Republic
of Rwanda

RWANDA'S 2035

NATIONALLY DETERMINED CONTRIBUTION NDC 3.0

2025


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NATIONALLY DETERMINED CONTRIBUTION NDC 3.0

2025

I. FOREWORD

Dr. Bernadette Arakwiye
Minister of Environment
Republic of Rwanda

It is an honor to present Rwanda's Nationally Determined Contribution (NDC) 3.0. Rwanda stands at a defining moment in its climate action journey. Building on the foundation of our green growth and climate resilience strategy and the commitments laid out in NDC 2.0, this enhanced NDC responds decisively to the findings of the first Global Stock Take under the Paris Agreement.

The stocktake confirmed that global efforts remain insufficient to limit warming to 1.5°C and called on all parties to raise ambition across mitigation, adaptation, and means of implementation.

Rwanda has answered that call with concrete, data-driven NDC 3.0 actions. This plan sets an ambitious economy-wide mitigation target of 53% reduction in greenhouse gas emissions by 2035 compared to a Business-As-Usual (BAU) scenario, a significant increase from the 38% target for 2030 under NDC 2.0. This new target is comprehensive: covering key sectors (land use, land-use change, and forestry, energy, agriculture, waste, industrial process and product use).

Although we are deepening our mitigation efforts, adaptation is Rwanda's foremost climate priority. The evidence of climate change impacts is clear. In 2023 alone, floods and landslides claimed 131 lives and caused damages exceeding USD 415 million in northern, western and southern provinces of Rwanda.

NDC 3.0, therefore places adaptation at its core, with robust, measurable interventions across nine priority sectors: water resources, agriculture, land and forestry, urbanization and human settlements, health, transport, mining, water, sanitation and hygiene as well as cross-cutting areas. We are also pioneering a dedicated loss and damage response mechanism that ensures strategic access to international finance including the fund for responding to loss and damage to address the growing climate impacts that lie beyond the reach of adaptation alone. Implementing NDC 3.0 requires unprecedented resources, where the total cost through 2035 is estimated at USD 12 billion; USD 5 billion for mitigation and USD 7 billion for adaptation.

This NDC is the product of an inclusive, multi-stakeholder process engaging ministries, local governments, civil society, youth, women, children, and the private sector. It embeds principles of gender equity, climate-induced mobility, and green job creation. It is also fully aligned with Rwanda's vision 2050, second national strategy for transformation, and the Global Sustainable Development Goals.

NDC 3.0 is more than a compliance document; it is a declaration of resilience. It affirms Rwanda's unwavering commitment to the Paris Agreement and our determination to build a green, inclusive, and climate-proof future not in spite of our vulnerabilities, but because of our resolve to overcome them. We invite all partners domestic and international; to walk with us on this journey.

II. ACRONYMS AND ABBREVIATIONS

AFOLU	Agriculture, Forestry and Other Land Use
BAU	Business as usual
bn	Billion
BRT	Bus rapid transport
BTR	Biennial Transparency Report
BUR	Biennial Update Report
CCDR	Country Climate and Development Report
CFL	Compact fluorescent lamp
CNFS	Climate and Nature Finance Strategy
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
CoK	City of Kigali
COP	Conference of the Parties
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
DDS	District Development Strategy
DIDIMAC	District Disaster Management Committee
EICV7	Seventh Integrated Household Living Survey
ESSP	Energy Sector Strategic Plan
ETF	Enhanced Transparency Framework
EV	Electric Vehicle
F-gas	Fluorinated gas
FRLD	Fund for responding to Loss and Damage
GDP	Gross Domestic Product
GESI	Gender, equality and social inclusion
GGCRS	Green Growth and Climate Resilience Strategy
GHG	Greenhouse gas
GoR	Government of Rwanda

GWP	Global warming potential
Ha	Hectare
HFC	Hydrofluorocarbon
HFO	Heavy fuel oil
IPCC	Intergovernmental Panel on Climate Change
IPPU	Industrial Processes and Product Use
ITMO	Internationally Transferred Mitigation Outcome
IWRM	Integrated Water Resources Management
L&D	Loss and damage
LEAP	Low Emissions Analysis Platform
LFG	Landfill gas
LPG	Liquefied petroleum gas
LULUCF	Land use, land use change and forestry
M&E	Monitoring and Evaluation
MBT	Mechanical and biological treatment
MEL	Monitoring, Evaluation and Learning
MINAGRI	Ministry of Agriculture and Animal Resources
MINALOC	Ministry of Local Government
MINECOFIN	Ministry of Finance and Economic Planning
MINEDUC	Ministry of Education
MINEMA	Ministry of Emergency Management
MININFRA	Ministry of Infrastructure
MoE	Ministry of Environment
MPGs	Modalities, procedures, and guidelines
MRV	Measuring, Reporting and Verification
Mt	Million metric tonnes
MW	Megawatt
NADIMATEC	National Disaster Management Technical Committee
NAP	National Adaptation Plan
NBS	Nature-based solution
NDC	Nationally Determined Contribution
NDIMS	National Disaster Information Management System
NGO	Non-Governmental Organisation
NISR	National Institute of Statistics of Rwanda
NLA	National Land Authority

NMT	Non-motorised transport
NPDM	National Platform for Disaster Management
NST2	Second National Strategy for Transformation
ODS	Ozone depleting substances
PaMs	Policies and Measures
SHCCIPV	Photovoltaic
RAB	Rwanda Agriculture Board
RBME	Results Based Monitoring and Evaluation
REG	Rwanda Energy Group Ltd
REMA	Rwanda Environment Management Authority
RFA	Rwanda Forestry Authority
RGF	Rwanda Green Fund
RHA	Rwanda Housing Authority
RMB	Rwanda Mines, Petroleum and Gas Board
RTDA	Rwanda Transport Development Agency
RURA	Rwanda Utilities Regulatory Authority
RWF	Rwandan Franc
RFA	Rwanda Forestry Authority
RWB	Rwanda Water Resources Board
SEDIMAC	Sector Disaster Management Committee
SFM	Sustainable Forestry Management
SHCCI	Strengthening Human Capital and Climate Integration
SPCR	Strategic Program for Climate Resilience
SSP	Sector Strategic Plan
SWG	Sector Working Group
SWH	Solar water heater
t	Metric tonne
TNC	Third National Communication under the UNFCCC
TWG	Thematic Working Group
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States (US) Dollar
VCM	Voluntary carbon market
WASAC	Water and Sanitation Corporation
WASH	Water, sanitation and hygiene
WtE	Waste to Energy

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EXECUTIVE SUMMARY

UPDATING AND ENHANCING THE NDC

The Republic of Rwanda submitted its first updated and revised NDC (NDC 2.0) to the United Nations Framework Convention on Climate Change (UNFCCC) Secretariat in May 2020. As required under the Paris Agreement, Rwanda is now pleased to submit this updated and enhanced NDC (NDC 3.0).

The Paris Agreement requires Parties' updated contributions to be informed by the outcome of the first Global Stocktake (GST) which concluded in 2023 and assessed collective progress toward meeting the goals of the Paris Agreement. The GST found that Global Greenhouse Gas (GHG) reduction pathways were not aligned with the Paris Agreement and therefore encouraged Parties to come forward in their next NDCs with "ambitious, economy-wide emission reduction targets, covering all greenhouse gases, sectors and categories and aligned with limiting global warming to 1.5 °C, as informed by the latest science, in the light of different national circumstances".

Responding to this request, Rwanda has now expanded the scope of its NDC to be economy-wide, including all GHGs and sectors included in its national greenhouse gas inventory. Previously excluded from NDC 2.0, emissions and removals from Land Use, Land Use Change and Forestry (LULUCF) have now been included within the NDC 3.0 mitigation contribution. Rwanda's adaptation contribution has also been significantly enhanced, with further elaboration of specific targets and indicators. As encouraged under the international framework, this updated NDC now incorporates an end date of 2035.

MITIGATION CONTRIBUTION

Rwanda's mitigation contribution takes the form of a reduction in GHG emissions relative to a BAU emissions scenario projected from a base year of 2015 over the period to 2035.

According to the latest national GHG inventory data base, year emissions totalled 8.7 million tonnes of carbon dioxide equivalent (tCO_2e). Energy use accounted for an estimated 18% of the total, mainly due to emissions from liquid fossil fuel combustion in road transport (diesel and gasoline), fuel use in manufacturing and construction, and in buildings for heating, cooking and lighting. Waste also accounted for around 18% of the total, mainly from solid waste disposal and wastewater treatment and discharge.

Agricultural sources accounted for around 63% of the total, mainly as emissions from livestock enteric fermentation and manure management, with industrial processes and product use (IPPU) accounting for the remaining 1% of the total emissions. Carbon removals from forests and harvested wood products were estimated to total 6.4 million tCO_2. These removals were partially offset by other Land Use, Land Use Change and Forestry (LULUCF) emissions from croplands, grasslands and other sources. The country's resulting net emissions (emissions and removals) in 2015 are estimated at around 4.2 million tCO_2e.

Under the BAU emissions scenario, total emissions excluding LULUCF are forecast to increase significantly, rising from 8.7 million tCO_2e in 2015 to 32.9 million tCO_2e in 2035. This outlook reflects assumptions around the growing contribution from fossil fuels to national emissions, in particular from increasing demand for road transport and modern energy services, as well as increased levels of waste generation. As seen over the past two decades, these factors are driven by strong economic and population growth which are both expected to continue through 2035. Although retaining a large share of the country's emissions, the contribution from agricultural sources is expected to be more limited, growing broadly in line with trends over the past decade. Accounting for the emissions and removals from LULUCF, net emissions are projected to increase from 4.2 million tCO_2e to 27.9 million tCO_2e in 2035.

An updated assessment of GHG mitigation measures for Rwanda was undertaken in order to determine which options are most suitable for inclusion within the NDC 3.0. The updated contribution, now calculated on the basis of net emissions and including LULUCF, comprises of two components:

- **Unconditional contribution:** A reduction of 7 per cent (%) relative to BAU in the year 2035; equivalent to an estimated mitigation level of 1.84 million tonnes of carbon dioxide equivalent (tCO_2e) in that year. This is an unconditional target, based on domestically supported and implemented mitigation policies and measures.

