) (AUC & OECD, 2018). Western Africa has the highest population density in the continent. Western Africa's population is projected to reach 809 million by 2050, representing 31.7 percent and 8.2 percent of the continent and world population respectively (AUC & OECD, 2018). Eastern Africa not only has the highest population; it also has the highest real gross domestic product (GDP) growth (**Figure 23**) (UN, 2020b).

FIGURE 23.

REAL GDP GROWTH IN AFRICA, BY SUB-REGION (2019-2020)



Source: UN. 2020b. World Economic Situation: Prospects. UN. 11 pp. (also available at https://www.un.org/development/desa/dpad/wp-content/uploads/sites/45/WESP2020_CH3_AFR.pdf).

Another salient demographic trend worth highlighting is that SSA is the only region in the world where rural population is expected to grow beyond 2050 (IFPRI, 2019). Rural Africa is expected to have nearly 60 percent more people in 2050 than it has today. Currently, between 40 and 80 percent of Africans live in rural areas (except in northern and southern Africa) and majority of these are youth. Despite migration and urbanization being on the rise, SSA is projected to record a substantial increase in total rural population by 260 million between 2020 and 2050. This makes rural transformation and investing in the youth an extremely important priority for Africa. Industrialization lies at the heart of this transformation.

Although Africa's industrial growth is inching up, this growth has not been able to match rapid population growth. Even with a labour glut and relatively low wages, the continent's share of manufacturing in GDP remains very low. For instance, despite eastern Africa being the region's economic giant (UN, 2020b), in 2016, only 24 percent of its exports were fully processed (AUC & OECD, 2018). The situation seems worse in other sub-regions (2 percent in central Africa, 19 percent in southern Africa and 4 percent in western Africa) (AUC & OECD, 2018). The dismal performance of Africa's manufacturing sector is a clear indication that Africa is yet to reap a demographic growth dividend from its labour force and youthful population. In order to boost growth and revitalize the rural economy, governments will need to urgently step up their efforts in unveiling and implementing economic stimulus programs and reforms in critical sectors and areas such as agriculture, science, technology and innovation. In addition, industrial development will need to go beyond traditional manufacturing to target growth and modernization in emerging sectors.

Regarding employment, agriculture is still the dominant employer in rural Africa accounting for a lion's share of rural household incomes (IFPRI, 2019). This is a stark contrast to Asia where non-farm employment accounts for the largest share of rural household incomes. Despite agriculture being the dominant employer, the share of people primarily engaged in farming has been declining over the years-an indication that the continent is undergoing structural transformation. Today, farming accounts for 40–65 percent of primary employment in sub-Saharan Africa's working-age population, compared to 70 to 80 percent just a decade ago (Jayne, Chamberlin and Benfica, 2018). As of 2000, 66 percent of Africa's population was employed in agriculture; by 2018, this figure had shrunk to 57 percent (IFPRI, 2019). There is also ample evidence that rural livelihoods in Africa are diversifying, with many people finding job opportunities in non-farm sectors (Davis, Di Giuseppe and Zezza, 2017; IFPRI, 2009; UN, 2020b). These insightful findings are corroborated by Carletto ***et al.*** (2017), who also found that a significant share of rural incomes is earned in the rural non-farm economy. These new emerging trends underscore the importance of investing in rural non-farm sectors.

Despite substantial progress, challenges remain. Africa is still faced with a daunting prevalence of poverty and gender inequality. As of 2018, the proportion of poor people in sub-Saharan Africa was estimated at 40.2 percent (WB, 2020). A study conducted by the African Development Bank and the UN Economic Commission for Africa in 2019 showed that the Africa gender gap currently stands at 51.4 percent with marked differences across the sub-regions. Southern Africa has less inequality between women and men, with a score of 61.3 percent followed by eastern Africa (51.8 percent). Central and western Africa have high gender inequality with a gender gap of 40.3 percent and 42.1 percent respectively. The results also showed that the ownership of land gender gap in Africa is 22.9 percent (AfDB & UNECA, 2020). Lack of access to land and finance are what keeps many women trapped in cycles of poverty. The impacts of climate change add to this tenuous situation.

Most of Africa's poor are concentrated in a limited number of countries: 5 countries account for more than 50 percent of Africa's poor while 10 countries account for 75 percent of Africa's poor (WB, 2019). Poverty rates are particularly high in fragile states. Underlying causes of poverty include climate change, political instability, conflict, unfavourable macroeconomic policies, and low agricultural yields. Agricultural productivity in rural areas remains low since majority of farmers, mainly small-scale farmers, do not have access to improved technologies (WB, 2018). But there is cause for optimism. Rural poverty, is estimated to have fallen by 50 percent between 2005 and 2017—with just under 500 million rural people living below the international poverty line of USD 1.90 per person per day (IFPRI, 2019). While these glimpses of success offer renewed hope for the future, gender inequality and the ongoing COVID-19 pandemic, if not effectively tackled, will impede poverty reduction efforts and reverse decades of hard-won development gains.

2.4 FOOD SECURITY AND NUTRITION

SSA has the highest Prevalence of Undernourishment (PoU) in the world at 21.4 percent, accounting for nearly 222 million people in hunger in 2018 (**Table 3**). If this trend continues in the same trajectory, the PoU is projected to increase up to 29.4 percent (412 million people) by 2030 – moving SSA further away from the Zero Hunger target. Based on the Food Insecurity Experience Scale (FIES) in 2018, the prevalence of severe food insecurity is at 21.3 percent, which is comparable to the PoU according to the latest report on State of Food Security and Nutrition in the World 2020. The main drivers behind food insecurity in SSA are climate shocks, conflicts and economic downturns. Moreover, the region is currently being impacted by the pandemic with estimates that it could potentially double the number of hungry people in the continent (FAO, 2020g).

TABLE 3.

PREVALENCE OF UNDERNOURISHMENT (POU), 2005-2019

	PREVALENCE OF UNDERNOURISHMENT (%)							
	2005	2010	2015	2016	2017	2018	2019*	2030**
WORLD	**12:6**	**9.6**	**8.9**	**8.8**	**8.7**	**8.9**	**8.9**	**9.8**
AFRICA	**21.0**	**18.9**	**18.3**	**18.5**	**18.6**	**18.6**	**19.1**	**25.7**
NORTHERN AFRICA	9.8	8.8	6.2	6.3	6.6	6.3	6.5	7.4
SUB-SAHARAN AFRICA	23.9	21.3	21.2	21.4	21.4	21.4	22.0	29.4
EASTERN AFRICA	32.2	28.9	26.9	27.1	26.8	26.7	27.2	33.6
MIDDLE AFRICA	35.5	30.4	28.2	28.8	28.7	29.0	29.8	38.0
SOUTHERN AFRICA	4.9	5.4	7.0	8.0	7.0	7.9	8.4	14.6
WESTERN AFRICA	13.8	12.1	14.3	14.2	14.6	14.3	15.2	23.0

**Shows projected values. **Values do not take into account the potential impact of COVID-19.*

Source: FAO, IFAD, UNICEF, WFP & WHO. 2020. The State of Food Security and Nutrition in the World: Transforming Food Systems for Affordable Healthy Diets. FAO, IFAD, UNICEF, WFP & WHO. 320 pp. (also available at http://www.fao.org/3/ca9692en/CA9692EN.pdf).

Eastern Africa consistently ranks the highest each year in undernourishment although the rate of the PoU (0.2 percent) between 2015-2018 has been significantly slower compared to other sub-regions. However, the Horn of Africa remains one of the most food-insecure regions in the world. With a majority of livelihoods depending on agro-pastoralism, the sub region is beleaguered by persistent droughts, floods, conflicts, population growth, and most recently the worst desert locust outbreak on record (FAO, undated). Ethiopia, Kenya and Somalia are among the worst affected, with the outbreak having reached a total of 7 countries till date (FAO, undated). A famine was declared as recent as 2017 in South Sudan which affected about 6 million people (FAO, undated).

PoU trends in central Africa and western Africa in contrast have been increasing at 1.6 percent and 0.9 percent respectively in 2015-2018 (FAO, IFAD, UNICEF, WFP & WHO, 2020). Food insecurity in these sub-regions has been highly affected by ongoing conflict, instability, population displacement and rising food prices (FAO, ECA and AUC, 2020). While southern Africa has the lowest number of undernourished people in SSA, the rate of the PoU has risen by 0.9 percent with 2030 projections indicating a continued increase instead of an improvement (FAO, IFAD, UNICEF, WFP & WHO, 2020). Repeated extreme weather events and fall armyworm outbreaks in this sub-region have impeded recovery and severely constraining coping capacities.

Prevalence of stunting in SSA is still relatively high (31.1 percent in 2019) despite a general decline from previous years however it is the only region where the number of stunted children is rising from 51.2 million in 2012 to 52.4 million in 2019 (FAO, IFAD, UNICEF, WFP, and WHO, 2020). In 2019, eastern Africa has the highest prevalence of stunting at 34.5 percent followed by central Africa (31.5 percent), southern Africa (29 percent) and western Africa (27.7 percent) (FAO, IFAD, UNICEF, WFP, and WHO, 2020).

Stunting is generally more prevalent in rural areas. By country, Burundi, Madagascar and Nigeria rank the highest in prevalence of stunting respectively, while the lowest is found in Senegal, Sao Tome and Principe, and Ghana (FAO, ECA and AUC, 2020).

While the prevalence of overweight children has declined in SSA from 2012 to 2018, the prevalence of overweight adults continues to rise and this is more prominent in southern Africa where one-fourth of the adult population is obese (FAO, ECA and AUC, 2020). Dietary patterns high in calories, meat products, fats and sugars have been transitioning in SSA over the years owing in part to urbanisation, improving income levels and ease of trade. Additionally, consumption of meat is highest in southern Africa and four times higher than the other sub-regions observed most prominently in South Africa, Namibia and Botswana (OECD and FAO, 2016). There is an increasing demand for processed food leading to a decline in healthy diets especially within urban areas. Consumption of processed food is high among the population residing in the Small Island Developing States (SIDS) of Africa as it accounts as one of the top five food imports (FAO, 2019b).

The pandemic in SSA has underscored the spill over effects of a global health crisis as it exacerbates the vulnerable food system even further (FAO, 2020). Moving forward, there is a need to balance short-term food objectives and long-term food security efforts to ensure not only recovery but also movement towards achieving the Zero Hunger target.

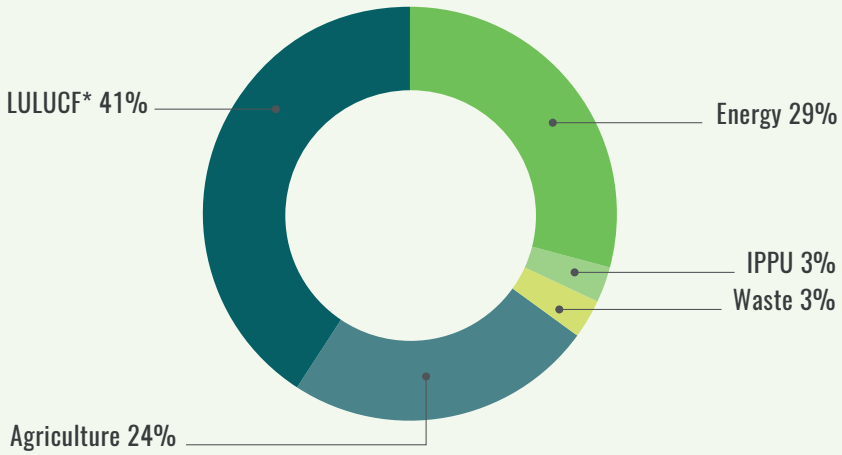
2.5 GREENHOUSE GAS EMISSIONS PROFILE

2.5.1 Sub-Saharan Africa

Based on the latest national GHG inventory data submitted to the UNFCCC (**Figure 24**) by all countries in the region, current emissions in SSA are approximately 3.1 Gt CO_2 eq., excluding removals. Forty-one percent of all GHG emissions in SSA are generated from land use, land-use change and forestry (LULUCF), and another 24 percent are generated in the agriculture sector, making agriculture, forestry and other land use (AFOLU) sector the greatest source of emissions in SSA with a 65 percent share of the total. Given the low development of industry and energy sectors overall, energy accounts for 29 and 24 percent of total emissions, while the Industrial Processes and Products Use (IPPU) and Waste sectors constitute a 3 percent share, respectively. Including removals from LULUCF, total net emissions in the SSA are approximately 1.7 Gt CO_2 eq.

FIGURE 24.

GREENHOUSE GAS EMISSIONS PROFILE FOR SSA, BY IPCC SECTOR



**Excluding removals.*

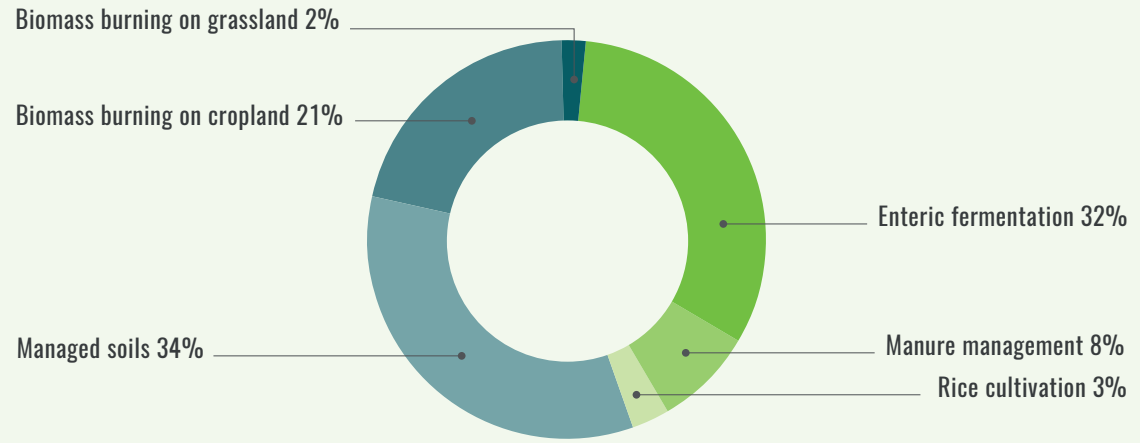
*Source: Authors. (Refer to **Annex 1**).*

Out of total agricultural emissions in SSA (811 Mt CO_2 eq), emissions from managed soils (34 percent) and enteric fermentation (32 percent) are the greatest sources. Biomass burning from cropland represent another 21 percent, manure management another 8 percent and emissions from rice cultivation and savanna burning hold a small share at 3 and 2 percent, respectively (**Figure 25**).

The LULUCF sector is overall a net sink in SSA (-622 Mt CO_2 eq). However, emissions from cropland (60 percent of emissions) represent the greatest source in SSA, followed by deforestation (19 percent). On the other hand, the greatest sinks for removals are forest management (87 percent of removals) and afforestation/reforestation (13 percent) (**Figure 26**).

FIGURE 25.

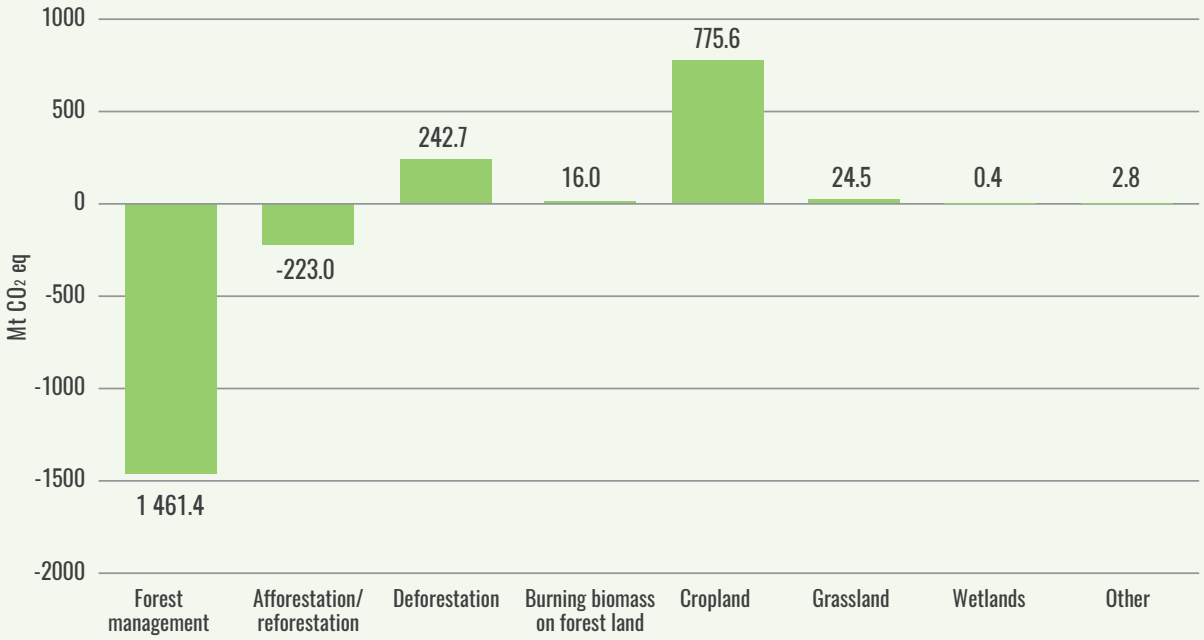
GREENHOUSE GAS EMISSIONS PROFILE FOR THE AGRICULTURE SECTOR IN SSA, BY SOURCE CATEGORY



*Source: Authors. (Refer to **Annex 1**).*

FIGURE 26.

GREENHOUSE GAS EMISSIONS AND REMOVALS PROFILE FOR THE LULUCF SECTOR IN SSA, BY SOURCE AND SINK CATEGORY



Notes: Figure excludes the GHG category "other". Negative values refer to removals and positive values refer to emissions.

*Source: Authors. (Refer to **Annex 1**).*

2.5.2 Eastern Africa

In eastern Africa (**Annex 5**), current emissions are equivalent to 849 Mt CO_2 eq., excluding removals. The Agriculture and LULUCF sectors constitute the greatest drivers of emissions, with 55 and 32 percent shares of total emissions in the sub-region, respectively. The remaining 13 percent are generated by a combination of the Energy, IPPU and Waste sectors.

Out of total agricultural emissions in eastern Africa (468 Mt CO_2 eq), emissions from biomass burning on cropland (36 percent) and enteric fermentation (30 percent) are the greatest sources. Emissions from managed soils represent another 21 percent of the total, while manure management holds another 10 percent share (**Annex 6**).

The LULUCF sector is overall a net sink in eastern Africa (-34 Mt). However, emissions from cropland (46 percent of emissions) represent the greatest source in eastern Africa, followed by deforestation (37 percent). On the other hand, the greatest sinks for removals are forest management (55 percent of removals) and afforestation/reforestation (45 percent) (**Annex 7**).

2.5.3 Middle Africa

In middle Africa (**Annex 5**), current emissions are equivalent to 324 Mt CO_2 eq., excluding removals. Two-thirds of all emissions are generated by LULUCF (63 percent) and the agriculture sector constitutes a 14 percent share. Energy represents one-fifth of total emissions and only two percent are related to the Waste sector.

Out of total agricultural emissions in middle Africa (45 Mt CO_2 eq), emissions from managed soils constitute two thirds (68 percent) and enteric fermentation (21 percent) another one-fifth (**Annex 6**).

The LULUCF sector is overall a net sink in middle Africa (-84 Mt CO_2 eq). The majority of emissions are generated from deforestation (128 Mt CO_2 eq), whereas the majority of removals are observed from forest management (-213 Mt CO_2 eq) (**Annex 7**).

2.5.4 Western Africa

In western Africa (**Annex 5**), current emissions are equivalent to 1.3 Gt CO_2 eq., excluding removals. Over half of all emissions are generated by LULUCF (57 percent); and the Agriculture sector constitutes a 14 percent share. Energy represents one-fifth of total emissions (23 percent), while IPPU and Waste hold a 3 percent share each.

Out of total agricultural emissions in western Africa (237 Mt CO_2 eq), emissions from managed soils (53 percent) and enteric fermentation (33 percent) are the greatest sources (**Annex 6**).

The LULUCF sector is overall a net sink in western Africa (-364 Mt CO_2 eq). The majority of land-based emissions are generated from cropland (647 Mt CO_2 eq), whereas the majority of removals are observed from forest management (-949 Mt CO_2 eq) (**Annex 7**).

2.5.5 Southern Africa

In southern Africa, current emissions are equivalent to 617 Mt CO_2 eq., excluding removals. The Energy sector holds a 72 percent share of total emissions in the sub-region. Agriculture and LULUCF hold 10 and 8 percent shares, respectively, whereas the IPPU and Waste sectors hold a 7 and 3 percent share, respectively (**Annex 5**).

Out of total agricultural emissions in southern Africa (60 Mt CO_2 eq), emissions from enteric fermentation (53 percent) and managed soils (38 percent) are the greatest sources (**Annex 6**).

The LULUCF sector is overall a net sink in southern Africa (-139 Mt CO_2 eq). The majority of land-based emissions are generated from deforestation (40Mt CO_2 eq), whereas the majority of removals are observed from forest management (-132 Mt CO_2 eq) and afforestation/reforestation (-41 Mt CO_2 eq) (**Annex 7**).

CHAPTER 3

CHAPTER

3

SYNTHESIS OF THE AGRICULTURE AND LAND USE SECTORS IN THE NATIONALLY DETERMINED CONTRIBUTIONS (NDCs)

3.1 ADAPTATION COMPONENT

This section provides a synthesis of the adaptation components in the agriculture and land use sectors contained in the first-round NDCs submitted by 47 countries in SSA. Adaptation to climate change refers to the process of adjustment to actual or expected climate and its effects in order to moderate harm or to benefit from opportunities associated with such changes (IPCC, 2019). In this report, adaptation in the agriculture and land use sectors signifies modifying agricultural production and socioeconomic institutional systems in response to and in preparation for actual or expected climate variability and change and their impacts, to moderate harmful effects and exploit beneficial opportunities (FAO, 2017c).

3.1.1. Climate-related impacts, risks and vulnerabilities

To inform adaptation planning and to contextualize the level of ambition and priorities set forth in the NDCs, adaptation components are often supplemented by a description of the climate-related impacts, risks and vulnerabilities either observed and/or projected in "ecosystems"and in livelihood or "social systems".[14] This section synthesizes the types of climate-related impacts, risks and vulnerabilities reported in either the NDCs or latest available NCs of 47 countries in the SSA region.

[14] Refer to FAO (2020d) for a definition of ecosystems and social systems in the context of adaptation in the agriculture and land use sectors in the NDCs.

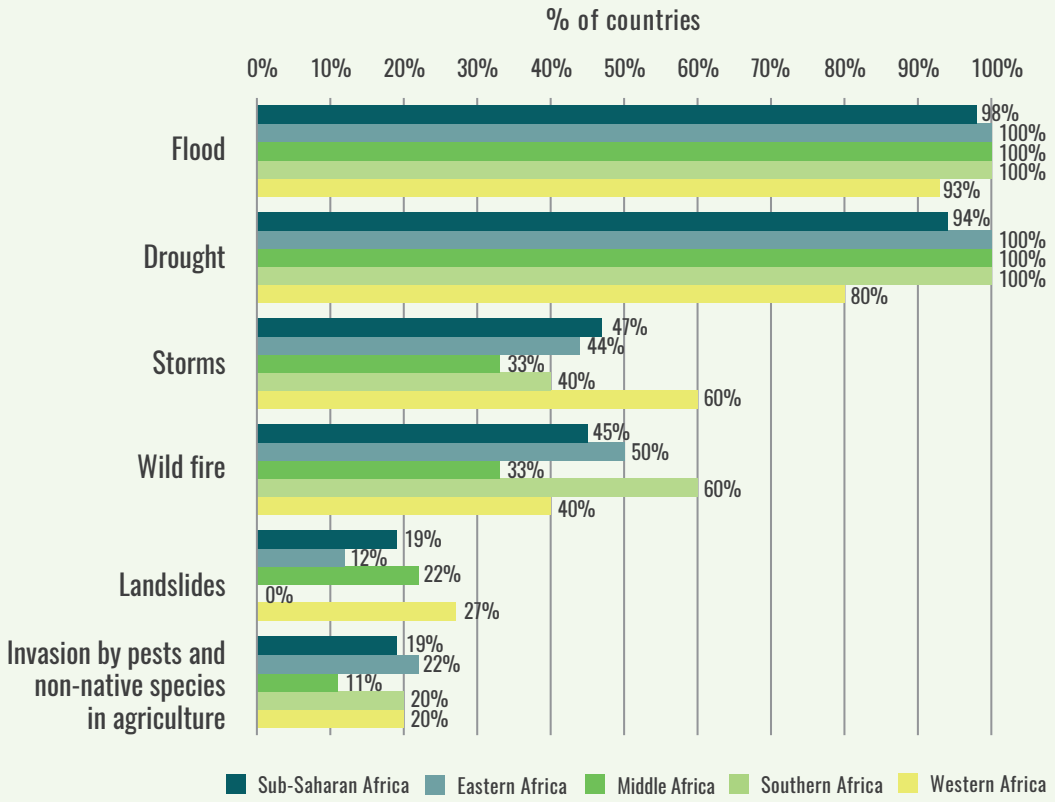
Climate-related hazards

All countries in the region make reference to observed and/or projected climate-related "hazards" in their NDCs and/or NCs, referring to hydro-meteorological, climatological and biological processes or phenomenon that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems, and environmental resources.[15]

Amongst the types of climate-related hazards reported, almost all countries in the region reference floods (46 countries/98 percent) and droughts (44 countries/90 percent), while around half report storms (22 countries/47 percent) and wild-fires (21 countries/44 percent). Around one-fifth report the invasion by pests and non-native species in agriculture and landslides (9 countries/21 percent). **Figure 27** illustrates the types of observed and/or projected climate-related hazards reported in NDCs and/or NCs (share of countries with an NDC) at the regional and sub-regional level.

FIGURE 27.

CLIMATE-RELATED HAZARDS REPORTED IN THE NDCs AND NCs IN SSA, BY TYPE



Source: Authors.

Climate-related slow-onset event

All countries in the region report observed and/or projected climate-related physical, biological, and chemical changes, leading to "slow-onset event."[16] Amongst the types of climate-related slow-onset event reported in terrestrial and freshwater ecosystems, around three-fourths of all countries reference water stress (38 countries/72 percent), and around one-half reference soil erosion (25 countries/56 percent) and desertification (13 countries/38 percent). One-fifth report salinization (11 countries/23 percent), while only one country (Madagascar) reports eutrophication amongst slow-onset events in freshwater ecosystems.

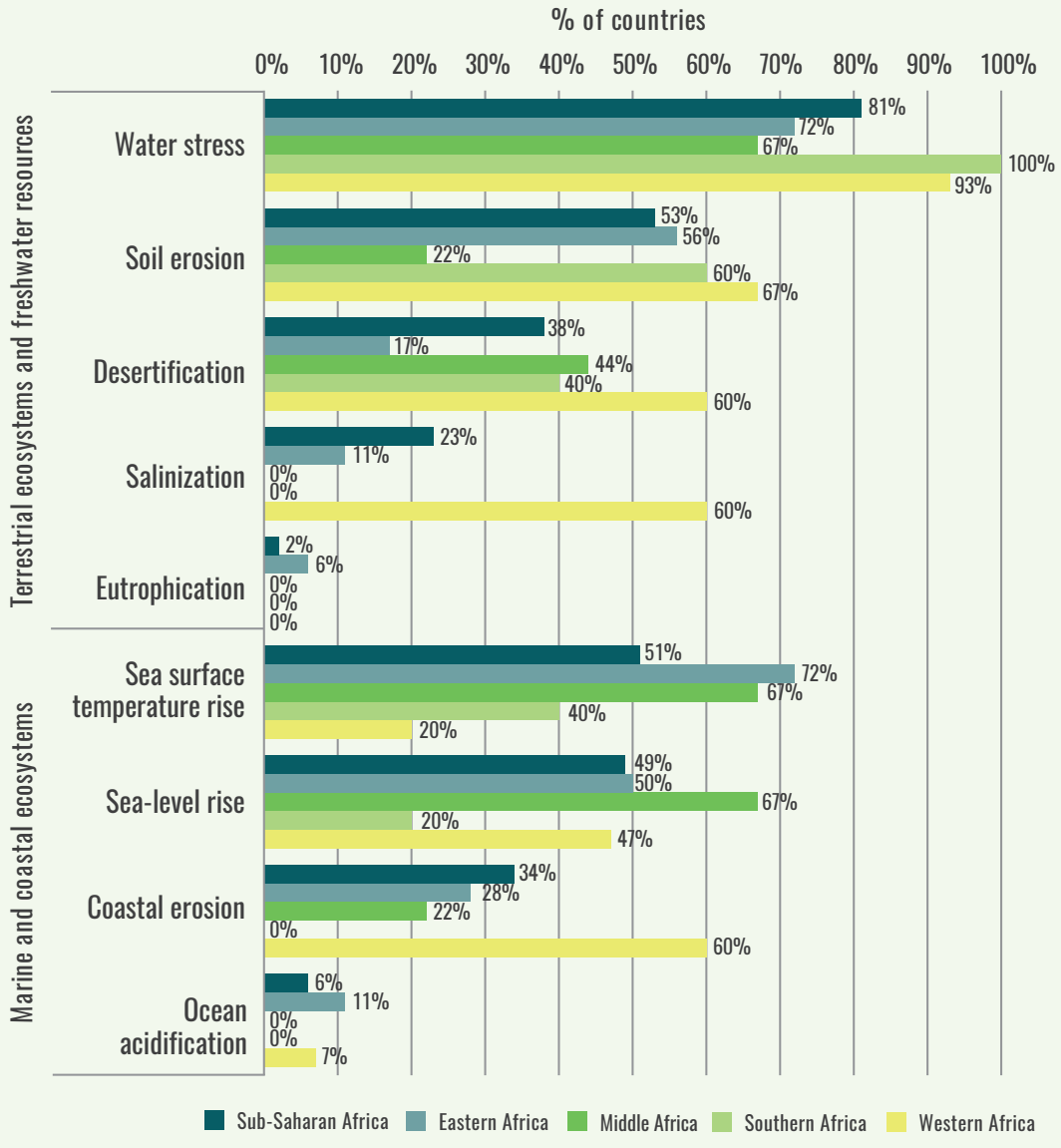
[15] Definition of climate-related hazard adapted from IPCC (2014a) and EM-DAT (undated).

[16] Definition of climate-related slow-onset event adopted from IPCC (2014a).

Amongst climate-related slow-onset event reported in marine and coastal ecosystems, around half of all countries in the region reference sea surface temperature rise (24 countries/51 percent) and sea level rise (23 countries/59 percent), (9 countries/50 percent). One-third report coastal erosion(16 countries/34 percent) and only three countries (Comoros, Seychelles and Côte d'Ivoire) reference ocean acidification. **Figure 28** illustrates the types of climate-related slow-onset event reported in the NDCs and/or NCs (share of countries with an NDC) at the regional and sub-regional level.

FIGURE 28.

CLIMATE-RELATED SLOW-ONSET EVENTS REPORTED IN THE NDCs AND NCs IN SSA, BY TYPE



Source: Authors.

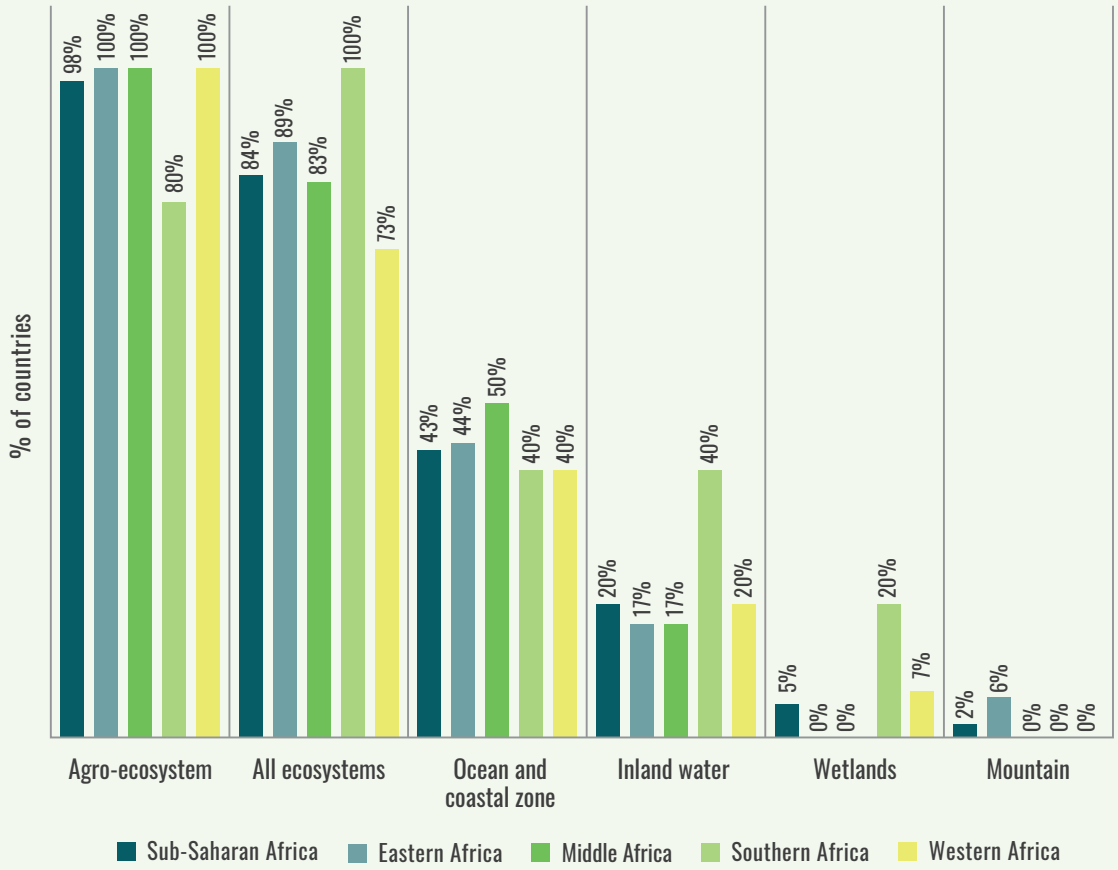
Climate-related impacts in ecosystems

All countries in the region report observed and/or projected climate-driven "impacts" in ecosystems.[17] The impacts of climate change refer generally to the effects of extreme weather and climate events and of climate change on ecosystems, biodiversity and ecosystem services due to the interaction between the vulnerability and exposure of a given system to climate hazards (IPCC, 2014a).

Almost all countries (43 countries/98 percent) reference climate-related impacts in agroecosystems, followed by ecosystems in general (37 countries/84 percent). Around half of all countries report climate-related impacts in ocean and coastal zones (19 countries/43 percent), while one-fifth do for inland water ecosystems (9 countries/20 percent). Two countries reference climate-related impacts in wetland ecosystems (South Africa and Togo), while one country references inland mountain ecosystems (Burundi). **Figure 29** illustrates the distribution of climate-related impacts reported across ecosystems in the NDCs and/or NCs (share of countries with an NDC) at the sub-regional level.

FIGURE 29.

CLIMATE-RELATED IMPACTS REPORTED IN ECOSYSTEMS IN THE NDCs AND NCs IN SSA, BY ECOSYSTEM TYPE AND SUB-REGION



Source: Authors.

Table 4 illustrates some country examples of observed and/or projected climate-related impacts in ecosystems reported in the NDCs or NCs.

[17] Definition of ecosystems elaborated from (WRI, 2005).

TABLE 4.

EXAMPLES OF CLIMATE-RELATED IMPACTS IN ECOSYSTEMS REPORTED IN THE SSA REGION

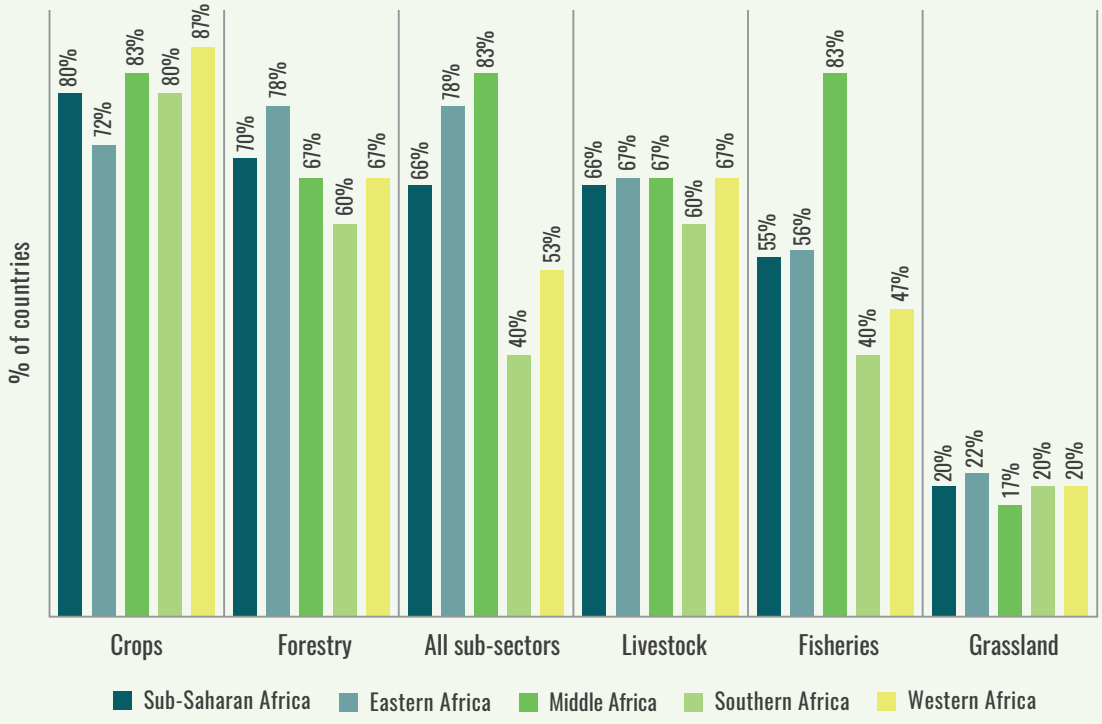
COUNTRY NAME	ECOSYSTEM OR SECTOR	DESCRIPTION
MAURITIUS	OCEAN AND COASTAL ZONE	ACCENTUATED BEACH EROSION HAS SHRUNK THE WIDTH OF BEACHES
SOMALIA	OCEAN AND COASTAL ZONE	SALTED WATER INTRUSION INCREASING SALINITY OF COASTAL GROUNDWATER RESOURCES
UNITED REPUBLIC OF TANZANIA	OCEAN AND COASTAL ZONE	WAVE SURGE CURRENTS WEAKEN THE COASTLINE AND UPROOT COASTAL MANGROVES WHICH STABILIZE THE SHORELINE
MADAGASCAR	ALL ECOSYSTEMS	DISTRIBUTION SHIFTS IN GEOGRAPHICAL RANGE OF SOME SPECIES, INCREASING RISKS OF SPECIES EXTIRPATION EXPECTED
ZAMBIA	ALL ECOSYSTEMS	BIODIVERSITY LOSS AND HABITAT DEGRADATION
MALAWI	ALL ECOSYSTEMS	CLIMATE CHANGE IS A THREAT TO WILDLIFE HABITAT IN TERMS OF AVAILABILITY OF BOTH WATER AND SUITABLE PLANTS FOR THE WILD ANIMALS
SAO TOME AND PRINCIPE	INLAND WATER	DECREASING RIVER FLOW LEVELS, WHICH CAUSES THE RISK OF DECREASING GROUNDWATER RESERVOIRS
NIGER	INLAND WATER	SILTING OF WATER COURSES (NIGER RIVER VALLEY AND LAKE CHAD) AND OASES
BURUNDI	MOUNTAIN	ESCALATION OF SOIL EROSION ALONG GROUNDWATER TRENCHES IN THE WATERSHEDS OF THE MIRWA MOUNTAINS
SOUTH AFRICA	WETLANDS	LOSS OF OR CHANGES TO COASTAL WETLANDS

Source: Authors.

Amongst the climate-related impacts observed and/or projected in agroecosystems, the majority of countries report impacts in the crops sector (35 countries/80 percent) and forestry sector (31 countries/70 percent). Two-thirds report impacts in the livestock sector (29 countries/66 percent) and half in fisheries (24 countries/55 percent) and one-fifth in grassland systems (9 countries/20 percent). Only one country (Madagascar) reports climate-related impacts in aquaculture. **Figure 30** illustrates the distribution of climate-related impacts reported across agro-ecosystems, by sub-sector in the NDCs and/or NCs (share of countries with an NDC) at the regional and sub-regional level.

FIGURE 30.

CLIMATE-RELATED IMPACTS REPORTED IN AGRO-ECOSYSTEMS IN THE NDCs AND NCs IN SSA, BY SUB-SECTOR AND COUNTRY



Source: Authors.

Table 5 illustrates some country examples of observed and/or projected climate-related impacts in ecosystems reported in the NDCs or NCs.

TABLE 5.

EXAMPLES OF CLIMATE-RELATED IMPACTS IN AGRO-ECOSYSTEMS REPORTED IN THE SSA REGION

COUNTRY NAME	ECOSYSTEM OR SECTOR	DESCRIPTION
MADAGASCAR	CROPS	DESTRUCTION OF AGRICULTURE CROPS AND FIELDS DUE TO HEAVY RAINS, FLOODS, AND STORMY WINDS
MAURITIUS	CROPS	INCREASED INCIDENCE OF PESTS AND CROP DISEASES LEADING TO A DECREASE IN CROP PRODUCTIVITY, DUE TO HEAT STRESS
LESOTHO	CROPS	UNDER THE CURRENT PROJECTED INCREASE IN TEMPERATURE MOST CROPS WILL NOT HAVE OPTIMAL GROWTH AND AS A RESULT WILL HAVE REDUCED YIELD TO VARYING DEGREES
MALAWI	LIVESTOCK	MILK AND BEEF PRODUCTION WOULD BE AFFECTED BY CLIMATIC FACTORS WHICH MAY HAVE DIRECT IMPACT ON THE ANIMAL SUCH AS HEAT AND WATER STRESSES
NAMIBIA	LIVESTOCK	INCREASED TEMPERATURES WILL NEGATIVELY IMPACT LIVESTOCK PRODUCTION, PARTICULARLY IN THE SOUTHERN AND CENTRAL REGIONS OF THE COUNTRY
BURUNDI	GRASSLAND	DISAPPEARANCE OF CERTAIN PLANT SPECIES AND AGGRAVATION OF EROSION AND BUSH FIRES
UNITED REPUBLIC OF TANZANIA	FORESTRY	THERE WILL BE AN INCREASE IN TROPICAL VERY DRY FOREST, TROPICAL DRY FOREST AND TROPICAL MOIST FOREST, WHICH AREA LIKELY TO REPLACE THE CURRENT LIFE ZONES
GUINEA-BISSAU	FORESTRY	SUDDEN ONSET AND RAPID PROPAGATION OF WILDFIRES, GIVEN THE EXISTENCE OF A DRY BIOMASS SUBSTRATE
GHANA	FISHERIES	INCREASING VARIABILITY IN MARINE FISH STOCK, REDUCTION IN CATCH RATE DUE TO RISING SEAS TEMPERATURE
RWANDA	ALL SUBSECTORS	INCREASE SOIL LOSS AND NUTRIENT LEACHING FROM SOIL, THUS CHALLENGING AGRICULTURAL PRODUCTIVITY GROWTH

Source: Authors.

As the variety of climate-related hazards, slow-onset event and impacts reported translate into impacts on the provision of ecosystem services and biodiversity, which are critical to sustaining agriculture and food systems, the following table details the types of ecosystem-service impacts observed and/or projected in the region. Amongst the most frequently reported ecosystem service impacts, losses in primary production and productivity (42 countries/89 percent), changes in water availability and quantity (27 countries/57 percent), pest and disease incidence (22 countries/47 percent), biodiversity loss (21 countries/45 percent), changes in species range, abundance and extinction (21 countries/45 percent) and desertification and land degradation (17 countries/36 percent) rank highest in the region. **Table 6** describes the types of ecosystem-service impacts reported in the NDCs and/or NCs (number of countries and share of total countries with impacts reported) at the regional and sub-regional level.

Climate-related impacts in social systems

All countries in the region, except Comoros, report observed and/or projected climate-related impacts or risks in "social" systems. The impacts of climate change generally refer to the effects of climate related extremes and variability, and longer-term changes, on the lives, livelihoods, health, ecosystems, economies, societies, cultures, services, and infrastructure, due to the interaction of climate changes or hazardous climate events occurring within a specific time period and the vulnerability of an exposed society or system. The vulnerability of an exposed system depends on sensitivity and lack of capacity to cope and adapt. The probability of occurrence compounded by the impact, or risk, results from the interaction of vulnerability, exposure, and hazard.[18]

[18] Definition of impact, vulnerability and risk in ecosystems adapted from IPCC (2014a).

TABLE 6.