- **Conditional contribution:** An additional reduction of 46% relative to BAU in the year 2035, equivalent to an estimated additional mitigation level of 13.02 million tCO_2e in that year. This represents an additional contribution, conditional on the provision of international support and funding.

The combined unconditional and conditional contribution is therefore a 53% reduction in net GHG emissions compared to BAU in 2035, equivalent to an estimated mitigation level 14.86 million tCO_2e in that year. This represents the estimated maximum mitigation potential if all of the identified mitigation measures are fully funded and implemented.

Figure ES-1 shows how the mitigation is expected to be delivered across the different key sectors of energy, IPPU, waste, agriculture and LULUCF. Changes in energy use are expected to deliver the largest share of the potential – including from investments in cleaner low carbon fuels and technologies such as electric vehicles (EVs), renewable power generation, clean and efficient cookstoves, and wide-ranging energy efficiency measures. Climate friendly low emission practices in agriculture and forestry-related-interventions are expected to deliver most of the remaining potential. Measures within the waste and IPPU sectors make a smaller albeit important contribution to the total. Table ES-1 shows the aggregated economy-wide targets through to 2035, including updated targets for 2030.

The sectoral scope of the contribution covers all emissions sources described in the IPCC 2006 Reporting Guidelines, including emissions from the categories of energy, IPPU, waste, and agriculture, forestry and other land use (AFOLU). The coverage of the contribution includes the main greenhouse gases carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and also hydrofluorocarbons (HFCs).

Figure ES-1 Mitigation contributions against BAU baseline (including LULUCF), 2035

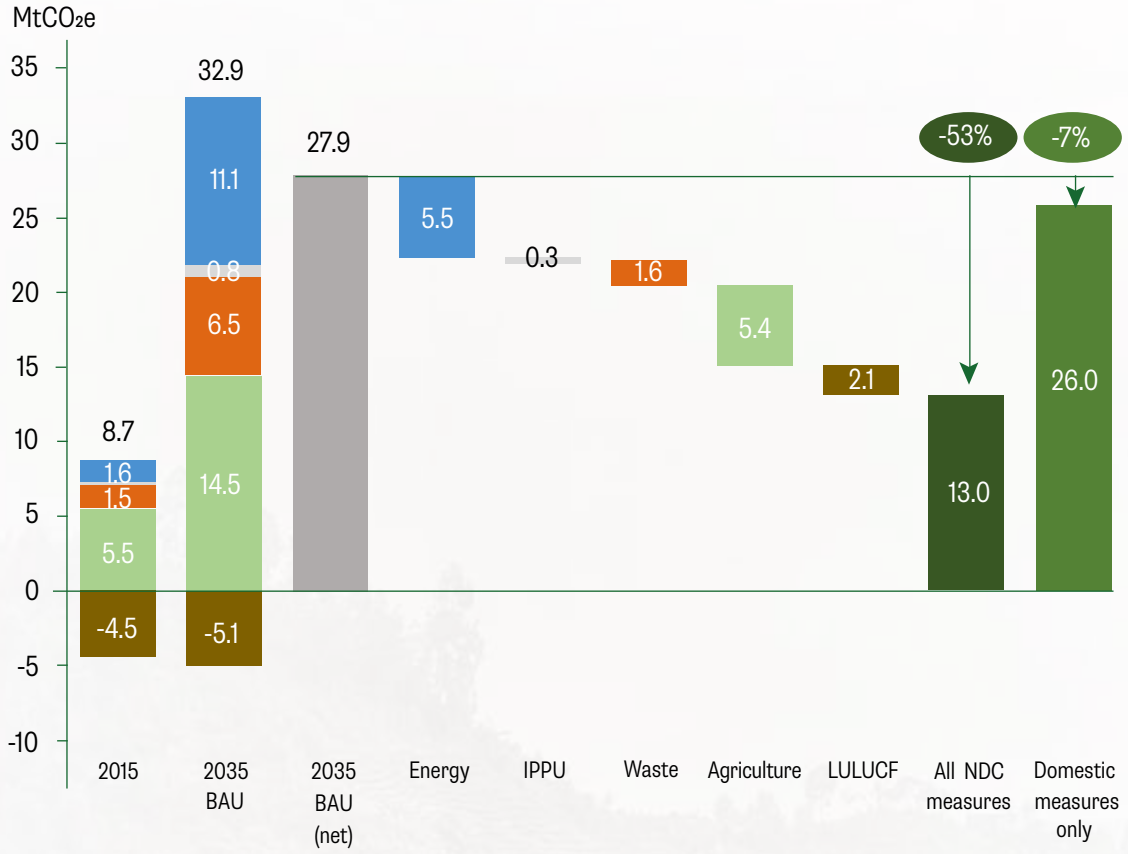

Table ES-1: Mitigation contributions against BAU baseline (including LULUCF)

	2015	2020	2025	2030	2035
Total net emissions (million tCO_2e/yr)					
BAU reference case	4.15	7.50	12.45	18.80	27.86
Unconditional measures	4.15	7.39	11.82	17.51	26.02
All NDC measures	4.15	6.47	9.38	10.93	13.00
GHG reduction relative to BAU (million tCO_2e/yr)					
Unconditional measures	-	0.12	0.63	1.29	1.84
Conditional measures	-	0.92	2.44	6.57	13.02
All NDC measures	-	1.04	3.08	7.86	14.86
GHG reduction relative to BAU (%)					
Unconditional measures	-	2%	5%	7%	7%
Conditional measures	-	12%	20%	35%	46%
All NDC measures	-	14%	25%	42%	53%

ADAPTATION CONTRIBUTION

In response to the growing challenges of climate change, Rwanda has established a comprehensive and robust legal, policy, and strategic framework which prioritizes adaptation across eight key sectors: agriculture, water resources, land and forestry, human settlements, health, transport, mining, and cross-sectoral activities. This sectoral approach has been consistently adopted in strategic documents, including the revised GGCRS and the sector strategic plans related to agriculture, urbanization and human settlement, transport, and water and sanitation.

Since NDC 2.0, Rwanda has experienced rising climate impacts with rising loss and damage. This includes the impact of the 2023 floods and landslides, which led to 131 fatalities and estimated damages of RWF 518.58 billion (USD 415 million) to recover from the damages and economic losses. Additional information has also emerged on the potential future impacts of climate change to Rwanda, which indicate much higher economic costs than previously identified, and thus greater adaptation needs. This includes the analysis in the World Bank's Country Climate and Development Report (CCDR) which estimates that without adaptation, climate change could reduce annual GDP by 5-7% below baseline levels by 2050.

Climate change poses a serious threat to Rwanda's economy and the livelihoods of its people. Additional net economic costs could amount to nearly 1% of GDP each year by 2030 and rise further to 2.5% of GDP by 2050. In agriculture, which employs 54.8% of the workforce, projected climate shifts are expected to reduce the yields of key staple crops by at least 10% under moderate warming scenarios (RCP 4.5) and up to 15% under higher-emission pathways (RCP 8.5) by 2050. These impacts threaten both macroeconomic stability and the food security and incomes of millions of Rwandans. This indicates that Rwanda needs to increase the rate and ambition of adaptation to address rising impacts and higher future risks. The prioritised adaptation measures for each of the eight thematic areas are as follows:

WATER RESOURCES

NDC 3.0 aims to accelerate Rwanda's transition to Integrated Water Resources Management (IWRM). It includes catchment restoration, using terracing and agroforestry, with a target to rehabilitate over one million hectares (ha) of degraded land by 2030. This will reduce run-off and floods risks, and help regulate water flows including dry-season flows.

It also includes increased water storage to enhance water security, as well as improved efficiency of water use. Currently, water quality monitoring covers 51 water bodies; the objective is to expand coverage to 76 water bodies by 2030 and to 101 by 2035. At the same time, flood protection investments will be increased to help protect 40% of high-risk households by 2030 and 60% by 2035. The NDC will also support sustainable expansion of irrigation, with a target to expand the irrigated area from 102,000 ha in 2025 to 200,000 ha by 2030, to support agricultural production and food security from the impacts of rainfall variability.

AGRICULTURE

Rwanda's drive towards climate-resilient and sustainable agriculture will combine on-farm water security (within the IWRM framework above) with an increase in solar irrigation, combined with climate-resilient seeds and livestock breeds. The increasing impacts of heavy rainfall and soil erosion will be tackled by soil conservation using terracing and agroforestry. Priorities along the value chain have also been identified, with storage and processing hubs utilizing solar dryers and biogas proposed to reduce post-harvest losses. These actions are complemented with a National Agriculture Insurance Scheme for crop and livestock insurance. Taken together, the NDC 3.0 measures can create a resilient and sustainable agri-food system.

First, improved seed adoption is currently at 85.7% and is slated to reach universal uptake (10%) by 2030. At baseline, 33% of farms use climate-resilient seed varieties; the strategy is to increase this share by 5% to 38% of farms by 2030 and to achieve 77% coverage by 2035. Second, at baseline, the national post-harvest storage capacity is 318,025 million tonnes, with average losses of 13.8% on food crops.

The target is to double this capacity to 551,013 million tonnes by 2030, reducing losses to under 8 per cent, and to further expand to 745,168 million tonnes by 2035, at which point losses should fall below 5%. Similarly, crop insurance currently covers 33,269 ha, while livestock insurance covers 48,962 cattle. Coverage will increase to 91,009 ha of crops and 70,754 cattle by 2030, and then scale up to 166,850 ha and 129,716 cattle insured by 2035.

LAND ADMINISTRATION & FORESTRY

By 2030, the NDC 3.0 sets a target that all districts will implement hazard-informed land use plans through a national spatial-data infrastructure, steering development away from flood and landslide prone zones. Payment for Ecosystem Services schemes will reward communities and will restore over 40,000 ha of forests by 2030 and nearly 70,000 ha by 2035, while agroforestry plantings are planned to exceed one million ha by 2030, collectively reducing flood intensity and sustaining river baseflows.

URBANIZATION & HUMAN SETTLEMENTS

Rwanda's urban adaptation priorities in NDC 3.0 are to transform informal settlements and hazard-prone neighbourhoods into planned, climate-resilient communities by integrating stormwater management into city master plans, and by expanding green and blue infrastructure. This will be measured by progress indicators, including the share of the population in risk-informed settlements and urban green space per capita. At baseline, 60% of Kigali's residents live in unplanned settlements, but NDC 3.0 aims to reduce this to 51.2% by 2030 and to 44% by 2035.

Meanwhile, rural households in integrated, planned communities will increase from 65.4% today to 84.2% by 2030 and to full coverage (100%) by 2035. By 2030, every urban land parcel will be governed by risk-informed physical plans, and public green and open spaces will grow from 19.8% to 30% of built-up areas, with progress tracked through surveys, satellite land-use data, and regular agency reporting.

WATER, SANITATION AND HYGIENE (WASH)

Frequent floods and droughts threaten Rwanda's progress toward universal Water, Sanitation And Hygiene (WASH) access, diverting funds to repairs rather than expansion. NDC 3.0 aims to provide access to universal and climate-resilient water supply services, with all villages receiving improved water supply and solar-powered water treatment facilities by 2030, doubling capacity and halving non-revenue water losses.

The target is to achieve universal sanitation coverage by 2030 and to climateproof all sewerage infrastructure in flood- and landslide-prone areas against those hazards., especially in high-risk zones, low-lying floodplains, unstable hillsides and informal settlements which are most vulnerable to sewer failures during extreme rains or landslides. Climate-proofing these areas first prevents service breakdowns that would divert funds into emergency repairs. Once these hotspots are secured, broader urban expansion can proceed on a stable, resilient foundation.

HEALTH

NDC 3.0 addresses the growing risks of climate change to vector-borne diseases and maternal and neonatal health. The real-time Meteo-Rwanda alerts, expanded EMR, and mobile surveillance will reduce malaria incidence from 76 to 41.4 cases per 1,000 by 2030; cut maternal mortality from 105 to 60 per 100,000 live births by 2030 (50 by 2035); and lower NCD mortality among 30–70 year-olds from 20% to 8% by 2030 (5% by 2035). EMR coverage will increase from 12% to 70% by 2030 (90% by 2035). All clinics will be climate-proofed, and community risk-reduction programmes will be rolled out.

TRANSPORT

Under NDC 3.0, primary road corridors will be climate-proofed through slope stabilization, raised embankments, and enhanced drainage systems. This will reduce the length of roads vulnerable to landslides from 67,683 km today to just 384 km by 2030. Concurrently, the modal share of public transport will increase from 21% of all trips at baseline to 23% by 2030 and 24% by 2035, supported by climate-smart bus routes and resilient urban transit corridors.

MINING

Rather than viewing mining as a vulnerable sector to climate risks, NDC 3.0 positions it as a resilience partner, with the ambition that 90% of operations will adopt climate-compatible practices, such as water-efficient processing and dry-stack tailings, by 2030. Abandoned sites will be filled in and replanted with native trees to create vegetated areas that improve stormwater absorption and support biodiversity. Mandatory flood-impact assessments will ensure these rehabilitated sites remain pollutant-free during extreme weather events.

CROSS-CUTTING

NDC 3.0 will deliver multi-hazard early warning to provide real-time meteorological, hydrological, and seismic data to all 30 district command posts. District climate hubs will be established, staffed with GIS and disaster risk reduction specialists, while adaptation will be embedded in every sector master plan. Rwanda's NDC 3.0 includes a clear results-based framework and financial needs assessment for the adaptation priorities. This includes quantified targets, a criteria-based evaluation of priority interventions, and the development of a Monitoring, Evaluation, and Learning (MEL) framework.

LOSS AND DAMAGE

The observed trends of national climate change impacts indicate that Rwanda's residual impacts, Loss & Damage (L&D), are growing faster than international mitigation and domestic adaptation measures can address. Without a dedicated policy response, these impacts will exceed both the "soft limits" (where options may exist but are currently not available) and "hard limits" (where no adaptive actions are possible to avoid intolerable risks).

To bridge the gap, Rwanda has **included a loss and damage response mechanism** with the aim to align with emerging international mechanisms - such as the **Fund for Responding to Loss and Damage (FRLD)**, the Warsaw International Mechanism and support from the Santiago Network. By integrating these frameworks into a coherent national strategy, Rwanda seeks to build capacity and mobilise finance to address unavoidable climate impacts. This updated NDC quantifies for the first time the current and projected magnitude of slow-onset and extreme weather events in Rwanda, reviews institutional and policy responses, and proposes interventions, indicators, and targets. The NDC 3.0 identifies the following priority interventions to strengthen Rwanda's L&D response:

1. **Loss and Damage Financing:** Rwanda aims to position itself to effectively access resources from the Fund to Respond to the Loss and Damage through the Rwanda Green Fund. This will be achieved by actively engaging in global climate negotiations, enhancing national readiness, and identifying strategic pathways for developing high-quality proposals. These proposals will be aligned with the emerging access modalities for climate-related loss and damage financing, ensuring that Rwanda can mobilize timely and impactful support for vulnerable communities.

2. **Real-Time NDIMS Upgrade:** The National Disaster Information Management System (NDIMS) currently logs hazards within 24 hours. By 2030, NDIMS will become a GIS-enabled, AI/ML-driven early-warning platform that ingests and displays reports in ≤ 6 hours, with full interactivity and countrywide sensor links.

3. **Santiago Network Technical Assistance:** At present, Rwanda has no Santiago Network support; through a USD 4.7 million partnership, it will co-develop a Technical Assistance Roadmap by December 2030, piloting it via five to ten cross-sector capacity-building workshops and initial risk assessments, and fully operationalise that support by 2035. Progress will be measured by the number of workshops delivered and assessments completed, in alignment with SDG 17 on global partnerships and Sendai Framework Priority 1 on understanding disaster risk.

4. **Integrated L&D Risk Database:** Leveraging the Cabinet's data-sharing policy of 26 May 2025, a unified L&D risk database will be established by 2030 to consolidate data from MINEMA, MINALOC, REMA, Meteo-Rwanda, and NISR. By 2035, this database will facilitate real-time integration, produce automated quarterly reports, and achieve a 50% improvement in assessment accuracy.

TRACKING THE NDC

The national MRV framework has been revised and updated to be consistent with emerging international requirements, allowing Rwanda to more effectively track progress of its mitigation and adaptation measures consistent with the Paris Agreement's ETF and relevant international monitoring and reporting guidelines. This NDC 3.0 describes the institutional arrangements used to collect, manage and report on data and implementation.

MEANS OF IMPLEMENTATION

In order to fully implement the mitigation and adaptation measures contained in this NDC, Rwanda will require significant support in the form of finance, capacity building, and technology transfer. Despite achievements in leveraging climate finance over the past decade and more, a significant scaling up of finance will be needed to implement the measures included in the NDC 3.0.

As part of the NDC preparation process, extensive analysis and consultations with sector experts were undertaken to produce conditional and unconditional cost estimates for the mitigation and adaptation measures through 2030 and 2035.

The total estimated cost for Rwanda's identified NDC mitigation measures through 2035 is estimated at around USD 5 billion, and around USD 7 billion for adaptation priorities, representing a combined funding requirement of around USD 12 billion (Table ES-2).

Table ES-2 Estimated mitigation and adaptation funding needs

USD million	2025-2030	2030-2035	Total (2025-2035)
Mitigation measures			
Unconditional	242	278	520
Conditional	2,251	2,190	4,441
Total	**2,493**	**2,467**	**4,960**
Adaptation measures			
Unconditional	1,091	528	1,618
Conditional	3,402	2,051	5,453
Total	**4,492**	**2,579**	**7,071**
Combined total	**6,986**	**5,046**	**12,032**

Rwanda's strategic priorities for climate finance to implement NDC 3.0 build upon institutional reforms and strategic investments initiated during the implementation of NDC 2.0. Key structural shifts, such as the adoption of the Climate and Nature Finance Strategy (CNFS), the development of the Rwandan Green Taxonomy, and the nationwide rollout of Climate Budget Tagging (CBT), have been instrumental in aligning financial flows with national climate priorities.

Rwanda has defined five strategic priorities for climate finance implementation which are Domestic Fiscal Leverage, Blended Finance Vehicles, Capital and Carbon Markets, International Access and Guarantees, Governance and Transparency.

As described above, Rwanda's NDC 3.0 targets for both mitigation and adaptation comprise of unconditional and conditional components. Unconditional components shall be funded through domestic sources of finance, paid for through a combination of direct government spending, consumer levies and payments, business levies, or mandated or incentivised through domestic climate-related policies and measures etc. Conditional components shall be funded by attracting international sources of finance. This could take several forms including grants and philanthropy, market-based mechanisms, and other types of international funding mechanisms.


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1. INTRODUCTION

1.1. OVERVIEW

The Republic of Rwanda submitted its first updated and revised NDC (NDC 2.0) to the United Nations Framework Convention on Climate Change (UNFCCC) Secretariat in May 2020. As required under the Paris Agreement, Rwanda is now pleased to submit this updated and enhanced NDC (NDC 3.0).

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This document describes how Rwanda's contributions have been updated and enhanced compared to the previous NDC 2.0. It also provides specific information on how the updated NDC responds to, and has been informed by the first GST.

The mitigation and adaptation contributions described in this submission build upon NDC 2.0, reflecting changes in national circumstances, new policies and plans, and recent work in developing quantifiable mitigation and adaptation targets. The updated NDC 3.0 has been informed by in-depth analysis using latest data and information and an extensive national stakeholder-driven consultation process.

1.2. RWANDA'S VISION FOR CLIMATE CHANGE

The Government of Rwanda is committed to taking urgent action to mitigate and adapt to the effects of climate change. As a Party to the UNFCCC, the country seeks to contribute to the ambitious goal of limiting temperature rise to 2°C with efforts to reach 1.5°C agreed under the Paris Agreement. Rwanda's vision for climate change is to achieve a just, inclusive, low-carbon and climate-resilient green economy that supports high-value job creation, sustainable urbanization, biodiversity conservation, and low-carbon industrialization. This ambition is fully aligned with Vision 2050, which aspires for Rwanda to become an upper-middle-income country by 2035 and a high-income country by 2050 through a green, inclusive development model.