CLIMATE-RELATED ECOSYSTEM SERVICE IMPACTS REPORTED IN NDCs AND/OR NCs IN SSA, BY TYPE

TYPE OF CLIMATE-RELATED ECOSYSTEM SERVICE IMPACTS	N. OF COUNTRIES WITH IMPACT REPORTED					SHARE OF COUNTRIES IN SUB-SAHARAN AFRICA WITH IMPACT
	EASTERN AFRICA	MIDDLE AFRICA	SOUTHERN AFRICA	WESTERN AFRICA	SUB-SAHARAN AFRICA	
PRIMARY PRODUCTION AND PRODUCTIVITY LOSS	18	5	4	14	42	89%
CHANGES IN WATER AVAILABILITY AND QUALITY	11	1	4	11	27	57%
PEST AND DISEASE INCIDENCE	9	2	3	8	22	47%
BIODIVERSITY LOSS	12	1	4	4	21	45%
CHANGES IN SPECIES RANGE, ABUNDANCE AND EXTINCTION	9	2	3	7	21	45%
DESERTIFICATION AND LAND DEGRADATION	4	2	1	10	17	36%
LOSS OF ECOSYSTEM, BIODIVERSITY AND ECOSYSTEM GOODS, FUNCTIONS AND SERVICES	6	4	3	3	16	34%
TREE MORTALITY AND FOREST LOSS	8	3		4	15	32%
COASTAL EROSION	5	2	2	5	14	30%
CHANGES IN HYDROLOGICAL FLOW AND WATER CYCLING	3	1	2	7	13	28%
SOIL FERTILITY LOSS	8	1	1	3	13	28%
CHANGES IN PHENOLOGY	6	2	1	2	11	23%
MANGROVE MORTALITY AND/OR CORAL REEF DEGRADATION	7	1		1	9	19%
HABITAT LOSS	6		1	1	8	17%
SOIL EROSION AND SEDIMENTATION	5		1	2	8	17%
CHANGES IN WATER AVAILABILITY	2			1	3	6%
BIOMASS LOSS				2	2	4%
POLLINATOR LOSS	1			1	2	4%
SOIL WATER RETENTION CAPACITY REDUCTION	1		1		2	4%

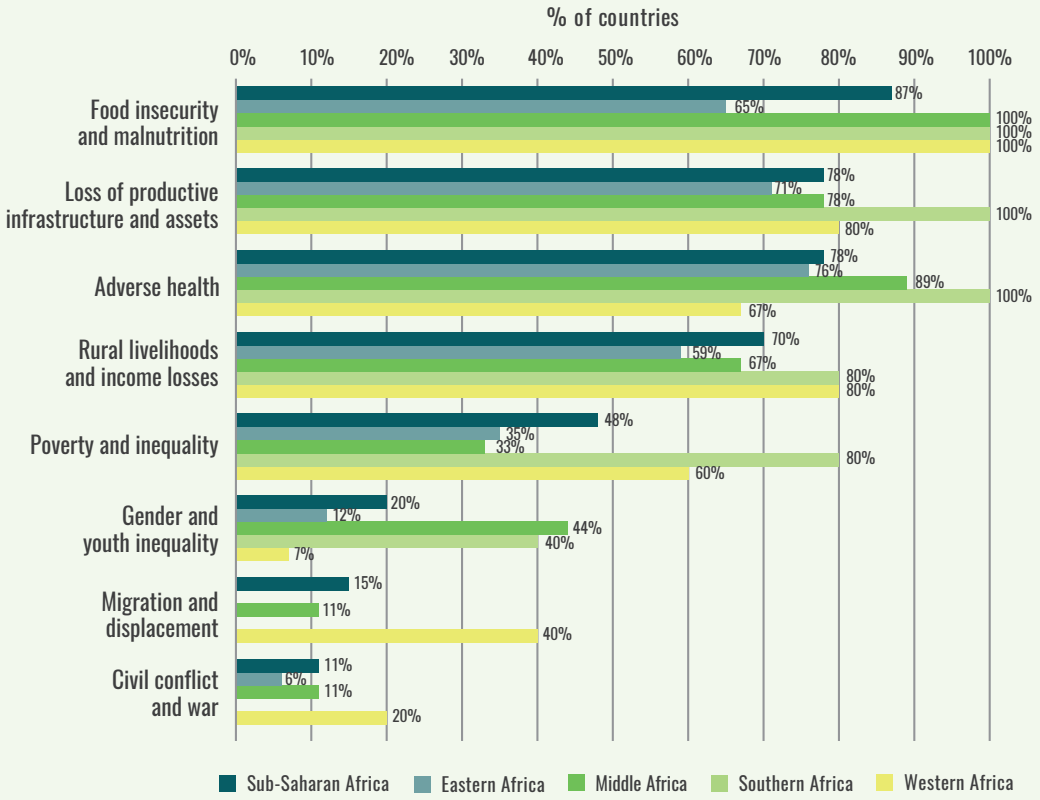
Source: Authors.

Amongst countries with observed and/or projected climate-related risks reported in social systems, the majority report food insecurity and malnutrition (40 countries/87 percent), followed by loss of productive infrastructure and assets and adverse health impacts (36 countries/78 percent each), as well as livelihoods and income losses (32 countries/70 percent). Half report climate-related poverty and inequality (22 countries/48 percent) and one-fourth reference gender inequality (29 countries/20 percent) and migration and displacement (7 countries/15 percent) as climate-related risks. Five countries (Madagascar, Central African Republic, Guinea, Niger and Togo) reference civil war and conflict as a climate-related risk. **Figure 31** illustrates the distribution of climate-related risks reported in the NDCs and/or NCs by type (share of countries with an NDC) at the regional and sub-regional level.

Table 7 illustrates some country examples of observed and/or projected climate-related risks in social systems reported in the NDCs or NCs.

FIGURE 31.

CLIMATE-RELATED RISKS REPORTED IN NDCs AND NCs IN SSA, BY TYPE AND SUB-REGION



Source: Authors.

TABLE 7.

EXAMPLES OF CLIMATE-RELATED RISKS IN SOCIAL SYSTEMS REPORTED IN THE SSA REGION

COUNTRY NAME	CLIMATE-RELATED RISK	DESCRIPTION
MOZAMBIQUE	LOSS OF PRODUCTIVE INFRASTRUCTURES AND PROPERTY	DESTRUCTION OF SOCIOECONOMIC INFRASTRUCTURES AND PROPERTY
CAPE VERDE	LOSS OF PRODUCTIVE INFRASTRUCTURES AND PROPERTY	WITH 80 PERCENT OF TOTAL POPULATION LIVING IN COASTAL AREAS, CABO VERDE IS PARTICULARLY SENSITIVE TO SEALEVEL RISE AND COASTAL HAZARDS
MADAGASCAR	ADVERSE HEALTH	HIGHLY INCREASING PREVALENCE RATE OF ACUTE RESPIRATORY INFECTIONS, AND WIDESPREAD DISTRIBUTIONS OF VECTOR-BORNE DISEASES EXPECTED
TOGO	ADVERSE HEALTH	SPREAD OF ILLNESSES LIKE MALARIA, DIARRHOEA, CARDIOVASCULAR AND RESPIRATORY DISEASE
NIGERIA	MIGRATION AND DISPLACEMENT	INCREASED RURAL TO URBAN MIGRATION LEADING TO A REDUCTION OF AVAILABLE FARM LABOUR AND LOSS OF SOIL FERTILITY
TOGO	CONFLICT AND CIVIL WAR	A DECLINE IN THE SUPPLY OF VEGETABLES, MEAT AND FISH AND IN PROVISIONS SENT TO THE CITIES COULD LEAD TO SOCIAL TENSIONS
LIBERIA	FOOD SECURITY AND MALNUTRITION	CROPS AND LIVESTOCK LOSSES THAT INTENSIFY FOOD INSECURITY AND LOSS OF INCOME
NIGERIA	FOOD SECURITY AND MALNUTRITION	THE INCREASING ARIDITY IN THE NORTHEAST OF THE COUNTRY HAS DRASTICALLY REDUCED OPPORTUNITIES FOR SUSTAINABLE AGRICULTURE AND IS CONSIDERED A CONTRIBUTING FACTOR TO THE CURRENT CONFLICT AND HIGH DEGREE OF INSECURITY IN THE REGION
MALAWI	GENDER AND YOUTH INEQUALITY	WOMEN AND GIRLS ARE PARTICULARLY IMPACTED, AS THEY HAVE TO WALK FURTHER IN SEARCH OF BASIC COMMODITIES FOR THE FAMILY SUCH AS FIREWOOD AND WATER
MADAGASCAR	POVERTY AND INEQUALITY	HIGHLY SIGNIFICANT DECREASE IN AGRICULTURAL YIELDS, POOR FISHERIES AND AQUACULTURE PRODUCTIONS, THEREFORE AGGRAVATION OF HOUSEHOLD POVERTY

Source: Authors.

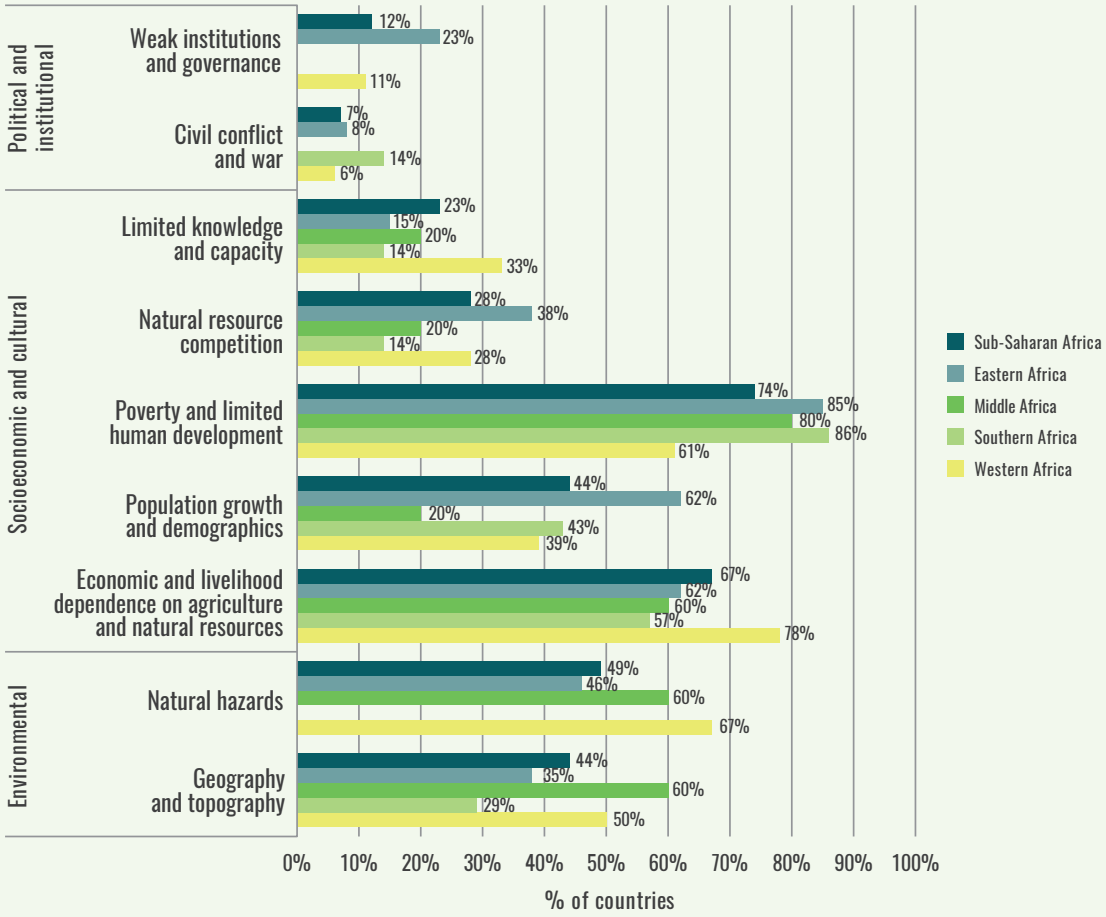
Non-climatic drivers of vulnerability

Almost all countries in the region (except Angola, Gambia, Ghana and Gabon) report on the intersecting environmental, social, economic, cultural, political and institutional variables, or stressors, that can affect individual adaptive capacity to respond, as well as the level of exposure to climate change, creating new or exacerbating existing vulnerabilities to climate change.[19]

Amongst non-climatic drivers of vulnerability to climate change reported in the region, three-fourths of countries in the region report poverty and low economic development (32 countries/74 percent each) and two-thirds report economic dependence on natural resources and agriculture for livelihoods (29 countries/68 percent) as non-climatic stressors. Another half reference natural hazards (21 countries/49 percent), geography and topography (19 countries/44 percent) and population growth and demographic changes (19 countries/44 percent). **Figure 32** illustrates the distribution of non-climatic drivers of vulnerability to climate change reported in the NDCs and/or NCs by type (share of countries with an NDC) at the regional and sub-regional level.

FIGURE 32.

NON-CLIMATIC DRIVERS OF VULNERABILITY TOO CLIMATE CHANGE REPORTED IN NDCs AND NCs IN SSA, BY TYPE AND SUB-REGION



Source: Authors.

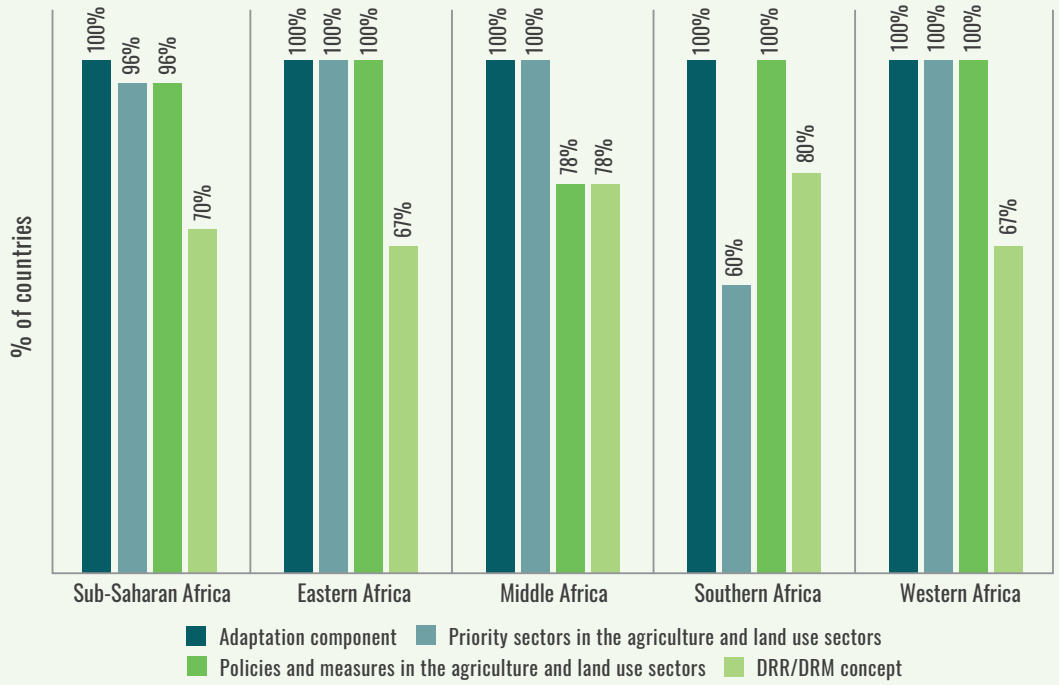
[19] Definition of non-climatic stressors adapted from IPCC (2014a).

3.1.2 Adaptation component in the agriculture and land sectors

All 47 countries in the region communicated an adaptation component – 46 of which contain adaptation in the agriculture and land use sectors (98 percent).[20] Almost all countries in the region include priority sectors or measures for adaptation in Agriculture and land use (45 countries/96 percent). Around two-thirds of all countries (33 countries/70 percent) reference DRR in their adaptation component. **Figure 33** illustrates the types of adaptation components in the agriculture and land use sectors in the NDCs (share of countries with an NDC) at the regional and sub-regional level.

FIGURE 33.

ADAPTATION COMPONENTS IN THE AGRICULTURE AND LAND USE SECTORS IN THE NDCs IN SSA, BY TYPE AND SUB-REGION



Source: Authors.

Adaptation priority sectors

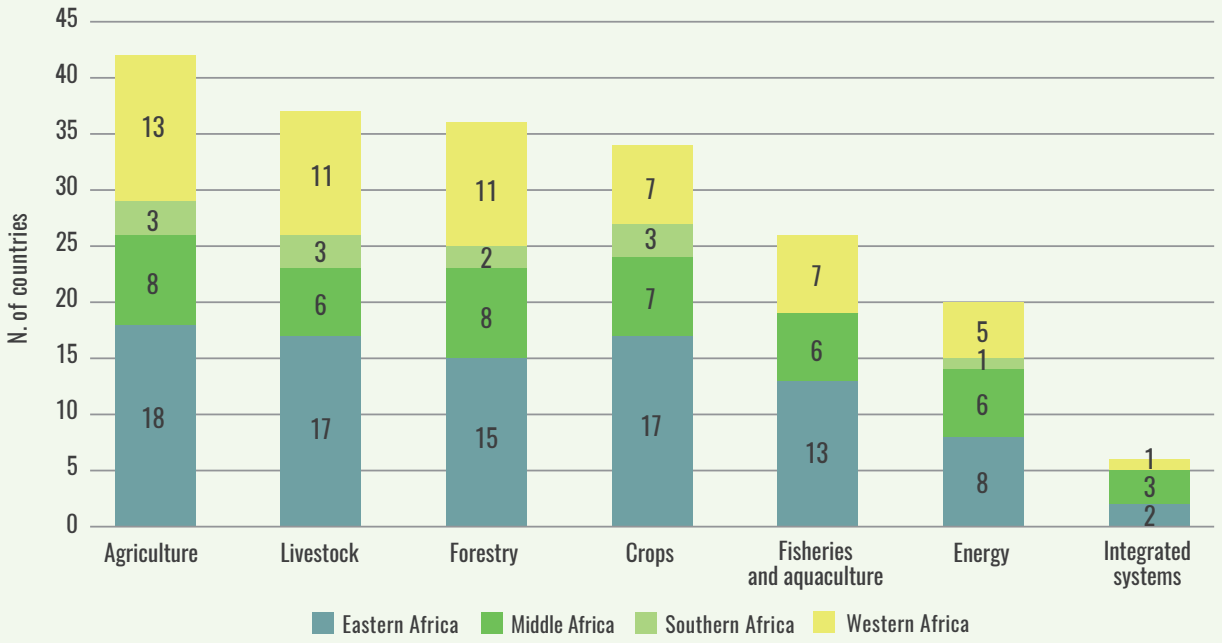
Amongst priority sectors for adaptation, the agriculture sector overall (crops, livestock and/or fisheries) is most frequently included (42 countries/89 percent), followed by the livestock (37 countries/79 percent), forestry (36 countries/77 percent), and crops sub-sector (34 countries/72 percent) more specifically. Around half include fisheries and aquaculture (26 countries/55 percent) and bioenergy (20 countries/43 percent). Only six countries (13 percent) include integrated systems for adaptation. **Figure 34** illustrates the distribution of adaptation priority sectors in the agriculture and land use sectors in the NDCs (number of countries) at the regional and sub-regional level.

Amongst cross-sectoral priorities for the agriculture and land use sectors, the majority of countries identify water resources (34 countries/72 percent), and half include health (24/51 percent) and oceans and coastal zones (21/45 percent). One-third mention land and soil resources, ecosystems and natural resources, and resilient infrastructure (15/32 percent each). Around one-quarter identify DRR, poverty and inequality reduction and food security and nutrition (11/23 percent each). Less than one-fifth include biodiversity, gender equality and human rights. **Figure 35** illustrates the distribution of cross-sectoral priorities for adaptation in the agriculture and land use sectors in the NDCs (number of countries) by sub-region.

[20] Gabon's adaptation component does not include the agriculture and land use sectors.

FIGURE 34.

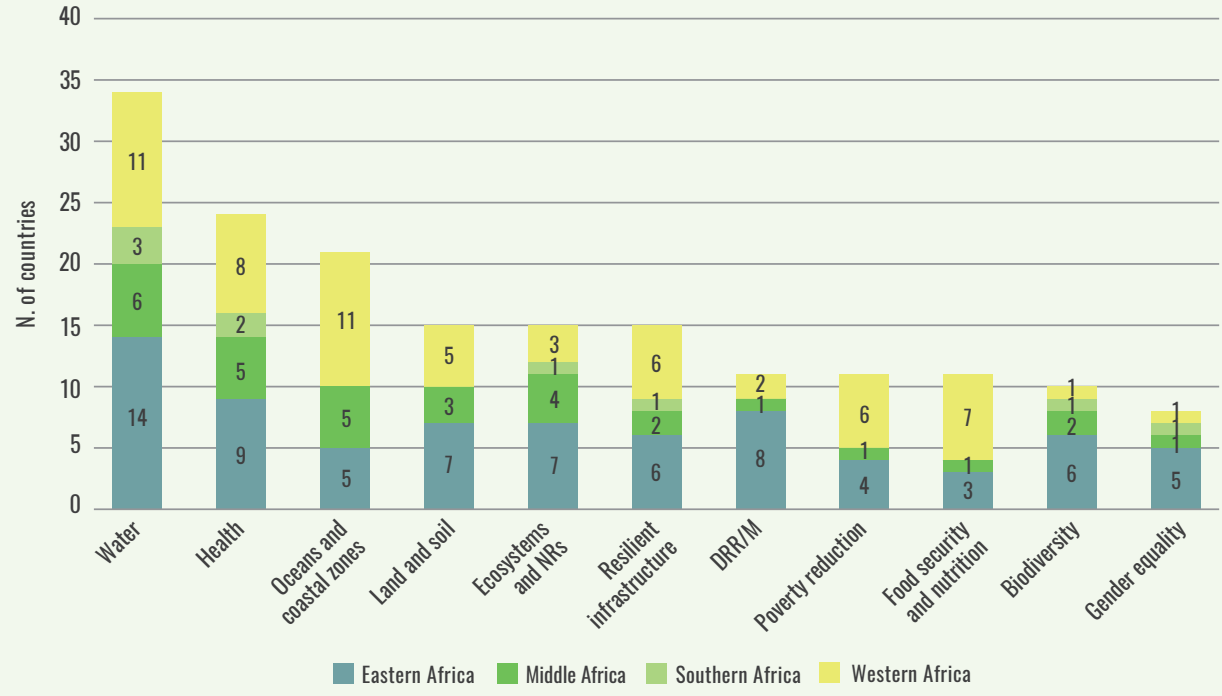
ADAPTATION PRIORITY SECTORS IN THE AGRICULTURE AND LAND USE SECTORS IN THE NDCs IN SSA, BY SUB-SECTOR AND SUB-REGION



Source: Authors.

FIGURE 35.

CROSS-SECTORAL PRIORITIES FOR ADAPTATION IN THE AGRICULTURE AND LAND USE SECTORS IN THE NDCs IN SSA, BY PRIORITY AND SUB-REGION



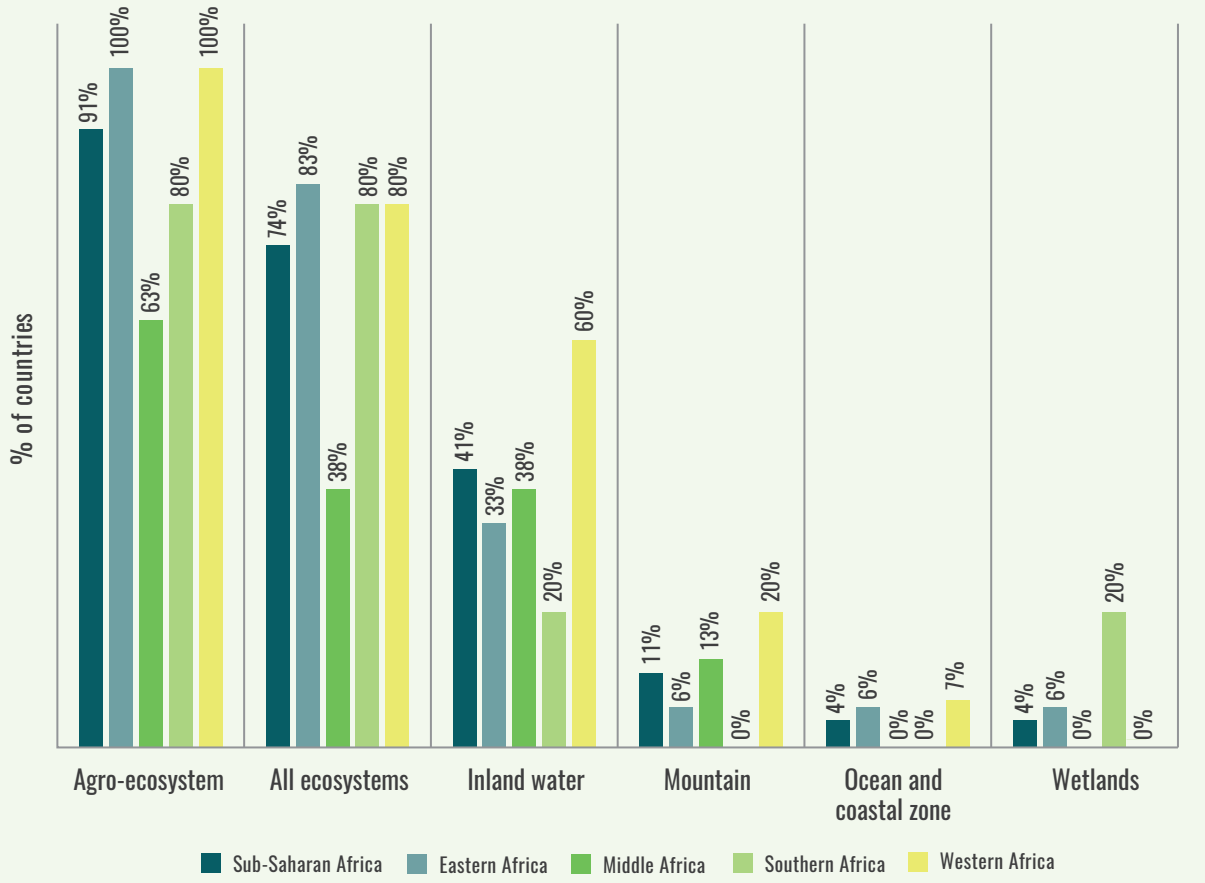
Source: Authors.

Adaptation measures in ecosystems

Amongst countries with an adaptation component in the agriculture and land use sectors, almost all include adaptation measures in agroecosystems (42 countries/91 percent) and in ecosystems in general (34 countries/ 74 percent), while over one-third (19 countries/41 percent) include measures in oceans and coastal zones. Very few countries include adaptation measures in inland water ecosystems (5 countries/ 11 percent) and mountain (Ethiopia and Togo) or wetland (Uganda and Lesotho) ecosystems. **Figure 36** illustrates the distribution of adaptation measures in the agriculture and land use sectors, by sub-sector and sub-region (share of countries with an NDC).

FIGURE 36.

ADAPTATION MEASURES IN THE AGRICULTURE AND LAND USE SECTORS IN THE NDCs IN SSA, BY ECOSYSTEM TYPE AND SUB-REGION

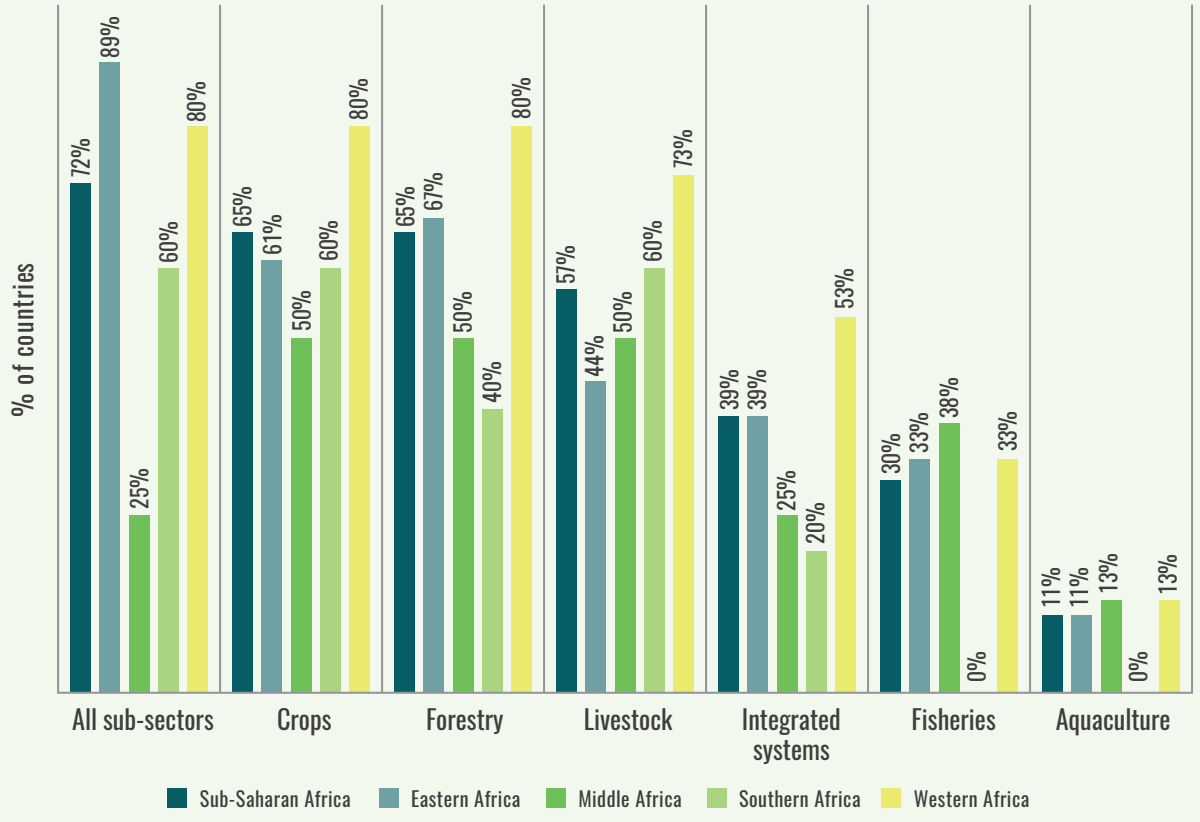


Source: Authors.

Amongst countries with an adaptation component in the agriculture and land use sectors, two-thirds promote adaptation measures in the crops and forestry sectors (30 countries/65 percent each), while over one-half promote adaptation in the livestock sector (26 countries/57 percent). One-third include adaptation measures in integrated systems (18 countries/39 percent) and in the fisheries sector (14 countries/30 percent). Five countries (11 percent) include adaptation measures in aquaculture. **Figure 37** illustrates the types of adaptation measures in the agriculture and land use sectors in the NDCs, by sub-sector (share of countries with an NDC) and sub-region.

FIGURE 37.

ADAPTATION MEASURES IN THE AGRICULTURE AND LAND USE SECTORS IN THE NDCS IN SSA, BY AGRICULTURAL SUB-SECTOR AND SUB-REGION



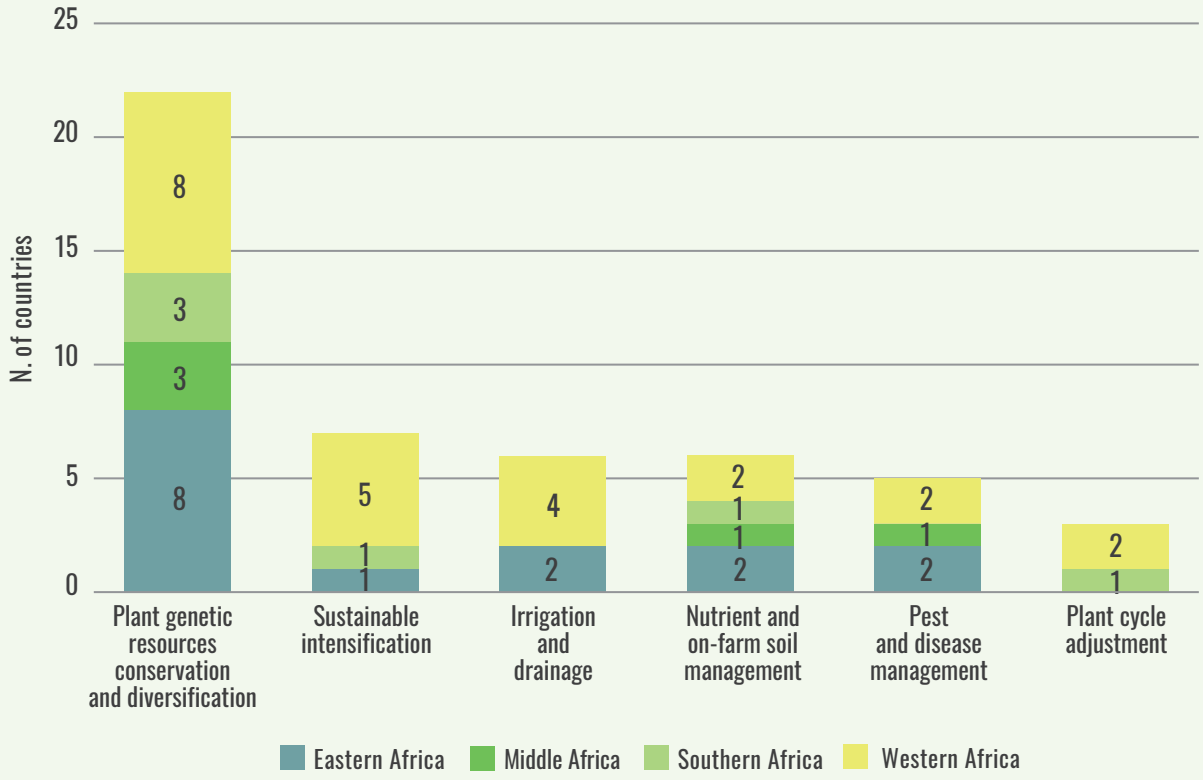
Source: Authors.

CROPS

Amongst countries with an adaptation component in the agriculture and land use sectors, around two-thirds promote adaptation measures in the crops sub-sector (30 countries/65 percent). Amongst those countries, the majority (22 countries/73 percent) promote plant genetic resources conservation and diversification, while around one-fourth promote sustainable intensification (7 countries/23 percent), irrigation and drainage and nutrient and on-farm soil management (6 countries/20 percent each). A small share of countries promotes pest and disease management (5 countries/17 percent) and adjustments in the plant cycle (Lesotho, Benin and Cape Verde). **Figure 38** illustrates the types of adaptation measures in the crops sub-sector in the NDCs (number of countries) at the sub-regional level.

FIGURE 38.

ADAPTATION MEASURES IN THE CROPS SUB-SECTOR IN THE NDCs IN SSA, BY TYPE AND SUB-REGION



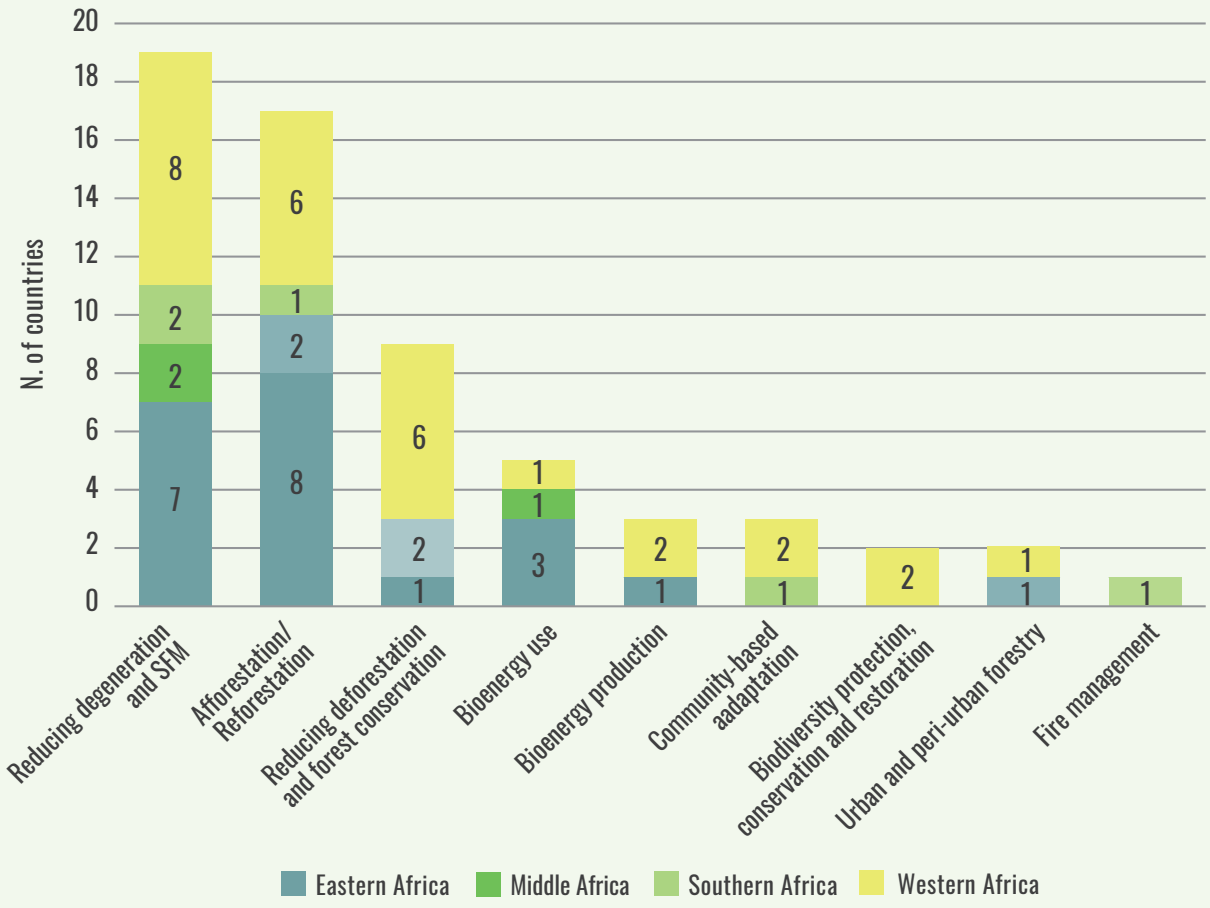
Source: Authors.

FORESTRY

Amongst countries with an adaptation component in the agriculture and land use sectors, around two-thirds promote adaptation measures in the forestry sector (30 countries/65 percent). Amongst those, the majority (19 countries/63 percent each) promote reducing forest degradation and sustainable forest management and afforestation/reforestation (17 countries/57 percent), while one-third promote reducing deforestation and forest conservation (9 countries/30 percent) as an adaptation measure. A small share of countries includes bioenergy use (5 countries/17 percent) and production (countries 3/10 percent) as part of their adaptation strategy. Three countries (Namibia, Benin and Nigeria) promote community-based adaptation in the forestry sector and two countries each promote biodiversity protection, conservation and management (Burkina Faso and Liberia) and urban and peri-urban forestry (Central African Republic and Togo). Only one country (South Sudan) promotes forest fire management as an adaptation measure. **Figure 39** illustrates the types of forestry adaptation measures in the NDCs (number of countries) at the sub-regional level.

FIGURE 39.

ADAPTATION MEASURES IN THE FORESTRY SECTOR IN THE NDCs IN SSA, BY TYPE AND SUB-REGION



Source: Authors.

LIVESTOCK

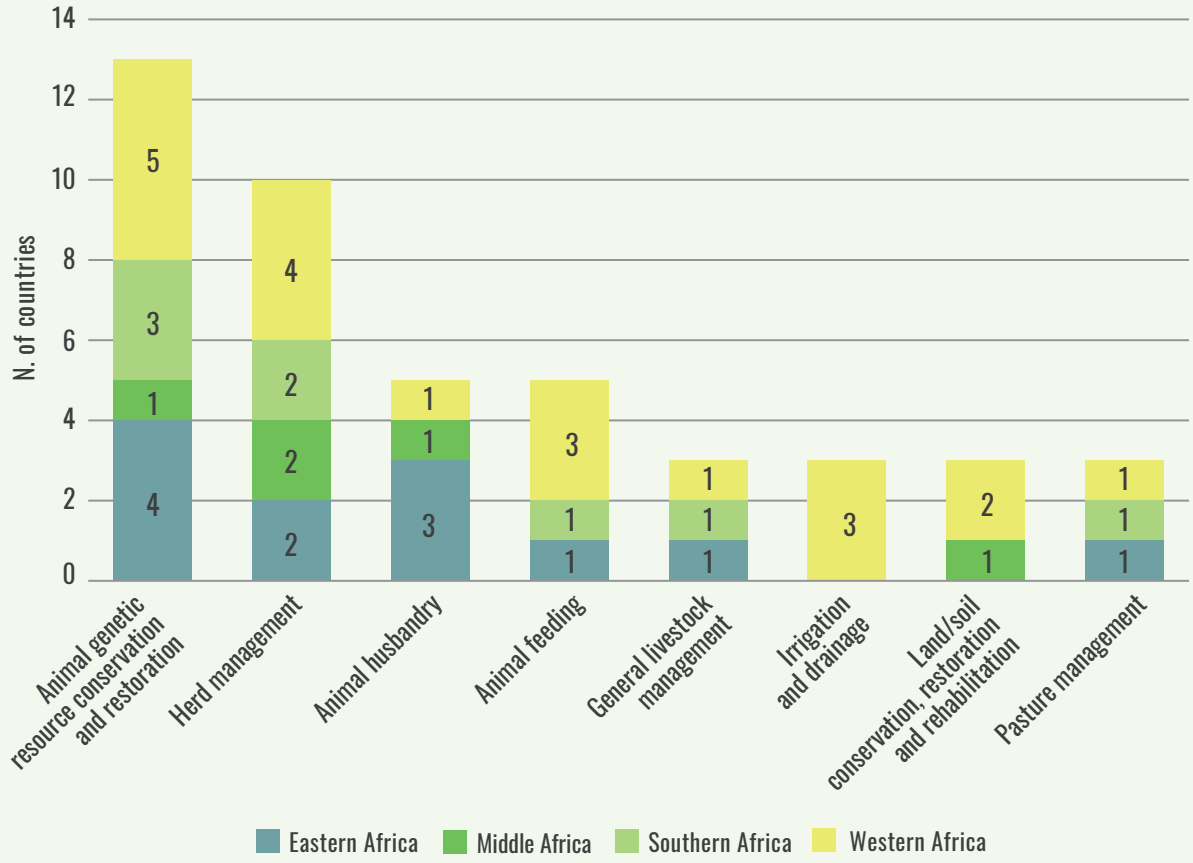
Amongst countries with an adaptation component in the agriculture and land use sectors, approximately one-half promote adaptation measures in the livestock sub-sector (26 countries/57 percent). Amongst those countries, half (13 countries/50 percent) promote animal genetic resource conservation and diversification, and over one-third include adaptation measures targeting herd management (10 countries/38 percent). One-fifth include improved animal husbandry (5 countries/19 percent) and improved feeding practices (4 countries/15 percent). A small share of countries includes irrigation and drainage practices (Côte d'Ivoire, Gambia and Togo), land/soil conservation, restoration and rehabilitation of grasslands (Angola, Gambia and Nigeria) and fire management on grasslands (United Republic of Tanzania). **Figure 40** illustrates the types of livestock adaptation measures in the NDCs (number of countries) at the sub-regional level.

INTEGRATED SYSTEMS

Amongst countries with an adaptation component in the agriculture and land use sectors, around one-third promote adaptation measures in integrated systems (18 countries/39 percent). Almost all focus on agroforestry systems, primarily in western and eastern Africa.

FIGURE 40.

ADAPTATION MEASURES IN THE LIVESTOCK SECTOR IN THE NDCs IN SSA, BY TYPE AND SUB-REGION



Source: Authors.

FISHERIES

Amongst countries with an adaptation component in the agriculture and land use sectors, just under one-third promote adaptation measures in the fisheries sector (14 countries/30 percent), primarily in eastern Africa. Amongst those, the majority (9 countries/60 percent) promote the conservation and diversification of aquatic genetic resources and one-third (4 countries/27 percent) promotes improved fisheries technologies as an adaptation measure. One country each includes fisheries certification schemes (Cape Verde) and climate-smart fisheries (Ghana) as part of their adaptation strategy. **Figure 41** illustrates the types of fisheries adaptation measures in the NDCs (number of countries) at the sub-regional level.

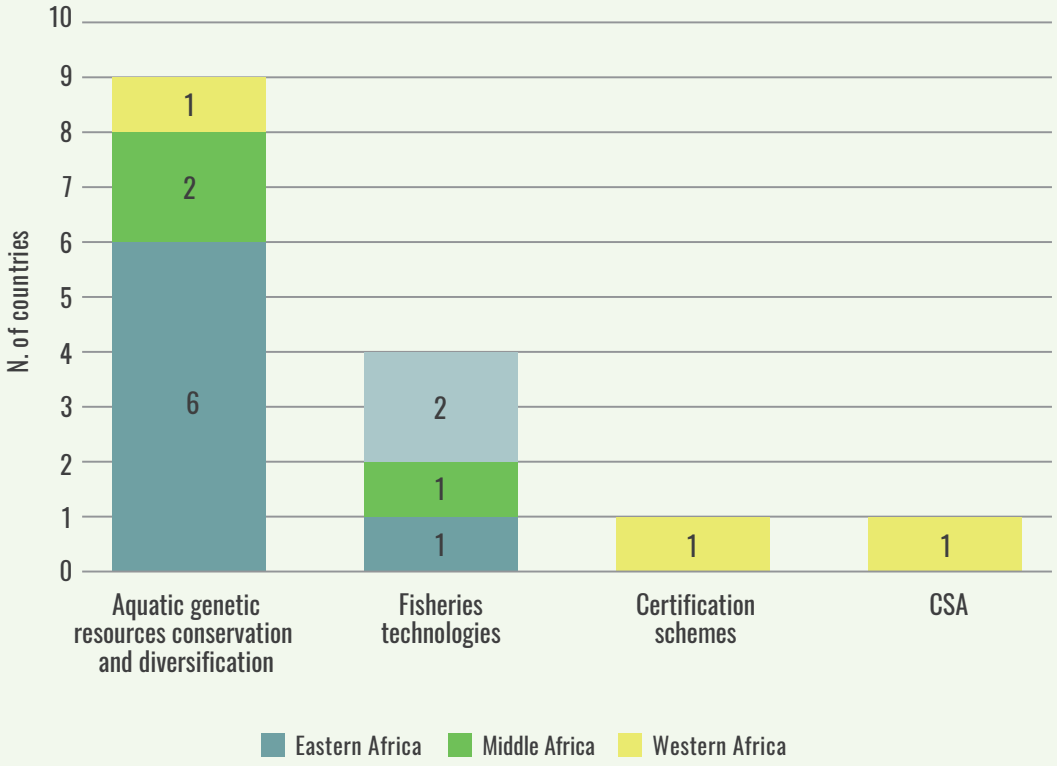
AQUACULTURE

Amongst countries with an adaptation component in the agriculture and land use sectors, around one-fourth promote adaptation measures in the aquaculture sector (5 countries/11 percent). Cape Verde, Chad, Guinea, Malawi and the Seychelles all include adaptation measures related to improved aquaculture management practices.

Table 8 illustrates some country examples of adaptation measures in the agriculture and land use sectors included in the NDCs.

FIGURE 41.

ADAPTATION MEASURES IN THE FISHERIES SECTOR IN THE NDCs IN SSA, BY TYPE AND SUB-REGION



Source: Authors.

TABLE 8.

EXAMPLES OF ADAPTATION MEASURES IN THE AGRICULTURE AND LAND USE SECTORS INCLUDED IN NDCs IN THE SSA REGION

COUNTRY NAME	SUB-SECTOR OR LAND USE TYPE	DESCRIPTION OF ADAPTATION MEASURE	QUANTIFIED TARGET (IF AVAILABLE)
ANGOLA	CROPS	DIVERSIFY CROPS TO LESS CLIMATE SENSITIVE CULTURES	
ERITREA	CROPS	PROMOTION OF CONSERVATION AGRICULTURE	5 PERCENT OF THE CULTIVABLE LAND
BENIN	CROPS	DEFINING NEW AGRICULTURAL CALENDARS ADAPTED TO A CHANGING CLIMATE	
CAPE VERDE	FORESTRY	INCREASE THE PERCENTAGE OF PROTECTED FOREST AREAS	FROM 15 TO 26 PERCENT OF FOREST AREA
MADAGASCAR	FORESTRY	RESTORATION OF 55,000 HECTARES OF PRIMARY FOREST AND MANGROVES BY 2030	55 000 HA
BURKINA FASO	LIVESTOCK	LIVESTOCK BREEDING INTENSIFICATION ZONES ARE ESTABLISHED WITHIN THE COUNTRY	5 BREEDING INTENSIFICATION ZONES
CHAD	LIVESTOCK	ENCOURAGE GENETIC DIVERSITY OF VARIOUS ANIMAL SPECIES	
ETHIOPIA	INTEGRATED SYSTEMS	IMPROVE AND DIVERSIFY ECONOMIC OPPORTUNITIES FROM AGROFORESTRY	
MAURITIUS	FISHERIES	DEVELOPMENT AND IMPLEMENTATION OF SUSTAINABLE FISHING MANAGEMENT PLANS	
GHANA	ALL SUB-SECTORS	COMMUNITY-BASED CONSERVATION AGRICULTURE ADOPTED IN 43 ADMINISTRATIVE DISTRICTS	43 DISTRICTS

Source: Authors.