Building on key national policies such as the Revised Green Growth and Climate Resilience Strategy (GGCRS) and the Second National Strategy for Transformation (NST2), this NDC 3.0 articulates a coherent, economy-wide approach to climate adaptation and mitigation. To support this ambition, Rwanda's Climate and Nature Finance Strategy (CNFS) establishes an integrated financing architecture that bridges climate and biodiversity priorities. The CNFS outlines mechanisms to unlock both public and private capital while promoting nature-based solutions and equitable benefit-sharing. This integrated model ensures that resource mobilisation under the CNFS is not only aligned with Rwanda's climate targets but also embedded within a results-driven NDC implementation framework.

Despite having one of the lowest per capita emissions rates worldwide, Rwanda believes in playing its part towards achieving the goals of the UNFCCC and the Paris Agreement. This updated NDC therefore proposes an ambitious and wide-ranging set of measures which can significantly reduce the country's GHG emissions compared to a Business-As-Usual (BAU) scenario of economic development and emissions growth over the next decade. The mitigation and adaptation contributions set out in this document are therefore considered to be both fair and ambitious in the context of Rwanda's national circumstances.

02

2. NATIONAL CIRCUMSTANCES

This section provides a brief overview of Rwanda's national circumstances, including the country's geographic profile and exposure to climate change impacts, natural resources and key socio-economic characteristics.

2.1. GEOGRAPHY AND CLIMATE CHANGE IMPACTS

Rwanda is a country located in the east of central Africa and covers an area of 26,338 km^2. It lies approximately at 120 km south of the equator, and is bordered by Uganda at the North, Tanzania at the East, Burundi at the South and the Democratic Republic of Congo at the West (GoR, 2018). The altitude varies between 900 m and 4,507 m from east to west where eastern plains lay between 1,000 m to 1,500 m and the central plateau region between 1,500 m and 2,000 m (Sirven et al, 1974; MINIRENA, 2010).

As with many countries worldwide, Rwanda is experiencing significant climate change impacts. Rainfall patterns have shifted, with rainy seasons becoming shorter but more intense, a trend most pronounced in the Northern and Western provinces (World Bank, 2021). Heavy downpours and more erratic precipitation are increasingly frequent. At the same time, temperatures have risen markedly. Rwanda's national average temperature has increased by roughly 1.4°C since 1970[1], which is higher than the global average (GoR, 2025). Some regions have experienced even greater warming, in the order of 2°C or more over the past years (GoR, 2024a).

These changes in rainfall and temperature are driving more frequent climate-related disasters across the country. The main hazards include droughts, floods, landslides, storms (often manifesting as severe windstorms and lightning storms), and episodes of extreme heat (GoR, 2024a). Such events are causing serious damages, destroying crops and infrastructure, eroding soils, contaminating water supplies, and tragically costing lives.

1 Rwanda Climate Change Portal. Retrieved June 13, 2025, from https://climatechange.gov.rw/home

Rwanda's government emphasizes that climate change is already negatively affecting the country's economy and livelihood (GoR, 2024a). Continued warming is projected across Rwanda, along with further shifts in rainfall. Climate models indicate that Rwanda's mean annual temperature will keep rising under all RCP4.5 and RCP8.5 scenarios. By mid-century (around 2050), average temperatures are expected to be 1.5–2.5°C higher than recent historical levels (GoR, 2024; WBG, 2021). In addition, extreme rainfall events in Rwanda are expected to become more frequent and intense, while annual rainfall is projected to decrease in most regions (Ndakize, J. S, et al, 2025).

There are strong regional disparities in how climate change is impacting Rwanda's rainfall and extreme weather, and these differences are expected to widen. The Eastern and South-Eastern parts of Rwanda (which are already the driest areas of the country) are projected to face worsening drought conditions. These lowland districts, for example, Nyagatare, Kayonza, Kirehe, Bugesera and neighbouring areas, frequently suffer from rainfall deficits, and climate projections show they will experience more frequent and severe droughts as the climate warms (World Bank, 2021). Prolonged dry seasons and higher temperatures in this region will further stress crops and water resources, potentially exacerbating food security issues. In contrast, the Northern and Western highlands (including the volcanoes region and Nyungwe forest region) are expected to see increases in heavy rainfall. These mountainous zones, which already receive the most rain, could get even more extreme rainfall during the wet seasons (GoR, 2024a; World Bank, 2021).

Rwanda is therefore recognised as a country that is highly vulnerable to climate change. The country's National Risk Atlas (MIDIMAR, 2015) identifies droughts, floods, landslides, and windstorms as the most severe natural hazards nationwide. Recent climate transparency reports reaffirm that Rwanda remains extremely prone to climate-related hazards like flooding and drought, which threaten lives, livelihoods and critical infrastructure (GoR, 2024a).

2.2. ENVIRONMENT AND NATURAL RESOURCES

Rwanda's total arable land is estimated at 14,000 km² or 52% of the country's total surface area (26,338 km²). However, in 2014 the total cultivated area increased to 1,747,559 ha or 66% of the national territory. This means that some mountainous and protected areas have progressively been cultivated, exposing the country to more climate change and climate variability impacts (GoR, 2018). Furthermore, farm ownership per household has decreased significantly, from 1.2 ha in 1984 to 0.89 ha in 1990 and 0.6 ha in 2010 (GoR, 2018). These smaller plots are overexploited, leading to degradation and a decrease in soil fertility (GoR, 2018).

Rwanda's hydrographic system is split into two basins divided by the Congo-Nile ridge, with water systems to the west of the ridge flowing into the Congo basin, and those to the east of ridge flowing into the Nile basin.

The country's hydrologic network covers 8% of the national territory, equivalent to about 2,143 km², on which 101 lakes cover around 1,300 km² (RNRA, 2015), 861 rivers occupy about 72.6 km² while the water of 860 wetlands and valleys covers 770 km² (Sirven et al, 1974; REMA, 2009; MINIRENA, 2012). The Congo basin drains around 33% of the national territory with around 10% of the country's water. The Nile basin drains around 67% of the national territory, with 90% of the country's water (Sirven et al, 1974).

Rwanda's territory is covered with diverse ecosystems which include natural ecosystems (mountain rainforests, gallery forests, savannah woodland, wetlands and aquatic forests), forested area and agro-ecosystems. Nationally protected areas are mainly represented by the four national parks: Volcanoes National Park, Nyungwe National Park, Akagera National Park and Gishwati-Mukura National Park. Unfortunately, Rwanda's protected areas have lost around 50% of their original surface area over the last 40 years. There are also small reserve forests including Busaga, Buhanga, Sanza, Iwawa, Rubirizi, Makera, and a number of public and private plantation forests.

Rwanda's wetlands comprise marshlands, lakes, rivers and streams and represent around 15% of the national territory (of which 6.3% are marshlands and 8.6% are lakes and streams). Total wetlands cover an area of 276,477 ha of which 74% is classified as conditionally exploited, 6% unconditionally exploited, and 20% fully protected. Wetlands are dominated by papyruses, especially in the Kamiranzovu, Gishoma and Rugezi marshlands and around lakes such as Muhazi, Burera and Ruhondo. Plantation forests are distributed throughout the country and dominated by exotic species such as *Eucalyptus, Pinus, and Grevillea*.

2.3. SOCIO-ECONOMIC CHARACTERISTICS

Rwanda has experienced rapid socio-economic and demographic transformation since 2000. Official data show that real Gross Domestic Product (GDP) grew at an average rate of around 7.4% per year between 2000 and 2023, reflecting one of the fastest sustained growth rates in the world (World Bank, 2024). This growth has more than doubled the size of the economy: for example, GDP at constant 2017 prices expanded from approximately RWF 3.88 trillion in 2007 to 12,48 trillion in 2024, despite a brief pandemic-related contraction in 2020 (NISR, 2025a).

For the year 2024, Rwanda's working-age population (16 years and above) was estimated at about 8.3 million people (NISR, 2024a), with females accounting for slightly over half of this total. According to the Fifth Population and Housing Census of 2022, Rwanda's population reached 13.25 million people in 2022, up from 11.2 million in 2015 and 8.13 million in 2002. This represents an average growth rate of about 2.3% per year during 2012–2022 (NISR, 2023a). Rwanda remains predominantly rural, with about 72.1% of the population living in rural areas and 27.9% in urban areas as of 2022.

The City of Kigali is by far the largest urban agglomeration, being the most urbanized province (around 87% urban; NISR, 2023a). Rwanda's population is projected to continue growing significantly. Recent projections (medium scenario) anticipate the total population could exceed 14 million by 2025 and reach roughly 16–17 million by 2030–2035, given current growth trends (Table 2.1). This expected growth, alongside a gradual increase in the urbanization rate, will have important implications for development planning (e.g. housing, services and infrastructure needs in cities, and land pressure in rural areas).

Table 2.1. Urban and rural population forecasts to 2035

Population (million)	2015	2020	2025	2030	2035
Urban	2.08	2.77	4.52	6.15	7.92
Rural	9.18	9.89	9.58	9.58	9.58
Total	**11.26**	**12.66**	**14.10**	**15.73**	**17.49**

Source: Adapted from NISR, 2023a and NISR, 2023b

Rwanda's policies for addressing poverty, most notably the Second National Strategy for Transformation (NST2 2024–2029) and Vision 2050 (GoR, 2020b), continue to prioritize poverty reduction through inclusive growth, social protection, and human capital investments. According to the Seventh Integrated Household Living Conditions Survey (EICV7), the national poverty rate fell from 38.2 % in 2017 to 27.4 % in 2024, lifting approximately 1.4 million Rwandans out of poverty (NISR, 2025b).

Rwanda's agriculture sector remains a cornerstone of its economy, engaging approximately 69% of households. To enhance this sector, the government launched the Fifth Strategic Plan for Agriculture Transformation (PSTA5) for the period 2024–2029. PSTA5 aims to build resilient and sustainable agri-food systems by modernizing agricultural practices, increasing productivity, and promoting inclusive markets. The strategy targets an average annual agricultural growth rate of 6.5%, an increase in export revenues to USD 1.54 billion, and the creation of over 644,000 off-farm jobs in agri-food systems.

It also emphasizes empowering women, with a goal of 72% female participation in agriculture, and improving food and nutrition security nationwide (MINAGRI, 2024). NST2 prioritizes economic transformation, aiming to elevate Rwanda to upper-middle-income status by 2035. Within this framework, agriculture is expected to grow by more than 6% annually, contributing significantly to national food security, employment generation, and poverty reduction. NST2 also focuses on creating 2.5 million productive and decent job opportunities over five years, enhancing climate resilience, and improving public service delivery (GoR, 2024b).

Rwanda's services and tourism sector is also a significant driver of economic growth. In the fiscal year 2023/24, the services sector contributed 46% to the national GDP, reflecting its pivotal role in the economy (NISR, 2024b). Tourism, a key component of the services sector, has shown remarkable resilience and growth. In 2023, Rwanda's tourism revenue reached USD 620 million, marking a 36% increase from the previous year (Rwanda Economic Journal, 2024). This growth is attributed to strategic initiatives under the First National Strategy for Transformation (NST1) and Vision 2050, which emphasize the development of high-end tourism and the promotion of Rwanda as a premier travel destination.

Rwanda's trade and industry sector has also experienced significant growth, driven by strategic national initiatives outlined in the NST2 and the Private Sector Development and Youth Employment Sector Strategic Plan (PSDYE SSP) 2024–2029. As of the third quarter of 2024, Rwanda's total trade reached USD 2.98 billion, marking a 41% increase compared to the previous year. Domestic exports accounted for USD 653.85 million, imports stood at USD 2.14 billion, and re-exports contributed USD 184.59 million (NISR, 2024b). This positive trend aligns with NST2's goal of boosting exports, enhancing domestic production, and reducing the national trade deficit.

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3. RWANDA'S CROSS-CUTTING INTERVENTIONS IN NDC 3.0

Rwanda's NDC3.0 integrates key cross-cutting themes to ensure inclusivity, sustainability, and alignment with national priorities and global climate commitments. These themes were embedded in technical design, stakeholder engagement, and action prioritization to enhance resilience and low-carbon development while addressing social, economic, and environmental challenges.

3.1. GENDER AND SOCIAL INCLUSION

To mainstream gender and social inclusion in NDC 3.0, a Gender Equality and Social Inclusion (GESI) Index and Simulation Tool has been developed. The consultations through participatory processes with insights from women, youth, civil society, and local governments were conducted to align each NDC 3.0 intervention with gender and social inclusion to ensure NDC implementation will respond to the needs of gender and be inclusive.

Women remain largely involved in subsistence agriculture or informal, low-income activities, and NDC 3.0 interventions such as irrigation, agro-processing and green jobs may bypass them unless deliberately designed to include them. In addition, low female participation in infrastructure-linked sectors means women are less likely to influence or benefit from NDC-related infrastructure projects (e.g., electric vehicle rollout, road rehabilitation for climate adaptation). The GESI inclusion in NDC 3.0 will help to address these key issues.

Climate change also exacerbates challenges in Sexual And Reproductive Health and Rights (SRHR) and increases Gender-Based Violence (GBV). Rwanda plans to establish a Climate-Health Coordination Platform, integrate early-warning and GBV risk protocols into climate planning, and launch a clean-institutional cooking framework to reduce emissions and gendered health risks, ensuring a rights-based, inclusive approach to sustainable development.

3.2. CHILDREN AND YOUTH

As of 2022, children made up nearly half of Rwanda's population, with about 46% under 18 years of age making them highly vulnerable to climate risks and climate-sensitive diseases. To address these challenges, this NDC recognises children and youth as core stakeholders. During implementation, emphasis will be put on integrating climate education across all school levels, institutionalizing youth participation in policy design, ensuring climate-resilient school infrastructure and health systems, and scaling youth-led adaptation projects.

Rwanda commits to engage children and youth in climate awareness programs, relocating schools from high-risk zones, increasing adoption of clean cooking in schools, and expanding youth-driven climate innovations. These efforts aim to safeguard Rwanda's youngest citizens, ensuring an inclusive and future-focused approach to climate resilience.

3.3. HUMAN MOBILITY

As climate change impacts are increasing, it might cause temporal or permanent movement of people who leave their habitual place of residence. To prevent climate related human mobility, NDC 3.0 integrated expansion of early warning coverage for climate-related disasters, establishing inclusive evacuation shelters for vulnerable populations, developing national emergency response guidelines for climate risks, and facilitating dignified voluntary relocation from high-risk areas. These efforts ensure Rwanda's climate strategies remain inclusive, mobility-aware, and resilience-focused, directly supporting NDC 3.0 implementation.

3.4. SHORT-LIVED CLIMATE POLLUTANTS AND AIR QUALITY

Short-Lived Climate Pollutants (SLCPs) and air pollution identified as the leading global environmental health risk. The SLCPs are group of GHGs and air pollutants that have a strong warming effect on the climate in the near term and harm public health. These pollutants, such as black carbon, methane, tropospheric ozone, and some hydrofluorocarbons (HFCs), can be mitigated to significantly reduce near-term global warming and the impacts on health. In Rwanda, key pollution sources include agriculture and livestock, traffic emissions, domestic fuel use, refrigeration and air conditioning leading to elevated concentrations of SLCPs.

To address these challenges, Rwanda's NDC 3.0 mitigation component prioritizes reduction of SLCPs and air quality improvement through vehicle emissions standards, regulate imports and enhance traffic management, adoption of efficient cookstoves to reduce emissions from traditional cooking methods, reduction of enteric fermentation and improved manure management, reduction of HFCs emissions under refrigeration and air conditioning measures, improved solid waste and waste water treatment, and national air quality monitoring systems to track air pollutant levels. By integrating SLCPs and air quality management with climate action, Rwanda aims to curb short-term warming, protect public health, and advance sustainable development.

3.5. DISASTER RISK REDUCTION

Rwanda has made significant strides in advancing climate resilience, focusing on agriculture, disaster risk reduction, and social protection. Disaster preparedness and risk reduction remains a priority crosscutting area within this NDC. This includes shock-responsive social protection, scaling early warning systems, and integration of anticipatory financing into disaster risk management frameworks. These strategic priorities align with Rwanda's climate and development goals, and ensuring overall management of climate extremes.

3.6. CREATION OF GREEN JOBS

Rwanda is integrating social inclusion, green growth, and climate resilience into its NDC 3.0. With 84% of the workforce in informal, climate-sensitive sectors mainly agriculture and small enterprises, many lack social protection, making them highly vulnerable to climate shocks. Climate change threatens key sectors like energy, transport, and agriculture, risking job losses and widening inequality unless addressed through inclusive NDC 3.0 interventions.

To address these challenges, under NDC 3.0 Rwanda has prioritized supporting informal biomass workers in energy transitions, empowering smallholder farmers to enhance climate resilience, expanding inclusive public transport for sustainable mobility, and creating restoration jobs in forestry and land-use management. In addition, the monitoring of green jobs will be monitored under each intervention in the NDC 3.0.


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4. NDC REVISION PROCESS

4.1. OVERVIEW

The Republic of Rwanda submitted its first updated NDC in May 2020 (NDC 2.0) outlining its mitigation and adaptation contributions. As required by the five-yearly timeline established by the Paris Agreement, Rwanda is now submitting its updated NDC (NDC 3.0). This now incorporates an end date of 2035, as encouraged under the international framework (Decision 6/CMA.3). 2023 saw the conclusion of the first Global Stocktake (GST) which assessed collective progress toward meeting the goals of the Paris Agreement (UNFCCC, 2023). The Paris Agreement requires Parties' updated contributions to be informed by the outcome of this process (Article 4.9).

The GST concluded that global GHG reduction pathways were not aligned with the Paris Agreement and therefore encouraged Parties to come forward in their next NDCs with "ambitious, economy-wide emission reduction targets, covering all greenhouse gases, sectors and categories and aligned with limiting global warming to 1.5 °C, as informed by the latest science, in the light of different national circumstances" (Paragraph 39). Responding to this request, Rwanda has now expanded the scope of its NDC to be economy-wide, including all GHG gases and sectors included in its national GHG inventory. Previously excluded from NDC 2.0, emissions and removals from Land Use, Land Use Change and Forestry (LULUCF) have now been included within the NDC 3.0 mitigation contribution.

The GST also reiterated the Paris Agreement requirement for each Party's successive NDC to "represent a progression beyond the Party's then current nationally determined contribution and reflect its highest possible ambition, reflecting its common but differentiated responsibilities and respective capabilities, in the light of different national circumstances" (Article 4.3).

This section summarizes the national NDC revision process undertaken to develop Rwanda's NDC 3.0 and describes how the contributions have been updated and enhanced compared to the previous NDC 2.0. It also provides specific information on how the updated NDC responds to, and has been informed by, the first GST.

The section first sets out some key lessons learned and challenges from NDC 2.0 implementation and how Rwanda plans to address them through the NDC 3.0 timeframe.

4.2. LESSONS LEARNED FROM NDC 2.0

In order to strengthen its climate policy effectiveness, Rwanda seeks to learn from previous NDCs as it revises and updates each successive contribution. Implementation of NDC 2.0 highlighted several challenges, including the following:

- **Subnational capacity constraints:** District-level institutions lacked technical expertise and resources for climate planning and implementation.
- **Limited stakeholder engagement:** Limited involvement of civil society, private sector, and local communities.
- **MRV operationalization challenges:** Constraints in operationalizing the MRV framework, including aligning specific NDC implementation indicators with those used across sectors, hindered tracking and impact assessment of NDC measures.

To help address these challenges, Rwanda has implemented a better coordinated and integrated institutional framework, with clearly defined roles for key organisations as follows:

- **Ministry of Environment (MoE)** oversees the policy alignment and the coordination of institutions in charge of Environment and Natural Resources Sector in Rwanda.
- **Rwanda Environment Management Authority (REMA)** leads environmental protection, ensures compliance with environmental law and policy, and advises the government on all matters related to climate change mitigation and adaptation.
- **Ministry of Finance and Economic Planning (MINECOFIN)** coordinates the preparation and implementation of the National Budget and ensures climate integration in budgeting.

- **Rwanda Green Fund (RGF)** mobilizes climate financial resources and manages climate finance instruments such as Ireme Invest and Intego.
- **Ministry of Local Government (MINALOC)** ensures district-level coordination and capacity-building for climate action.