OCEAN AND COASTAL ZONE ECOSYSTEMS

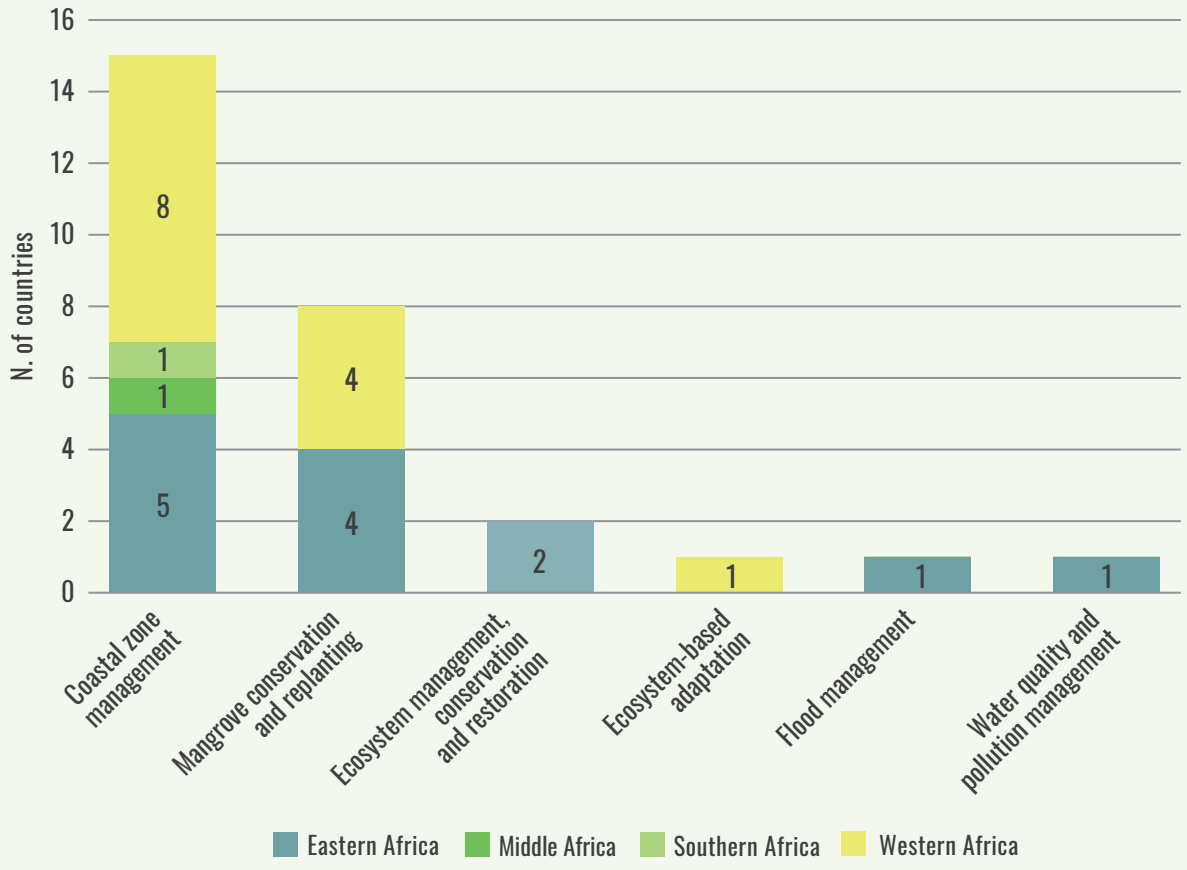
Amongst countries with an adaptation component in the agriculture and land use sectors, over one-third (19 countries/41 percent) include measures in oceans and coastal zones. Amongst those, the majority (15 countries/75 percent) promote coastal zone management, and around half include mangrove conservation and replanting (8 countries/40 percent) as adaptation measures. Two countries (Democratic Republic of Congo and Sao Tome and Principe) include ecosystem management, conservation or restoration. Only one country includes flood management (Mozambique) and water quality and pollution management (United Republic of Tanzania) in ocean and coastal zone ecosystems. **Figure 42** illustrates the types of adaptation measures in ocean and coastal zones in the NDCs (number of countries) at the sub-regional level.

INLAND WATER ECOSYSTEMS

Only ten percent of countries in the region includes adaptation measures in inland water ecosystems, namely water-related ecosystem protection and restoration (Benin and Guinea), flood management (Angola), pest and disease management (Burkina Faso) and water availability and access (Dijbouti).

FIGURE 42.

ADAPTATION MEASURES IN OCEAN AND COASTAL ZONES IN THE NDCs IN SSA, BY TYPE AND SUB-REGION



Source: Authors.

MOUNTAIN ECOSYSTEMS

Two countries (Ethiopia and Togo) in the region includes adaptation measures in mountain ecosystems, namely mountain ecosystem management, conservation and restoration.

WETLANDS ECOSYSTEMS

Two countries in the region include adaptation measures in wetlands ecosystems, namely Lesotho and Uganda **Table 9** illustrates some country examples of adaptation measures in ecosystems included in the NDCs.

TABLE 9.

EXAMPLES OF ADAPTATION MEASURES IN ECOSYSTEMS INCLUDED IN NDCs IN THE SSA REGION

COUNTRY NAME	ECOSYSTEM	DESCRIPTION OF ADAPTATION MEASURE	QUANTIFIED TARGET (IF AVAILABLE)
DJIBOUTI	OCEAN AND COASTAL ZONES	REHABILITATION OF MANGROVES WILL ENHANCE THEIR ROLE AS A SHIELD FOR COASTAL PROTECTION AGAINST THE TIDES AND EROSION	
UNITED REPUBLIC OF TANZANIA	OCEAN AND COASTAL ZONE	STRENGTHENING MANAGEMENT OF COASTAL RESOURCES AND BEACH EROSION/SEA LEVEL RISE CONTROL SYSTEMS	
NIGER	OCEAN AND COASTAL ZONE	DUNE FIXATION OVER 550,000 HA FOR SLM	55 0000 HA
ANGOLA	INLAND WATER	CONSTRUCT FLOOD PROTECTION BARRIERS ALONG MAJOR RIVERS	
BURKINA FASO	INLAND WATER	IMPROVE THE PROTECTION OF WATER RESOURCES AGAINST FILLING AND INVASIVE AQUATIC PLANTS	
LESOTHO	WETLANDS	CONSERVATION AND REHABILITATION OF DEGRADED WETLANDS	
TOGO	MOUNTAIN	PROTECTION OF ZONES WITH FRAGILE ECOSYSTEMS	
ETHIOPIA	MOUNTAIN	ECOSYSTEM REHABILITATION APPROACH IN THE HIGHLANDS OF ETHIOPIA	
ERITREA	ALL ECOSYSTEMS	REHABILITATE DEGRADED LAND FOR AGRICULTURE OVER 250 000 HA	25 0000 HA
SWAZILAND	ALL ECOSYSTEMS	SCALE UP INVESTMENTS IN RESTORING AND MAINTAINING ECOLOGICAL INFRASTRUCTURE, WITH A FOCUS ON PRIORITY ECOLOGICAL ASSETS	

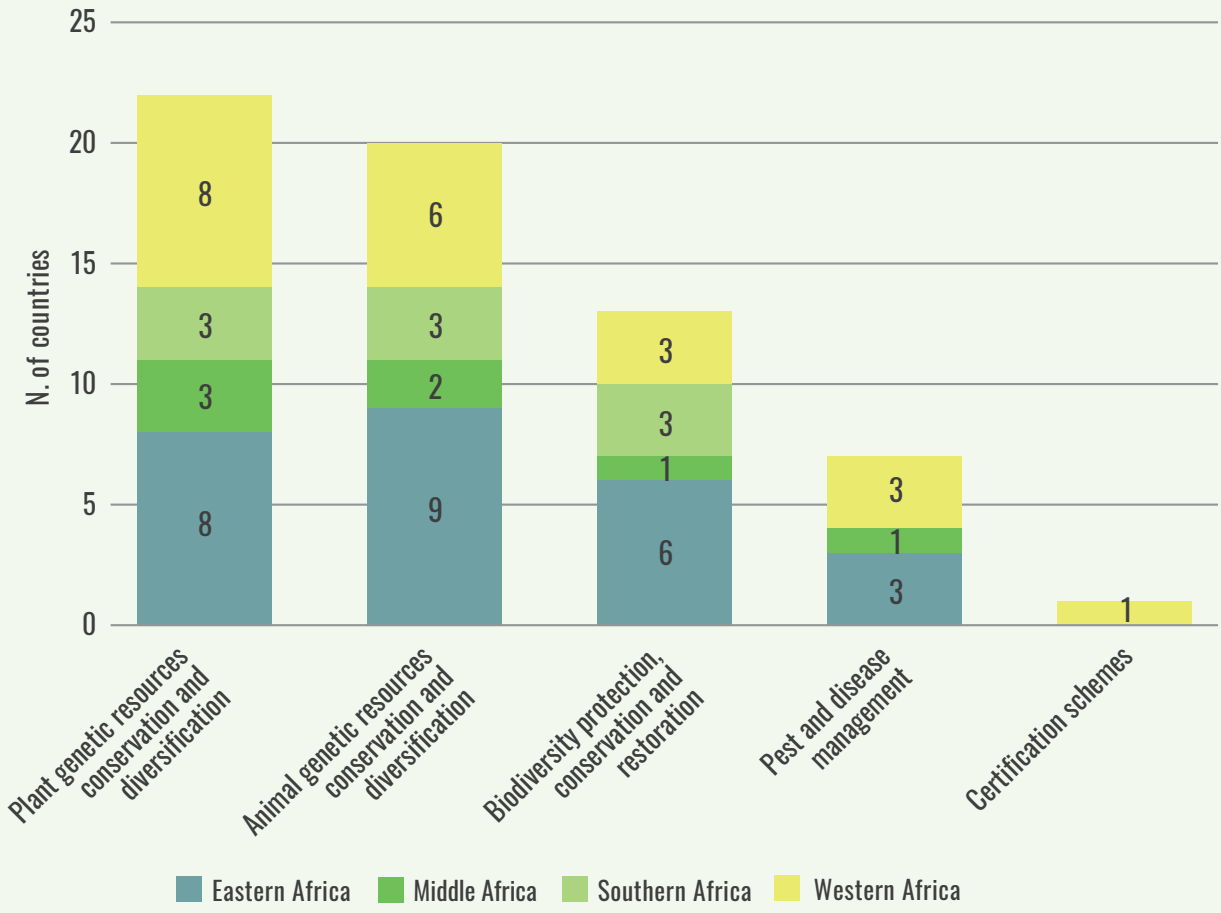
Source: Authors.

GENETIC RESOURCES

Amongst countries with an adaptation component in the agriculture and land use sectors, over three-fourths (38 countries/82 percent) include adaptation measures related to genetic resources. Amongst those, the majority promote plant genetic resources conservation and diversification (22 countries/58 percent) and animal genetic resources conservation and diversification (20 countries/53 percent). Around one-third promote aquatic genetic resources conservation and restoration (13 countries/34 percent) and one-fifth include biodiversity protection, conservation and restoration (7 countries/18 percent) as an adaptation measure. Less than ten percent include pests and diseases management and biodiversity-related certification schemes. **Figure 43** illustrates the types of genetic resource-related adaptation measures in the NDCs (number of countries) at the sub-regional level.

FIGURE 43.

GENETIC RESOURCE-RELATED ADAPTATION MEASURES IN THE NDCs IN SSA, BY TYPE AND SUB-REGION



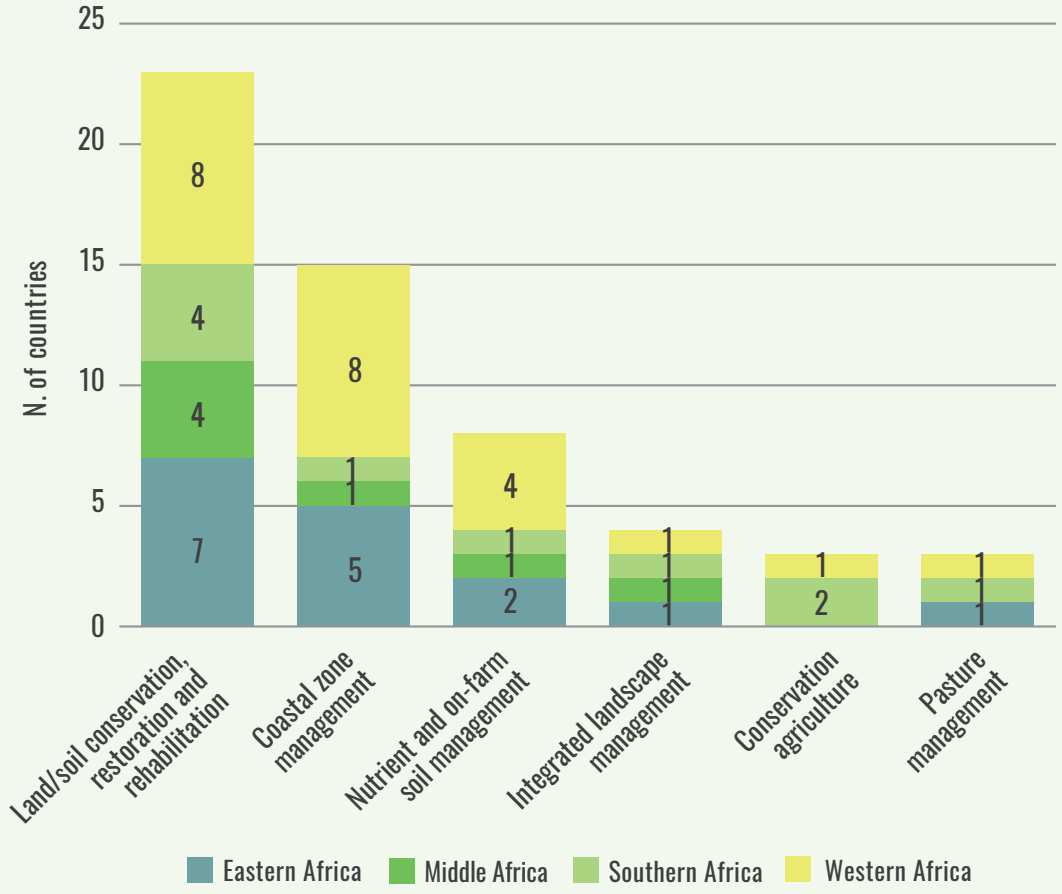
Source:Authors.

LAND AND SOIL RESOURCES

Amongst countries with an adaptation component in the agriculture and land use sectors, over three-fourths (37 countries/80 percent) include adaptation measures related to land and soil resources. Out of those, the majority (23 countries/62 percent) promote land/soil conservation, restoration and rehabilitation across a variety of ecosystems and agroecosystems, while almost half (15 countries/41 percent) promote coastal zone management and one-fifth (8 countries/22 percent) promote nutrient and on-farm soil management. A small share of countries in the region include integrated landscape management (4 countries/11 percent), conservation agriculture (Lesotho and Ghana) and pasture management (United Republic of Tanzania, Namibia and Niger). **Figure 44** illustrates the types of land and soil-related adaptation measures in the NDCs (number of countries) at the sub-regional level.

FIGURE 44.

LAND AND SOIL-RELATED ADAPTATION MEASURES IN THE NDCs IN SSA, BY TYPE AND SUB-REGION



Source: Authors.

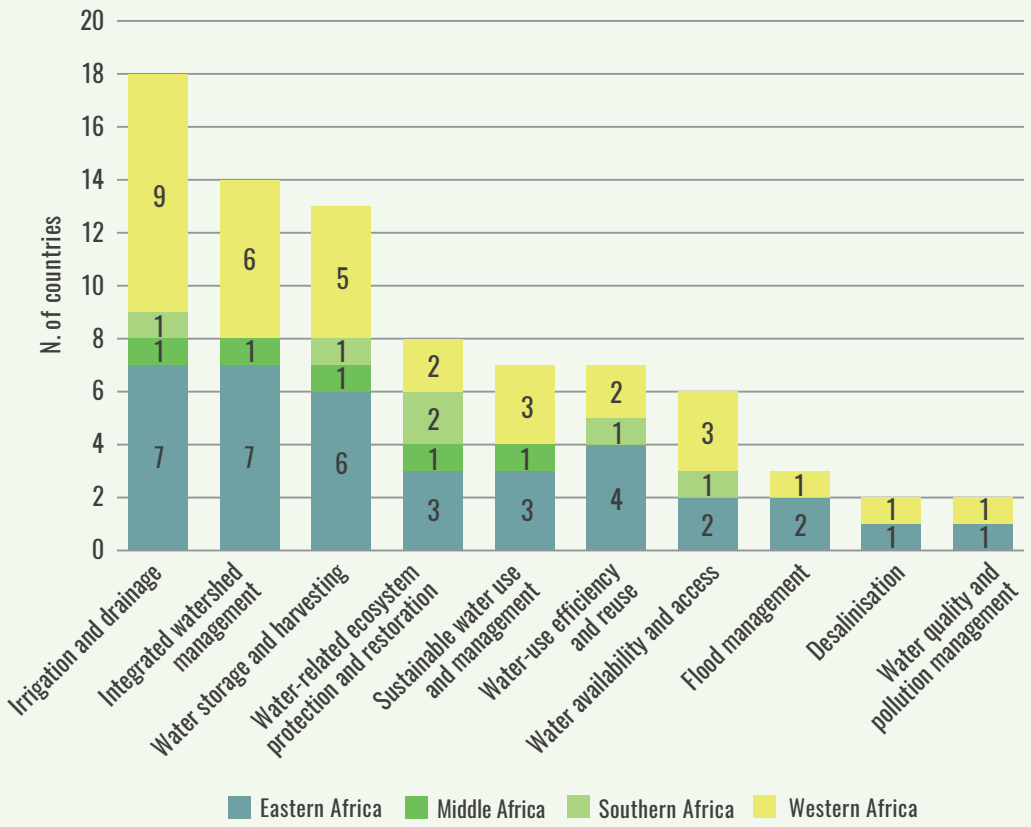
WATER RESOURCES

Amongst countries with an adaptation component in the agriculture and land use sectors, over two-thirds (33 countries/70 percent) include adaptation measures related to water resources. Amongst those, the majority promote irrigation and drainage (18 countries/55 percent), followed by integrated watershed management (14 countries/42 percent) and water storage and harvesting (13 countries/39 percent). Around one-fourth of countries promote water-related ecosystem protection and restoration (8 countries/24 percent), sustainable water use and management (7/21 percent) and water use efficiency and reuse (7 countries/21 percent). Only one-fifth of countries promote water availability and access-related adaptation measures (6 countries/18 percent), while three countries (Comoros, Mozambique and Burkina Faso) include flood management and two countries each promote desalinisation (Mauritius and Cape Verde) and water quality and pollution management (Mauritius and Guinea). **Figure 45** illustrates the types of water-related adaptation measures in the NDCs (number of countries) at the sub-regional level.

Table 10 illustrates some country examples of natural resource-related adaptation measures included in the NDCs.

FIGURE 45.

WATER-RELATED ADAPTATION MEASURES IN THE NDCs IN SSA, BY TYPE AND COUNTRY



Source: Authors.

TABLE 10.

EXAMPLES OF NATURAL RESOURCE-RELATED ADAPTATION MEASURES INCLUDED IN NDCs IN THE SSA REGION

COUNTRY NAME	NATURAL RESOURCE TYPE	DESCRIPTION OF ADAPTATION MEASURE
BURUNDI	WATER	WATER RESOURCES CONTROL AND MANAGEMENT FOR RAIN-FED CROPS
ETHIOPIA	WATER	DIVERTING STREAMS, DIGGING WELLS AND ENHANCING WATER HARVESTING TECHNIQUES
MALAWI	WATER	PROMOTE WATER HARVEST TECHNOLOGIES AT ALL LEVELS
NIGER	LAND AND SOIL	AERIAL SEEDING OF DEGRADED LANDS (10 000 HA/YEAR) TO FAVOR THE REGENERATION OF THE NATURAL ENVIRONMENT
SIERRA LEONE	LAND AND SOIL	RESTORATION OF DEGRADED LANDS WITH HIGH PRODUCTION POTENTIAL
NAMIBIA	LAND AND SOIL	ELIMINATION AND CONTROL OF THE INVADER BUSH TO RESTORE PASTURELAND TO THEIR ORIGINAL STATE
MOZAMBIQUE	GENETIC RESOURCES	ENSURE BIODIVERSITY PROTECTION
SEYCHELLES	GENETIC RESOURCES	REDUCE ILLEGAL, UNREPORTED AND UNREGULATED FISHING ACTIVITIES
ZIMBABWE	GENETIC RESOURCES	PROMOTING THE USE OF INDIGENOUS AND SCIENTIFIC KNOWLEDGE ON DROUGHT TOLERANT CROP TYPES AND VARIETIES AND INDIGENOUS LIVESTOCK THAT ARE RESILIENT TO CHANGES IN TEMPERATURES AND RAINFALL
GUINEA	GENETIC RESOURCES	DEVELOP RICE PRODUCTION BY IMPROVING YIELDS THROUGH USE OF VARIETIES BETTER ABLE TO COPE WITH THE IMPACTS OF CLIMATE CHANGE

Source: Authors.

Adaptation measures in social systems

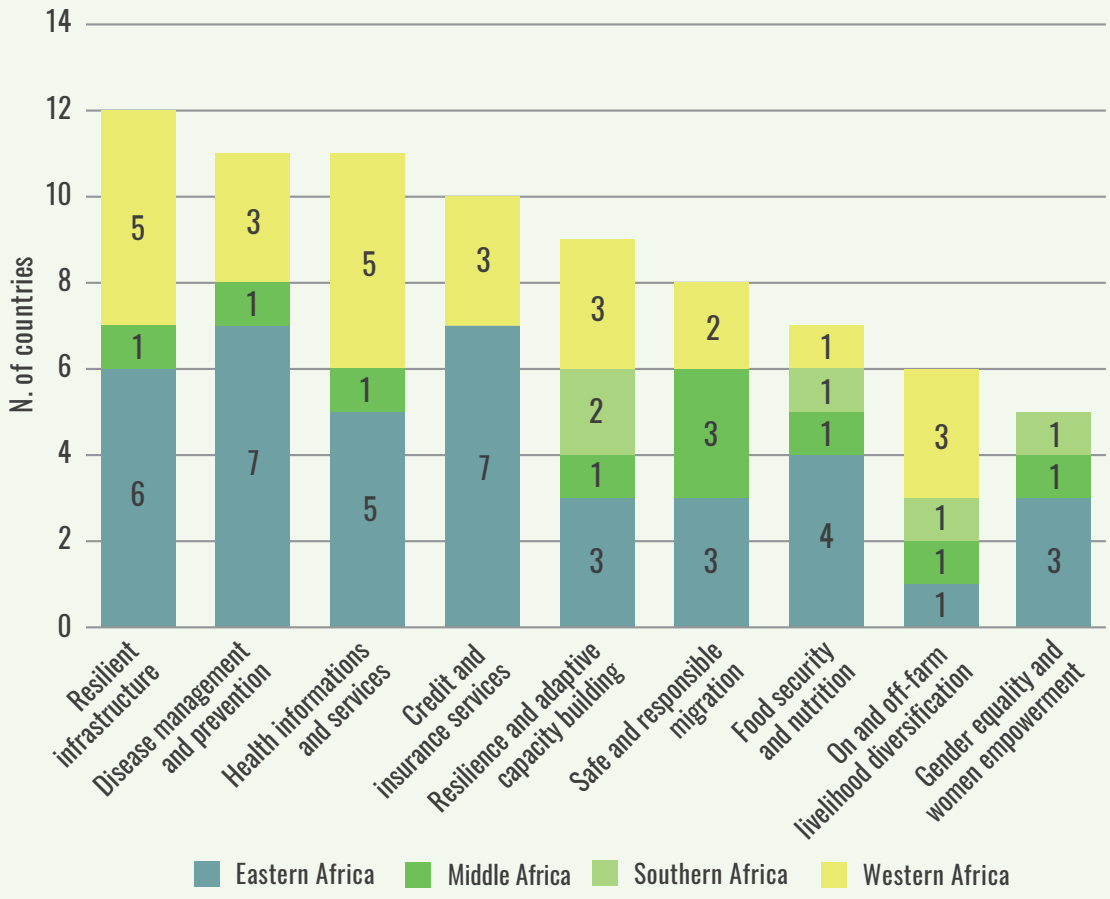
Adaptation measures in social systems generally span the following three dimensions: socioeconomics and well-being, knowledge and capacity and institutions and governance.

SOCIOECONOMICS AND WELL-BEING

Ninety percent of countries in the region with adaptation in the agriculture and land use sectors include adaptation measures related to socioeconomics and well-being. Amongst those, around one-fourth (12 countries/29 percent) promote resilient infrastructure, disease management and prevention (11 countries/26 percent), health information and services (11 countries/26 percent) and credit and insurance services (10 countries/24 percent). One-fifth of countries promote safe and responsible migration (8 countries/19 percent) and food security and nutrition-related measures (7 countries/17 percent). A small share of countries include on and off-farm livelihood diversification measures (6 countries/14 percent), gender equality and women's empowerment (5 countries/12 percent), decent rural employment and social protection (Togo). **Figure 46** illustrates the types of socioeconomics and well-being adaptation measures in the NDCs (number of countries) at the sub-regional level.

FIGURE 46.

SOCIOECONOMIC AND WELL-BEING RELATED ADAPTATION MEASURES IN THE AGRICULTURE AND LAND USE SECTORS IN THE NDCs IN SSA, BY TYPE AND SUB-REGION



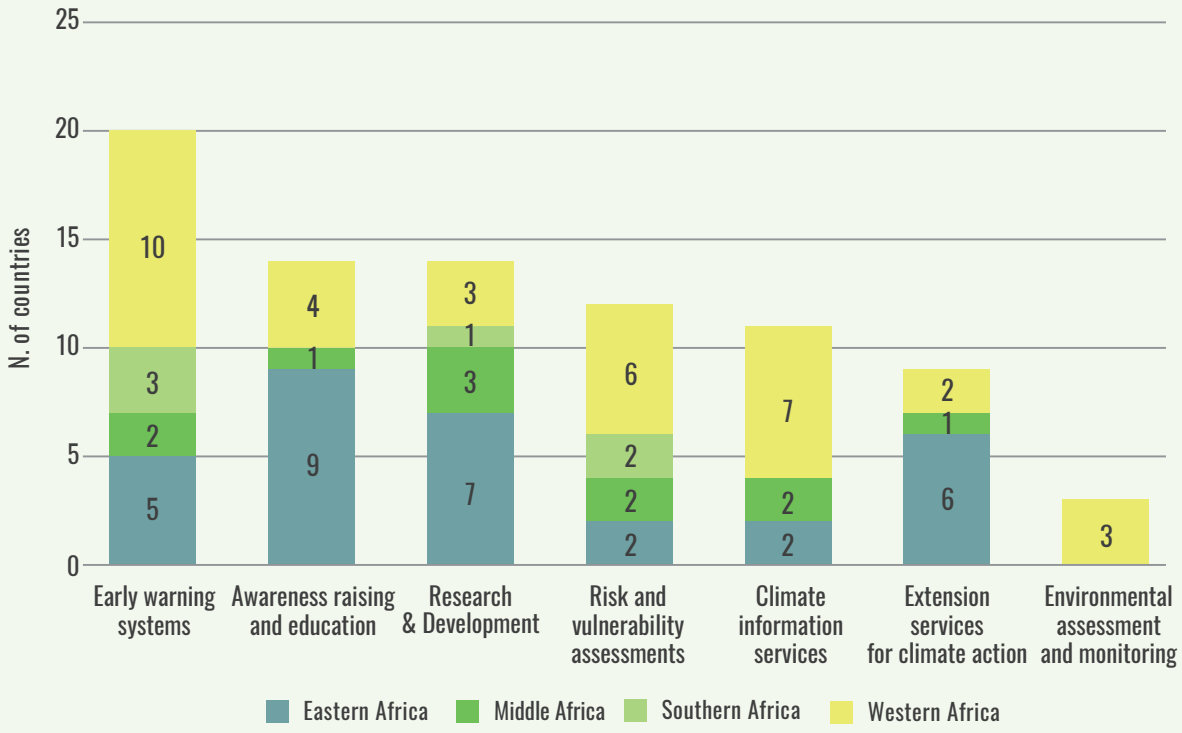
Source: Authors.

KNOWLEDGE AND CAPACITY

Ninety percent of countries in the region with adaptation in the agriculture and land use sectors include adaptation measures related to knowledge and capacity building. Amongst those, around one-half (20 countries/48 percent) promote EWS, as well as awareness raising and education (14 countries/33 percent), research and development (14 countries/33 percent) and risk and vulnerability assessments (12 countries/29 percent). Around one-fourth include climate information services (11 countries/26 percent) and extension services (9 countries/21 percent) as adaptation measures. Three countries (Cape Verde, Liberia and Nigeria) include environmental assessments and monitoring systems for adaptation. **Figure 47** illustrates the types of knowledge and capacity-related adaptation measures in the NDCs (number of countries) at the sub-regional level.

FIGURE 47.

KNOWLEDGE AND CAPACITY-RELATED ADAPTATION MEASURES IN THE AGRICULTURE AND LAND USE SECTORS IN THE NDCs IN SSA, BY TYPE AND SUB-REGION



Source: Authors.

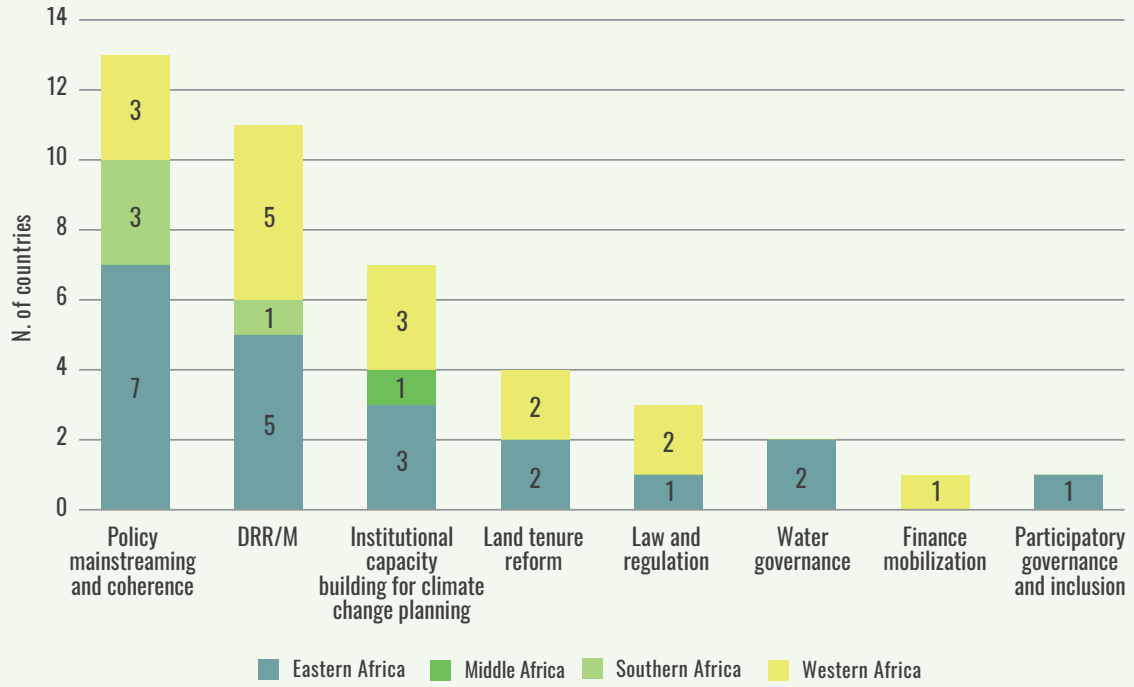
INSTITUTIONS AND GOVERNANCE

Ninety percent of countries in the region with adaptation in the agriculture and land use sectors include adaptation measures related to institutions and governance. Amongst those, around one-third (13 countries/31 percent) promote policy mainstreaming and coherence, and one-fourth of countries promote DRR (11 countries/26 percent). A small share of countries includes institutional capacity-building policies or measures (7 countries/17 percent), land tenure reform (4 countries/10 percent), law and regulation to support adaptation (South Sudan, Guinea and Togo), water governance (Comoros and Seychelles), finance mobilization (Benin) and participatory governance and inclusion (South Sudan). **Figure 48** illustrates the types of institutions and governance-related adaptation measures in the NDCs (number of countries) at the sub-regional level.

Table 11 illustrates some country examples of adaptation measures in social systems included in the NDCs.

FIGURE 48.

INSTITUTIONS AND GOVERNANCE-RELATED ADAPTATION MEASURES IN THE AGRICULTURE AND LAND USE SECTORS IN THE NDCs IN SSA, BY TYPE AND SUB-REGION



Source: Authors.

TABLE 11.

EXAMPLES OF ADAPTATION MEASURES IN SOCIAL SYSTEMS INCLUDED IN NDCs IN THE SSA REGION

COUNTRY NAME	TYPE OF ADAPTATION MEASURE	DESCRIPTION
BURUNDI	AWARENESS RAISING AND EDUCATION	INFORM, EDUCATE AND COMMUNICATE ABOUT THE CLIMATE, CLIMATE RISKS AND ADAPTATION TECHNOLOGIES
LIBERIA	EARLY WARNING SYSTEMS	STRENGTHEN EARLY WARNING SYSTEMS AND EVACUATION PLANNING FOR INTENSE RAINFALL EVENTS AND FLOODS
NAMIBIA	POLICY MAINSTREAMING AND COHERENCE	DEVELOPING COMMON GOALS AND FACILITATING BETTER INTEGRATION OF DIFFERENT POLICIES AND PRACTICES IN VULNERABLE SECTORS
SENEGAL	CREDIT AND INSURANCE SERVICES	PROMOTION OF FISHING INSURANCE
ZAMBIA	HEALTH INFORMATION AND SERVICES	STRENGTHEN HEALTH SURVEILLANCE AT ALL LEVELS
SOUTH SUDAN	CLIMATE INFORMATION SERVICES	ESTABLISH/REHABILITATE THE HYDRO-METEOROLOGICAL MONITORING NETWORK TO COLLECT CLIMATIC INFORMATION AND PROVIDE FLOOD AND DROUGHT EARLY WARNING
UNITED REPUBLIC OF TANZANIA	RESEARCH AND DEVELOPMENT	STRENGTHENING THE CAPACITY OF AGRICULTURAL RESEARCH INSTITUTIONS TO CONDUCT BASIC AND APPLIED RESEARCH
ANGOLA	RESILIENCE AND ADAPTIVE CAPACITY BUILDING	ENHANCEMENT OF COASTAL ADAPTIVE CAPACITIES AT THE INSTITUTIONAL, SYSTEMIC AND COMMUNITY LEVELS
MALAWI	DISEASE MANAGEMENT AND PREVENTION	BUILD CAPACITY TO DIAGNOSE, PREVENT AND CONTROL CLIMATE-SENSITIVE DISEASES SUCH AS MALARIA, DIARRHOEAL DISEASES AND MALNUTRITION
RWANDA	RISK AND VULNERABILITY ASSESSMENTS	CONDUCT RISK ASSESSMENTS AND VULNERABILITY MAPPING COUNTRYWIDE BY 2030 AND UPDATE EVERY 5 YEARS

Source: Authors

Long-term adaptation goals

One-third of SSA countries communicate a long-term adaptation goal or vision in their NDC. For example, Cameroon's long-term adaptation goal is to "develop effective adaptation responses and enhance adaptive capacity in order to protect livelihoods, natural resources and assets, and vulnerable areas to the impacts of climate change to all sectors."

3.2 MITIGATION CONTRIBUTION

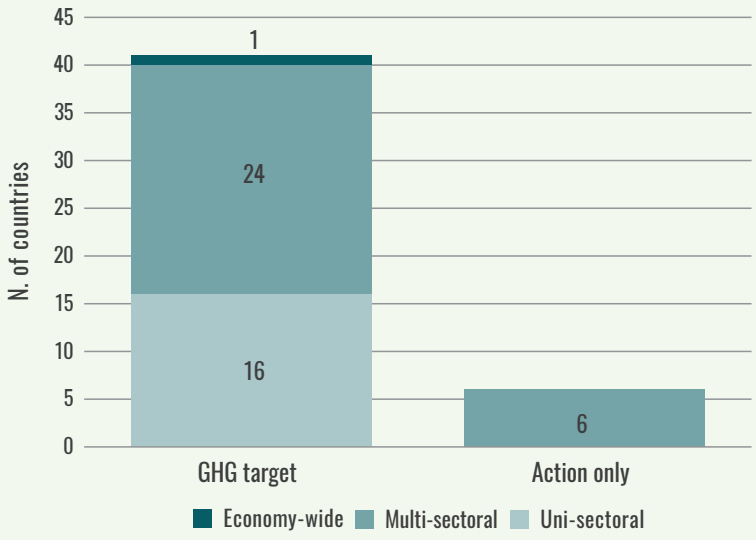
This section provides a synthesis of the mitigation contributions in the agriculture and land use sectors contained in the first-round NDCs submitted by 47 countries in the SSA region. Mitigation refers to a human intervention that aims to reduce emission sources or conserve and enhance sinks (IPCC, 2014b). In this report, mitigation in the agriculture and land use sectors refers to reducing emissions and/or increasing removalsin relation to the GHG source and sink categories defined by the 2006 IPCC Guidelines for national greenhouse gas inventories (NGHGIs) for the agriculture, forestry and other land use (AFOLU) sector, excluding Settlements and Other Land categories (IPCC, 2006).

3.2.1 General mitigation contribution

The majority of countries in the region (41 countries/87 percent) communicated a global GHG target, whereas around 10 percent[21] (6 countries/13 percent) committed to "action-only." The majority of these GHG targets are set in relation to a business as usual (BAU) scenario (88 percent), as opposed to a base year (10 percent) or trajectory (2 percent). **Figure 49** illustrates the types of general mitigation contributions in the NDCs in the SSA region (number of countries).

FIGURE 49.

TYPES OF GENERAL MITIGATION CONTRIBUTIONS IN THE NDCs IN THE SSA REGION



Source: Authors..

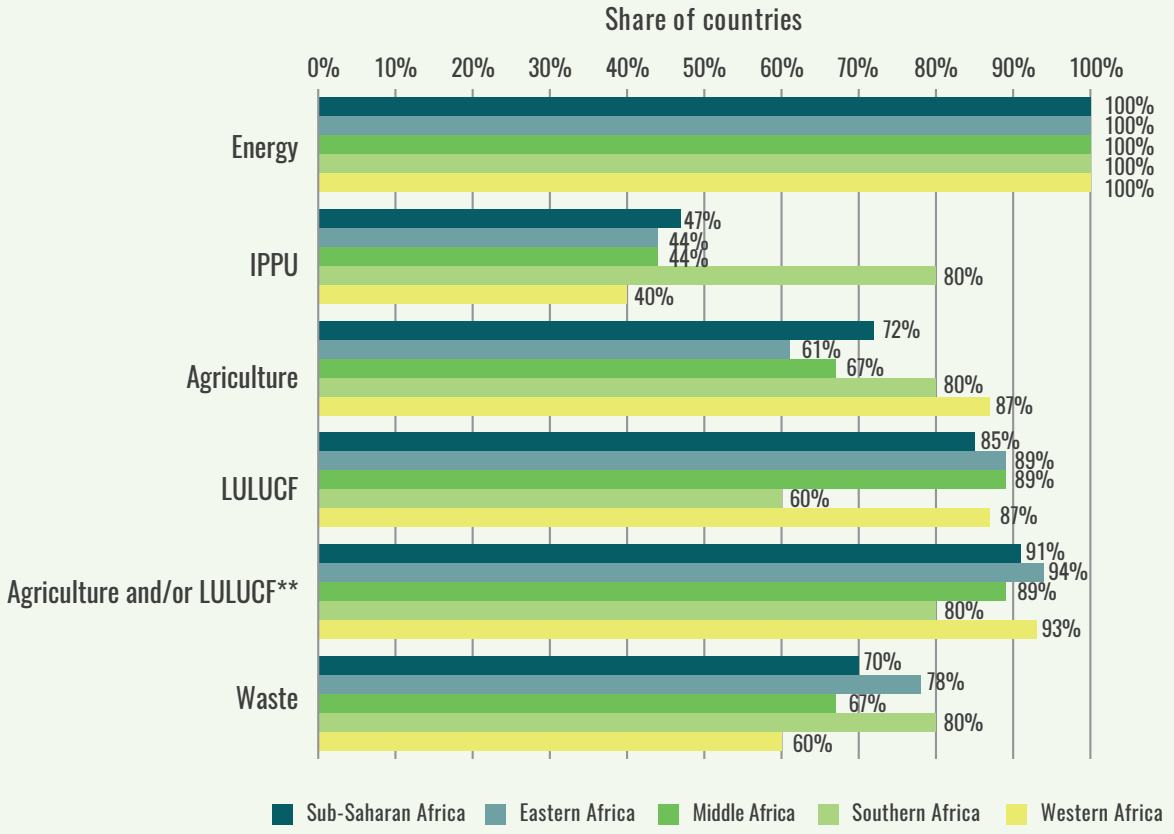
The sectoral coverage of general mitigation contributions in SSA varies by sub-region. Around one-fourth of countries (16 countries/34 percent) present an economy-wide mitigation contribution, which covers all four 2006 IPCC Sectors – Energy, IPPU, AFOLU and Waste. On the other hand, almost two-third (24 countries/64 percent) present mitigation contributions covering multiple sectors, and only one country's GHG target (Sao Tome and Principe) covers only one sector, that is energy.

All countries include mitigation in the energy sector (47 countries/100 percent), followed by LULUCF (40 countries/85 percent), agriculture (34 countries/72 percent) and lastly the IPPU sector (22 countries/47 percent). Considered together, 91 percent of countries in the region include mitigation in the agriculture and/or LULUCF sectors. **Figure 50** illustrates the scope of general mitigation contributions in the NDCs in the SSA region, by sector and sub-region (share of countries with an NDC).

[21] Rwanda, Somalia, South Sudan, Swaziland, Cape Verde, Guinea-Bissau.

FIGURE 50.

SCOPE OF GENERAL MITIGATION CONTRIBUTIONS IN THE NDCs IN THE SSA REGION, BY SECTOR AND SUB-REGION



Source: Authors.

The majority of SSA countries reference 2016 to 2030 as the period of NDC implementation, while some countries indicate an end-year of 2025 (Gabon and Gambia), 2035 (Cameroon and Congo), 2040 (Malawi) and 2050 (Sierra Leone). **Annex 2** contains detailed information on each country's general mitigation contribution.

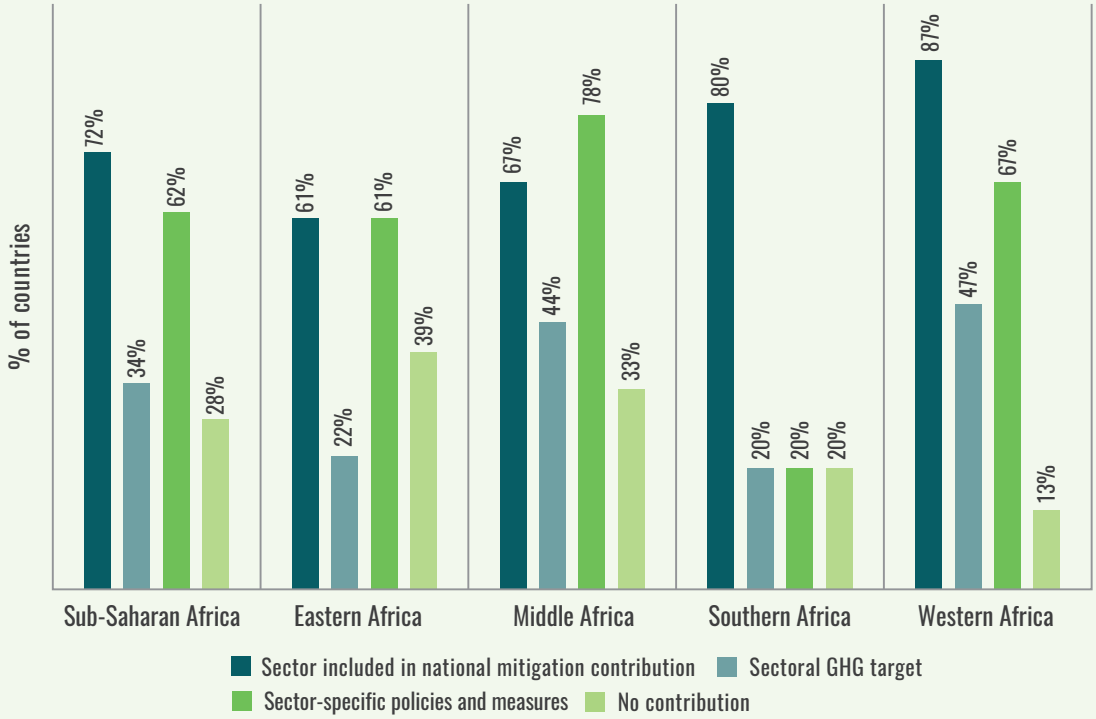
3.2.2 Mitigation contribution in the agriculture and land use sectors

Three-fourths of all countries in SSA (34 countries/72 percent) include the agriculture sector in their general mitigation contribution. Around one-third (16 countries/34 percent) present a GHG target specific to the agriculture sector and up to two-thirds (29 countries/62 percent) include measures in the agriculture sector. Less than one-third (13 countries/29 percent) do not include any mitigation contribution in the agriculture sector. At the sub-regional level, the share of countries with a mitigation contribution in agriculture ranges from 61 percent in eastern Africa to 87 percent in western Africa. **Figure 51** presents the variety of ways in which mitigation contributions in the agriculture sector are expressed in the NDCs at the regional and sub-regional level (share of countries with an NDC).

Eighty-five percent of all countries (40 countries/85 percent) include the LULUCF sector in their general mitigation contribution – the majority of which include sector-specific mitigation measures (39 countries/38 percent). One-third include a sector-specific GHG target (15 countries/32 percent) while none of the countries in the region present a sector-specific, non-GHG target. At the subregional level, the share of countries with a mitigation contribution in AG ranges from 60 percent in southern Africa to 89 percent in eastern and middle Africa. **Figure 52** presents the variety of ways in which mitigation contributions in the LULUCF sector are expressed in the NDCs (share of countries with an NDC).

FIGURE 51.