These roles and responsibilities are further described in subsequent sections of this document. To strengthening coordination across all areas of government and undertake relevant policy reforms to enhance NDC3.0 implementation, Rwanda is prioritizing the following activities.

- **Developing clearer institutional mandates:** Eliminating overlaps and fostering inter-agency collaboration.
- **Building capacity at Local Levels:** Investing in training and resources for districts.
- **Ensuring robust stakeholder engagement:** Strengthening participation of civil society and private sector.
- **Developing a comprehensive national MRV System:** Developing a more effective MRV framework of indicators and arrangements for data collection and management, and accurate NDC tracking and policy refinement.
- **Integrating climate policy within Rwanda's legal framework:** Embedding climate objectives into national regulations.

In addition, a report on NDC 2.0 implementation has been produced by Citepa, providing a detailed sectoral assessment of progress with the mitigation and adaptation components of NDC 2.0 over the period 2015-2024 (Citepa, 2025). The report's findings indicate good progress in certain sectors, notably within sustainable agriculture and renewable electricity generation, but a lack of progress in other sectors such as waste and IPPU. The report indicates a need for Rwanda to further strengthen and coordinate its climate policy efforts, including through its MRV system, and mobilise climate finance.

4.3. MITIGATION

As required by the Paris Agreement, and in response to the first GST, Rwanda's NDC 3.0 is now expanded to include all emissions sources and sinks. The NDC 3.0 has been updated since the previous NDC according to three key aspects:

1. **National GHG inventory data:** Revision and improvement of the national GHG inventory based on updated IPCC guidelines and improved national data, including for the NDC base year.

2. **BAU baseline projections:** Revision and update of the BAU baseline projections, using more recent data, sectoral analysis and projections and extended to 2035.

3. **Mitigation analysis and contribution:** Revised estimate of the technical mitigation potential and NDC contribution from policies and measures to 2035.

4.3.1. NATIONAL GHG INVENTORY REVISION

The national GHG inventory has undergone extensive revision and improvement since the development of NDC 2.0. As documented in Rwanda's recently published first Biennial Transparency Report (BTR 1; GoR, 2024a), estimated emissions across a number of reporting categories have been revised applying the methodologies contained in the 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (IPCC, 2019). The Global Warming Potential (GWP) values applied to the calculation of each GHG were also updated based on the IPCC's Fifth Assessment Report (AR5; IPCC, 2014) which provides higher GWP values for methane emissions which accounts for a large share of GHG emissions within Rwanda.

In parallel, the national GHG inventory has been strengthened since NDC 2.0 through the availability of additional and improved datasets across several reporting categories. These have been most significant within the Agriculture and Waste categories, which have seen estimated emissions in 2015 increase significantly from 2.94 million tCO_2e to 5.51 million tCO_2e, and 0.64 million tCO_2e to 1.53 million tCO_2e, respectively. Particular increases include estimated emissions from livestock (category 3.A), solid waste disposal (category 4.A.) and wastewater treatment and discharge (category 4.D), the latter two categories seeing the recent application of higher per capita waste generation values.

Additional emissions and removals sources, previously not included within the inventory, were also calculated most significantly the addition of category 3.D.1. (Harvested Wood Products) and several sub-categories falling within category3.C. (Aggregate Sources and Non-CO_2 Emissions Sources on Land). A number of improvements and updates were also made within the Energy fuel combustion category (Category 1.A) based on refined and additional activity data, for example,

relating to registered road vehicles and their classification. Some minor adjustments and corrections were also made to the national GHG inventory, updating the emissions reported in the BTR1, as part of the NDC development process.

Together, these refinements and updates to Rwanda's GHG inventory have resulted in a revised estimate of base year emissions increasing from 5.33 million tCO_2e (NDC 2.0) to 8.7 tCO_2. This updated estimate is considered more accurate, and aligned with latest IPCC guidance, and has therefore been used within NDC 3.0.

4.3.2. UPDATED BAU BASELINE PROJECTION

Rwanda has chosen to adopt a BAU baseline reference projected from 2015 to 2035 against which to quantify its estimated mitigation contribution. The baseline represents a counter-factual scenario which excludes the mitigation policies and measures (PaMs) which are instead attributed to the NDC scenario. The baseline takes the form of a dynamic baseline which is periodically updated and communicated within each successive NDC. Periodically updating the reference points in the BAU baseline is considered important as it ensures the reference against which commitments are being made reflects latest scientific data and any socio-economic changes.

Updated BAU baseline projections have therefore been developed in light of more recent and accurate information and, as requested under the Paris Agreement framework, extended to 2035. These have been developed based on the revised base year GHG emissions estimates and also updated key socio-economic drivers of emissions such as gross domestic product (GDP) forecasts, population growth outlook, revised power generation expansion plans, sectoral targets etc. The BAU projections have been developed using a combination of the Low Emissions Analysis Platform (LEAP; Heaps, C.G., 2022), IPCC software, and Excel-based modelling.

The combination of updated and increased base year emissions and the various updated forecasts and outlooks driving sector emissions which now more accurately reflect Rwanda's changing circumstances has resulted in a higher BAU reference projection of national GHG emissions as compared to NDC 2.0 over the same period. These updated reference points are considered to enhance the transparency of Rwanda's NDC, demonstrating both a commitment to accuracy and heightened ambition.

4.3.3. REVISED ESTIMATE OF MITIGATION CONTRIBUTION

As described above, Rwanda has updated its mitigation contribution based on an updated identification and analysis of proposed policies and measures. The resulting mitigation estimates and overall contributions through 2035 are set out in the next section of this document (Section 5).

This updated NDC extends its scope to include economy-wide emissions reduction targets covering all GHGs, sectors, and categories as requested under the Paris Agreement. For purposes of transparency however, this NDC distinguishes between emissions reduction targets and emissions removal targets.

Section 5 sets out range of policies and measures aimed at reducing emissions and/or sequestering carbon (removals) in Rwanda for the period 2015-2035. These cover all of the country's key emitting sectors and are considered to represent the maximum mitigation potential which can be feasibly achieved within the country over the coming decade, subject to the provision of international support. Many of these measures, such as the expansion of EVs and the scaling up of hydropower represent significant implementation and policy challenges often requiring changes in consumer behaviour. Their planned implementation through government policy, regulation and various supporting activities is summarised at the end of Section 5.

Rwanda's revised mitigation contribution has also been informed by the outcome of the first GST. This calls on Parties to contribute to the following global efforts, inter alia, in a nationally determined manner, taking into account the Paris Agreement and their different national circumstances, pathways and approaches (UNFCCC, 2023):

- Tripling renewable energy capacity globally and doubling the global average annual rate of energy efficiency improvements by 2030;
- Accelerating efforts globally towards net zero emission energy systems, utilizing zero- and low-carbon fuels, well before or by around mid-century;
- Transitioning away from fossil fuels in energy systems, in a just, orderly and equitable manner, accelerating action in this critical decade, so as to achieve net zero by 2050 in keeping with the science;

- Accelerating zero- and low-emission technologies, including, inter alia, renewables, nuclear, abatement and removal technologies such as carbon capture and utilization and storage, particularly in hard-to-abate sectors;
- Accelerating and substantially reducing non-carbon-dioxide emissions globally, including in particular methane emissions by 2030;
- Accelerating the reduction of emissions from road transport on a range of pathways, including through development of infrastructure and rapid deployment of zero and low-emission vehicles; and
- Phasing out inefficient fossil fuel subsidies that do not address energy poverty or just transitions, as soon as possible.

The planned expansion of renewable energy generation from hydropower and solar sources contained in this NDC represents an increase of over five times between the base year and 2030, rising from around 270 GWh to 1,440 GWh. This rate of increase rises even further when extended to 2035. This updated NDC also outlines a significant transition away from imported fossil fuel use, notably HFO and diesel in electricity generation and gasoline and diesel within transport, towards increased use of domestic zero- and low carbon sources. As well as accelerating renewable resources, this NDC also highlights the role for removals including through nature-based removals in the short-to medium term.

The NDC outlines several policies and measures aimed at significantly reducing methane emissions within the agriculture and waste sectors, and sets out plans and targets to accelerate the reduction of emissions from road transport including through increased use of electric vehicles (EVs) using decarbonised grid electricity, investing in measures to shift towards greater use of public and non-motorised transport (NMT). Finally, although Rwanda does continue to subsidise energy production, given its status as a land-locked country with a limited industrial base, this is aimed at ensuring increased access to affordable and clean sources of zero- and low carbon energy to help ensure ongoing development and rising living standards consistent with a Paris-aligned clean energy transition.

As with the BAU emissions projections, the technical analysis and mitigation scenarios have been developed using a combination of LEAP, IPCC software and Excel-based modelling.

4.4. ADAPTATION

The UAE Framework for Global Climate Resilience outlines 11 thematic and process-related targets to be achieved by 2030, emphasizing the need for Parties to elevate their ambitions and make progress on adaptation. In response, and in alignment with the global adaptation goal of the Paris Agreement (Article 7), this NDC presents Rwanda's updated and revised adaptation actions and targets to address climate change, including extreme weather events and slow-onset changes. It details revised baselines, indicators, and targets for 2030 and 2035, as well as the financial, technical, and capacity-building support needed from the international community.

While the initial selection of adaptation measures was based on priority sectors identified in the previous NDC (NDC 2.0) and confirmed within national policies, programs, and plans, this NDC refines those measures to enhance cross-sector collaboration in planning and implementation. Greater attention has been given to strengthening governance to support the coordinated execution of these measures, which was a significant challenge in delivering the previous NDC.

The updated adaptation component also introduces an enhanced Monitoring, Evaluation, and Learning (MEL) framework, highlighting the critical role of learning in adaptation. This involves analysing collected data and information to inform decision-making, generating knowledge about what has worked, what has not, and determining which adaptation actions have achieved the expected outcomes. This process will also improve tracking and reporting of progress at both national and international levels. The framework closely aligns with the NST2 and the United Nations Sustainable Development Goals (SDGs) through connections to SDG indicators. Further, it includes indicators capable of tracking the integration of gender and vulnerability across sectors.