TYPE OF MITIGATION CONTRIBUTIONS IN THE AGRICULTURE SECTOR IN THE NDCs IN THE SSA REGION

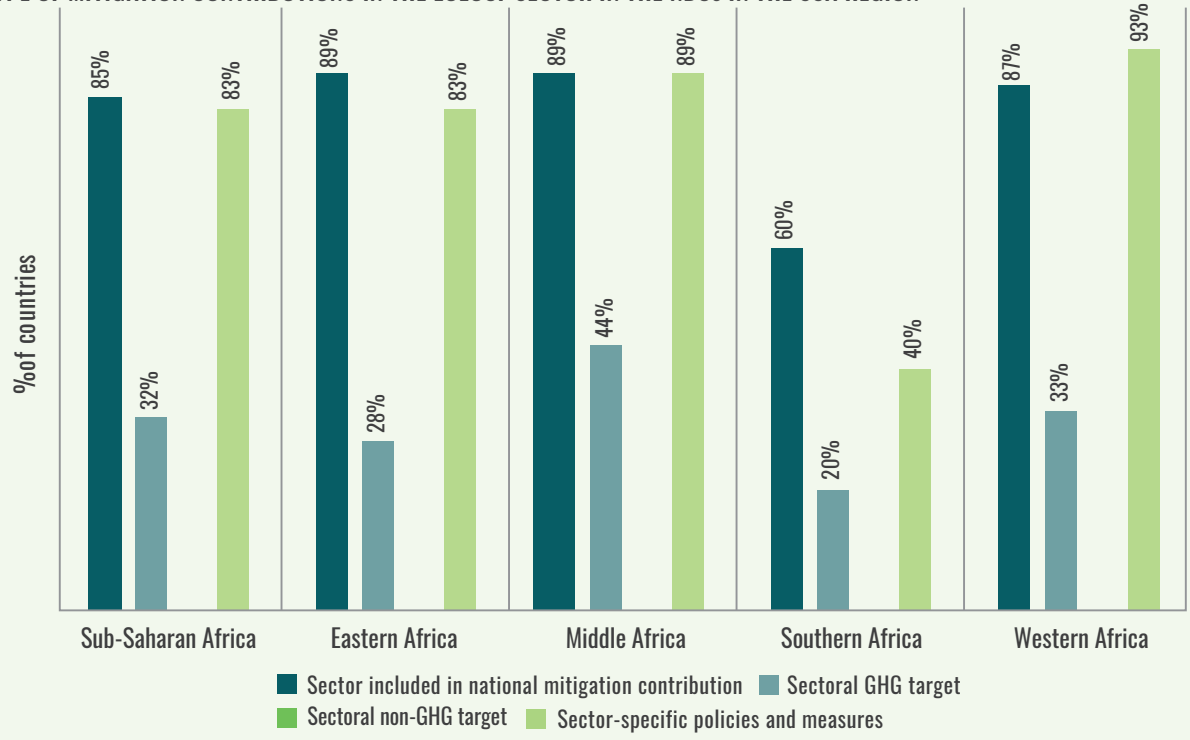


Notes: Angola (in middle Africa) includes measures that are additional to the national mitigation contribution.

Source: Authors

FIGURE 52.

TYPE OF MITIGATION CONTRIBUTIONS IN THE LULUCF SECTOR IN THE NDCs IN THE SSA REGION



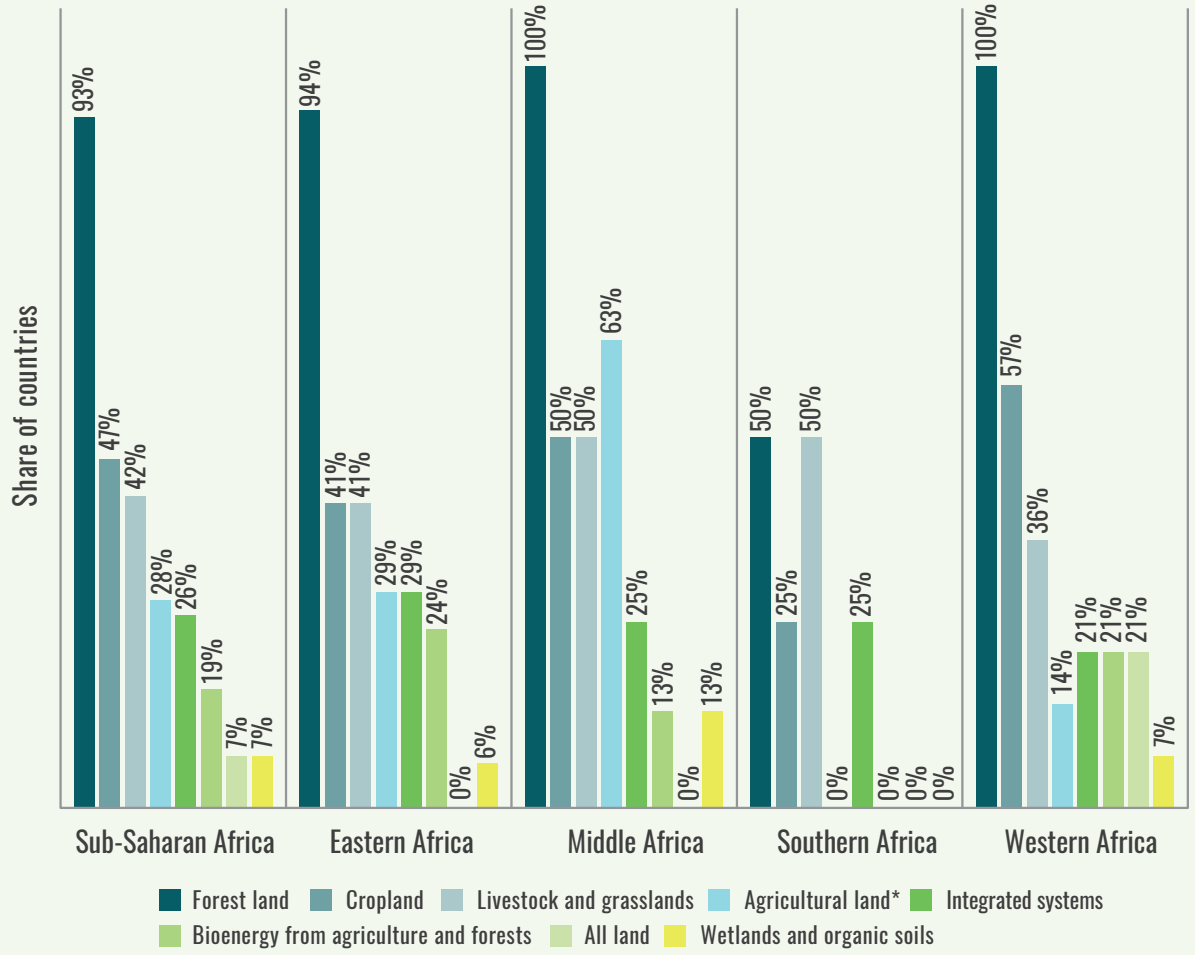
Source: Authors.

Mitigation measures

Out of countries with a mitigation contribution in the agriculture and/or land use sectors, almost all (40 countries/93 percent) include mitigation on forest land, and almost one-half include mitigation on cropland (20 countries/47 percent) and in livestock and grasslands (18 countries/42 percent). Around one-quarter (11 countries/26 percent) promote mitigation in integrated systems and via bioenergy from agricultural biomass (8 countries/19 percent). Only three countries (Uganda, Cameroon and Côte d'Ivoire) include mitigation measures in wetlands and organic soils. **Figure 53** illustrates the types of agricultural sub-sectors and land uses covered in the mitigation measures in the NDCs (share of countries with an NDC) at the regional and sub-regional level.

FIGURE 53.

MITIGATION MEASURES IN THE AGRICULTURE AND LAND USE SECTORS IN THE NDCs IN SSA, BY SUB-SECTOR/LAND USE COVERED AND SUB-REGION



**Agricultural land refers to cropland and grassland.*

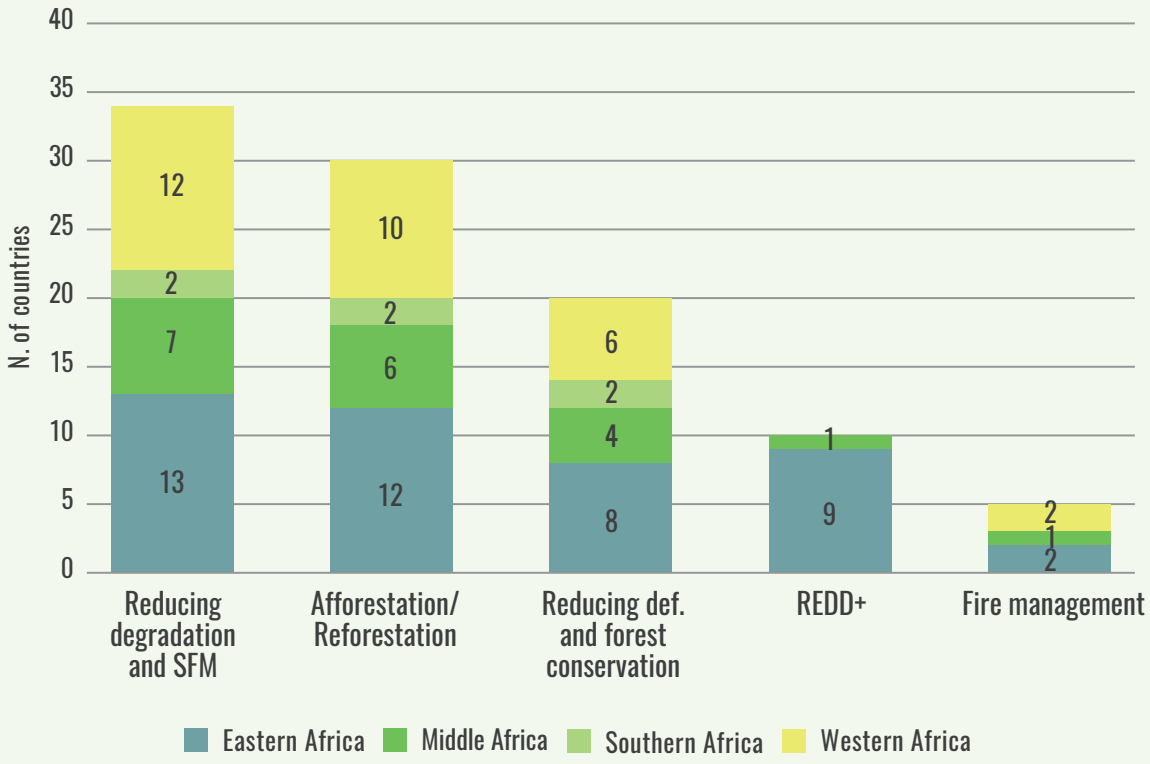
Source: Authors.

FOREST LAND

Ninety-three percent of countries with a mitigation contribution in the agriculture and/or land use sectors include mitigation on forest land. Amongst those, the majority (34 countries/85 percent) promote reducing degradation and sustainable forest management and promote afforestation and reforestation (30 countries/75 percent). One-half (20 countries/50 percent) promote reducing deforestation and forest conservation and one-quarter (10 countries/25 percent) reference to Reducing Emissions from Deforestation and forest Degradation, plus the sustainable management of forests, and the conservation and enhancement of forest carbon stocks (REDD+) as a mitigation policy. Only five countries (Madagascar, Zambia, Democratic Republic of Congo, Senegal, Togo) promote fire management on forest land. **Figure 54** illustrates the types of mitigation measures on forest land in the NDCs (number of countries) at the sub-regional level.

FIGURE 54.

MITIGATION MEASURES ON FOREST LAND IN THE NDCs IN SSA, BY TYPE AND SUB-REGION



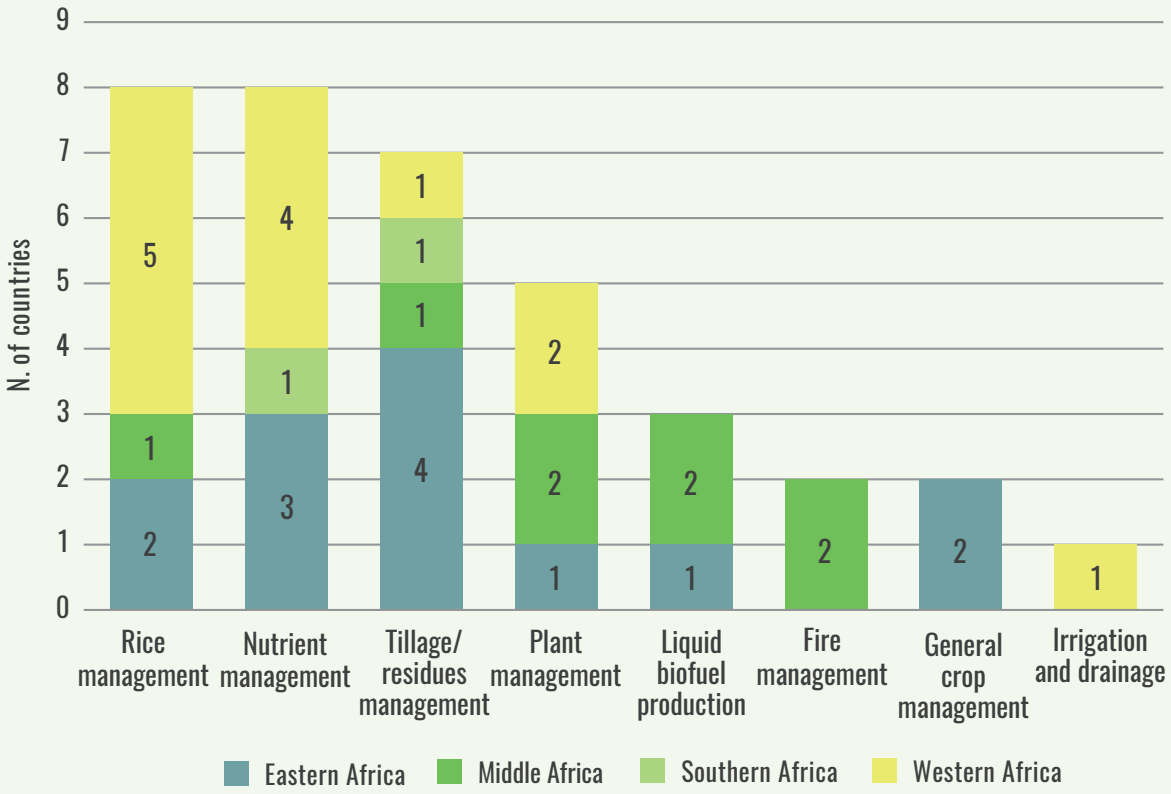
Source: Authors.

CROPLAND

Forty-seven percent of countries with a mitigation contribution in the agriculture and/or land use sectors include mitigation in the crops sector. Amongst those, just under one-half promote rice management (8 countries/40 percent) and nutrient management (8 countries/40 percent), and one-third promote tillage/residue management (7 countries/35 percent). One-quarter promote plant management (5 countries/25 percent) and a few other countries promote liquid biofuel production (Burundi, Comoros, Zambia, Zimbabwe, Angola, Congo, Niger and Sierra Leone), general crop management (Ethiopia and Malawi) and irrigation and drainage (Benin) on cropland. **Figure 55** illustrates the types of mitigation measures on cropland in the NDCs (number of countries) at the sub-regional level.

FIGURE 55.

MITIGATION MEASURES ON CROPLAND IN THE NDCs IN SSA, BY TYPE AND SUB-REGION



Source: Authors.

LIVESTOCK AND GRASSLANDS

Forty-two percent of countries with a mitigation contribution in the agriculture and/or land use sectors include mitigation in livestock and grasslands. Amongst those countries, over half (10 countries/56 percent) include manure management and one-quarter promote improved animal breeding and husbandry and improved animal feeding (4 countries/22 percent each). Three countries promote fire management on grasslands (Namibia, Ghana and Togo), general livestock management (Ethiopia, Angola and Togo) and grassland restoration and conservation (Cameroon, Congo and Namibia). **Figure 56** illustrates the types of mitigation measures in livestock and grasslands in the NDCs (number of countries) at the sub-reginal level.

AGRICULTURAL LAND

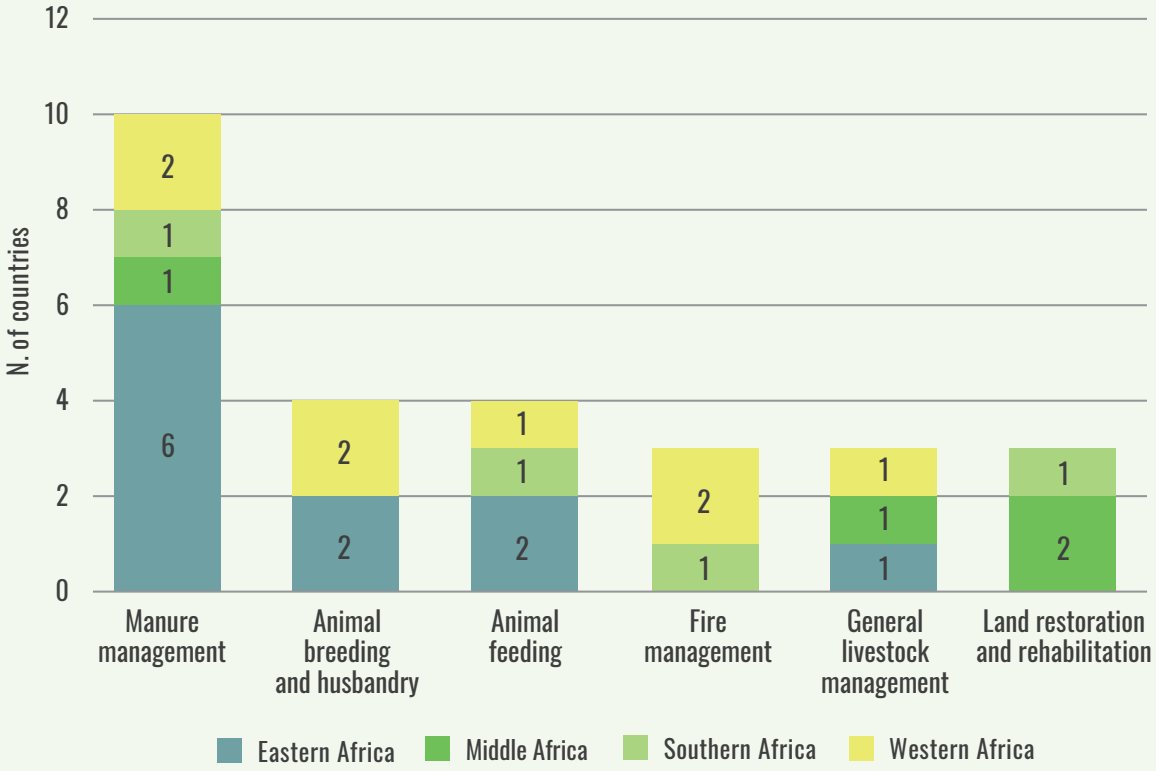
Twenty-eight percent of countries with a mitigation contribution in the agriculture and/or land use sectors include mitigation on agricultural land in general, including measures such as sustainable agricultural approaches and sustainable land management.

INTEGRATED SYSTEMS

Twenty-six percent of countries with a mitigation contribution in the agriculture and/or land use sectors include mitigation in integrated systems, particularly agroforestry, primarily in eastern and western Africa.

FIGURE 56.

MITIGATION MEASURES IN LIVESTOCK AND GRASSLANDS IN THE NDCs IN SSA, BY TYPE AND SUB-REGION



Source: Authors.

BIOENERGY

Nineteen percent of countries with a mitigation contribution in the agriculture and/or land use sectors include bioenergy-related mitigation measures. Amongst measures included, over two-thirds promote energy-efficient fuelwood cookstoves (70 percent of measures), while just under half (40 percent) include wood fuel and charcoal production and consumption. One-third of all bioenergy-related mitigation measures target biogas and one-fifth target general solid biofuel production. A few measures promote liquid biofuel production and bioenergy from non-specified biomass. **Figure 57** illustrates the distribution of bioenergy-related mitigation measures in the NDCs (number of measures) at sub-regional level.

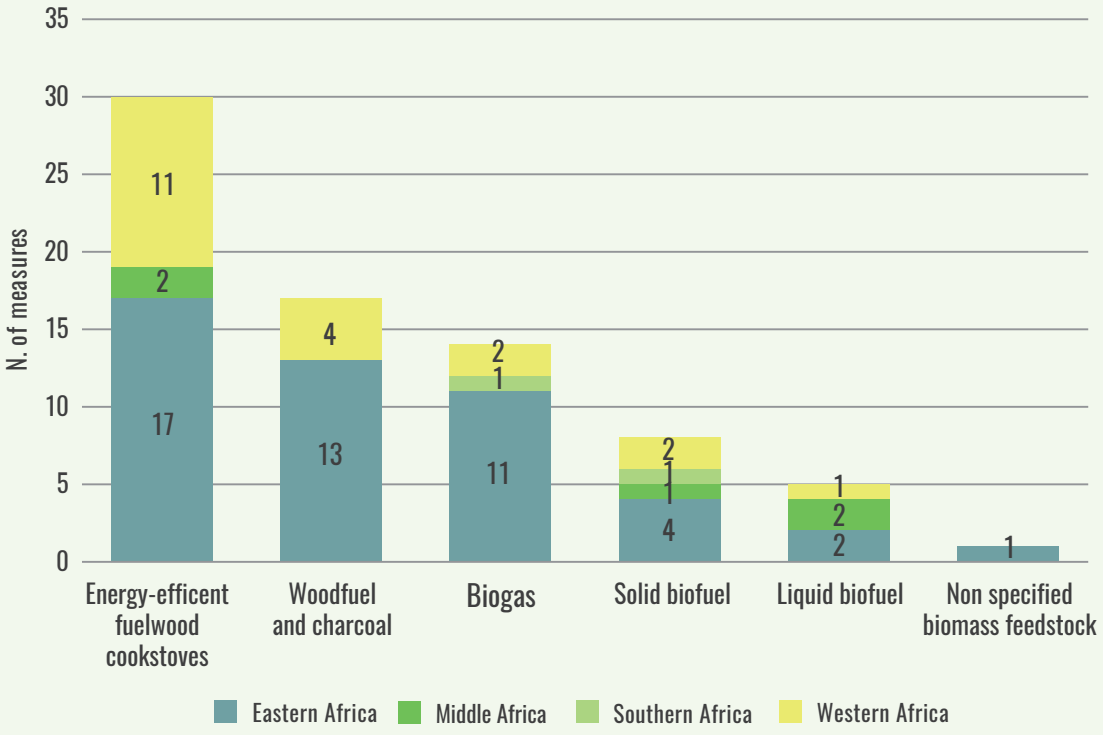
WETLANDS AND ORGANIC SOILS

Only three countries include mitigation measures on wetlands and organic soils, namely wetland conservation (Uganda, Cameroon and Côte d'Ivoire), the rewetting of organic soils drained for agriculture (Cameroon) and aquaculture management (Côte d'Ivoire).

Table 12 illustrates some country examples of mitigation measures in the agriculture and land use sectors included in the NDCs.

FIGURE 57.

BIOENERGY-RELATED MITIGATION MEASURES IN IN THE NDCs IN SSA, BY TYPE AND SUB-REGION



Source: Authors.

TABLE 12.

EXAMPLES OF MITIGATION MEASURES IN THE AGRICULTURE AND LAND USE SECTORS INCLUDED IN NDCs IN THE SSA REGION

COUNTRY NAME	SUB-SECTOR OR LAND USE TYPE	DESCRIPTION	QUANTIFIED TARGET (IF AVAILABLE)
BURUNDI	CROPLAND	REPLACE SYNTHETIC FERTILIZER WITH ORGANIC FERTILIZER	100% OF TOTAL FERTILIZER
GAMBIA	CROPLAND	REDUCE METHANE EMISSIONS FROM FLOODED RICE FIELDS BY REPLACING THEM WITH EFFICIENT DRY UPLAND RICE	
MALAWI	CROPLAND	USE OF ORGANIC AMENDMENTS SUCH AS CROP RESIDUES THAT CONTAIN THE POTENTIAL TO CONTRIBUTE TO SOIL CARBON LEVELS	
ERITREA	FOREST LAND	ASSISTED FOREST REGENERATION	-391.88 KT CO_2EQ/YEAR IN 2030
SOUTH SUDAN	FOREST LAND	REFORESTATION AND AFFORESTATION PROJECT TO PLANT 20 MILLION TREES OVER A PERIOD OF TEN YEARS	20 MILLION TREES IN TEN YEARS
KENYA	AGRICULTURAL LAND	LIMITED USE OF FIRE IN RANGELAND AND CROPLAND MANAGEMENT	-1 200 KT CO_2EQ PER YEAR
CAMEROON	BIOENERGY FROM AGRICULTURE	DEVELOP ENERGY PRODUCTION FROM AGRICULTURAL WASTE	
NAMIBIA	GRASSLAND	RESTORE 15 MILLION ACRES OF GRASSLAND	-1 359 KT CO_2EQ PER YEAR
DJIBOUTI	INTEGRATED SYSTEMS	REFORESTATION WITH THE ESTABLISHMENT OF SILVO-PASTORAL AGROSYSTEMS	1 000 HA
TOGO	LIVESTOCK	SUPPORT THE PROMOTION OF LOCAL BREEDS	

Source: Authors

Long-term mitigation goals

Only four countries in the region communicate a long-term mitigation goal or vision in their NDC, namely the Central African Republic, Equatorial Guinea, Liberia and Sierra Leone. For example, Liberia intends to achieve carbon neutrality by 2050.

3.3 BARRIERS TO IMPLEMENTATION

Under the call for enhanced transparency of action and support in the Paris Agreement (Article 13), Parties are now required to report information necessary to track progress made in implementing and achieving their NDC, including barriers to addressing the social and economic consequences of mitigation, barriers, gaps and challenges to the implementation of adaptation and to attracting international support.

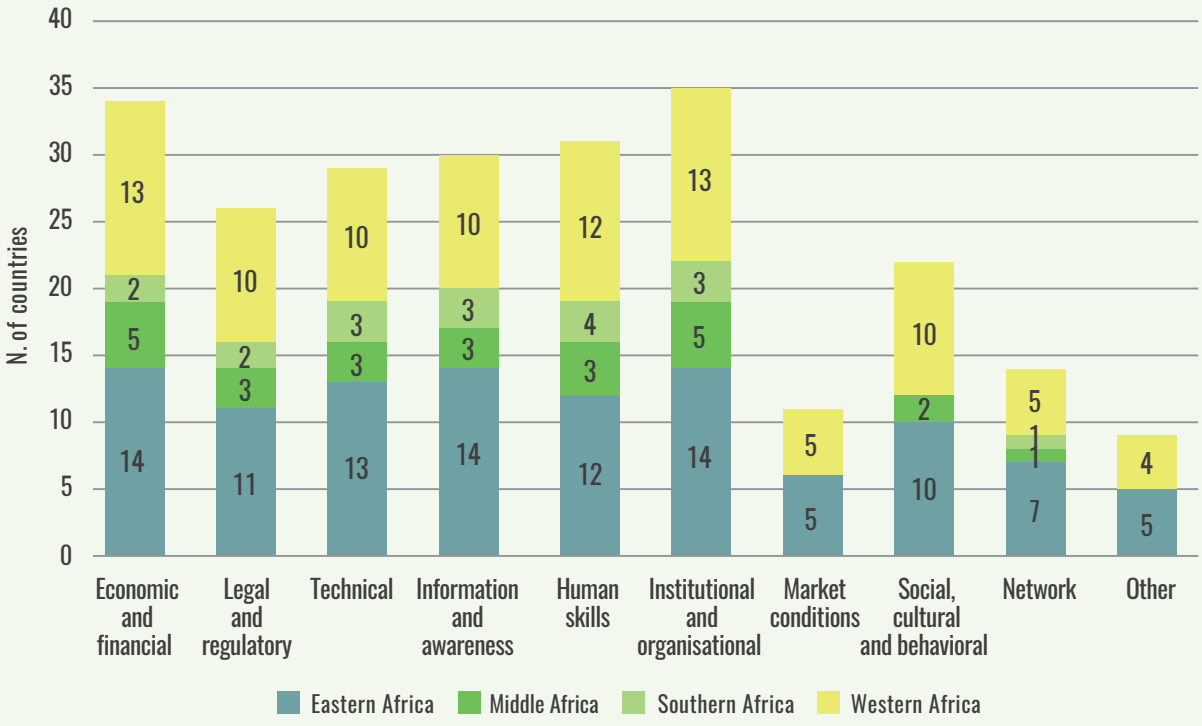
The TNAs provide critical information on the types of constraints impeding the uptake of climate change adaptation and mitigation at scale (UN Environment and UNEP DTU Partnership, 2018). So far, globally, more than 80 developing countries have already conducted their TNAs to identify priority mitigation and adaptation technologies to address climate change issues. The identified technologies have also been mentioned by several countries in their NDCs (UNFCCC, undated).

This section synthesizes the types of barriers to the implementation of climate change mitigation and adaptation in the context of the NDCs in the agriculture and land use sectors, as expressed in the NDCs and the latest available TNAs for 36 countries.

Around three-fourths of all countries in the region report barriers related to NDC implementation (36 countries/77 percent). The majority of those countries (35 countries/97 percent) identified institutional and organizational challenges, followed by economic and financial barriers (34 countries/94 percent), and human skills (31 countries/86 percent). Other barriers include lack of information and awareness on relevant technologies, unfavorable market conditions and prevalent social, cultural and behavioral restrictions. **Figure 58** illustrates the types of barriers to implementation reported (number of countries) at the sub-regional level.

FIGURE 58.

TYPES OF BARRIERS TO NDC IMPLEMENTATION EXPRESSED IN NDCs AND TNAs IN SSA, BY SUB-REGION



Source: Authors.

3.4 SUPPORT NEEDS

Article 9, 10 and 11 of the Paris Agreement recognize the importance of the provision of support towards developing country Parties, particularly countries with the least capacity and those that are particularly vulnerable to the adverse effects of climate change. Under the new transparency requirements of the ETF, Parties are required to report information on financial, technology transfer and capacity building support needed and received or provided, by sector or sub-sector.

This section provides a synthesis of the types of support needs (finance, technology transfer and capacity building) for NDC implementation in general and in the agriculture and land use sectors, as expressed in the NDCs and latest available TNAs submitted by 36 countries.

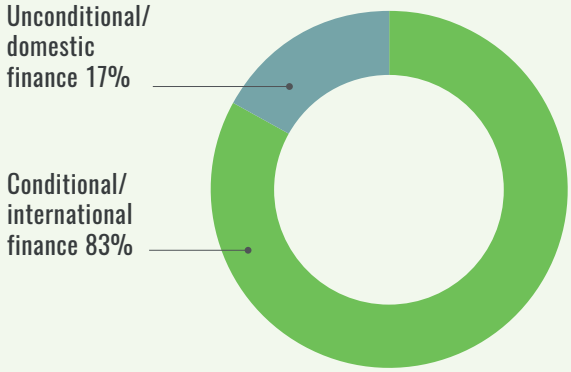
Overall, around three-fourths of countries in the region with an NDC report finance need (36 countries/77 percent), while around half report capacity building needs (21/45 percent) and up to ninety percent report technology needs (41/87 percent) for NDC implementation in the agriculture and land use sectors.

3.4.1 Finance needs

Around three-fourths of countries in SSA quantify the amount of finance needed for NDC implementation (36 countries/77 percent), which is estimated at 2.25 trillion USD. Based on those counties (22 countries) with disaggregate information on climate finance needs, around 3.73 billion USD (17 percent) of the 2.25 trillion USD is "unconditional" to international support or is earmarked to be sourced domestically. On the other hand, 1.89 trillion USD (83 percent) of the 2.25 trillion USD is the estimated amount required from international financial support and therefore "conditional." On average, the amount of climate finance needs estimated for mitigation is around two-thirds of total (62 percent) and one-thirds (38 percent). **Figures 59-60** illustrates the average share of unconditional/conditional finance and mitigation/adaptation finance.

FIGURE 59.

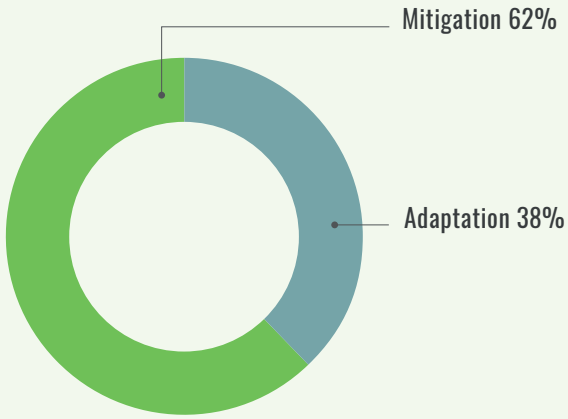
AVERAGE SHARE OF UNCONDITIONAL AND CONDITIONAL CLIMATE FINANCE FOR NDC IMPLEMENTATION IN SSA



Source: Authors.

FIGURE 60.

AVERAGE SHARE OF MITIGATION AND ADAPTATION FINANCE NEEDS FOR NDC IMPLEMENTATION IN SSA



Source: Authors.

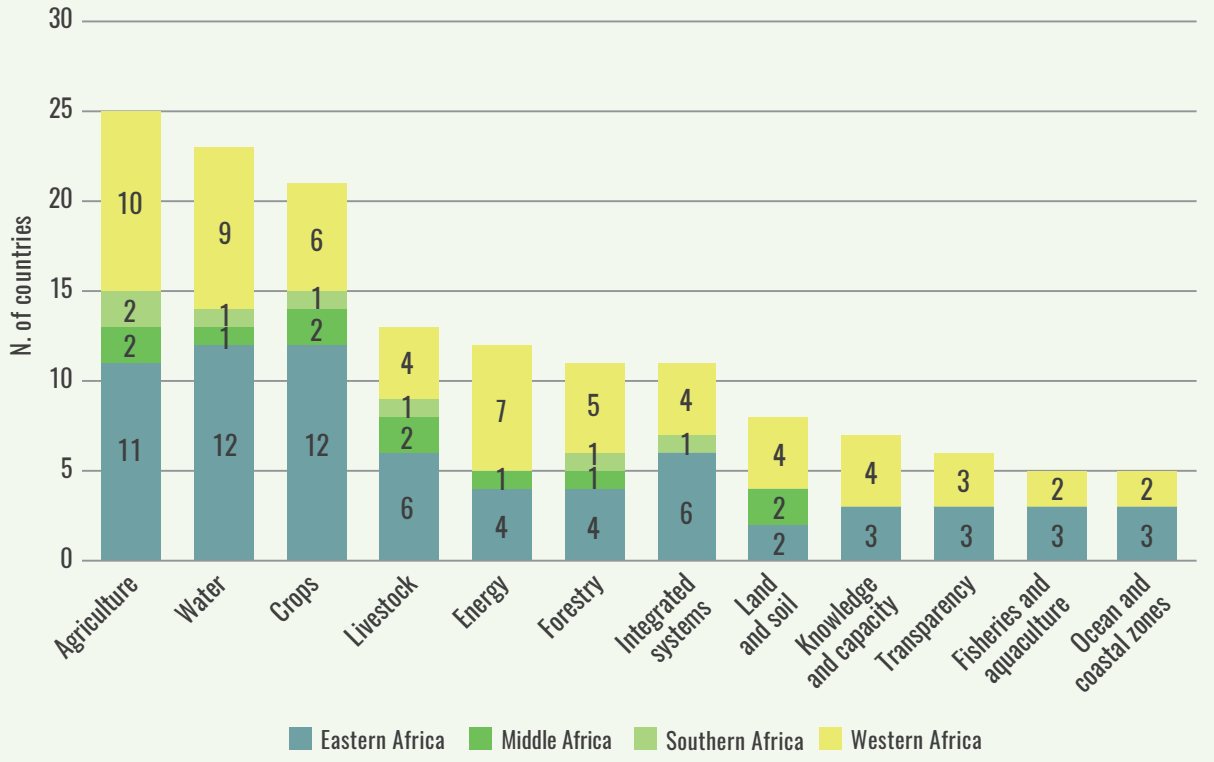
3.4.2 Technology transfer needs

To accelerate the rapid transformational changes needed towards low-emission development and climate resilience, scaling up support in the agriculture and land use sectors in the form of enhanced finance, technology development and transfer and capacity building is a prerequisite.Information on the potential, ability and scale of climate technologies and capacities required for the uptake of climate action in a country is a fundamental starting point for designing technology action plans and capacity-building programmes. The TNA process helps to formulate a country's long- term development plan by identifying priority technologies for key sectors in order to transit to a low emission, climate resilient and sustainable pathway (CTCN, n.d.).[22]

Overall, around ninety percent of all countries in the region report technology transfer needs for NDC implementation in the agriculture and land use sectors (41 countries/87 percent) in the NDCs and/or TNAs. Amongst those, around half report agriculture in general (25 countries/61 percent) as a priority area for technology transfer and dissemination, followed by water (23 countries/56 percent) and the crops sector (21 countries/51 percent). Around one-third of countries identify the livestock secto (13 countries/32 percent) and bioenergy (12 countries/29 percent) as priority areas for technology transfer, while one-fourth reference forestry and integrated systems (11 countries/27 percent), amongst others. **Figure 61** illustrates the priority areas for technology transfer in the agriculture and land use sectors expressed in the NDCs and TNAs (number of countries) at the sub-reginal level.

FIGURE 61.

PRIORITY AREAS FOR TECHNOLOGY TRANSFER AND DISSEMINATION IN THE AGRICULTURE AND LAND USE SECTORS EXPRESSED IN THE NDCs AND TNAs IN SSA, BY SUB-REGION



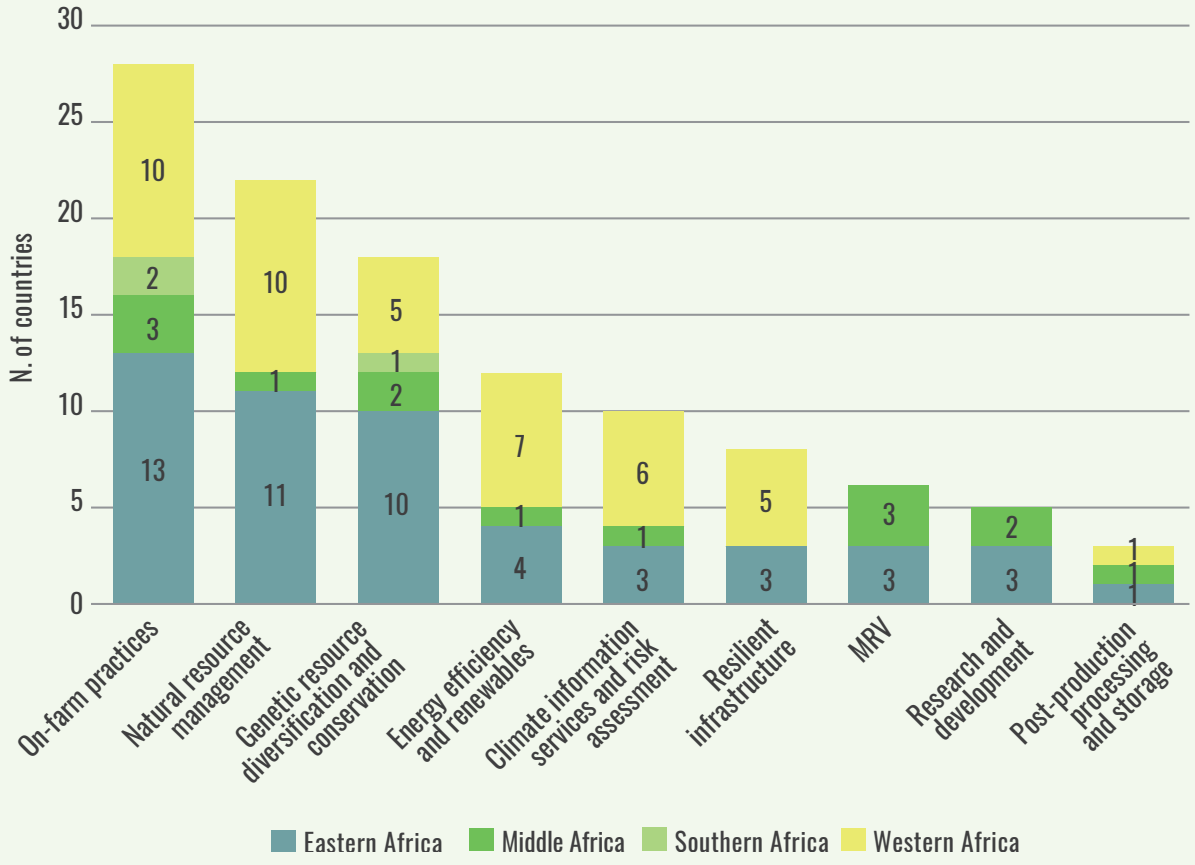
Source: Authors.

[22] https://www.ctc-n.org/technologies/technology-needs-assessments#:~:text=Thepercent20Technologypercent20Needspercent20Assessmentpercent20(TNA,andpercent20adaptationpercent20alreadypercent20inpercent20place.

Across the priority areas for technology transfer and dissemination identified in the agriculture and land use sectors, most countries report on-farm technologies (28 countries/68 percent) and natural resource management technologies (22 countries/54 percent) as most needed, followed by genetic resource conservation and diversification technologies (18 countries/44 percent). Around one-third of countries report technology needs for (bio) energy efficiency and renewables (12 countries/29 percent) and climate information services (10 countries/24 percent). One-fifth report technology needs for resilient infrastructure (8 countries/20 percent) and MRV (6 countries/15 percent) technology needs. Three countries (Liberia, Somalia, Central African Republic) include post-production and processing technologies as a priority need. **Figure 62** illustrates the types of priority technologies for transfer and dissemination in the agriculture and land use sectors expressed in the NDCs and TNAs (number of countries) at the sub-regional level.

FIGURE 62.

PRIORITY TECHNOLOGIES FOR TRANSFER AND DISSEMINATION IN THE AGRICULTURE AND LAND USE SECTORS EXPRESSED IN THE NDCs AND TNAs IN SSA, BY SUB-REGION



Source: Authors.

Table 13 illustrates some country examples of technology needs in the agriculture and land use sectors reported in NDCs and TNAs in the region.

TABLE 13.

EXAMPLES OF PRIORITY TECHNOLOGY NEEDS IN THE AGRICULTURE AND LAND USE SECTORS REPORTED IN NDCs AND TNAs IN THE SSA REGION

COUNTRY NAME	PRIORITY TECHNOLOGY NEED	DESCRIPTION
UNITED REPUBLIC OF TANZANIA	NATURAL RESOURCE MANAGEMENT	RAINWATER HARVESTING
COMOROS	GENETIC RESOURCE DIVERSIFICATION AND CONSERVATION	USE CROP VARIETIES RESISTANT TO DROUGHT
ERITREA	ON FARM PRACTICES	CLIMATE-RESILIENT CROP AND LIVESTOCK PRODUCTION, CROP & ANIMAL INTEGRATED TECHNOLOGIES
MAURITIUS	MRV	DEVELOP GHG INVENTORY
SEYCHELLES	RESEARCH AND DEVELOPMENT	REINFORCE AND ENHANCE THE QUALITY OF STEM (SCIENCE, TECHNOLOGY, ENGINEERING AND MATHEMATICS) EDUCATION AT ALL LEVELS TO DEVELOP A NEW GENERATION MORE CAPABLE OF CLIMATE CHANGE ADAPTATION LEADERSHIP
SOUTH SUDAN	CLIMATE INFORMATION SERVICES AND RISK ASSESSMENT	AVAILABILITY OF METHODS AND TOOLS TO ASSESS CLIMATE IMPACTS, VULNERABILITY AND ADAPTATION IN SPECIFIC SECTORS AND REGIONS; STRENGTHENING AND ESTABLISHING EARLY WARNING SYSTEMS IN THE COUNTRY
ZIMBABWE	DRR	BUILDING RESILIENCE IN MANAGING CLIMATE RELATED DISASTERS (DROUGHT, HAIL, VIOLENT STORMS/WINDS, FROST, HEAT WAVES, ERRATIC RAINFALL AND FLOODS) RISKS

Source: Authors.

3.4.3 Capacity-building needs

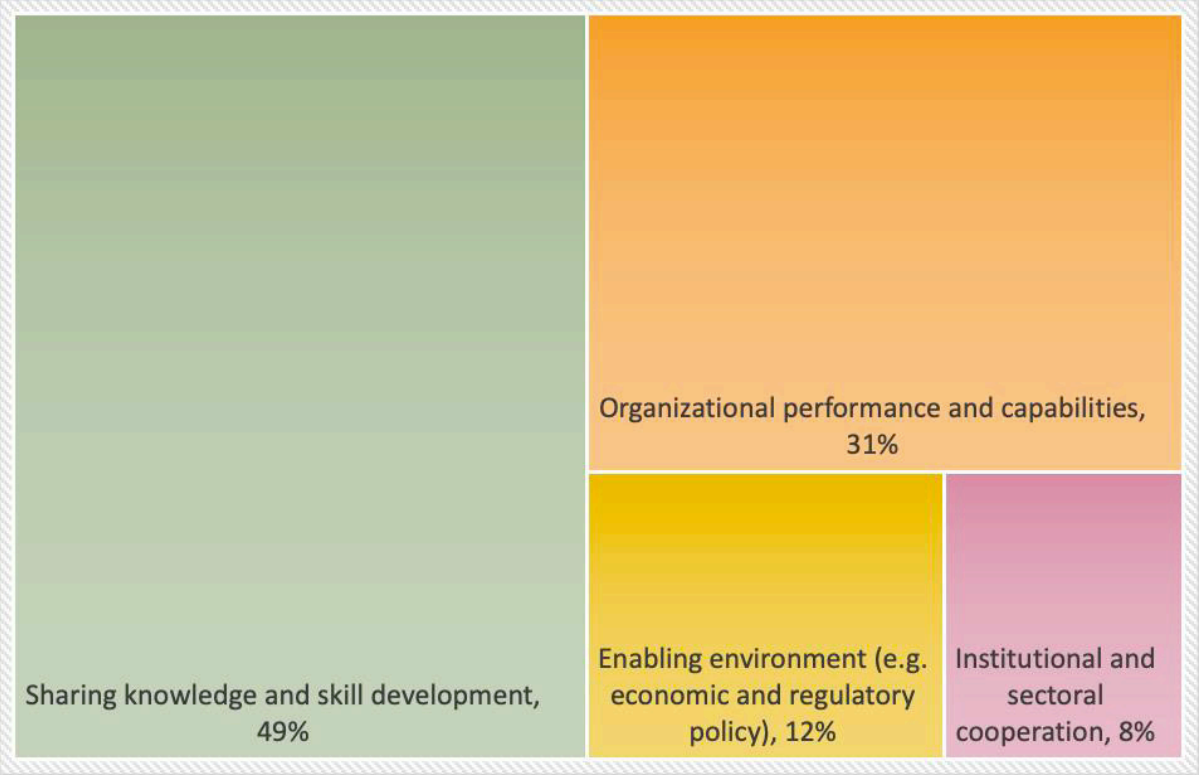
Around half of countries in the region report capacity building needs for NDC implementation in the agriculture and Land use sector (21 countries/45 percent). Amongst those, around half focus on sharing knowledge and skill development. Among these countries, multiple have identified that there is a general lack of knowledge and skills to undertake technical assessments and understand the impacts of climate change in this sector. For example, Eritrea supports the development of technical capacities and skills to conduct and effectively integrate vulnerability and adaptation assessments into sustainable development programmes in order to implement National Adaptation Programmes of Action. Likewise, Cameroon mentioned the need for capacity building support in order to adopt agricultural practices that can help to sustainably intensify agricultural production in this sector. Lesotho identified the need to strengthen capacities of experts and stakeholders in several technical areas such as data collection, preparation, management, ownership, sharing and dissemination. Niger specifically mentioned that there is a general lack of knowledge and understanding of the overall NDC implementation processes. Countries such as Ghana, Benin, Botswana, Cameroon Chad and Equatorial Guinea mentioned the need for training of stakeholders and introduction of climate change related topics at different tiers of the education systems.