The adaptation component of this NDC was developed in close coordination with experts and stakeholders from government, civil society, and academia across key sectors. The prioritized adaptation measures and actions identified through this process were paired with a proposed set of indicators to measure and evaluate progress toward targeted outcomes, along with cost estimates. Experts and stakeholders were invited to review and validate these measures, the proposed MEL framework, and the cost estimates. Consequently, changes and additions to the choice of indicators were made and incorporated into the final set of adaptation measures and the associated MEL framework.

Rwanda remains committed to addressing climate change by strengthening its mitigation and adaptation efforts. However, it is increasingly evident that the negative effects of climate change persist despite ambitious mitigation and adaptation initiatives. Hard limits to adaptation have already been reached in some ecosystems, and communities may face limitations in their ability to adapt, leading to displacement, migration, and relocation (IPCC, 2023).

In recent decades, the country has experienced significant climate change, characterized by rising temperatures and shifting rainfall patterns, as well as an increase in the frequency and severity of extreme weather events. These impacts have resulted in growing loss and damage, which are expected to escalate in the future and may exceed both soft and hard limits of adaptation. Consequently, Rwanda is aligning its efforts with the emerging international framework on loss and damage, including the recently established international Fund for Responding to Loss and Damage (FRLD). This updated NDC therefore includes a new section focused on loss and damage. Rwanda will use guidance for tracking loss and damage, as will be defined by the Warsaw International Mechanism (WIM) for Loss and Damage.

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5. MITIGATION CONTRIBUTION

5.1. OVERVIEW

Rwanda's updated mitigation contribution takes the form of a reduction in GHG emissions relative to a BAU emissions baseline over the period 2015-2035. Emissions and removals from LULUCF were not included within NDC 2.0 but has now been included within the scope of the current NDC 3.0. This means that the revised baseline and contributions are now based on Rwanda's net emissions, accounting for all emission sources and removals included in the national GHG inventory.

The updated contribution, now calculated on the basis of net emissions and including LULUCF, comprises of two components:

- **Unconditional contribution:** A reduction of 7 per cent (%) relative to BAU in the year 2035; equivalent to an estimated mitigation level of 1.84 million tonnes of carbon dioxide equivalent (tCO_2e) in that year. This is an unconditional target, based on domestically supported and implemented mitigation policies and measures.

- **Conditional contribution:** An additional reduction of 46% relative to BAU in the year 2035; equivalent to an estimated additional mitigation level of 13.02 million tCO_2e in that year. This represents an additional contribution, conditional on the provision of international support and funding.

The combined unconditional and conditional contribution is therefore a 53% reduction in GHG emissions compared to BAU in 2035, equivalent to an estimated mitigation level 14.86 million tCO_2e in that year. This represents the estimated maximum mitigation potential if all of the identified mitigation measures are fully funded and implemented.

For reasons of transparency and ease of comparison with NDC 2.0, the updated contribution is also communicated excluding LULUCF. Excluding these sources of emissions and removals results in an unconditional contribution of a 5% reduction in GHG emission compared to BAU in 2035, rising to 39% conditional on the provision of additional international support and funding.

The sectoral scope of the contribution covers all emissions sources described in the IPCC 2006 Reporting Guidelines, including emissions from the categories of energy; industrial processes and product use (IPPU); waste; and agriculture, forestry and other land use (AFOLU). The coverage of the contribution includes the three main greenhouse gases carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and also hydrofluorocarbons (HFCs).

This section describes Rwanda's nationally determined contribution to mitigation. It describes the emissions sources and removals covered by the contribution according to the latest version of the national GHG inventory, the development of BAU emissions projections by sector from the base year of 2015 to the NDC 3.0 end date of 2035, the expected contribution from mitigation measures according to each sector, and the associated funding requirements expected for both the unconditional and conditional components

5.2. NATIONAL EMISSIONS PROFILE

Rwanda's latest GHG inventory data covers emissions up to the year 2022. As part of the NDC update and enhancement process, a review and update of the GHG inventory data was undertaken. This resulted in the improvement of some activity data based on more recently available information and data to replace previously estimated values, as well as some minor corrections to the inventory. The historic and NDC base year data described below are based on this revised dataset which is considered the most recent and accurate information available against which to assess the NDC mitigation contributions. These will be reflected in Rwanda's next BTR and National Communication.

The GHG inventory data are summarised in aggregated form from 2010-2022 in Figure 5.1 and shown in more detail for the base year of 2015 and latest reporting year of 2022 in Table 5.1 for all key emissions sources and removals. The revised GHG inventory data indicates that there has been a 46% increase in emissions sources over the period 2010-2022, increasing from 8.1 million tCO_2e to 11.9 million tCO_2e. The inventory also indicates an increase in net carbon removals from LULUCF, rising from around 4.3 million tCO_2e in 2010 to 4.9 million tCO2e in 2022. As a result, net emissions (emissions sources and removals) are calculated at around 3.8 million tCO_2e for the year 2010, rising to around 7 million tCO_2e in 2022.

Figure 5.1 Rwanda's GHG emissions and removals by source 2010 to 2022, $MtCO_2e$

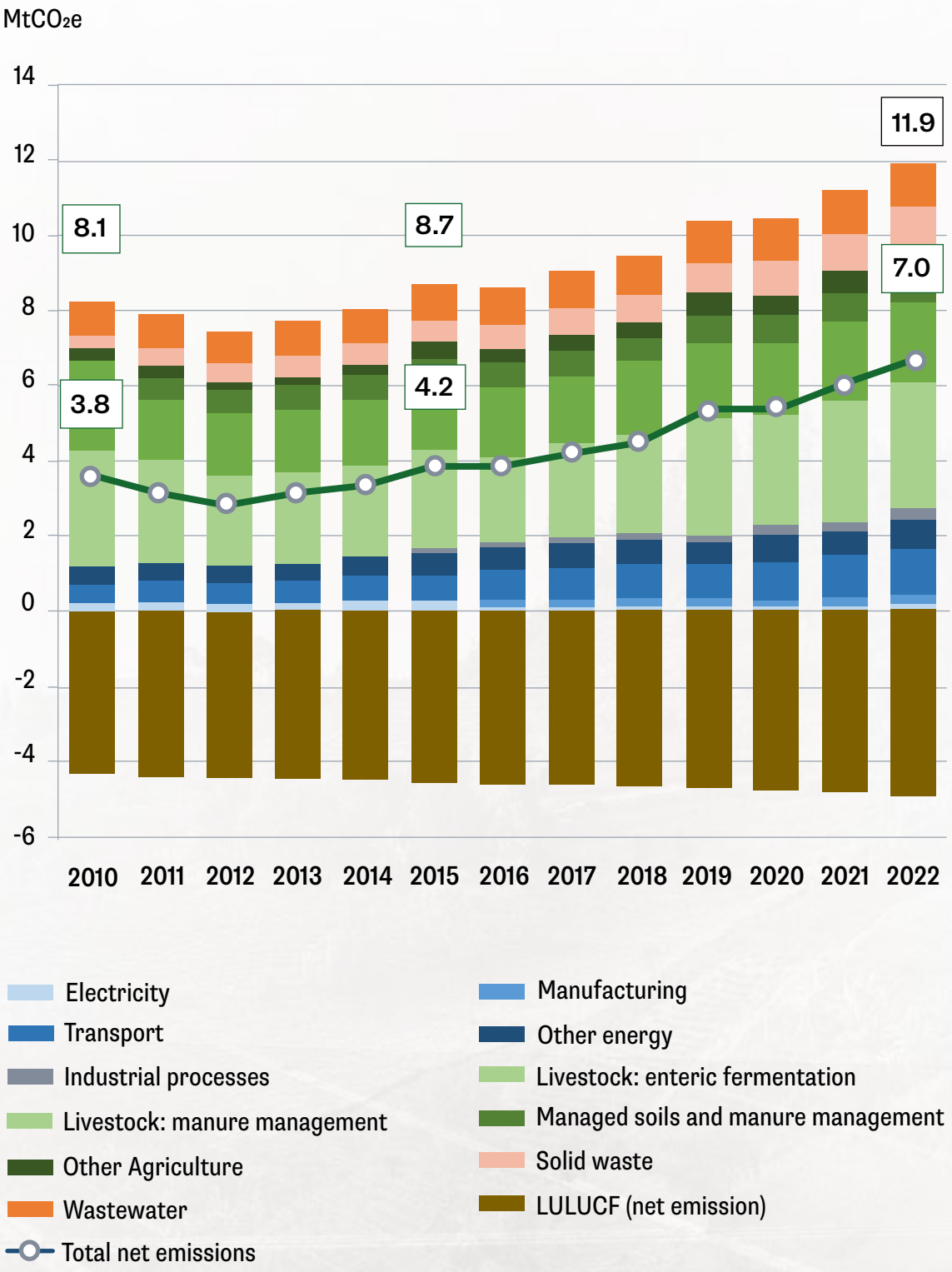


Table 5.1 Rwanda's GHG emissions and removals by source in 2015 and 2022, $MtCO_2e$

Categories			2015	2022
Energy	Fuel combustion activities	Electricity production	0.157	0.157
		Manufacturing and Construction	0.134	0.134
		Transport	0.712	0.712
		Other energy use	0.558	0.558
Industrial processes and product use (IPPU)	Mineral Industry (cement and lime production)		0.070	0.070
	Metal industry (iron and steel, and ferro-alloys production)		0.002	0.002
	Non-energy products from fuels and solvent use		0.004	0.004
	Product uses as substitutes for Ozone Depleting Substances		0.016	0.016
Agriculture	Livestock	Enteric fermentation	2.661	2.661
		Manure management	1.875	1.875
	Aggregate sources and sources of non-CO_2 emissions in the soil	Burning, liming and urea application	0.008	0.008
		N2O managed soils and manure	0.659	0.659
		Rice cultivation	0.293	0.293
		Other sources	0.018	0.018
LULUCF	Land	Forest land	-6.423	-6.805
		Crop land	1.546	1.592
		Grass land	0.316	0.321
		Other land	0.113	0.129
	Harvested wood products		-0.097	-0.127
Waste	Solid waste disposal		0.413	0.791
	Biological Treatment of Solid Waste		0.178	0.257
	Incineration and Open Burning of Waste		0.003	0.006
	Wastewater Treatment and Discharge		0.937	1.180
Total emissions: Energy			1.562	2.480
Total emissions: IPPU			0.092	0.253
Total emissions: Agriculture			5.514	6.971

Total emissions: Waste	1.532	2.234
Total emissions (excuding LULUCF)	8.700	11.938
LULUCF (net emissions)	-4.545	-4.890
Total net emissions (including LULUCF)	**4.155**	**7.048**

Source: Rwanda National GHG Inventory data as of April 2025
Note: Minus signs (-) indicate net removals

The 2015 base year emissions of 8.7 million tCO_2e are broken down by sector as follows:

- **Energy** use accounted for 18% of the total (1.56 million tCO_2e), mainly due to emissions from liquid fossil fuel combustion in road transport (diesel and gasoline) and fuel use in manufacturing and construction, and in buildings for heating, cooking and lighting.
- **Waste** also accounted for around 18% of the total (1.53 million tCO_2e), mainly from solid waste disposal and wastewater treatment and discharge.
- **Agriculture** accounted for around 63% of the total (5.51 million tCO_2e). Emissions from livestock accounted for the largest share (methane from livestock enteric fermentation and emissions from manure management) followed by emissions from managed agricultural soils.
- **IPPU** accounted for the remaining 1% of the total emissions (0.09 million tCO_2e), mainly arising from calcination in cement and lime production and the use of hydrofluorocarbons (HFCs) for refrigeration and air conditioning in buildings.