One-third focus on organizational performance and capabilities. Burundi, for example, identifies that there aren't enough technical experts in the country to efficiently conduct programmes, research and trainings on climate change. Similarly, Mozambique mentions that the country has weak capacities to design projects in order to access the different climate change related financing mechanisms and funds. Guinea requires enhanced capacities to provide institutional support to appoint and seek accreditation of a national implementing entity, thereby gaining direct access to the Green Climate Fund. Ghana supports the development of a national climate change capacity building plan to guide the organization and coordination of the different capacity development supports available. Zimbabwe identified that increased capacity is required to better manage, communicate and disseminate the results and outcomes of the different studies and projects on climate change risks and actions in the country.

Less than ten percent of countries (10 countries/12 percent) have identified the need for enabling conditions such as economic and regulatory policies in support of NDC implementation processes. Comoros mentions the need for streamlined allocation of financial resources to the various research centres while Gambia recognizes the need for capacity development for formulation of relevant legislations and policy frameworks. 8 countries/22 percent have also identified the need to develop institutional and sectoral cooperation to streamline the process of NDC implementation in their respective countries. Areas of capacity building needs identified includes better coordination among different institutions, stronger partnerships and networks between national, regional and international organizations and better policies and legislations.

FIGURE 63.

ILLUSTRATES THE TYPES OF CAPACITY-BUILDING NEEDS FOR NDC IMPLEMENTATION REPORTED IN NDCs AND TNAs IN SSA, BY SHARE OF TOTAL



Source: Authors.

3.5 NDC PLANNING PROCESSES

Under COP24 decision 4/CMA1 on information to facilitate CTU, Parties are expected to provide a description of the various planning processes underlying the preparation of NDCs, as well as the processes, either planned or already established, to accompany NDC implementation and track its progress. Such institutional arrangements provide the enabling environment for an iterative planning process that presents an opportunity to ensure that climate action is smart, forward-looking, and inclusive. The INDC (and later the NDC) planning processes differed across countries and regions, depending on the domestic circumstances, national and international environmental commitments, and lastly, country capacities to undertake a consultative process to formulate the NDC.

This section provides a synthesis of the types of planning processes underlying NDC formulation, implementation and reporting in general and in the agriculture and land use sectors, as described in the NDCs.

The majority of countries in the region include information on domestic institutional arrangements and coordination mechanisms (42 countries/89 percent), and information on domestic implementation mechanism and monitoring systems, (27 countries/57 percent), while very few include information on policy mainstreaming and budget integration processes (8 countries/17 percent), knowledge and evidence generation (Eritrea, Mauritius) and international policy processes and cooperation (Mozambique, Sierra Leone and Côte d'Ivoire). **Table 14** illustrates the types of NDC planning processes described in the NDCs (number of countries and share of total with NDC).

TABLE 14.

TYPES OF PLANNING PROCESSES FOR NDC FORMULATION, IMPLEMENTATION AND REPORTING IN SSA

NDC PLANNING PROCESSES	N. OF COUNTRIES IN SSA	PERCENT OUT OF COUNTRIES WITH NDC
DOMESTIC INSTITUTIONAL ARRANGEMENTS AND COORDINATION MECHANISMS	**42**	**89%**
CROSS-SECTORAL COORDINATION MECHANISMS BETWEEN NDC AND OTHER KEY POLICY PROCESSES	25	53%
CROSS-SECTORAL COORDINATION MECHANISMS FOR NDC PROCESSES	4	9%
NDC AND SECTORAL FOCAL POINTS	18	38%
STAKEHOLDER ENGAGEMENT	29	62%
POLICY COHERENCE AND BUDGETING PROCESSES	**8**	**17%**
POLICY MAINSTREAMING AND BUDGET INTEGRATION	17	36%
POLICY OPTION PRIORITIZATION	4	9%
PROJECT DEVELOPMENT AND CLIMATE FINANCE MOBILIZATION	12	26%
KNOWLEDGE AND EVIDENCE GENERATION	**2**	**4%**
SHARING BEST PRACTICES AND EXPERIENCES FOR ENHANCED NDCS	1	2%
VULNERABILITY AND CAPACITY ANALYSIS	1	2%
DOMESTIC IMPLEMENTATION MECHANISMS AND MONITORING SYSTEMS	**27**	**57%**
INSTITUTIONAL ARRANGEMENTS FOR MONITORING AND EVALUATING NDC IMPLEMENTATION	11	23%
INSTITUTIONAL ARRANGEMENTS FOR TRACKING AND REPORTING NDC PROGRESS	18	38%
NDC IMPLEMENTATION PLAN	2	4%
INTERNATIONAL POLICY PROCESSES AND COOPERATION	**2**	**4%**
ENGAGEMENT IN UNFCCC PROCESSES	1	2%
PARTICIPATION IN REGIONAL ECONOMIC INTEGRATION ORGANIZATIONS TO ACT JOINTLY IN CONTRIBUTION TO GOALS OF PA	1	2%

Notes: A country may communicate more than one type of policy process per category.

Source: Authors.

Amongst the types of domestic institutional arrangements and coordination mechanisms related to NDC planning, many countries provide information on NDC and sectoral focal points, stakeholder engagement processes and cross-sectoral coordination mechanisms set up between the NDCs and other key policy processes.Several countries in the region had established national committees comprising relevant ministries and government representatives to formulate the NDCs. For example, in Madagascar, the National Bureau of Climate Change Coordination will take the lead in coordinating, facilitating, supervising, and monitoring the effective implementation of the NDC. Likewise, the Ministry of Environment will lead the implementation process in Burundi while it will be coordinated by the National Climate Change Council in Kenya. Multiple countries such as Mozambique, Ethiopia, Kenya and Rwanda have also ensured that the NDCs were developed through consultative and participatory processes.

Many countries have also reported various initiatives under domestic implementation mechanisms and monitoring systems such as institutional arrangements for monitoring and evaluating NDC implementation, tracking and reporting NDC progress and developing NDC implementation plans. For example, in Rwanda, have been set up the Green Economy Technical Coordinating Committee for

coordinating and monitoring the implementation of the adaptation and mitigation actions in the different sectors, and the National Fund for Environment and Climate change to mobilize additional internal and external climate funds. The Ministry of Natural Resources will be responsible to monitor and evaluate the implementation of INDCs through regular statutory stakeholders' consultative engagement including the Environment and Natural Resources Joint Sector Review meetings. Likewise, the Ministry of Environment and Forest in Ethiopia will regularly organize consultative dialogues to review the implementation of the national and sectoral adaptation plans as part of the NDC implementation process. In the Seychelles, the Department Energy and Climate Change of the Ministry of Environment, Energy and Climate Change (DECC), under the Chair of the National Focal Point for Climate Change who is also the Head of the DECC is responsible for implementing, monitoring and evaluating the process.

The need for policy mainstreaming and budget integration through policy options prioritization and project development and climate finance mobilization has also been identified by a few countries in the region. In countries such as Eritrea and Ethiopia, the NDCs were developed in alignment with several existing national plans and policy frameworks. The Ethiopian government has also established a national fund, the Climate Resilient Green Economy Facility, as a mechanism to mobilize finance from various sources to attract necessary investments. A similar climate fund is also expected to be supporting and driving several of the priority climate change activities in Kenya. Zambia will integrate its NDC into existing planning processes, which will be further supported by national allocations to the priority sectors, ministries and sub national authorities.

CHAPTER 4

CHAPTER

4

GAP AND OPPORTUNITY ANALYSIS FOR THE AGRICULTURE AND LAND USE SECTORS IN THE NDCs

4.1 NDC BASELINE AND EMISSION REDUCTION TARGET SCENARIOS

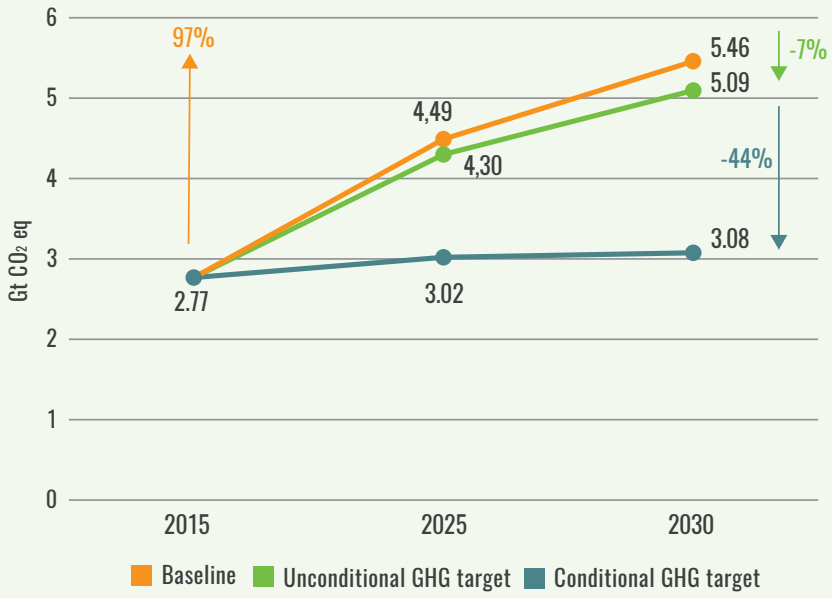
Based on national GHG inventory data of all countries and the emission reduction scenarios reported in the NDCs of 41 countries[23] in the SSA region, this section depicts three emission scenarios: 2015 historical emission levels (2015), baseline emission levels "without" NDC implementation (2030) and target emission levels "with" NDC implementation. For those countries with a GHG target and baseline emission levels reported in the NDC, the target emission levels were estimated at the country level. For those countries with a GHG target but no baseline emission level reported in the NDC, the baseline was extrapolated based on the country's historical emission level and the sub-regional baseline trend (that is the average change in baseline net emissions between 2015 and 2030). For those countries without a GHG target and baseline emission levels reported in the NDC, the baseline was extrapolated based on the country's historical emission level and the regional baseline trend. For those countries without a GHG target, their 2030 emission levels "with" and "without" NDC implementation are identical. The uncertainty and limitations of the analysis should be acknowledged given the variation in national GHG inventory methods and accuracy; lack of transparency in baseline emission scenarios; and limits to the representativeness of regional trends due to scare national data provided in the NDCs. It should be noted that the target scenarios refer to economy-wide or sector-specific GHG targets and do not consider the aggregate impact of individual mitigation measures. Refer to FAO (2021) for further details on the methodology behind the GHG emission scenarios under NDC implementation.

[23] Out of the 47 countries in the region, 6 do not communicate a GHG target (Rwanda, Somalia, South Sudan, Swaziland, Cape Verde and Guinea-Bissau).

Without NDC implementation, net emissions are expected to double by 2030 in SSA, compared to 2015 levels, rising from 2.77 to 5.46 Gt of CO_2 eq. The expected reduction in net emissions if unconditional NDC mitigation targets are met is around 7 percent,[24] while meeting conditional targets would imply another 44 percent reduction by 2030, compared to the baseline scenario.[25] This equates to 3.08 Gt CO_2 eq in 2030. Despite NDC implementation, however, total net emissions are nonetheless expected to rise by around 10 percent compared to the 2015 starting levels. **Figure 64** illustrates the 2015 historical, 2025 and 2030 baseline and 2025 and 2030 NDC target GHG emission scenarios as either communicated in the NDCs or extrapolated by FAO using the methodology described above (Gt CO_2 eq).

FIGURE 64.

ECONOMY-WIDE GHG EMISSION SCENARIOS "WITH" AND "WITHOUT" NDC IMPLEMENTATION IN SSA



Source: Authors.

4.1.1 Economy-wide scenarios

In eastern Africa, net emissions are expected to rise by around two-thirds (67 percent) by 2030, compared to 2015 levels, rising from 0.80 to 1.35 Gt of CO_2 eq. The expected reduction in net emissions if unconditional mitigation targets are implemented is around 3 percent,[26] while conditional targets imply another 35 percent reduction by 2030, compared to the baseline scenario.[27] This equates to 0.88 Gt CO_2 eq in 2030. Despite NDC implementation, however, total net emissions are nonetheless expected to rise by around 10 percent compared to the 2015 starting levels. **Figure 65** illustrates the 2015 historical, 2025 and 2030 baseline and 2025 and 2030 NDC target GHG emission scenarios as either communicated in the NDCs or extrapolated by FAO using the methodology described above (Gt CO_2 eq).

In middle Africa, net emissions are expected to rise by around one-third (28 percent) by 2030, compared to 2015 levels, rising from 0.84 to 1.08 Gt of CO_2 eq. The expected reduction in net emissions if unconditional mitigation targets are implemented is around 9 percent,[28] while conditional targets imply another

[24] Twenty countries in the region communicate an unconditional GHG target.

[25] Net reduction estimated based on GHG targets and baselines referenced by 41 countries in the region.

[26] Five countries in the region communicate an unconditional GHG target.

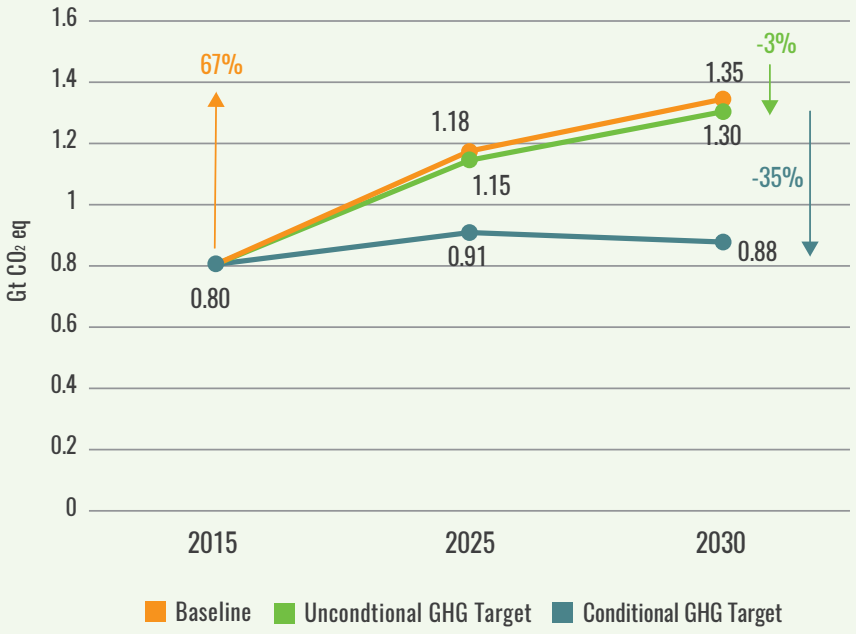
[27] Net emission reduction estimated based on GHG target expressed by all countries in the sub-region; Somalia, South Sudan and Rwanda did not communicate a GHG target.

[28] Four countries in the region communicate an unconditional GHG target.

32 percent reduction by 2030, compared to the baseline scenario. This equates to 0.73 Gt CO_2 eq in 2030. Middle Africa is the only sub-region where net emissions are expected to fall under NDC implementation when compared to the 2015 starting level. **Figure 66** illustrates the 2015 historical, 2025 and 2030 baseline and 2025 and 2030 NDC target GHG emission scenarios as either communicated in the NDCs or extrapolated based on methodology in FAO (2021).

FIGURE 65.

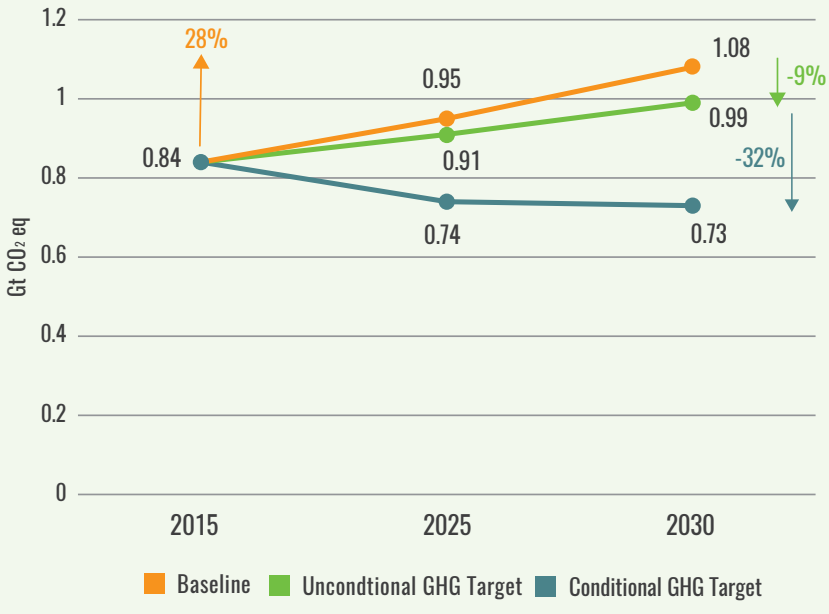
ECONOMY-WIDE GHG EMISSION SCENARIOS "WITH" AND "WITHOUT" NDC IMPLEMENTATION IN EASTERN AFRICA



Source: FAO elaboration of NDC targets in eastern Africa.

FIGURE 66.

ECONOMY-WIDE GHG EMISSION SCENARIOS "WITH" AND "WITHOUT" NDC IMPLEMENTATION IN MIDDLE AFRICA

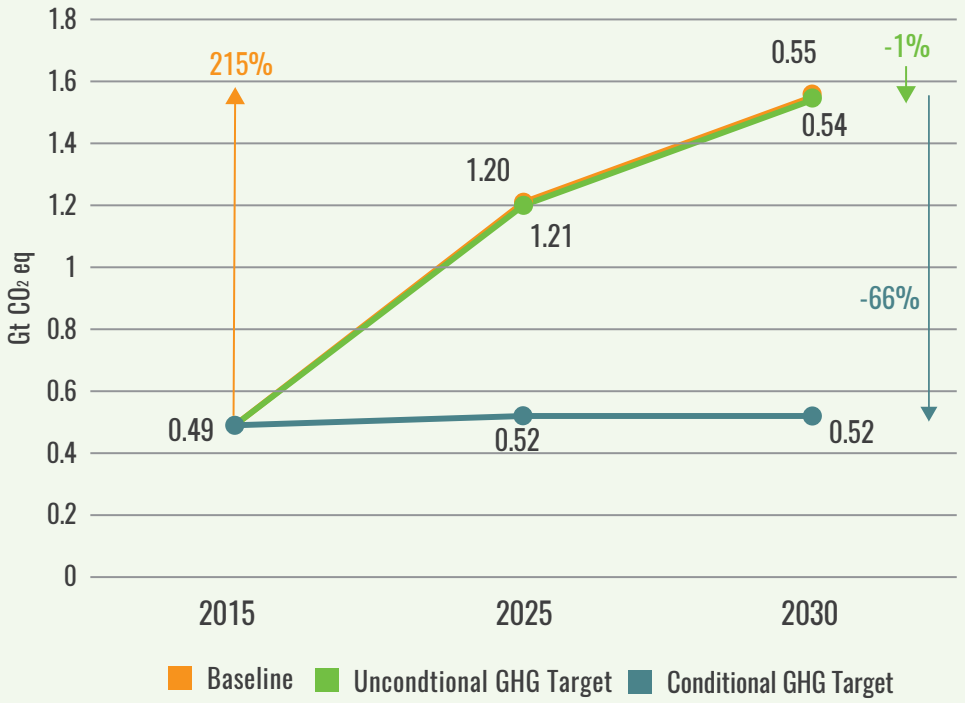


Source: Authors.

In southern Africa, net emissions are expected to triple (215 percent) by 2030, compared to 2015 levels, rising from 0.49 to 1.54 Gt of CO_2 eq. The expected reduction in net emissions if unconditional mitigation targets are implemented is around 1 percent,[29] while conditional targets imply another 66 percent reduction by 2030, compared to the baseline scenario.[30] This equates to 0.52 Gt CO_2 eq in 2030. Despite NDC implementation, however, total net emissions are nonetheless expected to rise by around 5 percent compared to the 2015 starting levels. It should be noted that this scenario is based on the data provided by only two out of five countries in the sub-region, accounting for the significant difference between conditional and unconditional scenarios at the regional level. **Figure 67** illustrates the 2015 historical, 2025 and 2030 baseline and 2025 and 2030 NDC target GHG emission scenarios as either communicated in the NDCs or extrapolated based on methodology in FAO (2021).

FIGURE 67.

ECONOMY-WIDE GHG EMISSION SCENARIOS "WITH" AND "WITHOUT" NDC IMPLEMENTATION IN SOUTHERN AFRICA



Source: Authors.

In western Africa, net emissions are expected to more than double (135 percent) by 2030, compared to 2015 levels, rising from 0.63 to 1.48 Gt of CO_2 eq. The expected reduction in net emissions if unconditional mitigation targets are implemented is around 15 percent,[31] while conditional targets imply another 36 percent reduction by 2030, compared to the baseline scenario.[32] This equates to 0.95 Gt CO_2 eq in 2030. Despite NDC implementation, however, total net emissions are nonetheless expected to rise by around 50 percent compared to the 2015 starting levels. **Figure 68** illustrates the 2015 historical, 2025 and 2030 baseline and 2025 and 2030 NDC target GHG emission scenarios as either communicated in the NDCs or extrapolated based on methodology in FAO (2021).

[29] Two countries in the region communicate an unconditional GHG target.

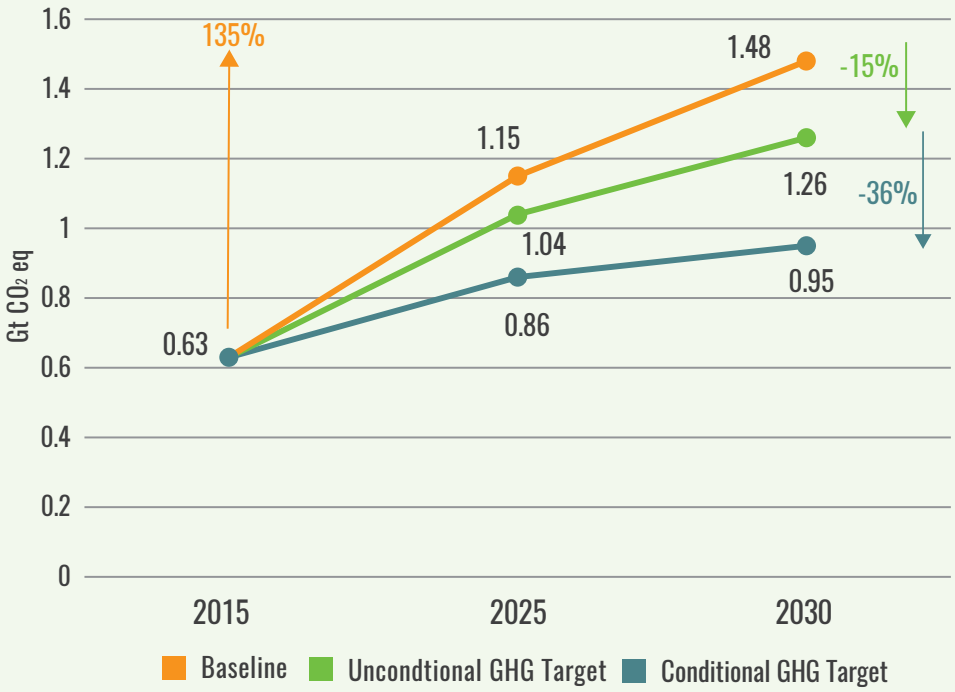
[30] Net emission reduction estimated based on countries in the sub-region with a GHG target; Swaziland did not communicate a GHG target.

[31] Nine countries in the region communicate an unconditional GHG target.

[32] Net emission reduction estimated based on countries in the sub-region with a GHG target; Cape Verde and Guinea-Bissau did not communicate a GHG target.

FIGURE 68.

ECONOMY-WIDE GHG EMISSION SCENARIOS "WITH" AND "WITHOUT" NDC IMPLEMENTATION IN WESTERN AFRICA



Source: Authors.

Without NDC implementation, net emissions in agriculture are expected to rise by around 80 percent by 2030 in SSA, compared to 2015 levels, rising from 1.04 to 1.87 Gt of CO_2 eq. The expected reduction[33] in net emissions if unconditional NDC mitigation targets are implemented is 1 percent,[34] while conditional targets imply another 12 percent reduction by 2030, compared to the baseline scenario. This equates to 1.65 Gt CO_2 eq in 2030. Despite NDC implementation, however, total net emissions are nonetheless expected to rise by around 60 percent compared to the 2015 starting levels. **Figure 69** illustrates the 2015 historical, 2025 and 2030 baseline and 2025 and 2030 NDC target GHG emission scenarios as either communicated in the NDCs or extrapolated based on methodology in FAO (2021).

4.1.2 Agriculture sector scenarios

In eastern Africa, net emissions in the agriculture sector are expected to rise by around 41 percent by 2030 in SSA, compared to 2015 levels, rising from 590 to 833 Mt of CO_2 eq. The expected reduction[35] in net emissions if conditional mitigation targets are implemented is 11 percent by 2030,[36] compared to the baseline scenario. This equates to 739 Mt CO_2 eq in 2030. Despite NDC implementation, however, total net emissions are nonetheless expected to rise by around 25 percent compared to the 2015 starting levels. **Figure 70** illustrates the 2015 historical, 2025 and 2030 baseline and 2025 and 2030 NDC target GHG emission scenarios as either communicated in the NDCs or extrapolated based on methodology in FAO (2021).

[33] Net reduction estimated based on sectoral GHG targets and baselines referenced by 16 countries in the region.

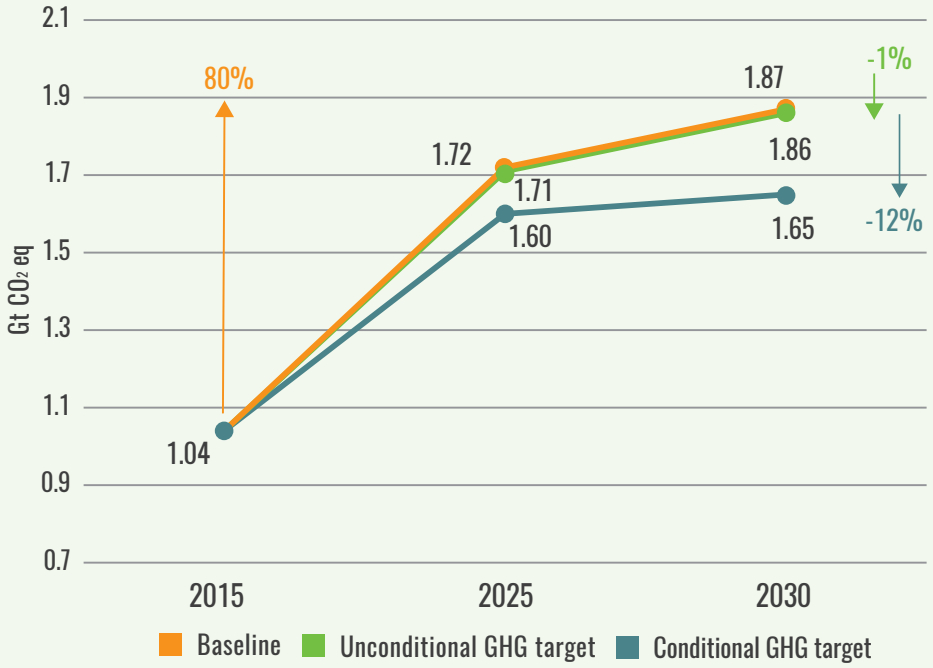
[34] Seven countries in the region communicate an unconditional GHG target.

[35] Net reduction estimated based on sectoral GHG targets and baselines referenced by 4 countries (Comoros, Ethiopia, Madagascar and Malawi) in the sub-region.

[36] Only one country in the region communicates an unconditional GHG target.

FIGURE 69.

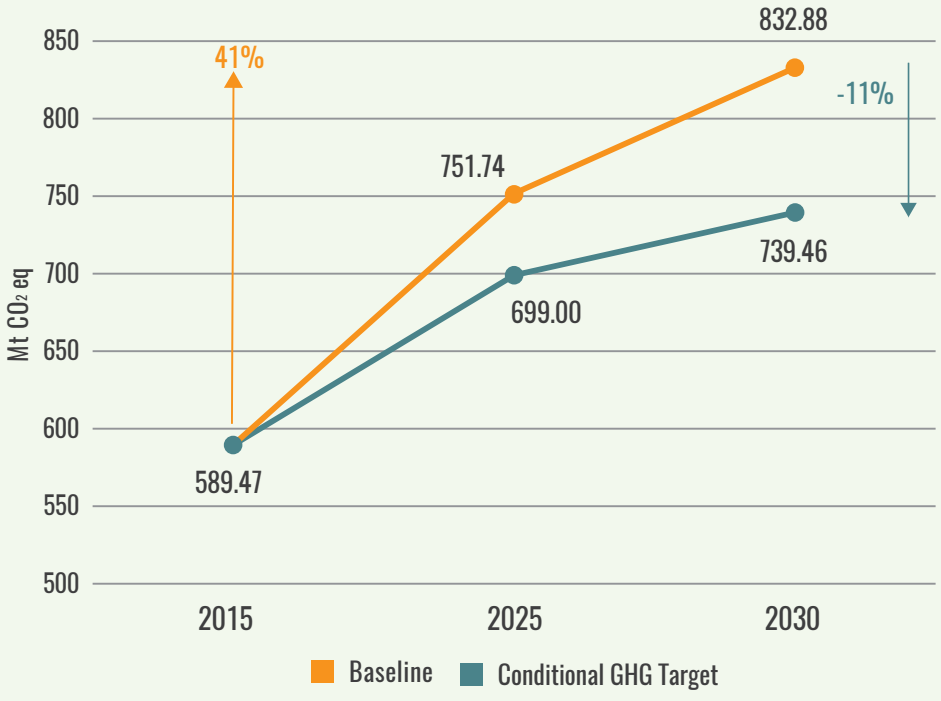
GHG EMISSION SCENARIOS IN THE AGRICULTURE SECTOR "WITH" AND "WITHOUT" NDC IMPLEMENTATION IN SSA



Source: Authors.

FIGURE 70.

GHG EMISSION SCENARIOS IN THE AGRICULTURE SECTOR "WITH" AND "WITHOUT" NDC IMPLEMENTATION IN EASTERN AFRICA

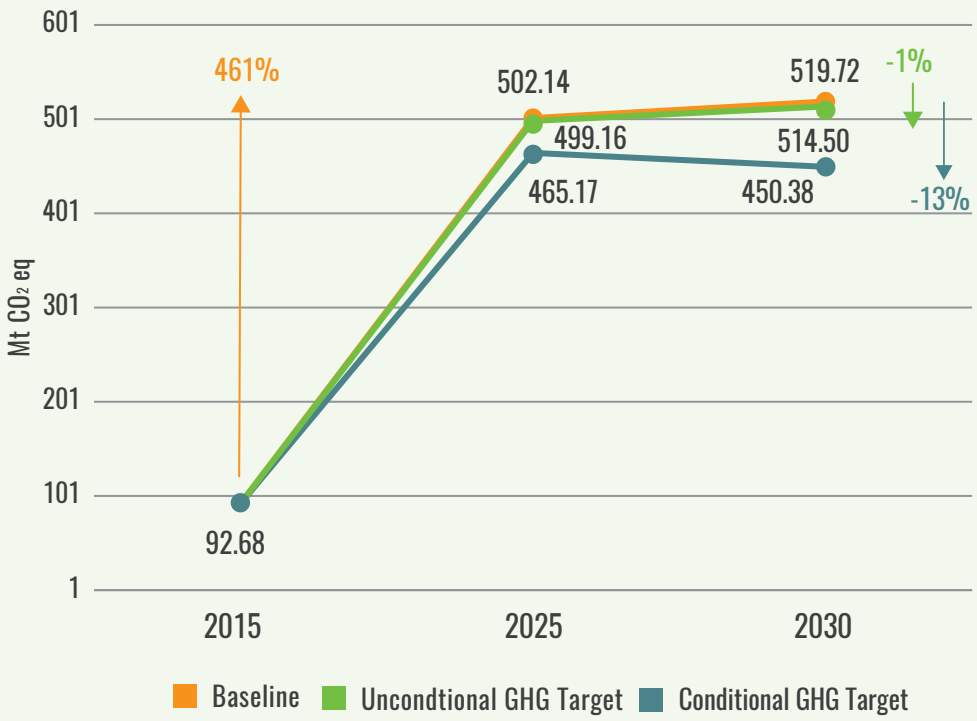


Source: Authors.

In middle Africa, net emissions in the agriculture sector are expected to rise by around 500 percent by 2030 in SSA, compared to 2015 levels, rising from 92 to 502 Mt of CO_2 eq. The expected reduction[37] in net emissions if unconditional mitigation targets are implemented is 1 percent,[38] while conditional targets imply another 13 percent reduction by 2030, compared to the baseline scenario. This equates to 450 Mt CO_2 eq in 2030. Despite NDC implementation, however, total net emissions are nonetheless expected to rise by around 380 percent compared to the 2015 starting levels. **Figure 71** illustrates the 2015 historical, 2025 and 2030 baseline and 2025 and 2030 NDC target GHG emission scenarios as either communicated in the NDCs or extrapolated based on methodology in FAO (2021).

FIGURE 71.

GHG EMISSION SCENARIOS IN THE AGRICULTURE SECTOR "WITH" AND "WITHOUT" NDC IMPLEMENTATION IN MIDDLE AFRICA



Source: Authors.

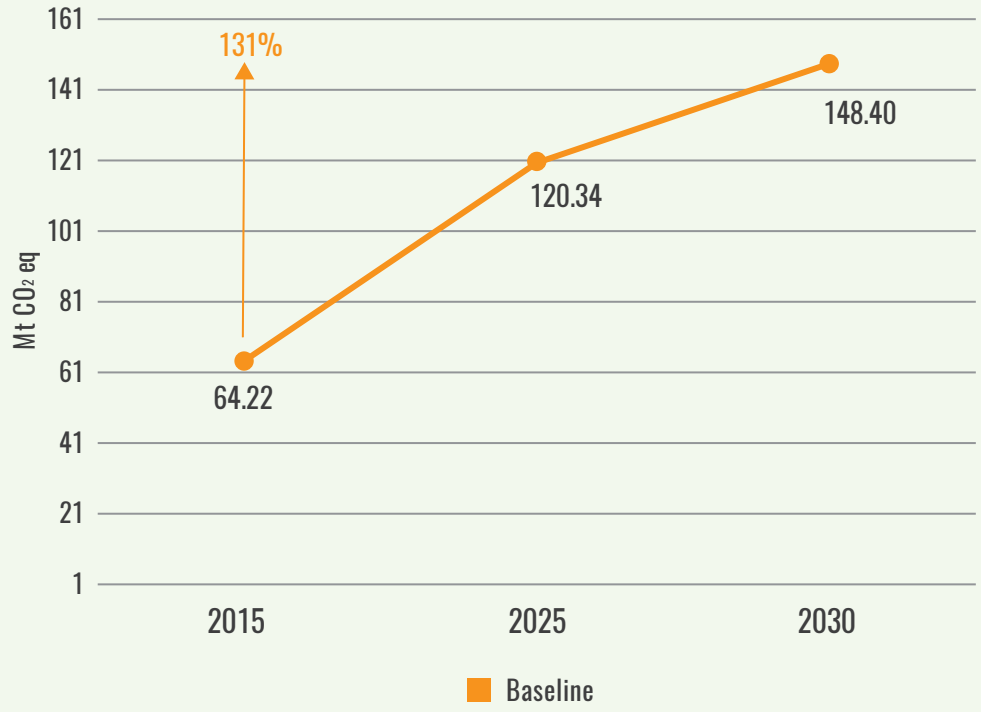
In southern Africa, net emissions in the agriculture sector are expected to rise by around 130 percent by 2030 in SSA, compared to 2015 levels, rising from 64 to 148 Mt of CO_2 eq. One country (Namibia) in the sub-region communicates a sectoral GHG target. However, the impact of the country's net emission reduction, at the sub-regional level, would have an impact of -0.01 percent in 2030 compared to the baseline. **Figure 72** illustrates the 2015 historical, 2025 and 2030 baseline and 2025 and 2030 NDC target GHG emission scenarios as either communicated in the NDCs or extrapolated based on methodology in FAO (2021).

[37] Net reduction estimated based on sectoral GHG targets and baselines referenced by 4 countries (Cameroon, Chad, Congo, Democratic Republic of Congo) in the region.

[38] Three countries in the region communicate an unconditional GHG target.

FIGURE 72.

GHG EMISSION SCENARIOS IN THE AGRICULTURE SECTOR IN SOUTHERN AFRICA



Source: Authors.

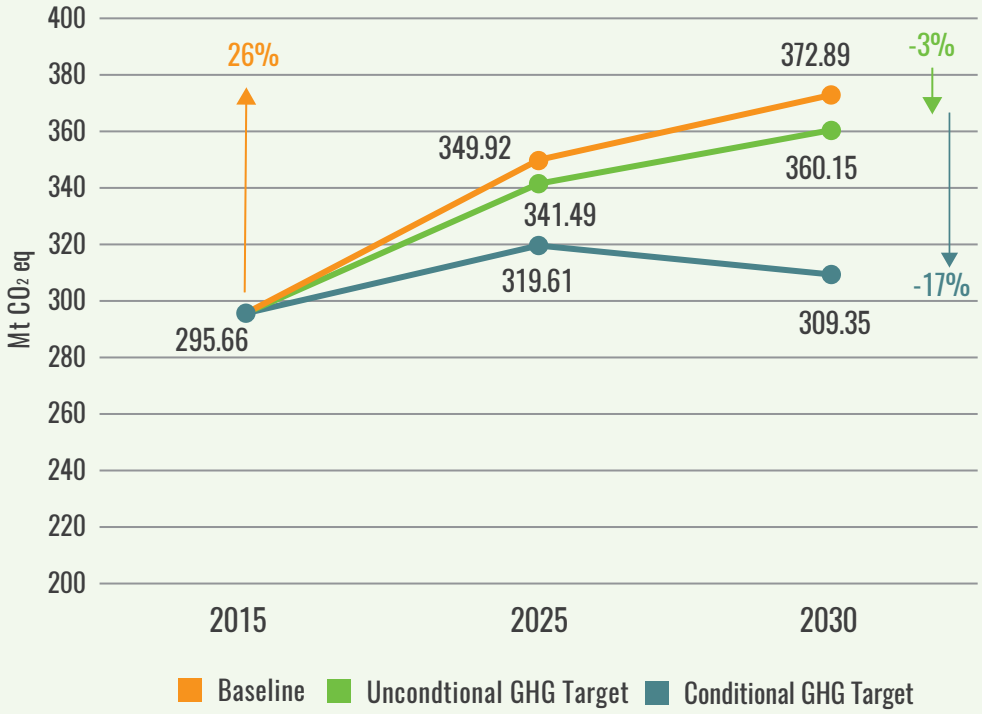
In western Africa, net emissions in the agriculture sector are expected to rise by around 26 percent by 2030 in SSA, compared to 2015 levels, rising from 296 to 373 Mt of CO_2 eq. The expected reduction[39] in net emissions if unconditional mitigation targets are implemented is 3 percent,[40] while conditional targets imply another 17 percent reduction by 2030, compared to the baseline scenario. This equates to 309 Mt CO_2 eq in 2030. Despite NDC implementation, however, total net emissions are nonetheless expected to rise by around 5 percent compared to the 2015 starting levels. **Figure 73** illustrates the 2015 historical, 2025 and 2030 baseline and 2025 and 2030 NDC target GHG emission scenarios as either communicated in the NDCs or extrapolated based on methodology in FAO (2021).

[39] Net reduction estimated based on sectoral GHG targets and baselines referenced by 7 countries (Burkina Faso, Cape Verde, Côte d'Ivoire, Gambia, Mali, Nigeria and Senegal) in the region.

[40] Three countries in the region communicate an unconditional GHG target.

FIGURE 73.

GHG EMISSION SCENARIOS IN THE AGRICULTURE SECTOR "WITH" AND "WITHOUT" NDC IMPLEMENTATION IN WESTERN AFRICA



Source: Authors.

4.1.3 Land use, land-use change and forestry (LULUCF) sector scenarios

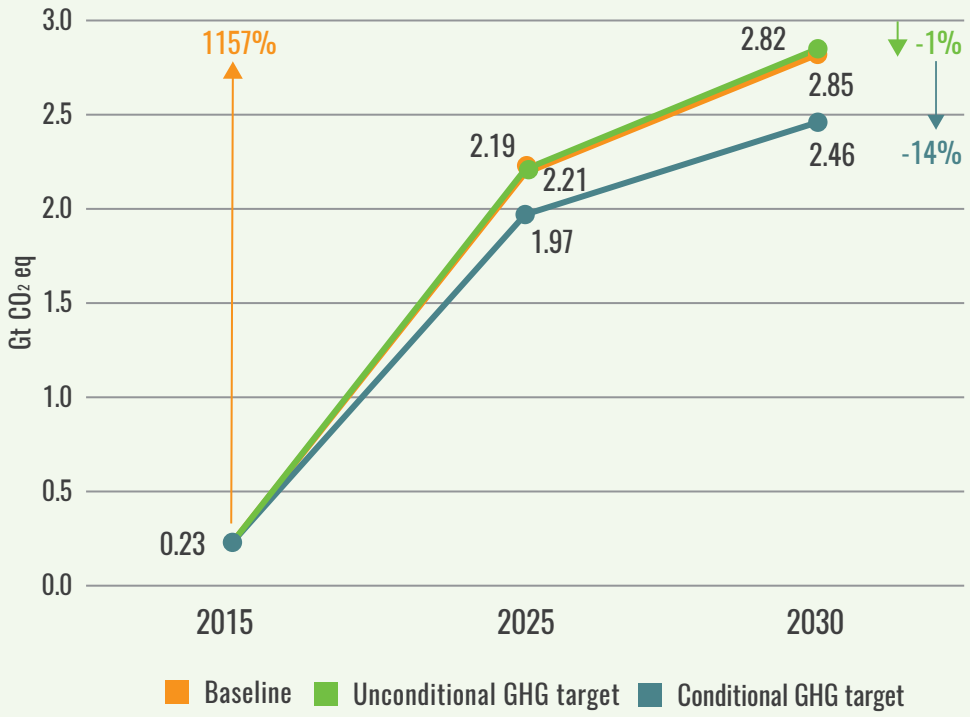
In the LULUCF sector, net emissions are expected to rise by tenfold by 2030 in SSA, compared to 2015 levels, rising from 0.23 to 2.82 Gt of CO_2 eq. The expected reduction[41] in net emissions if unconditional mitigation targets are implemented is 1 percent,[42] while conditional targets imply another 14 percent reduction by 2030, compared to the baseline scenario. This equates to 2.46 Gt CO_2 eq in 2030. Despite NDC implementation, however, total net emissions are nonetheless expected to rise by ninefold compared to the 2015 starting levels. **Figure 74** illustrates the 2015 historical, 2025 and 2030 baseline and 2025 and 2030 NDC target GHG emission scenarios as either communicated in the NDCs or extrapolated based on methodology in FAO (2021).

[41] Net reduction estimated based on sectoral GHG targets and baselines referenced by 15 countries in the region.

[42] Eleven countries in the region communicate an unconditional GHG target.

FIGURE 74.

GHG EMISSION SCENARIOS FOR THE LULUCF SECTOR "WITH" AND "WITHOUT" NDC IMPLEMENTATION IN SSA



Source: Authors.

In eastern Africa, the net emissions in the LULUCF sector are expected to more than double (146) percent by 2030, compared to 2015 levels, rising from 667 to 1 627 Mt of CO_2 eq. The expected reduction[43] in net emissions if unconditional mitigation targets are implemented is 1 percent,[44] while conditional targets imply another 13 percent reduction by 2030, compared to the baseline scenario. This equates to 1 433 Mt CO_2 eq in 2030. Despite NDC implementation, however, total net emissions are nonetheless expected to rise by around 115 percent compared to the 2015 starting levels. **Figure 75** illustrates the 2015 historical, 2025 and 2030 baseline and 2025 and 2030 NDC target GHG emission scenarios as either communicated in the NDCs or extrapolated based on methodology in FAO (2021).

In middle Africa, the net emissions in the LULUCF sector are expected to rise by around 50 percent by 2030, compared to 2015 levels, rising from 341 to 534 Mt of CO_2 eq. The expected reduction[45] in net emissions if conditional mitigation targets are implemented is 20 percent by 2030,[46] compared to the baseline scenario. This equates to 425 Mt CO_2 eq in 2030. Despite NDC implementation, however, total net emissions are nonetheless expected to rise by around 25 percent compared to the 2015 starting levels. **Figure 76** illustrates the 2015 historical, 2025 and 2030 baseline and 2025 and 2030 NDC target GHG emission scenarios as either communicated in the NDCs or extrapolated based on methodology in FAO (2021).

[43] Net reduction estimated based on sectoral GHG targets expressed by 5 countries (Comoros, Ethiopia, Madagascar, Malawi and United Republic of Tanzania) in the region.

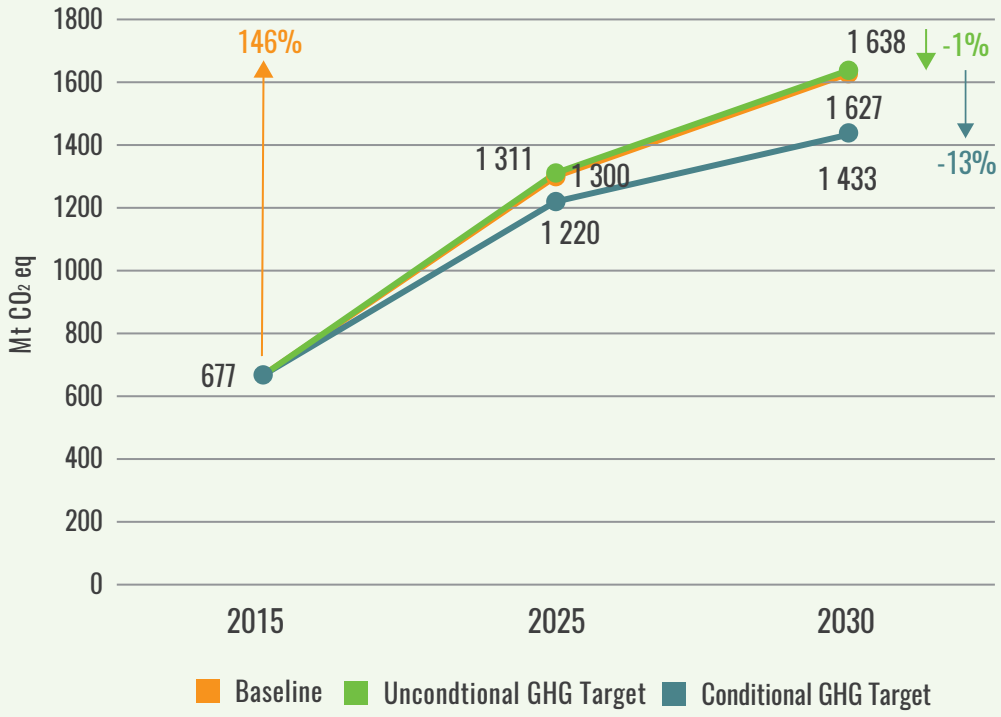
[44] Two countries in the region communicate an unconditional GHG target.

[45] Net reduction estimated based on sectoral GHG targets expressed by 4 countries (Angola, Chad, Gabon and Democratic Republic of Congo) in the region.

[46] Three countries in the region communicate an unconditional GHG target.

FIGURE 75.

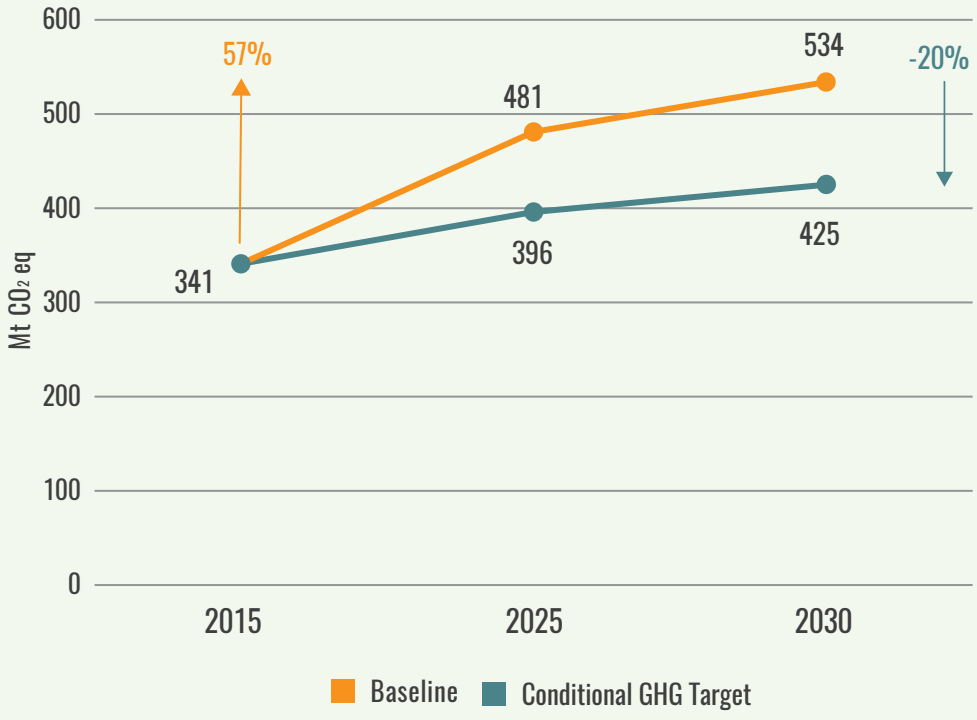
GHG EMISSION SCENARIOS FOR THE LULUCF SECTOR "WITH" AND "WITHOUT" NDC IMPLEMENTATION IN EASTERN AFRICA



Source: Authors.

FIGURE 76.

GHG EMISSION SCENARIOS FOR THE LULUCF SECTOR "WITH" AND "WITHOUT" NDC IMPLEMENTATION IN MIDDLE AFRICA

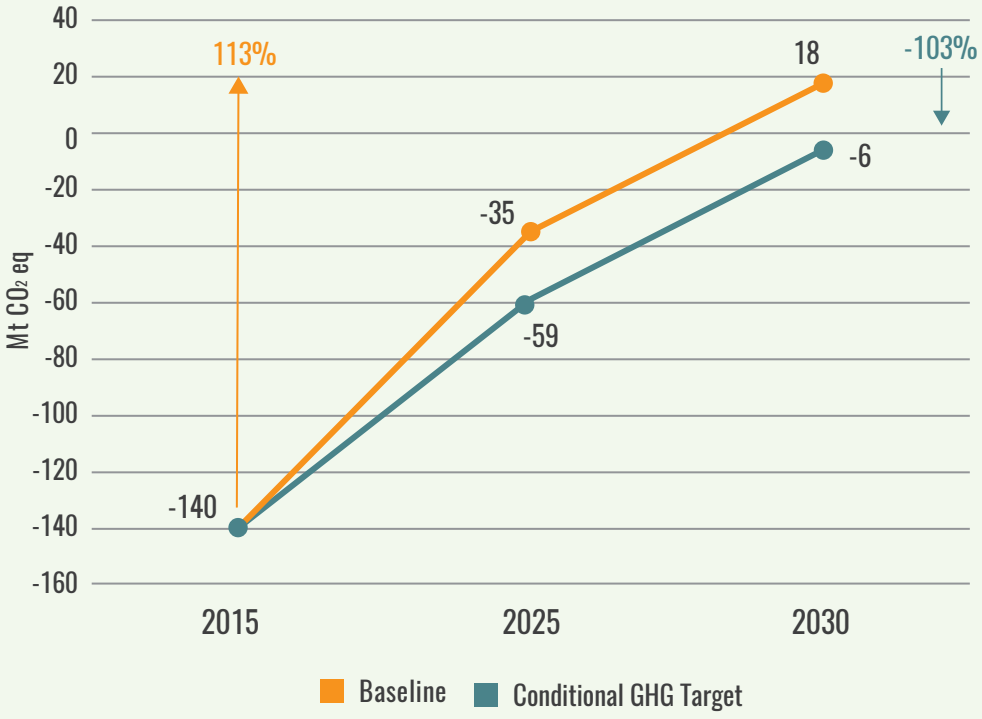


Source: Authors.

In southern Africa, the net emissions in the LULUCF sector are expected to rise by around 113 percent by 2030, compared to 2015 levels, rising from -140 to 18 Mt of CO_2 eq. The expected reduction[47] in net emissions if conditional mitigation targets are implemented is 103 percent by 2030, compared to the baseline scenario. This equates to -1 Mt CO_2 eq in 2030. Despite NDC implementation, however, total net emissions are nonetheless expected to rise by around 100 percent compared to the 2015 starting levels. **Figure 77** illustrates the 2015 historical, 2025 and 2030 baseline and 2025 and 2030 NDC target GHG emission scenarios as either communicated in the NDCs or extrapolated based on methodology in FAO (2021).

FIGURE 77.

GHG EMISSION SCENARIOS FOR THE LULUCF SECTOR "WITH" AND "WITHOUT" NDC IMPLEMENTATION IN SOUTHERN AFRICA



Source: Authors.

In western Africa, the net emissions in the LULUCF sector are expected to rise by around 200 percent by 2030, compared to 2015 levels, rising from -640 to 660 Mt of CO_2 eq. The expected reduction[48] in net emissions if unconditional mitigation targets are implemented is 1 percent,[49] while conditional targets imply another 10 percent reduction by 2030, compared to the baseline scenario. This equates to 594 Mt CO_2 eq in 2030. Despite NDC implementation, however, total net emissions are nonetheless expected to rise by around 190 percent compared to the 2015 starting levels. **Figure 78** illustrates the 2015 historical, 2025 and 2030 baseline and 2025 and 2030 NDC target GHG emission scenarios as either communicated in the NDCs or extrapolated based on methodology in FAO (2021).

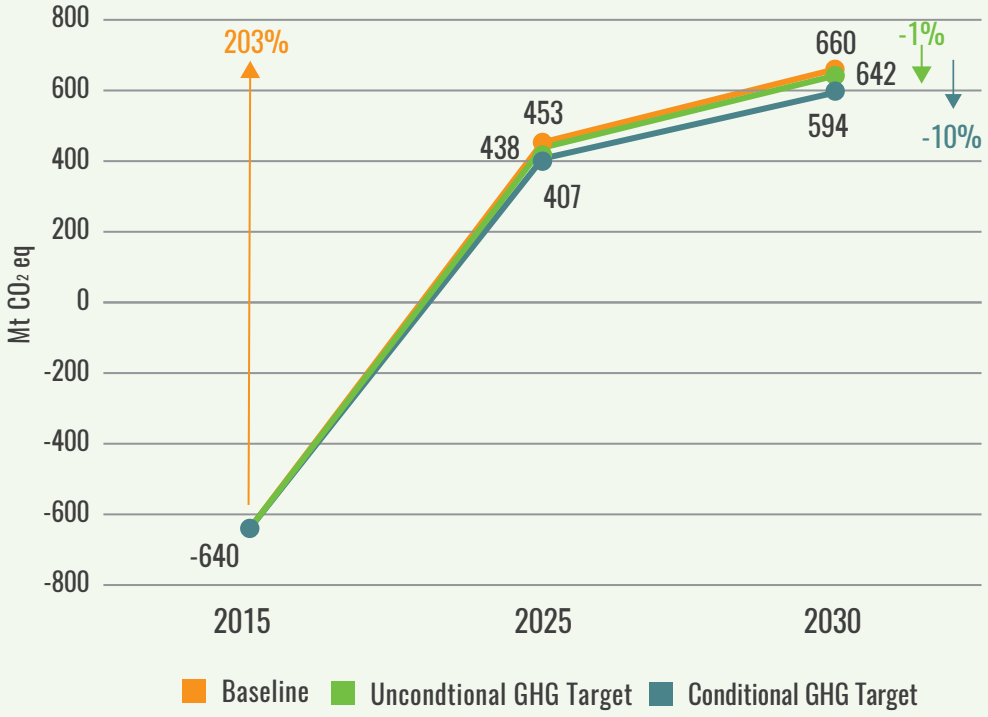
[47] Net reduction estimated based on sectoral GHG targets expressed by 1 country (Namibia) in the region.

[48] Net reduction estimated based on sectoral GHG targets expressed by 5 countries (Benin, Burkina Faso, Gambia, Mali and Senegal) in the region.

[49] Six countries in the region communicate an unconditional GHG target.

FIGURE 78.

GHG EMISSION SCENARIOS FOR THE LULUCF SECTOR "WITH" AND "WITHOUT" NDC IMPLEMENTATION IN WESTERN AFRICA



Source: Authors.

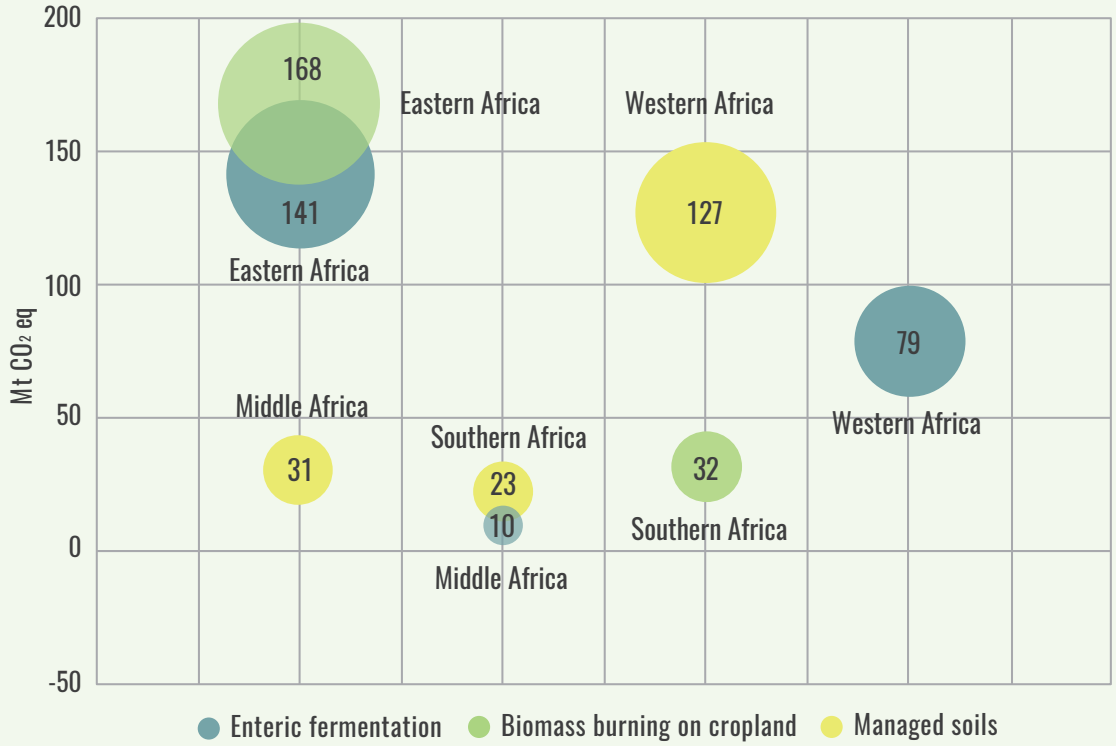
4.2 MITIGATION POLICY GAPS AND OPPORTUNITIES IN AGRICULTURE AND LAND USE

Based on the national GHG inventories of those countries[50] in the region with sectoral emissions and removals disaggregated by category and sub-category in the agriculture and land use sectors, the greatest sources of emissions, or "GHG hotspots," were identified at the sub-regional level. Overall, the largest GHG hotspots in the agriculture sector are associated with emissions from biomass burning on cropland in eastern Africa (168 Mt CO_2eq), emissions from managed soils in western Africa (127 Mt CO_2eq), and enteric fermentation in eastern Africa (141 Mt CO_2eq) and western Africa (79 Mt CO_2eq), amongst others. **Figure 79** illustrates the overall distribution of GHG hotspots in the agriculture sector in the region by sub-region (Mt CO_2eq).

[50] Angola, Cameroon, Central African Republic, Chad, Congo, Lesotho, Malawi, Swaziland and Sierra Leone are excluded from the LULUCF analysis as they did not report disaggregated emissions by sources and removals by removals. Angola, Central African Republic, Congo and Democratic Republic of Congo are excluded from the agriculture sector analysis as they did not report disaggregated emissions by sources.

FIGURE 79.

GHG HOTSPOTS IN THE AGRICULTURE SECTOR IN SSA, BY SUB-REGION

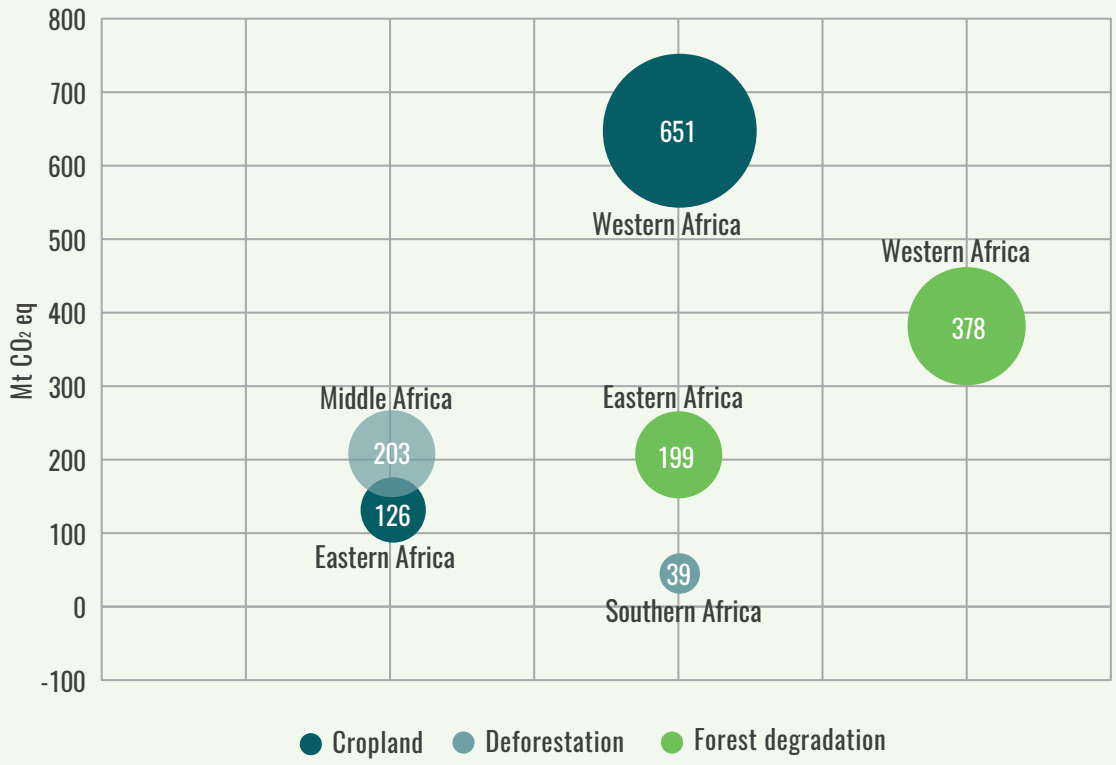


Source: Authors.

Overall, the largest GHG hotspots in the LULUCF sector are associated with emissions from cropland in western Africa (651 Mt CO_2eq), emissions from forest degradation in western Africa (378 Mt CO_2eq) and in eastern Africa (199 Mt CO_2eq), and deforestation in middle Africa (203 Mt CO_2eq), amongst others. **Figure 80** illustrates the overall distribution of GHG hotspots in the LULUCF sector in the region by sub-region (Mt CO_2eq).

FIGURE 80.

GHG HOTSPOTS IN THE LULUCF SECTOR IN SSA, BY SUB-REGION



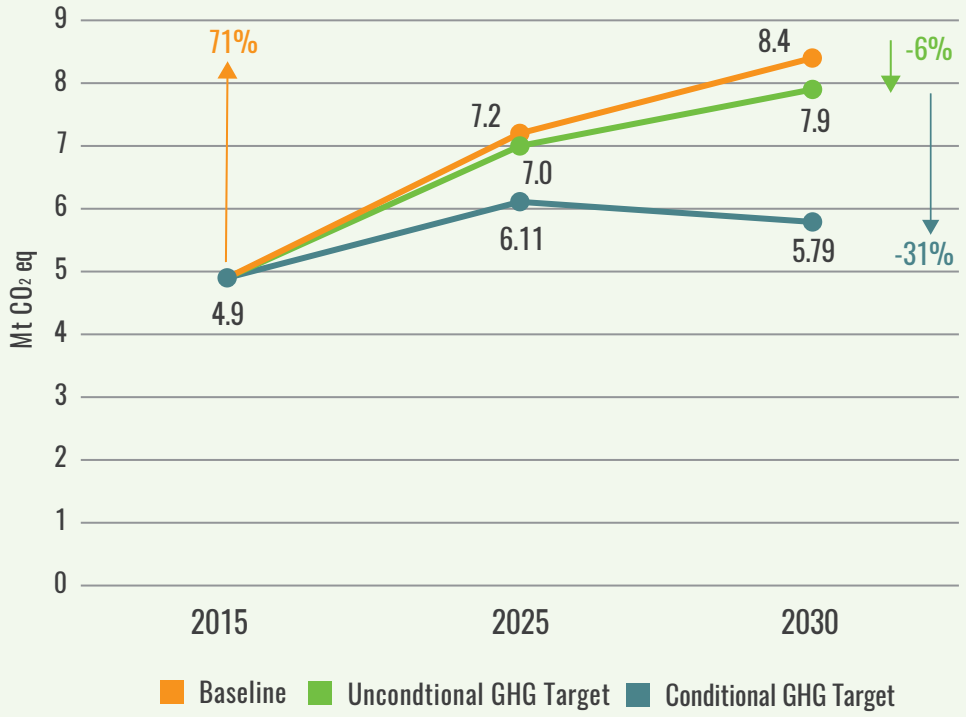
Source: Authors.

4.2.1 Project sectoral baselines in order to set emission reduction targets in the agriculture, forestry and other land use (AFOLU) sector

One-third of all countries in the region include a GHG target specific to the agriculture sector. An estimate of both the unconditional and conditional emission reduction, such as the one provided by Benin, provides clarity on what the government considers feasible within their domestic context and the extent to which mitigation would be conditional to external support. **Figure 81** illustrates the historical, counterfactual and mitigation scenarios for the agriculture sector found in Benin's NDC.

FIGURE 81.

BENIN'S GHG TARGET IN THE AGRICULTURE SECTOR



Source: Authors.

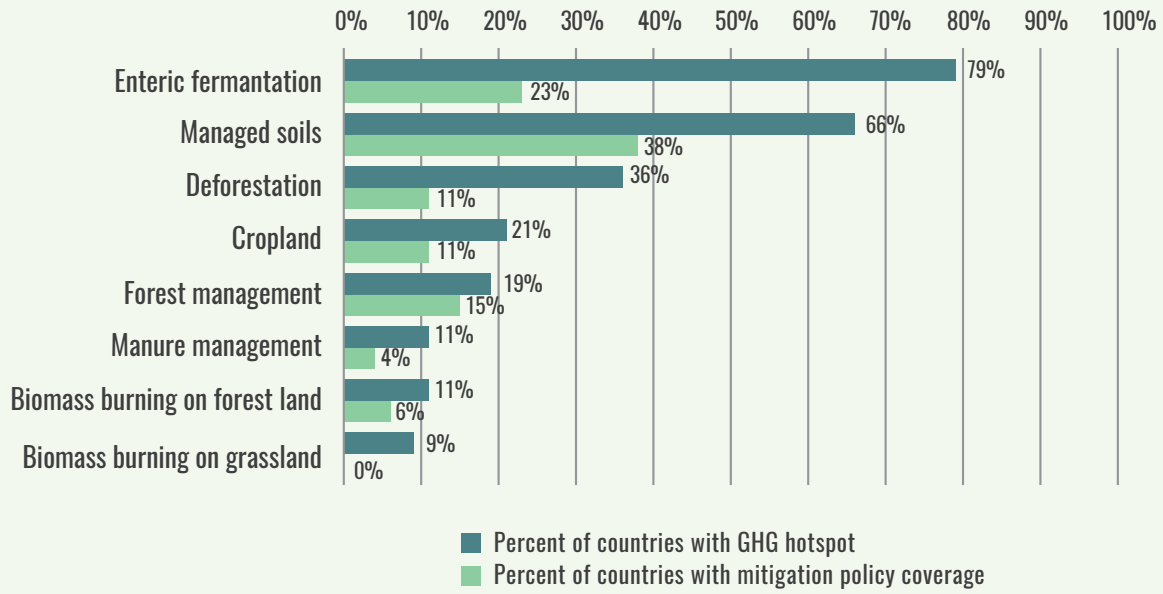
4.2.2 Identify mitigation options to address greenhouse gas (GHG) emission hotpots in the livestock sector and deforestation

A comparative analysis was undertaken to assess the coverage of agricultural and land use mitigation measures presented in the NDCs against the GHG hotspots identified in national GHG inventories. Overall, significant mitigation policy coverage gaps in the NDCs emerge across SSA, around emissions from enteric fermentation, managed soils and deforestation amongst others. For instance, over 80 percent of countries in SSA have a GHG hotspot related to enteric fermentation, yet only around 25 percent include a mitigation measure aiming to improve feeding or breeding practices. **Figure 82** illustrates the results of the policy gap analysis comparing the share of countries with a given GHG hotspot against the share of countries with mitigation policy coverage in relation to its respective hotspot.

In eastern Africa, significant mitigation policy coverage gaps are found around emissions from enteric fermentation, deforestation and cropland. For instance, around 80 percent of countries in the sub-region have a GHG hotspot related to enteric fermentation, yet only around 30 percent include a mitigation measure aiming to improve feeding or breeding practices. **Figure 83** illustrates the results of the policy gap analysis comparing the share of countries with a given GHG hotspot against the share of countries with mitigation policy coverage in relation to its respective hotspot.

FIGURE 82.

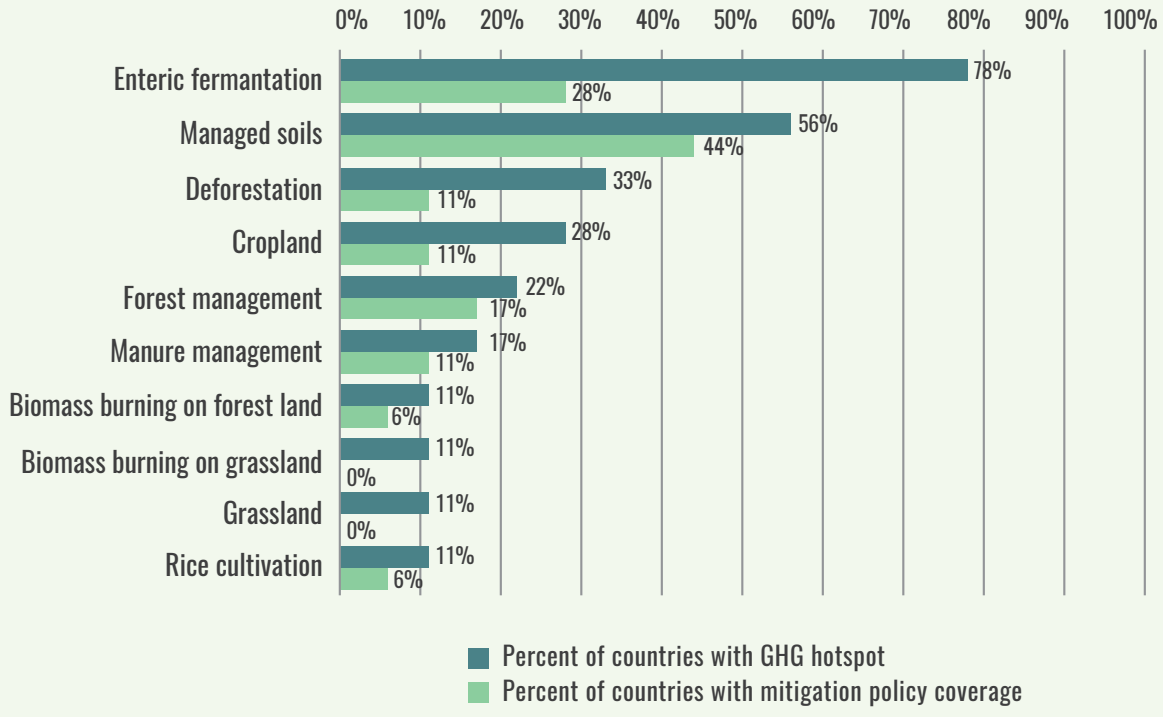
NDC MITIGATION POLICY COVERAGE GAP ANALYSIS FOR THE AGRICULTURE AND LAND USE SECTORS IN SSA



Source: Authors.

FIGURE 83.

NDC MITIGATION POLICY COVERAGE GAP ANALYSIS FOR THE AGRICULTURE AND LAND USE SECTORS IN EASTERN AFRICA

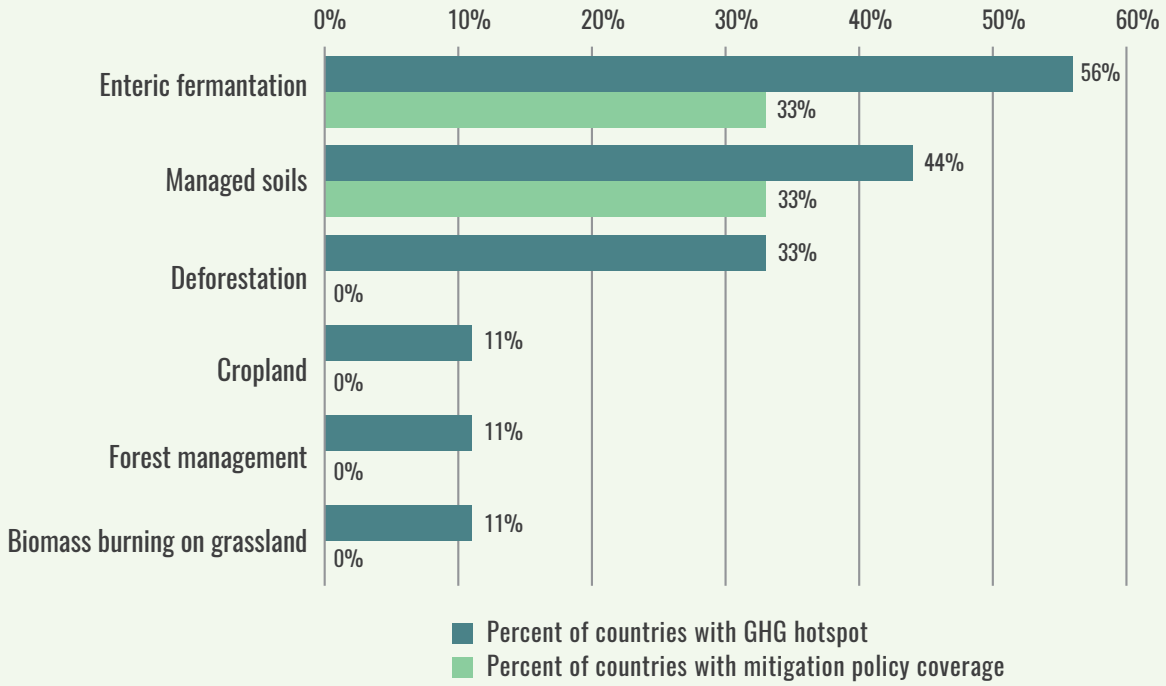


Source: Authors.

In middle Africa, significant mitigation policy coverage gaps are found around emissions from deforestation. For instance, around one-third of countries in the sub-region have a GHG hotspot related to deforestation, yet none of them include a mitigation measure aiming to reduce deforestation or promote conservation. **Figure 84** illustrates the results of the policy gap analysis comparing the share of countries with a given GHG hotspot against the share of countries with mitigation policy coverage in relation to its respective hotspot.

FIGURE 84.

NDC MITIGATION POLICY COVERAGE GAP ANALYSIS FOR THE AGRICULTURE AND LAND USE SECTORS IN MIDDLE AFRICA



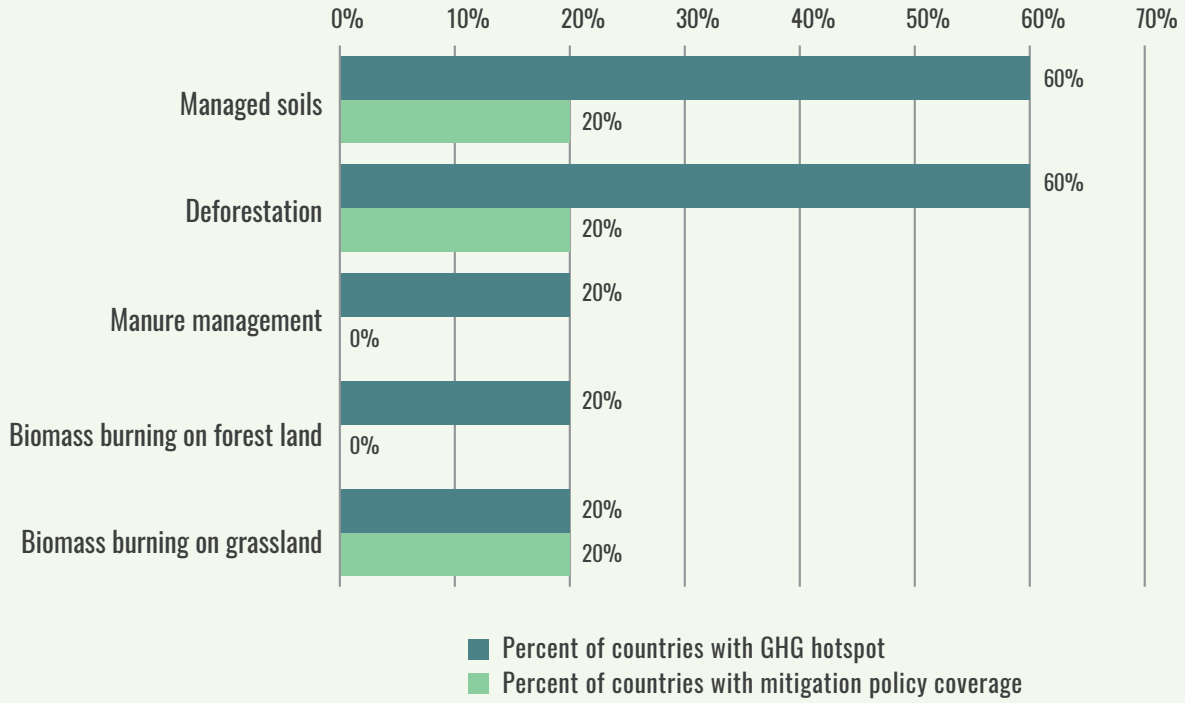
Source: Authors.

In South Africa, significant mitigation policy coverage gaps are found around emissions from managed soils and deforestation, followed by manure management and biomass burning on pastures. For instance, 60 percent of countries in the sub-region have a GHG hotspot related to deforestation, yet only 20 percent include a mitigation measure aiming to reduce deforestation or promote conservation. **Figure 85** illustrates the results of the policy gap analysis comparing the share of countries with a given GHG hotspot against the share of countries with mitigation policy coverage in relation to its respective hotspot.

In western Africa, significant mitigation policy coverage gaps are found around emissions from enteric fermentation and managed soils. For instance, over 90 percent of countries in the sub-region have a GHG hotspot related to enteric fermentation, yet only around 13 percent include a mitigation measure aiming to improve feeding or breeding practices. **Figure 86** illustrates the results of the policy gap analysis comparing the share of countries with a given GHG hotspot against the share of countries with mitigation policy coverage in relation to its respective hotspot.

FIGURE 85.

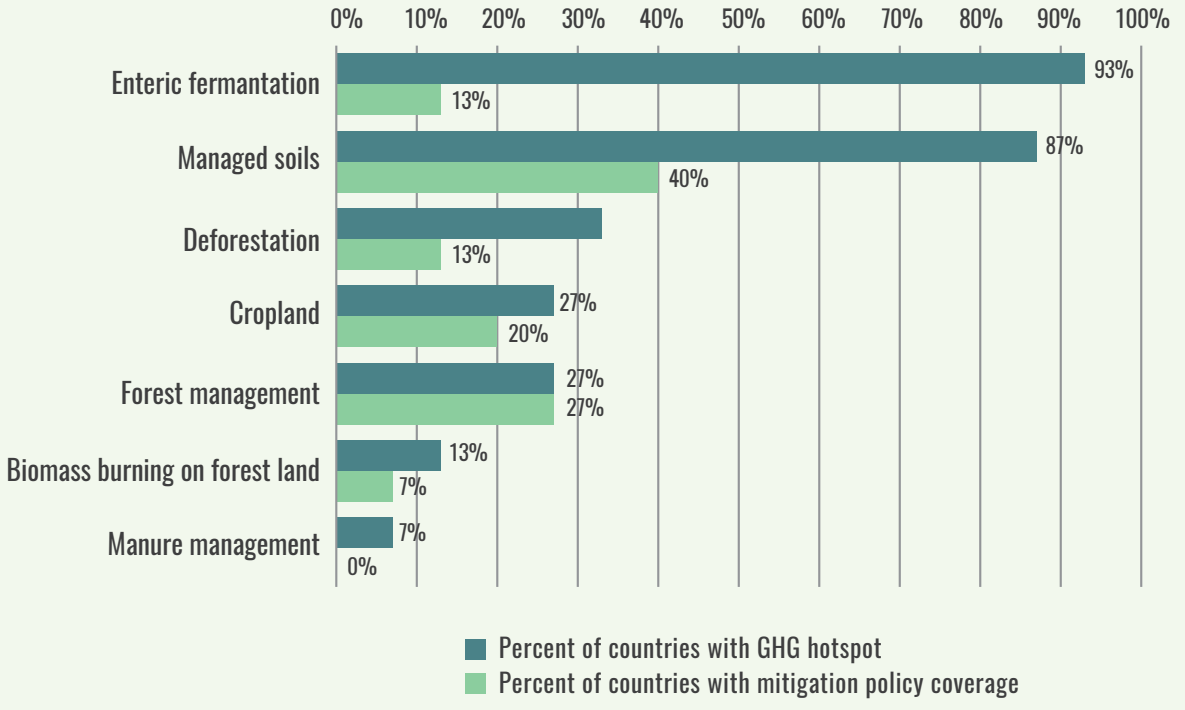
NDC MITIGATION POLICY COVERAGE GAP ANALYSIS FOR THE AGRICULTURE AND LAND USE SECTORS IN SOUTH AFRICA



Source: Authors.

FIGURE 86.

NDC MITIGATION POLICY COVERAGE GAP ANALYSIS FOR THE AGRICULTURE AND LAND USE SECTORS IN WESTERN AFRICA



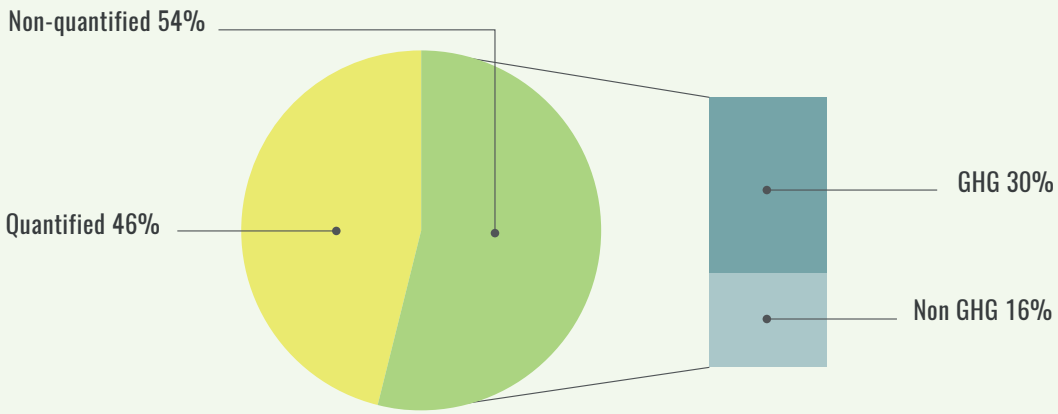
Source: Authors.

4.2.3 Include measurable indicators for planning and tracking NDC mitigation actions under the Enhanced Transparency Framework

Key to NDC implementation and the tracking of progress is the extent to which mitigation policies have quantified and measurable targets. In the SSA region, almost half of all mitigation measures (46 percent) are quantified, primarily in terms of GHG emission reductions. Some countries include non-GHG metrics to measure mitigation policies or measures in the agriculture and land use sectors, such as hectares of land or number of farms under improved management. **Figure 87** illustrates the distribution of metrics associated with mitigation measures in the agriculture and land use sectors in the NDCs, by type (share of total).

FIGURE 87.

METRICS ASSOCIATED WITH MITIGATION MEASURES IN THE AGRICULTURE AND LAND USE SECTORS IN THE NDCs IN SSA



Source: Authors.

4.2.4 Present NDCs as milestones in long-term emission goals or strategies

Only three countries (Equatorial Guinea, Sierra Leone and Liberia) in the region make reference to long-term strategies whereby NDC targets could serve as milestones in the longer-term approach to ensuring low-emission, climate-resilient development.

4.3 ADAPTATION POLICY GAPS AND OPPORTUNITIES IN AGRICULTURE AND LAND USE

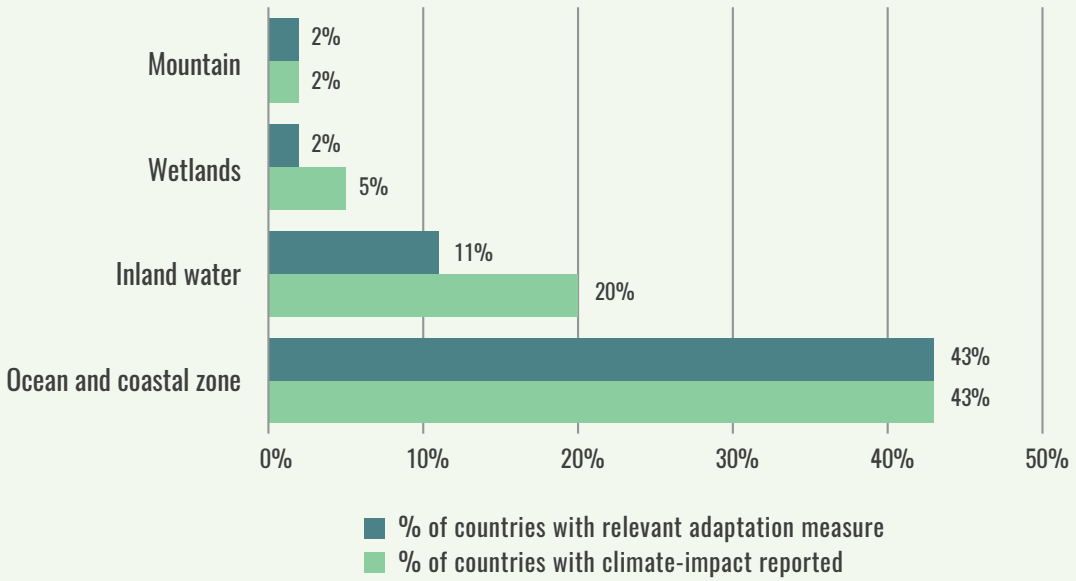
4.3.1 Strengthen adaptation options to address climate risks reported in ocean and coastal zones, inland water ecosystems and wetlands

A comparative analysis was undertaken to assess the coverage of agricultural and land use adaptation measures presented in the NDCs against the 'at risk' ecosystems and agro-ecosystems identified in NDC and/or NCs. An 'at risk' ecosystem refers to those ecosystems for which climate-related impacts, vulnerabilities and risks are either observed or projected in the region, as reported in the NDCs and/or NCs. At the ecosystem level, adaptation policy coverage gaps emerge in the NDCs around vulnerable inland water ecosystems in southern Africa, and wetlands in western Africa. On the other hand, there was high

adaptation policy coverage of vulnerable ocean and coastal zones. **Figure 88** illustrates the adaptation policy coverage gaps in the NDCs in relation to vulnerable ecosystems, represented as the share of countries with climate-impacts reported per ecosystem compared against the share of countries with a relevant adaptation measure.

FIGURE 88.

ADAPTATION POLICY COVERAGE GAP ANALYSIS OF VULNERABLE ECOSYSTEMS IN THE NDCs IN SSA



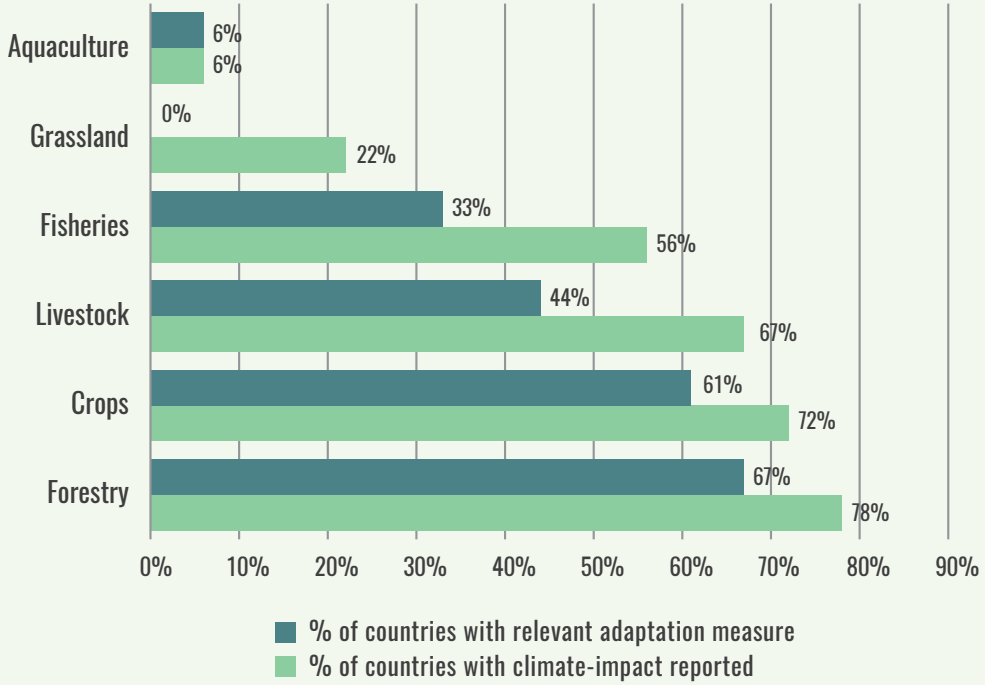
Source: Authors.

4.3.2 Close the adaptation coverage gap in response to the major climate risks reported in agricultural sub-sectors across the region

A comparative analysis points to gaps in adaptation coverage in response to the types of climate risks reported in all agricultural sub-sectors. In eastern Africa, high adaptation policy gaps emerge around grassland, livestock and fisheries sectors, followed by gaps in the cropping and forestry sectors. In middle Africa, the highest adaptation policy coverage gaps emerge around grasslands, fisheries and cropping systems. In southern Africa, adaptation policy coverage gaps emerge in grasslands, crops, fisheries and forestry sector. In western Africa, moderate adaptation policy coverage gaps emerge in all sub-sectors. **Figures 89-92** illustrate the adaptation policy coverage gaps in the NDCs in relation to vulnerable agro-ecosystems for each sub-region, represented as the share of countries with climate-impacts reported per agro-ecosystem compared against the share of countries with a relevant adaptation measure.

FIGURE 89.

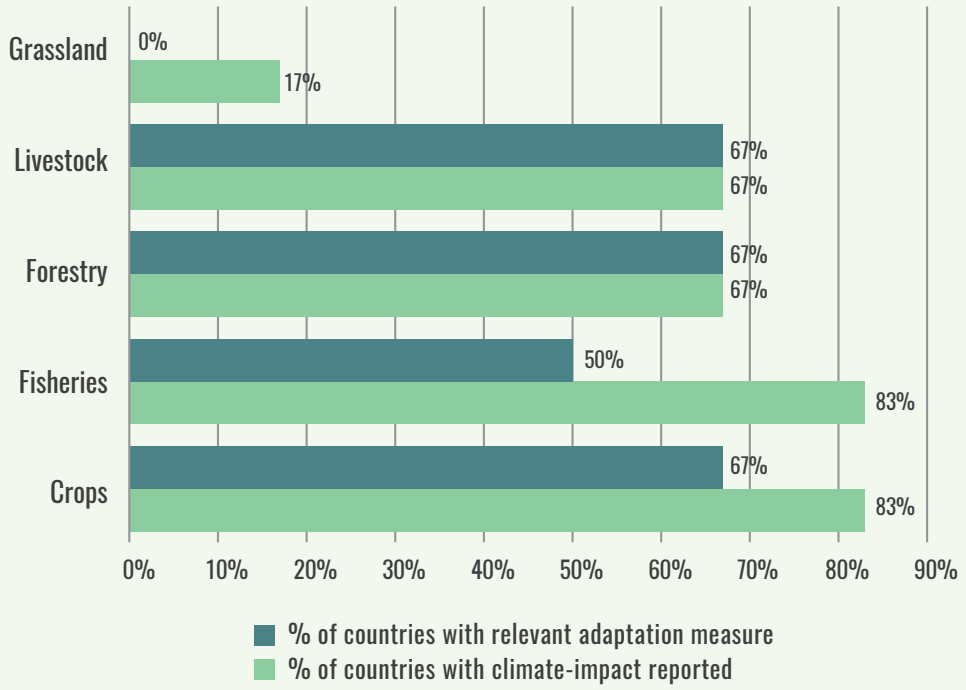
ADAPTATION POLICY COVERAGE GAP ANALYSIS OF VULNERABLE AGRO-ECOSYSTEMS IN THE NDCs IN EASTERN AFRICA



Source: Authors.

FIGURE 90.

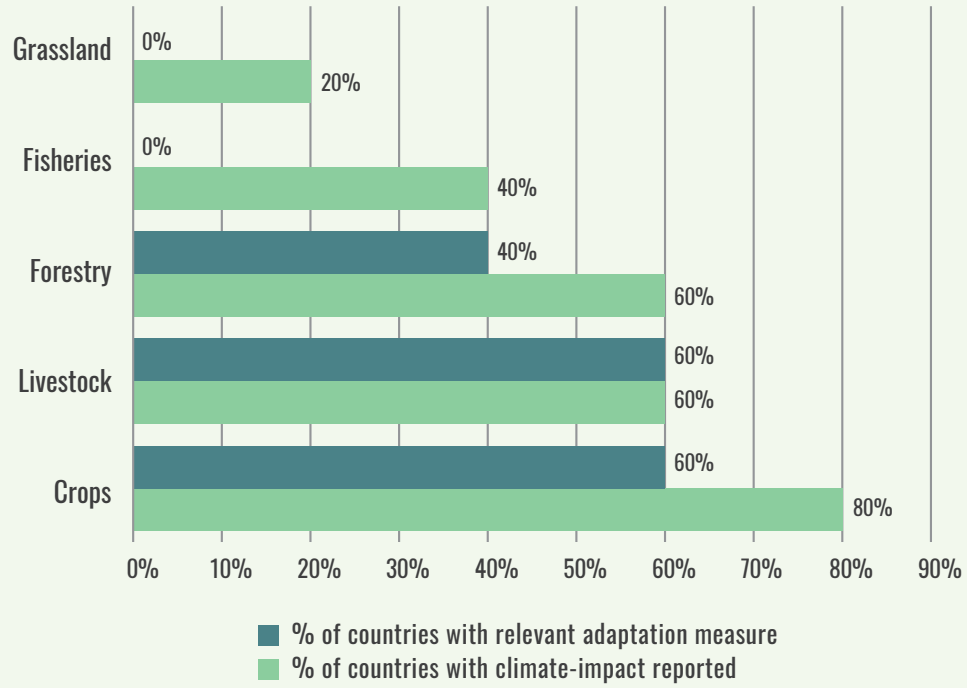
ADAPTATION POLICY COVERAGE GAP ANALYSIS OF VULNERABLE AGRO-ECOSYSTEMS IN THE NDCs IN MIDDLE AFRICA



Source: Authors.

FIGURE 91.

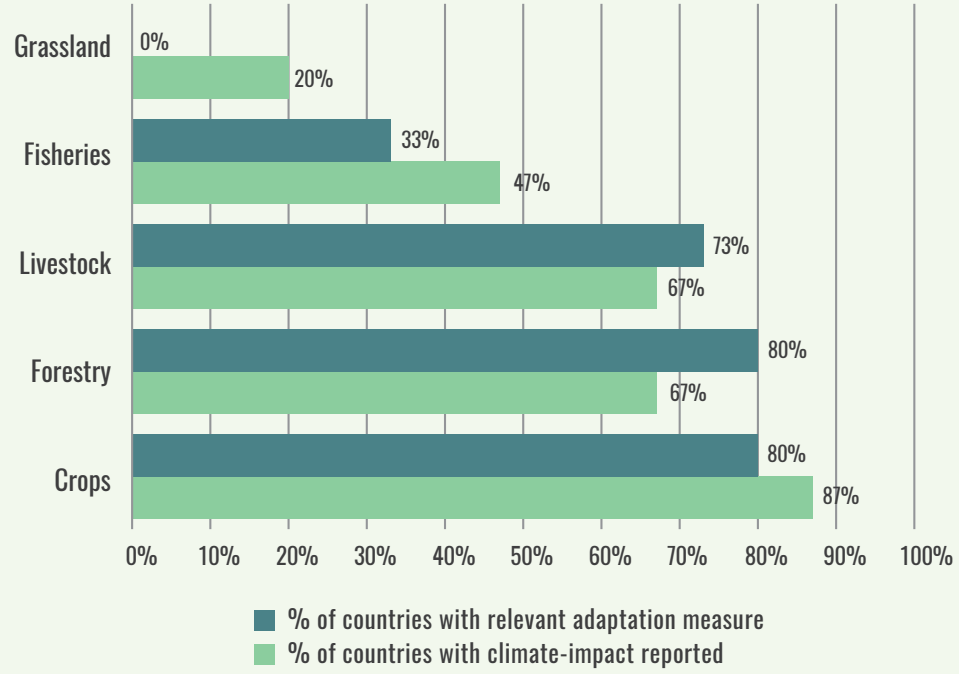
ADAPTATION POLICY COVERAGE GAP ANALYSIS OF VULNERABLE AGRO-ECOSYSTEMS IN THE NDCs IN SOUTHERN AFRICA



Source: Authors.

FIGURE 92.

ADAPTATION POLICY COVERAGE GAP ANALYSIS OF VULNERABLE AGRO-ECOSYSTEMS IN THE NDCs IN WESTERN AFRICA



Source: Authors.

4.3.3 Strengthen climate information, health and credit services in agriculture

Enhancing the resilience of agricultural systems to climate extremes and slow-onset events, notably floods, droughts, water stress and soil erosion, through near-, medium- and long-term adaptation and risk reduction measures are essential to reduce risks to food security and nutrition. Across the region, countries are promoting early warning systems, credit and insurance services and health and diseases management as key to their adaptation and resilience building strategies in agriculture.

4.3.4 Include measurable indicators for planning and tracking NDC adaptation actions under the Enhanced Transparency Framework

Key to NDC implementation and the tracking of progress is the extent to which mitigation policies have quantified and measurable targets. Only 12 percent of all adaptation measures in the agriculture and land use sectors in the region are quantified.

4.3.5 Ground NDCs in long-term adaptation visions or goals

Grounding NDCs in long-term adaptation goals or visions is essential to avoiding technology lock-in and maladaptation. One third of countries in the region communicate a long-term adaptation goal in their NDC. For instance, Madagascar includes the finalisation and implementation of its NAP among its priority actions for adaptation. Ethiopia's long-term adaptation goal as communicated in the NDC states that its objective is to ensure that adaptation to climate change is fully mainstreamed into development activities. Rwanda's long term vision is to become a climate resilient economy. Mozambique's vision is to increase resilience in the communities and the national economy including the reduction of climate risks and promote a low carbon development and the green economy through the integration of adaptation and mitigation in sectorial and local planning.

4.4 POLICY INSTRUMENTS AND VALUE CHAIN ENTRY-POINTS

4.4.1 Diversify the types of policy instruments to support climate action

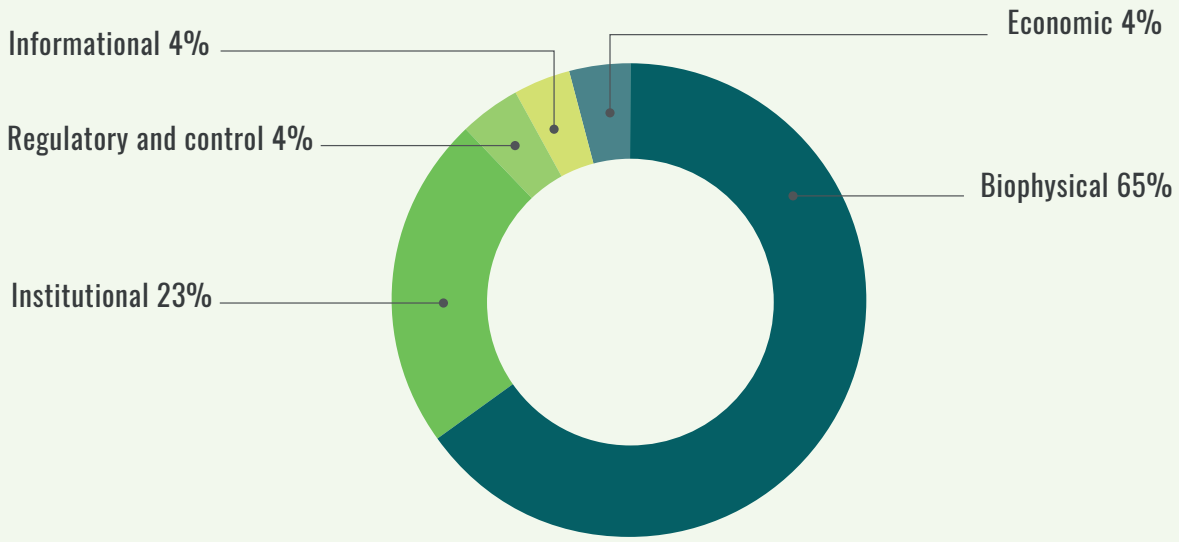
A diversity of policy instruments will be required to mobilize climate action across sectors and stakeholders. The mitigation and adaptation measures in the agriculture and land use sectors presented in the NDCs were characterized by the type of intervention or policy instrument. In the SSA region, over half of all mitigation and adaptation policies were biophysical in nature (65 percent), and one-quarter considered institutional approaches. Only a small share of policies was focused on regulatory or control instruments, informational approaches or economic incentives. **Figure 93** illustrates the climate action in the agriculture and land use sectors, by intervention type (share of total climate actions).

4.4.2 Target various stages of agriculture and food systems for mitigation and adaptation

The development of sustainable food value chains is not only critical to reduce hunger and poverty in developing countries but also provides a key opportunity to address priorities for climate change adaptation and mitigation. Each of the mitigation and adaptation measures in the agriculture and land use sectors presented in the NDCs were characterized by the stage in the agriculture and food system targeted. In the SSA region, almost all (89 percent) of the measures in the NDCs were focused on the production phase of the agriculture and food systems, while only a small share included measures related to post-harvest operations (Seychelles, Lesotho, Congo and Côte d'Ivoire, Ghana and Guinea), processing and packaging (Rwanda, Gambia, Cameroon and Côte d'Ivoire), transport, storage and distribution (Ethiopia, Guinea-Bissau, Liberia and Côte d'Ivoire), and retail (Cape Verde and Gambia).

FIGURE 93.

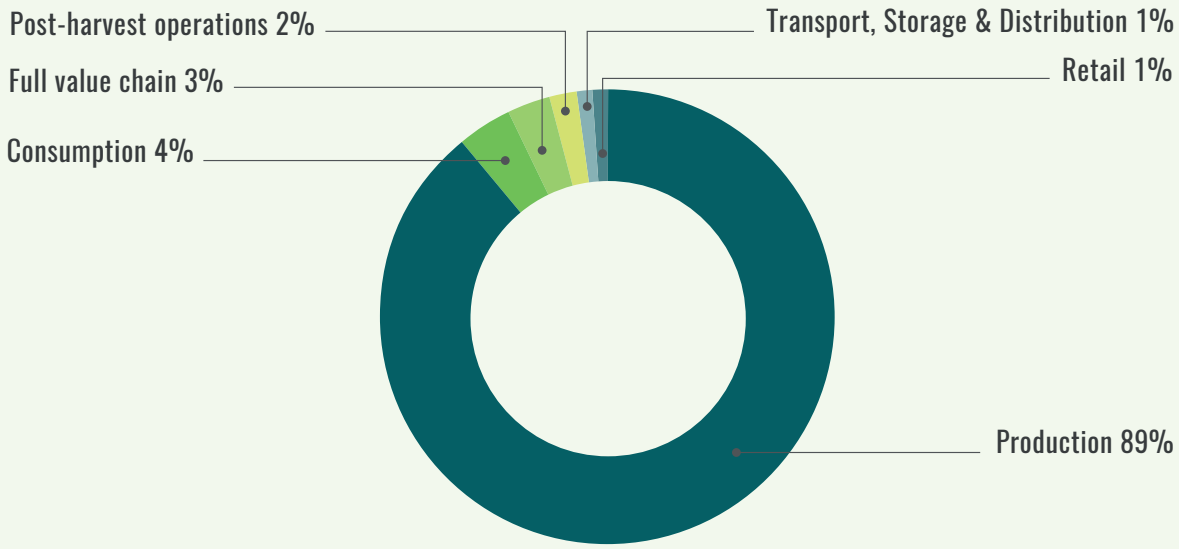
DISTRIBUTION OF CLIMATE ACTIONS IN THE AGRICULTURE AND LAND USE SECTORS IN THE NDCs IN SSA, BY INTERVENTION TYPE



Source: Authors.

FIGURE 94.

DISTRIBUTION OF CLIMATE ACTIONS IN THE AGRICULTURE AND LAND USE SECTORS IN THE NDCs IN SSA, BY VALUE CHAIN STAGE



Source: Authors.

CHAPTER 5

CHAPTER

5

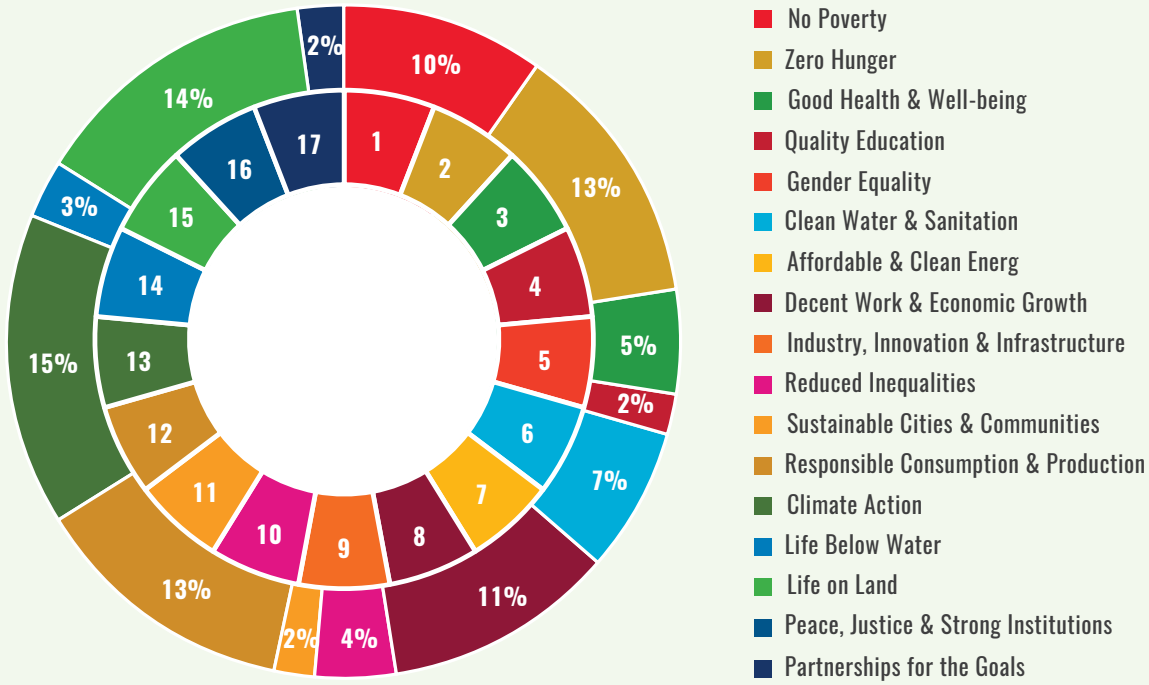
SYNERGIES WITH THE 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT AND SENDAI FRAMEWORK FOR DISASTER RISK REDUCTION

5.1 NDC-SUSTAINABLE DEVELOPMENT GOAL (SDG) SYNERGIES IN THE AGRICULTURE AND LAND USE SECTORS

The success of NDC implementation depends to a great extent on the capacity of governments to integrate climate change mitigation and adaptation priorities into existing national development and sectoral policies and plans (Riva *et al.*, 2020). An analysis of the alignment (**Figure 95**) between the climate actions presented in the NDCs in the region and the 17 SDG goals and 169 targets reveals a high degree of convergence (in addition to SDG 13 "Climate Action") with SDG 15 "Life on Land", particularly SDG target 15.3 "Restore degraded land and combat desertification," and SDG 2 "Zero Hunger", particularly SDG target 2.3 "Assure agricultural productivity for the marginalized," and SDG 12 "Sustainable Consumption and production," particularly SDG target 12.2 "Efficient use of natural resources." Other synergies include SDG 8 "Decent Work and Economic Growth" and SDG 1 "No Poverty," especially SDG 1.4 "Equal access of vulnerable to all types of resources" and 1.5 "Resilience of the poor to climate events."

FIGURE 95.

DEGREE OF ALIGNMENT BETWEEN THE NDC PRIORITIES IN AGRICULTURE AND LAND USE AND THE SDGs IN SSA



Source: Authors.

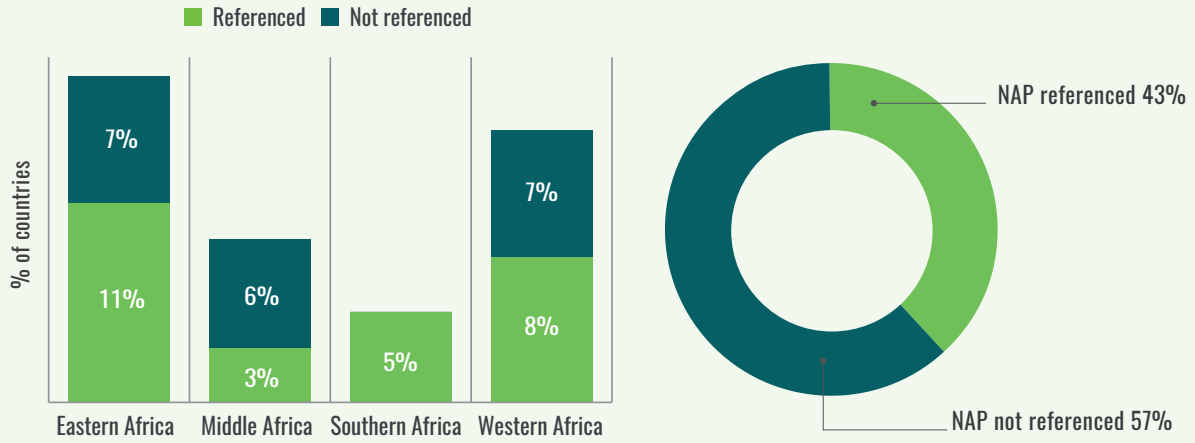
5.2 NDC-NATIONAL ADAPTATION PLAN (NAP) RELATIONSHIP IN THE AGRICULTURE AND LAND USE SECTORS

In SSA, under half of all countries (57 percent) make a reference to the relationship between the NDC and the NAP process (**Figure 96**) – the majority of which mention that their NAP is under development. Around one-quarter of those countries communicate that their NAP is the primary adaptation communication. Given the progressive trend by which countries are aligning NDC and NAP processes, particularly around the agriculture and water sectors (UNDP, 2019), it is expected that the next round of NDCs will not only evidence those efforts but enhanced coordination will improve the efficiency of implementation.

The NAP process is a continuous, iterative, country-driven process that seeks to enhance coherence between adaptation and development planning within the country and identify relevant domestic medium to long term actions and policies to reduce climate change impacts and risks (NAPGN, 2018). The process was established under the Cancun Adaptation Framework and re-emphasized in the Paris Agreement. The Least Developed Countries Expert Group has prepared NAP Technical Guidelines (UNFCCC, 2012), that have been supplemented by cross-sectoral guidance Addressing agriculture, forestry and fisheries in National Adaptation Plans – Supplementary guidelines prepared by FAO (Karttunen *et al.*, 2017), and by two specific sub-sectoral guidance on forestry and agroforestry (Meybeck *et al;*, 2020), and on fisheries and aquaculture (Brugere and De Young, 2020).

FIGURE 96.

REFERENCE TO THE NAP PROCESS IN THE NDCs IN SSA, BY NUMBER AND SHARE OF COUNTRIES



Source: Authors.

Aligning NAP and NDC processes can improve the efficiency and effectiveness of adaptation planning. In particular, NAPs are more and more considered as a concrete implementation mechanism of the adaptation component of an NDC (GIZ, 2018). While NDCs spell out what a country is committing to, in terms of adaptation, their NAP lays out the details on how those objectives will be achieved, including planning, budgeting and monitoring and evaluation. Among the benefits of aligning NDCs and NAPs as complementary instruments for a country adaptation planning is improved coordination within ministries. Countries have reported that line ministries responsible for the NDC and NAP process might be different. However, by linking the two, countries will be able to enhance internal coordination for adaptation planning, make the best use of their resources and avoid duplication. Another aspect to keep in mind is that NDC-NAP alignment would ensure that the groundwork (Element A) for the NAP process will be informed by goals and priorities set out in the NDCs, which would also serve as overarching vision for the NAP, as well as any synergy or mitigation co-benefits, particularly important for agriculture. Similarly, it would ensure that preparatory elements (Element B) identified during the NAP process, are reflected in the adaptation component of the NDC (GIZ, 2017).

5.3 NDC-DISASTER RISK REDUCTION (DRR) SYNERGIES IN THE AGRICULTURE AND LAND USE SECTORS

As countries are affected by incremental climate change and increasingly frequent and severe climate-related disasters, successful climate change adaptation relies to a large extent on the reduction and management of climate-related disaster risks. The two workstreams are strongly interrelated and mutually complement each other, including in the agriculture and land use sectors. The intertwined nature of climate change and disaster impacts on agriculture calls for coherent approaches and working methods that enhance the resilience of individual farmers and entire production systems. Coherence between adaptation DRR can significantly enhance the effectiveness of action on the ground (Bojić, Baas and Wolf, 2019).

The 2015-2030 Sendai Framework[51] presents an opportunity to enhance such coherence across climate and development agendas, by encouraging coordinated implementation, monitoring and reporting processes. The framework comprises four priorities for action:

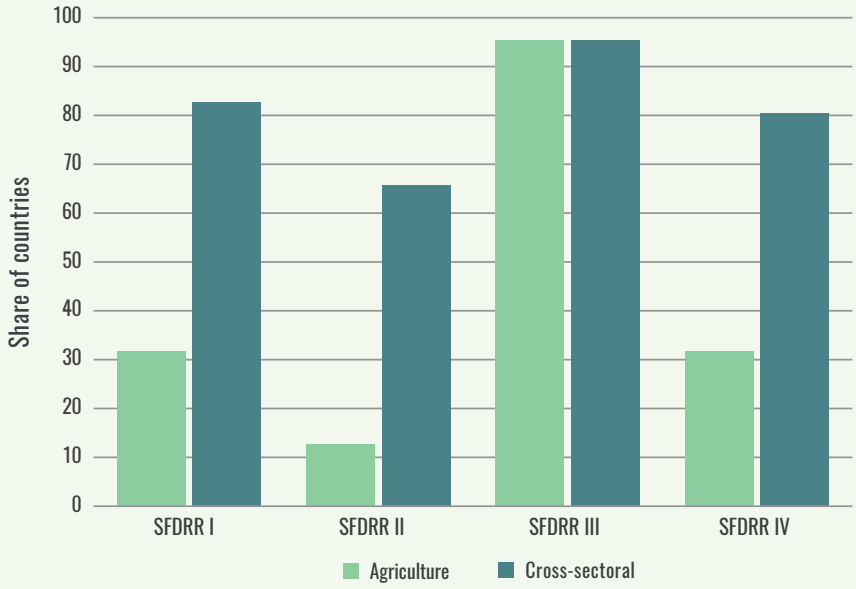
- Sendai Framework on Disaster Risk Reduction priority I: Understanding disaster risk;
- Sendai Framework on Disaster Risk Reduction priority II: Strengthening disaster risk governance to manage disaster risk;
- Sendai Framework on Disaster Risk Reduction priority III: Investing in disaster risk reduction for resilience; and
- Sendai Framework on Disaster Risk Reduction priority IV: Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction.

This section analyses the alignment of adaptation priorities set forth in NDCs of the countries in the SSA region with the four priorities for action of the SFDRR. The aim of this section is to provide a better understanding of the extent to which, in the context of NDCs, climate change adaptation and DRR in the agriculture and land use sectors are mutually reinforcing and promote policy coherence.

Overall, all countries in the region promote climate change adaptation measures in the agriculture and land-use sectors in their NDC that contribute to the Sendai Framework. While in most NDCs, DRR measures are cross-sectoral, agriculture-specific actions are featured prominently. This is true in particular in relation to SFDRR priority III, as 96 percent of countries specify measures that entail 'investing in disaster risk reduction for resilience' both cross-sectorally and exclusively for the agriculture and land use sectors. Around one third of countries specifies agriculture measures related to SFDRR priorities I and IV. Conversely, integration of measures promoting better institutions and governance for climate-related activities in agriculture (related to SFDRR priority II) received the least priority amongst countries. **Figure 97** illustrates the share of country NDCs with cross-sectoral and/or agriculture -related adaptation priorities contributing to the SFDRR priorities of action.

FIGURE 97.

CROSS-SECTORAL AND AGRICULTURE -SPECIFIC ADAPTATION PRIORITIES IN THE NDCs WITH RELEVANCE TO THE SENDAI FRAMEWORK, BY SHARE OF COUNTRIES IN SSA



Source: Authors.

[51] The SFDRR is a country-driven and non-binding international agreement that recognizes the importance of integrating systematic efforts and strategies at different levels to prevent new and reduce existing disaster risk, by reducing hazard exposure and vulnerability to disasters, increasing preparedness for response and recovery and thus strengthening resilience.

5.3.1 Sendai Framework on Disaster Risk Reduction Priority I: Understanding disaster risk

In order to manage and reduce disaster risks, including those associated with climate-related disasters, a sound understanding of these risks in all their dimensions is necessary. Consensus exists that DRR and climate change adaptation policies and actions ought to be based on a contextually adequate combination of scientific evidence and indigenous knowledge on causes, forms and consequences of the addressed risks (UNDRR, 2019).

Accordingly, 83 percent of countries in the region refer to measures contributing to an improved understanding of climate-related risks in their NDCs, with 32 percent of countries specifically outlining measures for a better understanding of these risks in the agricultural sectors.

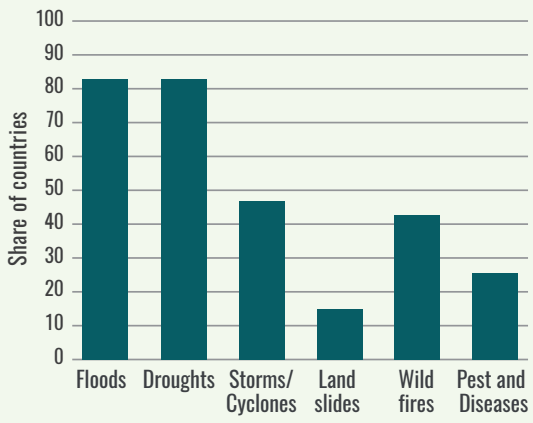
Vulnerability and risk assessments

Conducting robust vulnerability and risk assessments is a key requirement for gaining a valid, up-to-date understanding of the kind and extent of climate-related risks a country is facing. As a consequence, results of such assessments, as well as intended action to further develop their accuracy, scope, quality or frequency, feature prominently across the NDCs of countries in the region.

In accordance with the IPCC Fifth Assessment Report risk framework that defines *exposure*, *hazards* and *vulnerability* as factors contributing to specific risks (Oppenheimer ***et al.*** 2014), many of the NDCs refer to information partially informed by such vulnerability and risk assessments. While often also including information on slow-onset hazards (see section 3.2.1.2), **Figure 98** illustrates that NDCs refer to at least six types of sudden-onset climate extreme events (*hazards*). Among these, floods and droughts are referred to by the highest share of countries (83 percent of countries each). Though the varying length and specificity of NDCs complicates comparison, it is noted that a minority of countries (13 percent) focuses on a single such sudden-onset hazard that calls for adaptation (**Figure 99**). More than three-quarters of countries include reference to multiple hazards.

FIGURE 98.

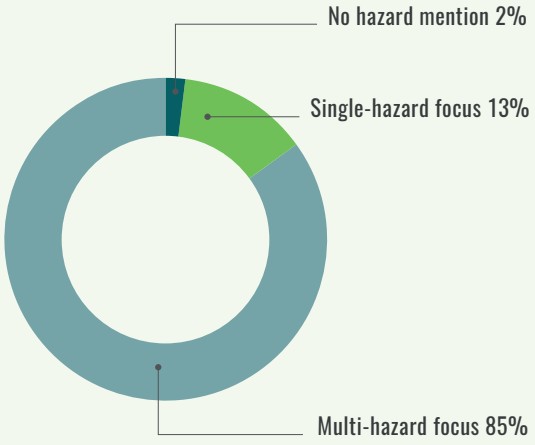
SUDDEN EXTREME EVENTS REFERENCED IN THE NDCs IN SSA, BY SHARE OF COUNTRIES



Source: Authors.

FIGURE 99.

SINGLE AND MULTIPLE EXTREME EVENTS REFERENCED IN THE NDCs IN SSA, BY SHARE OF TOTAL



Source: Authors.

In terms of drivers of *vulnerability* that make countries susceptible to harmful disaster impacts, 74 percent of countries in the region include reference to prevailing poverty, 68 percent to economic and livelihood dependence on agriculture and natural resources and 44 percent each to population growth and/or density, and unfavorable geographic conditions. While for some countries, such accounts are already partly informed by dedicated vulnerability and risk assessments, the need to increase knowledge through quantity and quality of such assessments is expressed frequently, both for cross-sectoral and for agriculture-specific vulnerabilities and risks.

Lesotho's NDC, for instance, specifies that multiple sectoral vulnerability assessments have been undertaken, and that the country plans to conduct further risk assessments and vulnerability mapping exercises. To reduce the risk of losses in crops, livestock and agricultural incomes specifically, Zimbabwe's NDC puts emphasis on plans to build national capacity to conduct comprehensive agricultural vulnerability assessments that can inform the identification of appropriate responses.

Data collection, analysis and management

Collection, analysis and management of high-quality, relevant data including both climatic or meteorological data and socioeconomic data is a pre-requisite for vulnerability and risk assessments, and improved risk understanding more generally. Strengthening of national data collection and management systems is therefore frequently referred to by countries in the region.

Cameroon, for instance, aims to facilitate an improved risk understanding by upgrading national systems for collecting and analyzing hydro-meteorological data. Sierra Leone, too, identifies the need for improved capacity related to gathering, processing, providing and communicating data, but extends this beyond meteorological information to explicitly also include socioeconomic information.

Climate research

The availability of detailed data and information facilitates the process of undertaking research related to climate, which can then help to improve knowledge and understanding of different stakeholders and contribute to improved resilience of communities and countries at large. Countries in the region hence aim to strengthen knowledge generation and relevant, context-specific high-quality research.

In the context of Burkina Faso, for instance, this involves the launching of dedicated research programmes on the climate resilience of forests, wildlife and fish species. What is more, countries consistently emphasize the importance of decentralized outreach on climate risks and capacity building at the community level, in particular among extension officers and farmers. Nigeria, for example, aims to strengthen local-level risk understanding and response capacity through information and awareness of risk management strategies and plans, which would be communicated through various channels including mobile technologies. In addition, the country plans to overhaul agricultural extension services, including by improving capacities for evidence-based assessment and management of climate risks.

5.3.2 Sendai Framework on Disaster Risk Reduction Priority II: Strengthening disaster risk governance to manage disaster risk

Adequate risk governance is crucial for the implementation of DRR and climate change adaptation activities in the agriculture and land use sectors. Strengthening disaster management structures, policies and development plans and the institutional capacity to implement them is a prerequisite for reducing climate-related risks at the national level. Sixty-six percent of countries in the region have indicated the need to strengthen risk governance and institutions in the context of climate change, yet only 13 percent of countries explicitly mention this need for stronger DRR governance mechanisms in the agricultural sector. The discrepancy hints at the persistence of an explicitly cross-sectoral, overarching institutional approach to managing disaster risks and might also point to the disregarded importance to integrate DRR considerations in the sectoral agricultural governance structures.

Primarily by integrating climate-specific aspects into disaster risk management and institutions, where appropriate, coherence between climate change adaptation and DRR can contribute to strengthened disaster risk governance. Three types of coherence can be distinguished (OECD, 2020) and are reflected in priorities set forth by countries in the region, including in relation to the agricultural sectors.

Coherence between adaptation and DRR/M can contribute to strengthened disaster risk governance by integrating climate-specific aspects into disaster risk management and institutions (see above). Three types of coherence can be distinguished (OECD, 2020) and are partially reflected in priorities set forth by countries in the region.

Strategic coherence

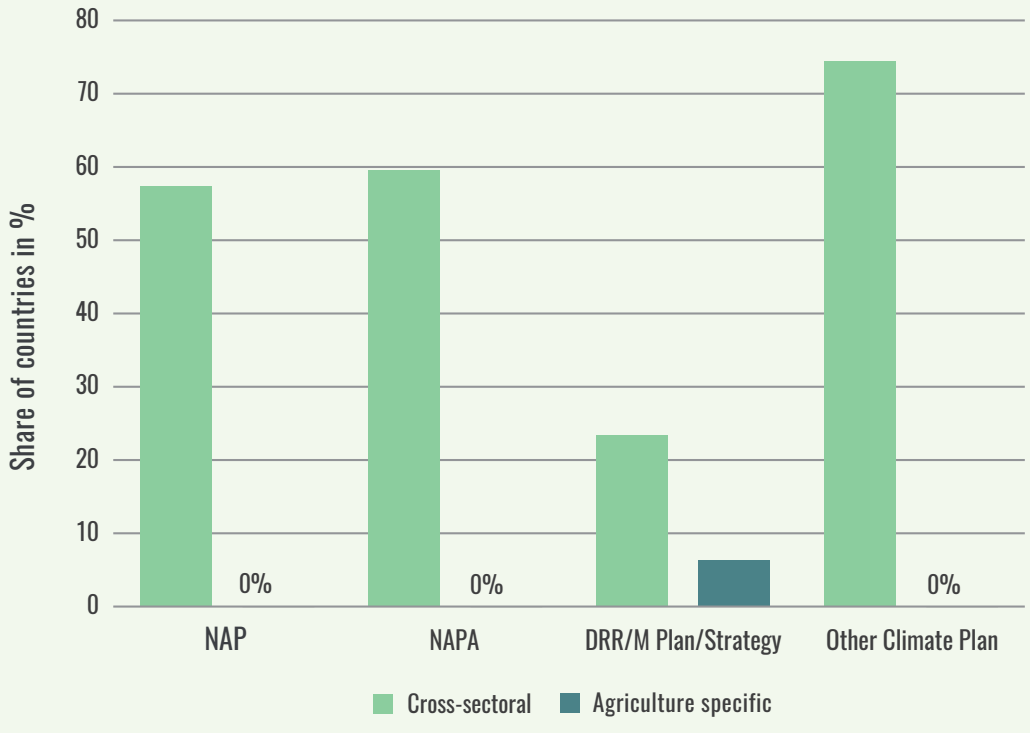
Strategic coherence manifests itself through aligned visions, goals and priorities on adaptation and DRR in plans and strategies, providing a framework for operational coherence. An indication of generally high levels of strategic coherence, country NDCs in the region do include a substantive amount of cross-references to related policy documents, with many of the countries referring to more than one.

Figure 100 shows that 57 percent of countries refer to the NAP process, primarily reaffirming their willingness to engage in the process of formulating and implementing a NAP. Twenty-three percent of countries, moreover, link climate change adaptation aspects set out in the NDC to existing or to-be-developed dedicated DRR plans. Again reflecting the prevalence of cross-sectoral over sector-specific DRR approaches, a subset of only three countries disposes of such DRR plans that are specific to the agricultural sector, such as Nigeria's National Agricultural Resilience Framework, or of specific relevance to agricultural DRR, such as Mauritius' Strategy for Integrated Pest and Disease Management.

It is also noted that 74 percent of countries make a connection between the NDC and other national climate plans, strategies and laws (apart from NAPs/NAPAs and so on), which indicates substantial integration between the internationally-driven processes and national frameworks.

FIGURE 100.

CROSS-REFERENCES OF RELEVANT CLIMATE CHANGE ADAPTATION AND DRR LEGISLATION, POLICIES, STRATEGIES AND PLANS IN THE NDCs IN SSA, BY SHARE OF COUNTRIES



Source: Authors.

Operational coherence

Operational coherence, instead, can be achieved when policy frameworks and institutional arrangements are supportive of the implementation of aligned objectives on adaptation and DRR, and effective in doing so.

Supportive policy frameworks to a large extent require the integration of the aligned climate change adaptation-DRR objectives into sectoral policies, and their implementation and monitoring by sectoral institutions. Given the mentioned widespread prevalence of overarching, cross-cutting institutional DRR approaches, this goal of "mainstreaming" the consideration of climate-related (disaster) risks receives high amounts of attention across NDCs in the region. Guinea-Bissau, for instance, stresses plans to improve integration of climate change into overarching development policies and strategies including local development plans, as well as sectoral plans for forest management and soil occupancy.

Supportive institutional arrangements on the other hand require effective cooperation and co-ordination by public institutions at various levels, but also including other stakeholders.Gambia in this regard affirms its intention to harmonize and re-align interventions by development partners towards improved disaster risk reduction.

Actual *effectiveness* of risk governance structures (policy frameworks and institutional arrangements) in the implementation of aligned climate change adaptation-DRR objectives, however, is hardly the subject of NDCs. Some countries such as Lesotho refer to insufficiently effective current policy frameworks and plans as a baseline to develop more supportive and effective structures. While many NDCs also highlight progress in the implementation of specific climate change adaptation-DRR projects or programmes, the NDCs do not contain comprehensive evaluations of progress, implementation and effectiveness of risk governance arrangements.

Technical coherence

Technical coherence, lastly, refers to strengthened technical capacities to assess the risks and opportunities, to identify climate change adaptation-DRR measures, and to finance them, and thus displays significant linkages to SFDRR priorities I and III.

While additional activity-specific examples can be found in part 3, the cross-cutting need for strengthened capacities of public sector institutions governing disaster and climate risks is a common theme across NDCs. In some contexts, such as that of Guinea-Bissau, this involves capacities and coherence in decision-making and planning primarily at a national or sectoral level and extends to capacities of private actors. In a majority of cases, however, countries refer to the need for strengthened decentralized technical capacities. Angola, for example, emphasizes the need to increase overarching technical capacity to manage risks related to natural disasters at the level of communities and local institutions.

5.3.3 Sendai Framework on Disaster Risk Reduction Priority III: Investing in DRR for resilience

The adverse impact of climate-related disasters on livelihoods and food security can be effectively reduced through investments in DRR and climate change adaptation. With two exceptions (Gabon and South Africa), all countries in the region indirectly or directly have committed towards investing in DRR and climate change adaptation measures for developing more climate resilient economies and societies, as well as more resilient agricultural production systems.

Most countries identify such climate change adaptation-DRR measures for various agricultural sub-sectors, with more than three-quarters of countries including such measures for three agricultural subsectors or more. Moreover, a clear trend regarding adaptation priorities for different sub-sectors emerges, with 65 percent of countries referring measures in the cropping and forestry sub-sector, and 57 percent in the livestock sub-sector. Thirty percent include measures for the fisheries and aquaculture subsectors.

Social protection

While adaptive management practices included in the NDCs for each subsector are discussed in detail in chapter 3, a particular instrument category of relevance in the context of climate and disaster risks is social protection, which includes risk transfer and insurance mechanisms.

A substantive proportion of countries in the region intend to develop or increase use of such mechanisms. Malawi and Tanzania, for instance, aim to develop financial mechanisms that would support crop

insurance targeting smallholder farmers. Common themes in countries' NDCs in this regard are the strengthening of insurance markets and business models, including via the development of (crop or climate) index solutions. Coastal and island countries such as the Seychelles commit to providing insurance as a social protection mechanisms for fisherfolk to reduce the impact of weather-related shocks.

5.3.4 Sendai Framework on Disaster Risk Reduction Priority IV: Enhancing disaster preparedness for effective response and to "Build back better" in recovery, rehabilitation and reconstruction

Capacities in climate-related disaster preparedness to improve the response to and recovery from extreme weather events are essential to ensure climate-resilient livelihoods. Eighty percent of the countries in the region aim to enhance climate-related disaster preparedness for effective response, with 32 percent of countries acknowledging this need for agriculture specifically. In most cases, however, only general measures have been outlined highlighting actions that have been put in place or are being intended to be implemented for better response and preparedness.

Contingency plans

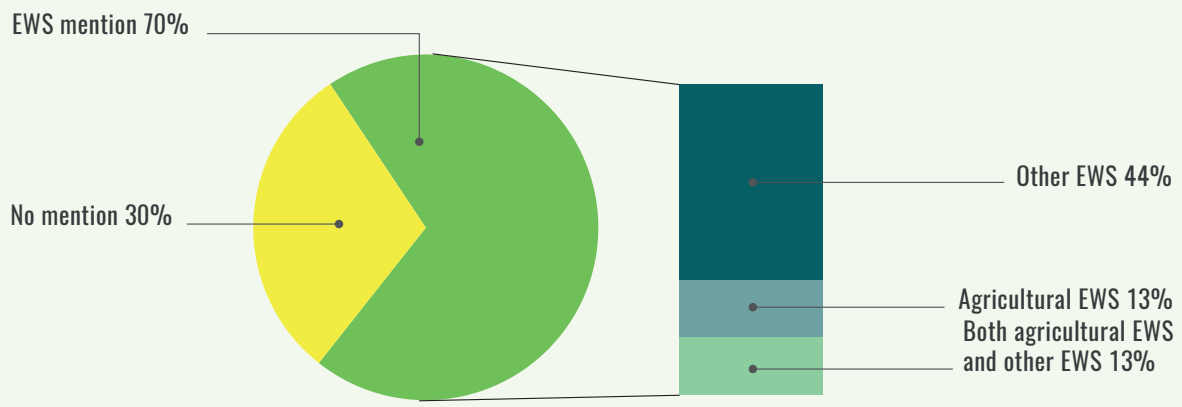
Up-to-date contingency plans specifying responsibilities and standard operating procedures significantly enhance institutional disaster preparedness. Apart from that, funding mechanisms for DRR are necessary for timely actions. Multiple countries in the region, accordingly, set out intentions to strengthen disaster preparedness by developing or updating contingency plans and/or emergency funds. Cameroon, for example, affirms its intention to update plans and funding at national, regional and departmental level. Uganda, too, plans to establish a contingency fund to cover emergency needs following certain extreme climate events.

Early Warning Systems

EWS improve climate risk preparedness and enable to respond efficiently to hazards, in the agriculture sector as well as in other sectors. **Figure 101** shows that 70 percent of countries refer to existing or to be developed or strengthened EWS. Among these, one-quarter of countries also includes reference to AG-specific EWS. While some countries intend to use these systems to anticipate, detect and respond to various or unspecified types of climatic events and impacts (multi-hazard EWS), others identify specific types of events targeted by the EWS, such as floods and storms (Angola) as well as droughts (Madagascar), intense rainfall and floods (Liberia), livestock and vector-borne diseases (Comoros) or general disease outbreaks (Uganda), and sea level rise impacts and extreme weather events (Tanzania).

FIGURE 101.

REFERENCE TO EARLY WARNING SYSTEMS IN THE NDCs, BY SHARE OF COUNTRIES IN SSA



Source: Authors.

Building back better

In the event of occurrence of a disaster, "building back better" by ensuring the resilience of new and existing physical infrastructure, as well as societal structures can significantly reduce vulnerability and exposure to climatic extreme events and thus reduce future disaster risk.

Sao Tome and Principe, for instance, plans to reduce the population living in disaster-prone areas by providing housing in less vulnerable, safer areas. In the agricultural sector, resilient on-farm infrastructure as well as along value chains, too, makes a significant difference to the reduction of disaster risk. Madagascar therefore commits to the effective application of newly established policies and norms for agricultural resilience. Emphasizing the interplay of on- and off-farm infrastructure (such as irrigation and transport infrastructure), these include inter-alia flood and cyclone-resistant hydro-agricultural infrastructures standards, cyclone resistant buildings standards, and flood-resistant terrestrial transport infrastructure standards.

CHAPTER 6

CONCLUSIONS

In light of the recent release of the IPCC's AR6 report, the climate impacts faced and projected for the world are increasingly irrefutable and unequivocal. In a number of African sub-regions (particularly southern Africa), the frequency and intensity of drought, aridity, and fire weather are expected to increase and severely affect crucial sectors such as agriculture, forestry, health and ecosystems. While pluvial floods are expected to increase in most African regions, there is a projected decrease in total precipitation anticipated in the southern most African regions, and a general weakening of the African monsoons at even a 1.5°C global warming scenario (IPCC, 2021b). Without an accelerated and transformative effort in the reduction of GHG emissions, and adaptation to already locked-in climate impacts, the lasting ramifications on the SSA region and its most vulnerable could prove to be fatal.

With overall net emissions expected to increase by 10 percent by 2030 across all sectors compared to 2015 levels (including significant increases in agricultural and LULUCF emissions) despite NDC implementation, it is vital that SSA countries create transformational shifts in their adaptation and mitigation actions to stave off the worst impacts of climate change. Observed and projected increases in the frequency and severity of heatwaves, droughts, and storms, combined with land degradation, water scarcity and the spread of agricultural pests and diseases, are threatening agricultural production systems, value chains and rural livelihoods across the region. Despite substantial progress, SSA is still faced with a daunting prevalence of extreme poverty, gender inequality, hunger and malnutrition.

A comparative analysis of SSA's NDCs finds that adaptation and mitigation action, especially in the agriculture and land use sectors, are reflected as clear priorities within the national climate change commitments of the region. The AFOLU sector constitutes the greatest source of emissions in SSA with a 65 percent share of regional emissions. Over 90 percent of countries recognize the potential to reduce the emission intensity of agricultural systems or enhance carbon sinks in soils and biomass. However, current NDC commitments are still gravely inadequate to prevent the region from, and help it cope with, experiencing the most pernicious impacts of climate change.

Moving forward, reducing emissions from livestock, agricultural soils, forest loss and degradation, and biomass burning will be critical to lowering the GHG footprint of the region and the sector. Directing resources and capacities towards the implementation of key adaptation priorities in the sector is direly needed, including plant and animal genetic resource conservation and diversification, soil restoration practices, sustainable forest management, improved irrigation technologies and climate smart agriculture. Moreover, crafting transformational climate action within the region's AFOLU sector requires that countries address the existing mitigation and adaptation gaps, especially in policy coverage, flow of finance, capacities and technologies.

When it comes to mitigation, currently, almost 80 percent of countries in SSA have a GHG hotspot related to enteric fermentation, yet only around 25 percent include a mitigation measure aiming to improve feeding or breeding practices. On the adaptation front, gaps exist in the adaptation policy coverage of responses to climate risks reported in all agricultural sub-sectors. Moreover, mainstreaming climate change adaptation and disaster risk reduction planning in the agriculture and land use is seen as a necessary institutional reform, as is aligning the NDC with ongoing or planned NAP processes.

Climate finance to small-scale agriculture remains a major gap to transforming food systems and livelihood opportunities. The development and dissemination of climate resilient crop varieties, climate information services and renewable energy technologies are flagged as a major barrier to the uptake of climate action in the region. Gaps in technical capacities and knowledge around the impacts of climate change in the sector, as well as limited organizational capabilities at the national level to mobilize climate finance through project development were identified as impeding factors to progress in the sector.

Building on existing efforts in the region presents an opportunity for co-delivering on NDC and other sustainable development agendas, such as the Africa Great Green Wall Initiative, African Forest Landscape Restoration Initiative and the UN Decade on Ecosystem Restoration. For instance, gender-responsive forest landscape restoration approaches can strengthen the resilience of forest ecosystems and forest-dependent communities to climate risks and other stresses, while enhancing the natural capacity of biomass to store and sequester carbon from the atmosphere.

FAO is committed to supporting SSA countries in the transition to more inclusive, climate-resilient and low-emission agricultural and land use systems. This includes building the evidence base and multi-stakeholder engagement in climate smart agricultural approaches across Africa, including in SIDS and in the Sahel (FAO, ICRISAT, CIAT, CCAFS, n.d.). Working with a wide range of local and national stakeholders, institutions and financial partners on the ground has proven to be a critical factor in wider uptake of climate smart agriculture, particularly when facilitated by policy enablers to address underlying risks and barriers.

As new and updated NDCs are rolling in, we are seeing a greater focus on gender equality and social inclusion, green recovery and ecosystem restoration in the region. To date, seventeen SSA countries[52] have already submitted a new or updated NDC ahead of COP26. Moving ahead, there is an unprecedented opportunity for national governments to address the underlying vulnerabilities facing our agriculture and food systems within COVID-19 response and recovery programmes to ensure that national food system transformations are prepared for, responsive to and bounce back from climatic and other future shocks and stresses.

[52] UNFCCC Interim NDC Registry as of August 2021.

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ANNEXES

ANNEX 1.

NATIONAL UNFCCC SUBMISSIONS ANALYSED, BY COUNTRY AND DATE

COUNTRY NAME	NDC	INDC	NC	BUR	NGHGI	TNA
BURUNDI	2018		2019		2015	
COMOROS	2016		2013		2000	
DJIBOUTI	2016		2014		2000	
ERITREA	2018		2012		2000	
ETHIOPIA	2017		2016		2013	
KENYA	2016		2015		2010	
MADAGASCAR	2016		2017		2010	2018
MALAWI	2017		2012		2015	
MAURITIUS	2016		2017		2013	2012
MOZAMBIQUE	2018				1994	2017/2018
RWANDA	2016		2018		2015	2013
SEYCHELLES	2016		2013		2000	2017
SOMALIA	2016		2019		2015	
SOUTH SUDAN		2015	2019		2015	
UGANDA	2016		2014	2019	2015	
UNITED REPUBLIC OF TANZANIA	2018		2015		2000	
ZAMBIA	2016		2014	2020	2000	2013
ZIMBABWE	2017		2017		2006	
ANGOLA	2020		2012		2005	
CAMEROON	2016		2016		2000	
CENTRAL AFRICAN REPUBLIC	2016		2015		2010	
CHAD	2017		2013		2000	
CONGO	2017				2000	
DEMOCRATIC REPUBLIC OF THE CONGO	2017		2015		2010	
EQUATORIAL GUINEA	2018		2019		2013	
GABON	2016		2011		2000	
SAO TOME AND PRINCIPE	2016		2019		2012	
BOTSWANA	2016		2019	2019	2015	
LESOTHO	2017		2013		2000	
NAMIBIA	2016		2020		2015	
SOUTH AFRICA	2016		2018		2015	2010
SWAZILAND	2016		2016		2010	2016/2017
BENIN	2017		2019	2019	2015	

BURKINA FASO	2016		2015		2007	2017/2018
CAPE VERDE	2017		2018		2010	
CÔTE D'IVOIRE	2016		2017	2018	2014	2013
GAMBIA	2016		2020		2000	2016
GHANA	2016		2020	2019	2016	2013
GUINEA	2016		2018		2000	
GUINEA-BISSAU	2018		2018	2020	2010	
LIBERIA	2018		2013		2000	
MALI	2016		2018		2014	2012
NIGER	2016		2017		2015	
NIGERIA	2017		2020	2018	2008	
SENEGAL	2020		2016		2016	2012
SIERRA LEONE	2016		2018		2005	
TOGO	2017		2015	2017	2010	2016

ANNEX 2.

GENERAL MITIGATION CONTRIBUTIONS IN SSA, BY SCOPE, TYPE AND TARGET

COUNTRY	SCOPE OF CONTRIBUTION	TYPE OF CONTRIBUTION	2030 GHG TARGET			HISTORICAL	BASELINE		UNCONDITIONAL		CONDITIONAL	
			PERCENT REDUCTION			MT CO_2 EQ						
			UNCONDITIONAL	CONDITIONAL	COMBINED	2015	2025	2030	2025	2030	2025	2030
EASTERN AFRICA						**804.70**	**1,175.24**	**1,345.27**	**1,145.29**	**1,303.98**	**908.73**	**877.70**
BURUNDI	MULTI-SECTORAL	GHG TARGET (BAU)	2.00	3.00	17.00	-13.57	58.50	75.00	57.33	72.75	48.56	60.00
COMOROS	MULTI-SECTORAL	GHG TARGET (BAU)	NA	NA	NA	0.25	0.43	0.52	0.43	0.52	0.13	0.08
DJIBOUTI	MULTI-SECTORAL	GHG TARGET (BAU)	NA	40.00	20.00	2.44	3.69	4.48	2.58	2.69	1.94	1.79
ERITREA	ECONOMY-WIDE	GHG TARGET (BAU)	30.20	39.20	41.40	4.49	5.50	6.33	3.84	3.85	2.14	1.23
ETHIOPIA	ECONOMY-WIDE	GHG TARGET (BAU)	NA	NA	NA	116.03	304.30	398.44	304.30	398.44	174.47	143.44
KENYA	ECONOMY-WIDE	GHG TARGET (BAU)	NA	NA	30.00	90.50	125.50	143.00	125.50	143.00	100.40	100.10
MADAGASCAR	MULTI-SECTORAL	GHG TARGET (BAU)	NA	NA	NA	-43.37	- 0.76	22.10	- 0.76	22.10	- 0.67	17.16
MALAWI	ECONOMY-WIDE	GHG TARGET (BAU)	NA	NA	NA	30.47	37.30	40.71	37.30	40.71	24.87	20.36
MAURITIUS	ECONOMY-WIDE	GHG TARGET (BAU)	NA	NA	30.00	5.22	6.41	7.00	6.41	7.00	5.13	4.90
MOZAMBIQUE	MULTI-SECTORAL	GHG TARGET (BAU)	NA	NA	NA	36.93	47.79	53.21	47.79	53.21	42.79	43.01
RWANDA	MULTI-SECTORAL	ACTION ONLY	NA	NA	NA	- 0.81	- 0.19	0.12	- 0.19	0.12	- 0.19	0.12
SEYCHELLES	MULTI-SECTORAL	GHG TARGET (BAU)	NA	NA	NA	0.55	0.79	0.91	0.79	0.91	0.62	0.65
SOMALIA	MULTI-SECTORAL	ACTION ONLY	NA	NA	NA	64.24	113.59	138.27	113.59	138.27	113.59	138.27
SOUTH SUDAN	MULTI-SECTORAL	ACTION ONLY	NA	NA	NA	36.39	64.35	78.33	64.35	78.33	64.35	78.33
UGANDA	MULTI-SECTORAL	GHG TARGET (BAU)	NA	NA	NA	87.21	80.60	77.30	80.60	77.30	68.78	60.29
UNITED REPUBLIC OF TANZANIA	MULTI-SECTORAL	GHG TARGET (BAU)	NA	10.00	10.00	312.36	201.12	145.50	187.71	130.95	174.30	116.40
ZAMBIA	MULTI-SECTORAL	GHG TARGET (BAU)	NA	25.00	22.00	65.21	75.64	80.85	63.03	60.64	51.94	42.85
ZIMBABWE	MULTI-SECTORAL	GHG TARGET (BAU)	NA	NA	NA	10.16	50.67	73.20	50.67	73.20	35.59	48.72
MIDDLE AFRICA						**844.06**	**953.41**	**1,083.65**	**909.84**	**987.49**	**736.41**	**731.63**
ANGOLA	MULTI-SECTORAL	GHG TARGET (BAU)	20.00	35.00	15.00	101.87	162.79	193.25	130.23	125.61	118.84	96.63
CAMEROON	MULTI-SECTORAL	GHG TARGET (BAU)	NA	NA	NA	28.32	78.77	104.00	78.77	104.00	61.97	70.72
CENTRAL AFRICAN REPUBLIC	ECONOMY-WIDE	GHG TARGET BASE YEAR)	NA	3.33	1.18	184.69	120.65	122.10	120.65	118.04	120.65	116.60
CHAD	MULTI-SECTORAL	GHG TARGET (BAU)	NA	18.18	53.11	13.45	23.59	28.66	20.73	23.45	12.38	8.23
CONGO	ECONOMY-WIDE	GHG TARGET (BAU)	48.00	55.00	0.00	5.32	17.00	35.00	8.84	15.75	8.84	15.75
DEMOCRATIC REPUBLIC OF THE CONGO	MULTI-SECTORAL	GHG TARGET (BAU)	NA	NA	17.00	280.00	380.00	430.00	380.00	430.00	347.70	356.90
EQUATORIAL GUINEA	ECONOMY-WIDE	GHG TARGET (BASE YEAR)	NA	NA	NA	- 4.75	- 3.84	- 3.84	- 3.84	- 3.84	- 3.84	- 3.08
GABON	MULTI-SECTORAL	GHG TARGET (BAU)	NA	NA	NA	235.01	174.25	174.25	174.25	174.25	69.70	69.70
SAO TOME AND PRINCIPE	UNI-SECTORAL	GHG TARGET (BAU)	NA	NA	24.00	0.15	0.21	0.24	0.21	0.24	0.18	0.18

SOUTHERN AFRICA						**491.98**	**1,211.90**	**1,552.03**	**1,210.24**	**1,549.19**	**525.35**	**520.53**
BOTSWANA	MULTI-SECTORAL	GHG TARGET (BASE YEAR)	NA	NA	NA	-30.07	8.31	8.31	8.31	8.31	8.31	7.06
LESOTHO	ECONOMY-WIDE	GHG TARGET (BAU)	10.20	10.00	25.00	3.53	4.82	5.71	4.33	5.14	3.16	3.71
NAMIBIA	ECONOMY-WIDE	GHG TARGET (BAU)	NA	10.00	78.60	5.55	17.54	22.65	16.37	20.38	7.18	2.58
SOUTH AFRICA	ECONOMY-WIDE	GHG TARGET (TRAJECTORY)	NA	NA	NA	513.23	1,180.53	1,514.18	1,180.53	1,514.18	506.00	506.00
SWAZILAND	MULTI-SECTORAL	ACTION ONLY	NA	NA	NA	- 0.26	0.70	1.18	0.70	1.18	0.70	1.18
WESTERN AFRICA						**618.96**	**1,133.62**	**1,457.91**	**1,026.49**	**1,244.15**	**844.26**	**931.36**
BENIN	MULTI-SECTORAL	GHG TARGET (BAU)	NA	3.63	12.54	1.94	26.31	38.50	25.83	37.10	24.18	32.27
BURKINA FASO	MULTI-SECTORAL	GHG TARGET (BAU)	6.27	6.60	11.60	64.78	105.32	118.32	98.71	110.51	86.92	96.79
CAPE VERDE	MULTI-SECTORAL	ACTION ONLY	NA	NA	NA	1.17	2.02	2.45	2.02	2.45	2.02	2.45
CÔTE D'IVOIRE	ECONOMY-WIDE	GHG TARGET (BAU)	NA	NA	NA	49.71	39.41	34.25	39.41	34.25	31.98	24.58
GAMBIA	MULTI-SECTORAL	GHG TARGET (BAU)	NA	9.31	36.09	7.02	3.35	3.80	3.19	3.45	1.86	2.07
GHANA	ECONOMY-WIDE	GHG TARGET (BAU)	12.00	15.00	30.00	43.24	53.50	73.95	47.08	62.86	39.06	40.67
GUINEA	MULTI-SECTORAL	GHG TARGET (BASE YEAR)	NA	NA	NA	13.00	30.11	30.11	30.11	30.11	30.11	26.20
GUINEA-BISSAU	MULTI-SECTORAL	ACTION ONLY	NA	NA	NA	0.28	0.48	0.58	0.48	0.58	0.48	0.58
LIBERIA	MULTI-SECTORAL	GHG TARGET (BAU)	NA	NA	NA	5.38	5.33	5.30	5.33	5.30	4.80	4.51
MALI	MULTI-SECTORAL	GHG TARGET (BAU)	24.53	56.43	134.03	-20.53	-69.33	-29.24	-52.32	-12.74	-43.16	26.45
NIGER	ECONOMY-WIDE	GHG TARGET (BAU)	NA	20.00	25.00	52.00	81.64	96.47	79.20	93.09	57.31	63.09
NIGERIA	MULTI-SECTORAL	GHG TARGET (BAU)	4.00	5.00	16.00	357.57	785.86	1,000.00	681.08	800.00	550.10	550.00
SENEGAL	MULTI-SECTORAL	GHG TARGET (BAU)	NA	NA	25.00	16.56	30.50	38.00	29.28	36.10	25.93	30.02
SIERRA LEONE	ECONOMY-WIDE	GHG TARGET (BAU)	NA	11.14	20.00	4.77	5.85	6.55	5.85	6.55	5.05	4.91
TOGO	ECONOMY-WIDE	GHG TARGET (BAU)	2.00	3.00	17.00	22.08	33.27	38.86	31.25	34.53	27.62	26.76

Blue text indicates FAO elaboration (ie. interpolation or extrapolation of national data, or proxy based on regional trend) of data reported in the NDC and NGHGI as detailed in FAO (2021) methodology. All countries communicate an end year of 2030 unless otherwise indicated.

ANNEX 3.

MITIGATION CONTRIBUTIONS IN THE AGRICULTURE SECTOR IN SSA, BY SCOPE, TYPE AND TARGET

COUNTRY	TYPE OF CONTRIBUTION	2030 GHG TARGET			HISTORICAL	BASELINE		UNCONDITIONAL		CONDITIONAL	
		PERCENT REDUCTION			MT CO_2 EQ						
		UNCONDITIONAL	CONDITIONAL	COMBINED	2015	2025	2030	2025	2030	2025	2030
EASTERN AFRICA					**589.47**	**751.74**	**832.88**	**751.74**	**832,876.49**	**699.00**	**739.46**
BURUNDI	POLICIES OR MEASURES ONLY	NA	NA	NA	0.40	0.53	0.59	0.53	0.59	0.53	0.59
COMOROS	GHG TARGET (BASE YEAR)	NA	NA	16.16	0.08	0.09	0.09	0.09	0.09	0.08	0.08
DJIBOUTI	POLICIES OR MEASURES ONLY	NA	NA	NA	1.21	1.48	1.61	1.48	1.61	1.48	1.61
ERITREA	POLICIES OR MEASURES ONLY	NA	NA	NA	4.79	5.84	6.37	5.84	6.37	5.84	6.37
ETHIOPIA	GHG TARGET (BAU)	NA	NA	48.65	103.85	157.95	185.00	157.95	185.00	106.72	95.00
KENYA	POLICIES OR MEASURES ONLY	NA	NA	NA	35.33	45.30	50.29	45.30	50.29	45.30	50.29
MADAGASCAR	GHG TARGET (BAU)	NA	NA	9.97	30.18	30.13	30.10	30.13	30.10	28.62	27.10
MALAWI	GHG TARGET (BASE YEAR)	2.16	6.47	8.62	4.64	4.64	4.64	4.64	4.54	4.64	4.24
MAURITIUS	POLICIES OR MEASURES ONLY	NA	NA	NA	0.14	0.18	0.20	0.18	0.20	0.18	0.20
MOZAMBIQUE	NO CONTRIBUTION	NA	NA	NA	3.30	4.28	4.78	4.28	4.78	4.28	4.78
RWANDA	NO CONTRIBUTION	NA	NA	NA	5.49	7.30	8.20	7.30	8.20	7.30	8.20
SEYCHELLES	NO CONTRIBUTION	NA	NA	NA	0.02	0.03	0.03	0.03	0.03	0.03	0.03
SOMALIA	NO CONTRIBUTION	NA	NA	NA	24.91	33.10	37.19	33.10	37.19	33.10	37.19
SOUTH SUDAN	NO CONTRIBUTION	NA	NA	NA	26.83	35.65	40.06	35.65	40.06	35.65	40.06
UGANDA	POLICIES OR MEASURES ONLY	NA	NA	NA	23.50	31.23	35.09	31.23	35.09	31.23	35.09
UNITED REPUBLIC OF TANZANIA	NO CONTRIBUTION	NA	NA	NA	306.50	373.96	407.69	373.96	407.69	373.96	407.69
ZAMBIA	POLICIES OR MEASURES ONLY	NA	NA	NA	12.00	12.00	12.00	12.00	12.00	12.00	12.00
ZIMBABWE	NO CONTRIBUTION	NA	NA	NA	6.29	8.07	8.95	8.07	8.95	8.07	8.95
MIDDLE AFRICA					**92.68**	**502.14**	**519.72**	**499.16**	**514.50**	**465.17**	**450.38**
ANGOLA	NO CONTRIBUTION	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CAMEROON	GHG TARGET (BAU)	NA	NA	32.98	36.09	58.33	69.44	58.33	69.44	45.50	46.54
CENTRAL AFRICAN REPUBLIC	POLICIES OR MEASURES ONLY	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CHAD	GHG TARGET (BAU)	12.00	18.00	30.00	24.69	37.18	43.43	34.21	38.22	29.75	30.40
CONGO	GHG TARGET (BAU)	2.67	0.00	2.67	0.60	0.23	0.38	0.22	0.37	0.22	0.37
DEMOCRATIC REPUBLIC OF THE CONGO	GHG TARGET (BAU)	0.00	8.35	8.35	27.35	400.00	400.00	400.00	400.00	383.30	366.60
EQUATORIAL GUINEA	POLICIES OR MEASURES ONLY	NA	NA	NA	0.02	0.05	0.07	0.05	0.07	0.05	0.07
GABON	NO CONTRIBUTION	NA	NA	NA	3.87	6.20	6.20	6.20	6.20	6.20	6.20
SAO TOME AND PRINCIPE	NO CONTRIBUTION	NA	NA	NA	0.06	0.16	0.21	0.16	0.21	0.16	0.21
SOUTHERN AFRICA					**64.22**	**120.34**	**148.40**	**120.34**	**148.40**	**120.23**	**148.20**
BOTSWANA	SECTOR INCLUDED IN GENERAL CONTRIBUTION ONLY	NA	NA	NA	1.65	3.19	3.95	3.19	3.95	3.19	3.95
LESOTHO	SECTOR INCLUDED IN GENERAL CONTRIBUTION ONLY	NA	NA	NA	5.36	7.44	8.48	7.44	8.48	7.44	8.48

NAMIBIA[53]	GHG TARGET (BAU)	NA	1.44	1.44	5.84	11.28	14.00	11.28	14.00	11.17	13.80
SOUTH AFRICA	SECTOR INCLUDED IN GENERAL CONTRIBUTION ONLY	NA	NA	NA	48.63	93.94	116.60	93.94	116.60	93.94	116.60
SWAZILAND	NO CONTRIBUTION	NA	NA	NA	2.75	4.49	5.37	4.49	5.37	4.49	5.37
WESTERN AFRICA					**295.66**	**349.92**	**372.89**	**341.49**	**360.15**	**319.61**	**309.35**
BENIN	GHG TARGET (BAU)	5.80	25.30	31.10	4.90	7.23	8.40	7.02	7.91	6.11	5.79
BURKINA FASO[54]	GHG TARGET (BAU)	7.00	10.18	17.21	71.44	95.56	103.42	89.35	96.19	78.79	85.63
CAPE VERDE	SECTOR INCLUDED IN GENERAL CONTRIBUTION ONLY	NA	NA	NA	0.12	0.13	0.13	0.13	0.13	0.13	0.13
CÔTE D'IVOIRE	GHG TARGET (BAU)	NA	NA	33.10	6.25	6.79	7.06	6.79	7.06	5.29	4.72
GAMBIA	GHG TARGET (BASE YEAR)	NA	NA	69.86	3.08	1.58	1.58	1.58	1.58	0.48	0.48
GHANA	POLICIES OR MEASURES ONLY	NA	NA	NA	9.88	10.55	10.89	10.55	10.89	10.55	10.89
GUINEA	SECTOR INCLUDED IN GENERAL CONTRIBUTION ONLY	NA	NA	NA	49.80	52.85	54.37	52.85	54.37	52.85	54.37
GUINEA-BISSAU	NO CONTRIBUTION	NA	NA	NA	4.08	4.34	4.47	4.34	4.47	4.34	4.47
LIBERIA	NO CONTRIBUTION	NA	NA	NA	2.91	3.09	3.18	3.09	3.18	3.09	3.18
MALI	GHG TARGET (BAU)	5.71	23.29	29.00	59.11	77.59	87.59	75.59	82.59	67.83	62.19
NIGER	POLICIES OR MEASURES ONLY	NA	NA	NA	13.79	14.67	15.12	14.67	15.12	14.67	15.12
NIGERIA	GHG TARGET (BASE YEAR)	NA	NA	23.77	56.02	59.79	59.79	59.79	59.79	59.79	45.57
SENEGAL	GHG TARGET (BAU)	0.19	0.63	0.82	7.13	8.10	9.00	8.09	8.98	8.05	8.93
SIERRA LEONE	POLICIES OR MEASURES ONLY	NA	NA	NA	0.56	0.59	0.61	0.59	0.61	0.59	0.61
TOGO	POLICIES OR MEASURES ONLY	NA	NA	NA	6.60	7.05	7.27	7.05	7.27	7.05	7.27

Blue text indicates FAO elaboration (ie. interpolation or extrapolation of national data, or proxy based on regional trend) of data reported in the NDC and NGHGI as detailed in FAO (2021) methodology. All countries communicate an end year of 2030 unless otherwise indicated.

[53] FAO elaboration of Namibia's GHG target for the AFOLU sector.

[54] FAO elaboration of Burkina Faso's GHG target for the AFOLU sector.

ANNEX 4.

MITIGATION CONTRIBUTIONS IN THE LULUCF SECTOR IN SSA, BY SCOPE, TYPE AND TARGET

COUNTRY	TYPE OF CONTRIBUTION	2030 GHG TARGET			HISTORICAL	BASELINE		UNCONDITIONAL		CONDITIONAL	
		PERCENT REDUCTION			MT CO_2 EQ						
		UNCONDITIONAL	CONDITIONAL	COMBINED	2015	2025	2030	2025	2030	2025	2030
EASTERN AFRICA					**666.70**	**1,311.16**	**1,638.28**	**1,300.22**	**1,626.78**	**1,219.71**	**1,433.45**
BURUNDI	POLICIES OR MEASURES ONLY	NA	NA	NA	-1.28	0.61	1.56	0.61	1.56	0.61	1.56
COMOROS	GHG TARGET (BAU)	NA	NA	56.67	-0.05	0.03	0.05	0.03	0.05	0.01	0.02
DJIBOUTI	NO CONTRIBUTION	NA	NA	NA	2.98	6.61	8.42	6.61	8.42	6.61	8.42
ERITREA	POLICIES OR MEASURES ONLY	NA	NA	NA	26.78	39.08	45.23	39.08	45.23	39.08	45.23
ETHIOPIA	GHG TARGET (BAU)	NA	NA	144.44	- 29.63	50.12	90.00	50.12	90.00	1.86	- 40.00
KENYA	POLICIES OR MEASURES ONLY	NA	NA	NA	36.93	68.29	83.97	68.29	83.97	68.29	83.97
MADAGASCAR	GHG TARGET (BAU)	NA	NA	31.60	-217.99	-204.00	- 192.10	-204.00	-192.10	-236.22	-252.80
MALAWI	GHG TARGET (BASE YEAR)	58.59	26.26	84.85	9.90	9.90	9.90	9.90	4.10	9.90	1.50
MAURITIUS	POLICIES OR MEASURES ONLY	NA	NA	NA	-0.26	0.28	0.55	0.28	0.55	0.28	0.55
MOZAMBIQUE	SECTOR INCLUDED IN GENERAL CONTRIBUTION ONLY	NA	NA	NA	31.48	42.82	48.48	42.82	48.48	42.82	48.48
RWANDA	POLICIES OR MEASURES ONLY	NA	NA	NA	- 11.36	5.41	13.79	5.41	13.79	5.41	13.79
SEYCHELLES	NO CONTRIBUTION	NA	NA	NA	0.99	2.18	2.78	2.18	2.78	2.18	2.78
SOMALIA	POLICIES OR MEASURES ONLY	NA	NA	NA	36.97	91.53	118.82	91.53	118.82	91.53	118.82
SOUTH SUDAN	POLICIES OR MEASURES ONLY	NA	NA	NA	2.76	6.84	8.87	6.84	8.87	6.84	8.87
UGANDA	GHG TARGET (BAU)	71.25	0.00	71.25	53.15	23.05	8.00	12.10	2.30	12.10	2.30
UNITED REPUBLIC OF TANZANIA	POLICIES OR MEASURES ONLY	NA	NA	NA	579.66	845.85	978.95	845.85	978.95	845.85	978.95
ZAMBIA	POLICIES OR MEASURES ONLY	NA	NA	NA	118.42	172.80	199.99	172.80	199.99	172.80	199.99
ZIMBABWE	POLICIES OR MEASURES ONLY	NA	NA	NA	27.25	149.75	211.00	149.75	211.00	149.75	211.00
MIDDLE AFRICA					**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
ANGOLA	GHG TARGET (BASE YEAR)	166.67	0.00	166.67	NA	NA	NA	NA	NA	NA	NA
CAMEROON	POLICIES OR MEASURES ONLY	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CENTRAL AFRICAN REPUBLIC	POLICIES OR MEASURES ONLY	NA	NA	NA	- 12.53	- 15.77	-17.39	- 15.77	- 17.39	- 19.97	- 24.34
CHAD	GHG TARGET (BAU)	0.00	40.00	40.00	NA	NA	NA	NA	NA	NA	NA
CONGO	POLICIES OR MEASURES ONLY	NA	NA	NA	238.16	346.05	400.00	346.05	400.00	335.58	375.80
DEMOCRATIC REPUBLIC OF THE CONGO	GHG TARGET (BAU)	0.00	6.05	6.05	-8.33	-6.43	- 5.49	-6.43	-5.49	-6.43	-5.49
EQUATORIAL GUINEA	POLICIES OR MEASURES ONLY	NA	NA	NA	128.00	160.00	160.00	160.00	160.00	87.47	87.47
GABON	GHG TARGET (BAU)	NA	NA	68.00	-0.30	-0.23	- 0.20	-0.23	-0.20	-0.23	-0.20
SAO TOME AND PRINCIPE	NO CONTRIBUTION	NA	NA	NA	340.89	480.62	533.93	480.62	528.93	393.41	425.24

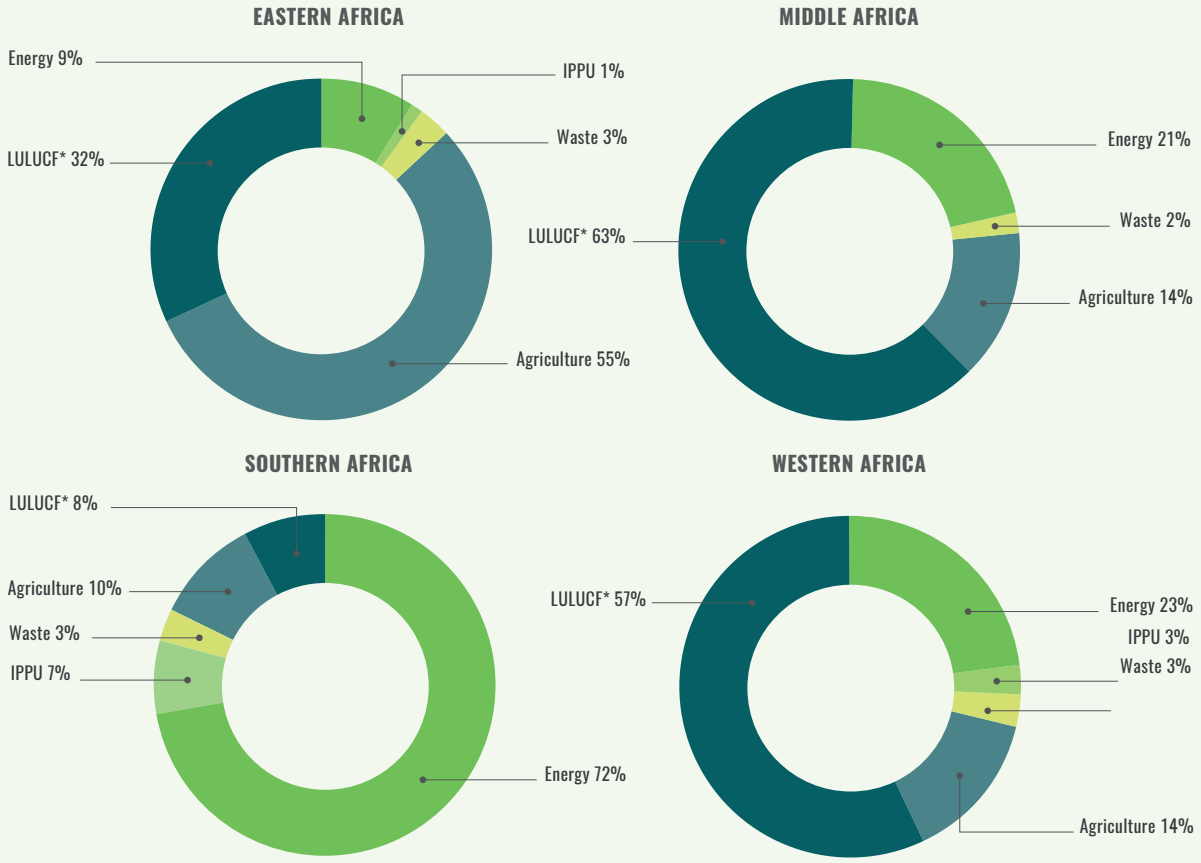
SOUTHERN AFRICA					**-139.74**	**- 34.77**	**17.72**	**- 34.77**	**17.72**	**- 58.71**	**-0.58**
BOTSWANA	NO CONTRIBUTION	NA	NA	NA	-2.59	-0.64	0.33	-0.64	0.33	-0.64	0.33
LESOTHO	POLICIES OR MEASURES ONLY	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NAMIBIA[55]	GHG TARGET (BAU)	NA	130.71	130.71	-110.42	- 27.47	14.00	- 27.47	14.00	- 51.41	-4.30
SOUTH AFRICA	SECTOR INCLUDED IN GENERAL CONTRIBUTION ONLY	NA	NA	NA	- 26.72	-6.65	3.39	-6.65	3.39	-6.65	3.39
SWAZILAND	NO CONTRIBUTION	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
WESTERN AFRICA					**-1.28**	**0.61**	**1.56**	**0.61**	**1.56**	**0.61**	**1.56**
BENIN	GHG TARGET (BAU)	NA	NA	411.78	-4.00	-2.37	- 1.55	-2.37	-1.55	-7.24	-7.95
BURKINA FASO	GHG TARGET	6.98	10.18	17.16	52.46	95.56	103.42	91.12	96.21	84.63	85.68
CAPE VERDE	POLICIES OR MEASURES ONLY	NA	NA	NA	-0.09	0.00	0.05	0.00	0.05	0.00	0.05
CÔTE D'IVOIRE	POLICIES OR MEASURES ONLY	NA	NA	NA	32.45	45.15	51.50	45.15	51.50	45.15	51.50
GAMBIA	GHG TARGET (BASE YEAR)	75.79	0.00	75.79	40.67	0.44	0.44	0.16	0.11	0.16	0.11
GHANA	POLICIES OR MEASURES ONLY	NA	NA	NA	12.46	17.75	20.39	17.75	20.39	17.75	20.39
GUINEA	POLICIES OR MEASURES ONLY	NA	NA	NA	-172.67	8.21	98.64	8.21	98.64	8.21	98.64
GUINEA-BISSAU	POLICIES OR MEASURES ONLY	NA	NA	NA	-8.53	-4.17	- 1.99	-4.17	-1.99	-4.17	-1.99
LIBERIA	NO CONTRIBUTION	NA	NA	NA	- 37.65	1.79	21.51	1.79	21.51	1.79	21.51
MALI	GHG TARGET BAU	0.00	20.93	20.93	-134.61	-129.26	- 126.59	-129.26	-126.59	-144.02	-153.08
NIGER	POLICIES OR MEASURES ONLY	NA	NA	NA	298.91	425.86	489.33	425.86	489.33	425.86	489.33
NIGERIA	POLICIES OR MEASURES ONLY	50.00	25.00	75.00	-712.63	- 20.00	-20.00	- 30.00	- 30.00	- 35.00	- 35.00
SENEGAL	GHG TARGET (BASE YEAR)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SIERRA LEONE	POLICIES OR MEASURES ONLY	NA	NA	NA	17.47	24.59	28.15	24.59	28.15	24.59	28.15
TOGO	POLICIES OR MEASURES ONLY	NA	NA	NA	-640.46	452.92	659.73	438.20	642.18	407.08	593.76

Blue text indicates FAO elaboration (ie. interpolation or extrapolation of national data, or proxy based on regional trend) of data reported in the NDC and NGHGI as detailed in FAO (2021) methodology. All countries communicate an end year of 2030 unless otherwise indicated.

[55] FAO elaboration of Namibia's GHG target for the AFOLU sector.

ANNEX 5.

GREENHOUSE GAS EMISSIONS PROFILE FOR THE AGRICULTURE SECTOR IN SSA SUB-REGIONS, BY SOURCE CATEGORY

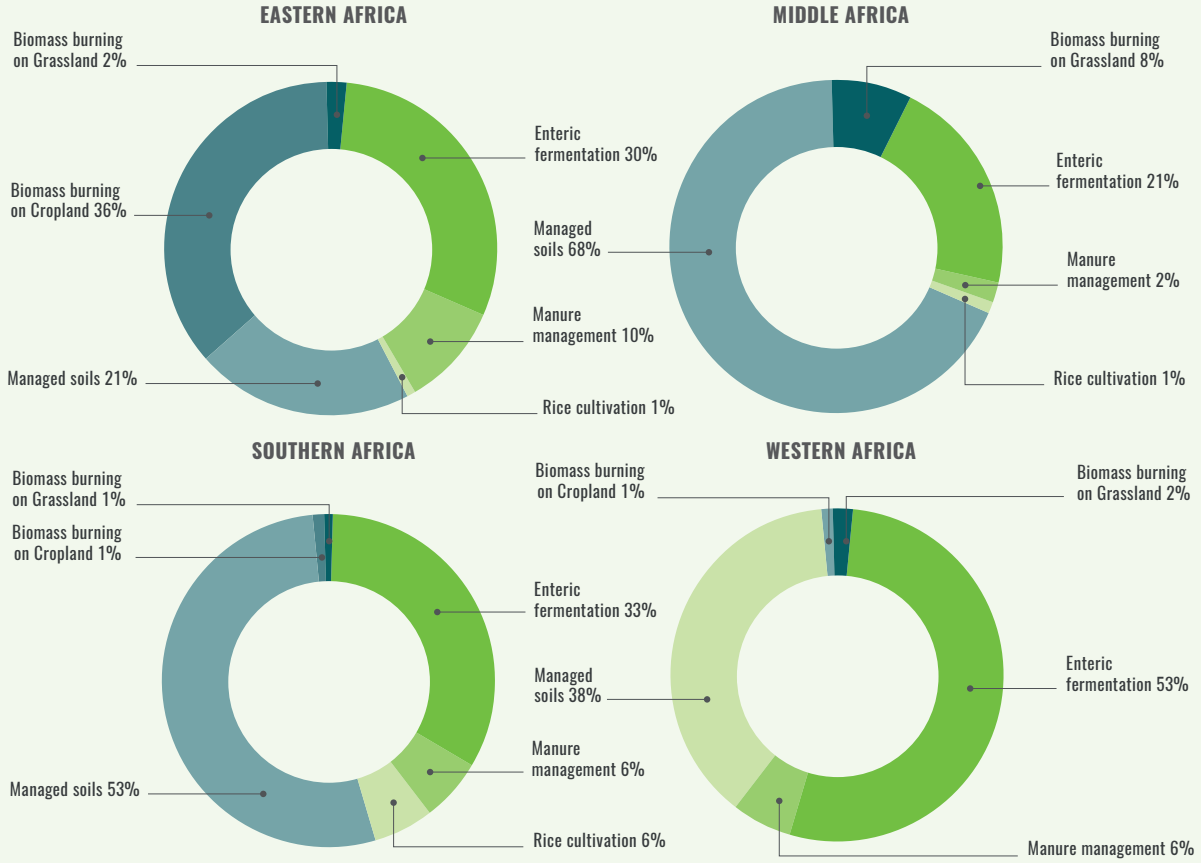


**Excluding removals.*

Source: Authors.

ANNEX 6.

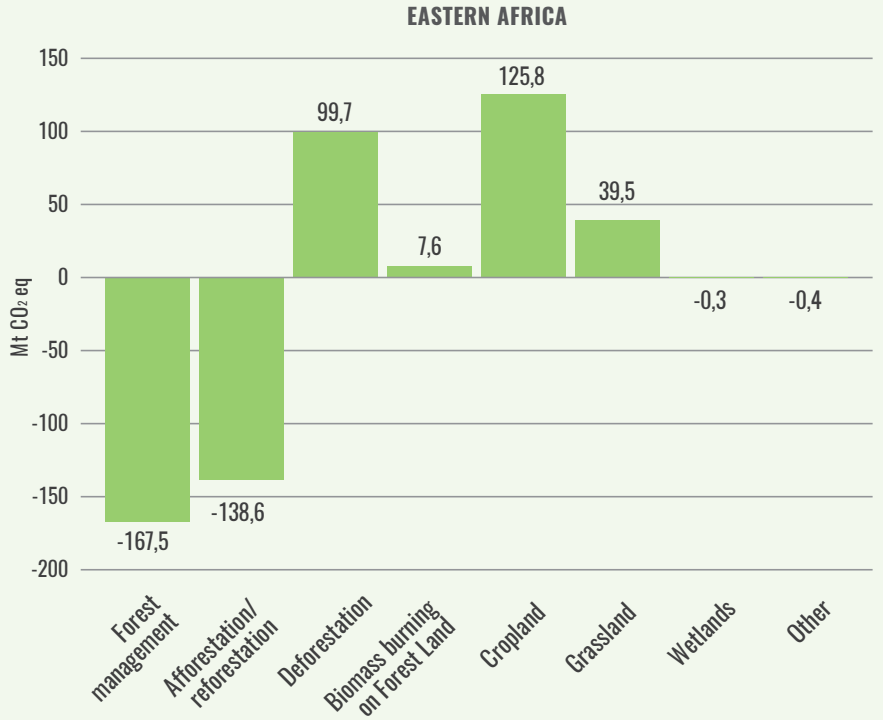
GREENHOUSE GAS EMISSIONS PROFILE FOR THE AGRICULTURE SECTOR IN SSA SUB-REGIONS, BY SOURCE CATEGORY

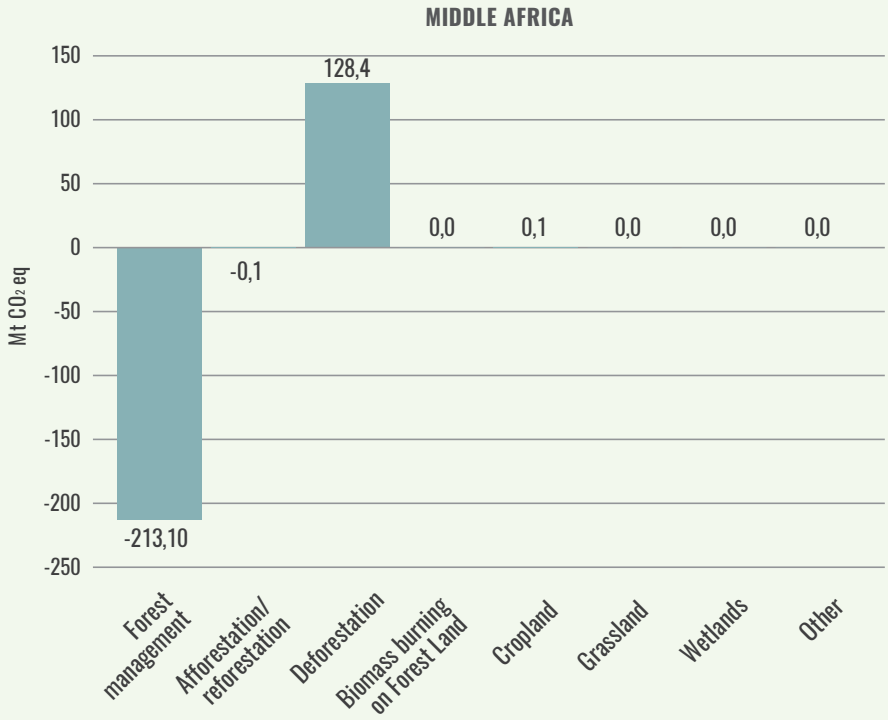


Source: Authors.

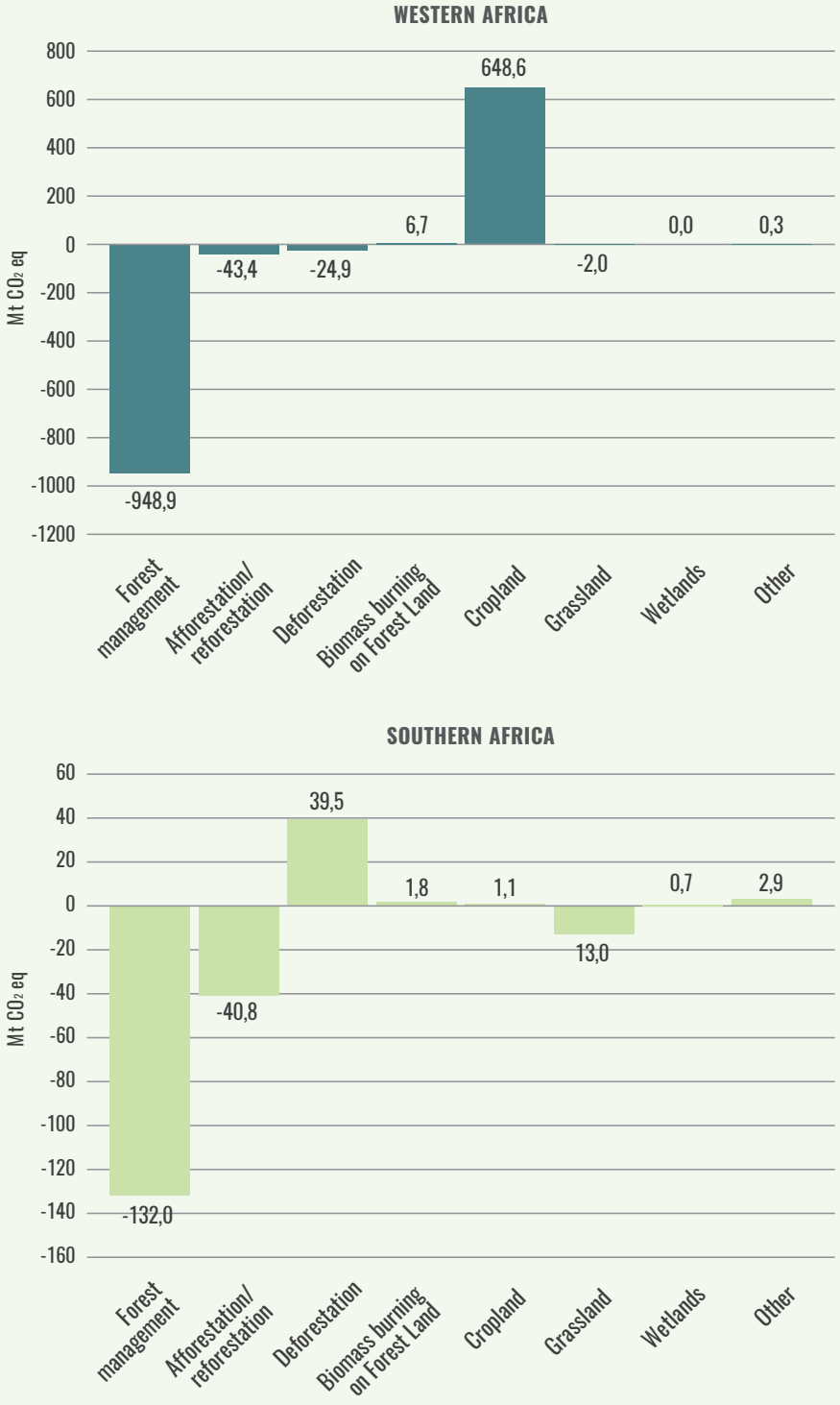
ANNEX 7.

GREENHOUSE GAS EMISSIONS AND REMOVALS PROFILE FOR THE LULUCF SECTOR IN SSA SUB-REGIONS, BY SOURCE AND SINK CATEGORY





GREENHOUSE GAS EMISSIONS AND REMOVALS PROFILE FOR THE LULUCF SECTOR IN SSA SUB-REGIONS, BY SOURCE AND SINK CATEGORY



Notes: Negative values refer to removals and positive values refer to emissions. (Refer to Annex 1). Figure excludes the GHG category "other".

Source: Authors.

This report provides a unique, sector-specific synthesis of the agriculture, and land use sectors in the nationally determined contributions (NDC) from sub-Saharan Africa. It summarizes the substantial contributions already put forward by countries, opportunities for further action and the gaps, barriers and needs that will need to be addressed if the region is to raise mitigation and adaptation ambitions. The findings of this report will help member countries to reflect on their progress in advancing toward NDC priorities for agriculture, water and land use, and associated national climate goals including related targets under the Sustainable Development Goals.

The analysis also helps to make clear the links between the NDCs from the region and the ongoing work of the United Nations Framework Convention on Climate Change in support of the Koronivia Joint Work on Agriculture. Finally, the report serves as a guide to the Food and Agriculture Organization of the United Nations, as well as other organizations and financial institutions, of the support that will be required to help countries in the region move forward to implement agriculture, and land use priorities in their NDCs and ensure that future commitments from the sector are quantifiable, verifiable and sufficiently ambitious.

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