Within LULUCF, carbon removals from forest land were estimated to total 6.42 million tCO_2 with storage in harvested wood products around 0.097 million tCO_2. These removals were partially offset by LULUCF emissions from croplands, grasslands and other sources, resulting in a net removal within this category of around 4.55 million tCO_2e in the base year.

5.3. MITIGATION ASSESSMENT

5.3.1. BAU EMISSIONS PROJECTIONS

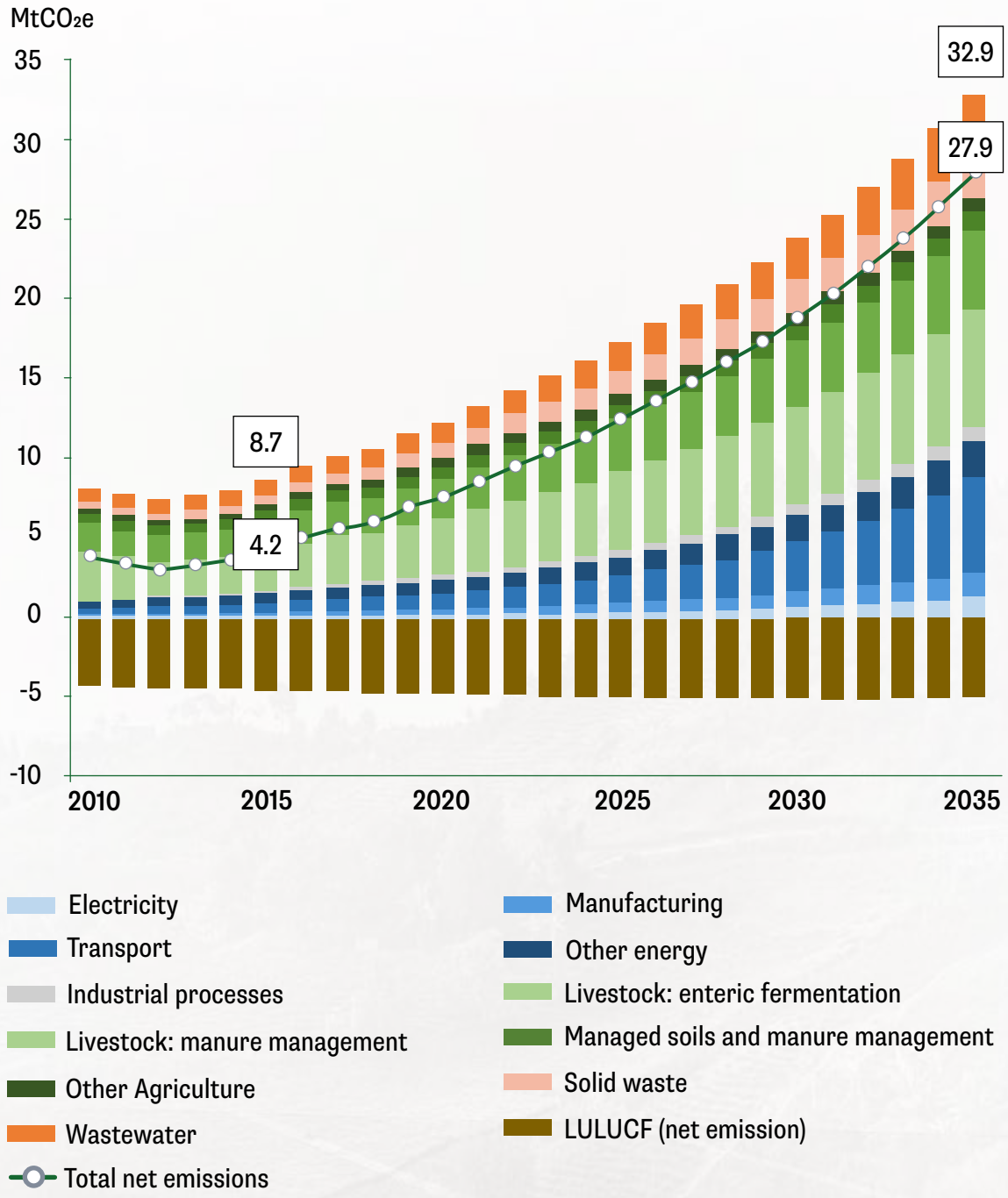
Based on detailed projections developed for each sector, an aggregated economy-wide forecast of BAU emissions through 2035 is shown below in Figure 5.2. This represents the updated BAU baseline projection against which Rwanda's mitigation contribution has been quantified.

At an aggregate level, total emissions excluding LULUCF are forecast to increase very significantly over the 2015-2035 period, rising from 8.7 million tCO_2e in the base year to 32.9 million tCO_2e in 2035. Taking LULUCF emissions and removals into account, annual net emissions increase from around 4.2 million tCO_2e to 27.9 million tCO_2e over the same forecast period.

The most rapid emission growth is forecast within energy use, which doubles its share of total aggregate emissions from 17% in 2015 to around 34% in 2035. This is driven largely by forecast fuel use in road transport, as well as energy use in buildings, manufacturing and construction. Agriculture, waste and IPPU also see significant emissions growth but more in line with trends seen over the past decade.

Increases in waste-related emissions are largely driven by rising population and per capita waste generation both of which are projected to increase, while agriculture emissions typically rise in line with expected domestic crop product and livestock demand. Despite potential for increased productivity, agricultural output is limited due to land availability, thereby limiting emissions growth from this sector. LULUCF net emissions are expected to remain fairly stable through 2035 with a slight increase in carbon removals overall within forestry.

Figure 5.2 BAU GHG emissions projection, all sectors



The overall outlook to 2035 reflects expectations of a growing contribution from fossil fuel use to Rwanda's emissions profile, increasingly driven by increasing demand for electricity and transport services. This is shown more clearly by comparing the relative contribution of emitting sectors in the base year and target year, demonstrating how energy and waste's share of total emissions increases over the period while that of agriculture's declines (Figure 5.3). This shift reflects

the assumptions underpinning the outlook concerning Rwanda's development from a low-income country highly dependent on agricultural output towards a fast-growing service-based economy with rising demand for modern energy, transport and waste services.

Figure 5.3 BAU scenario emissions in 2015 and 2035

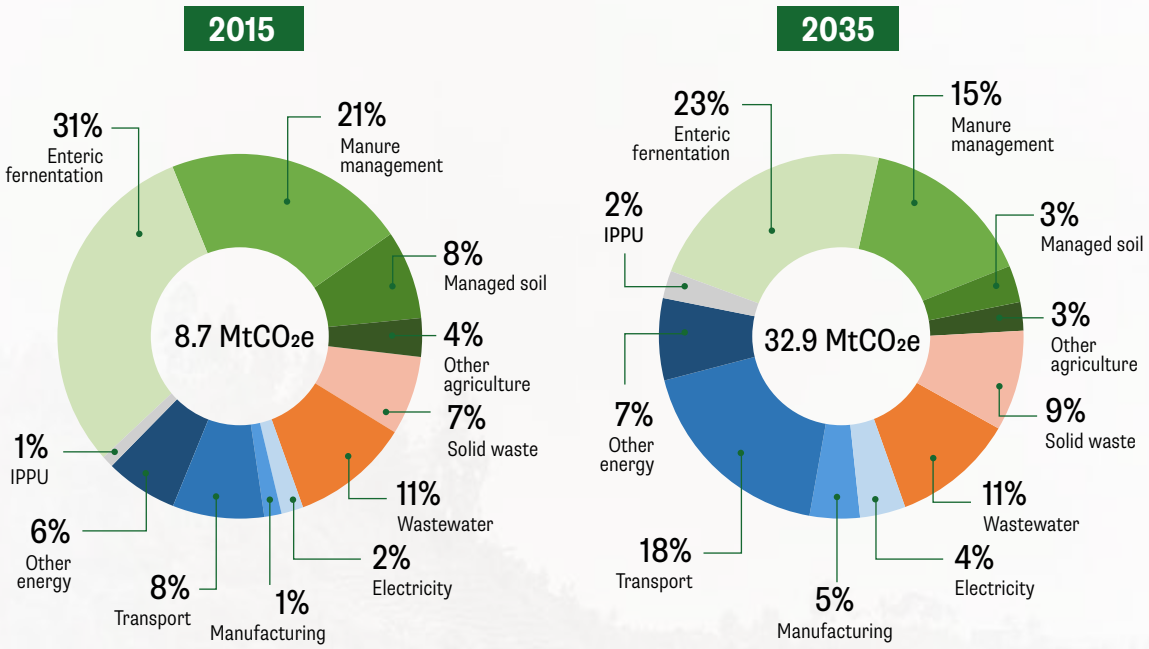
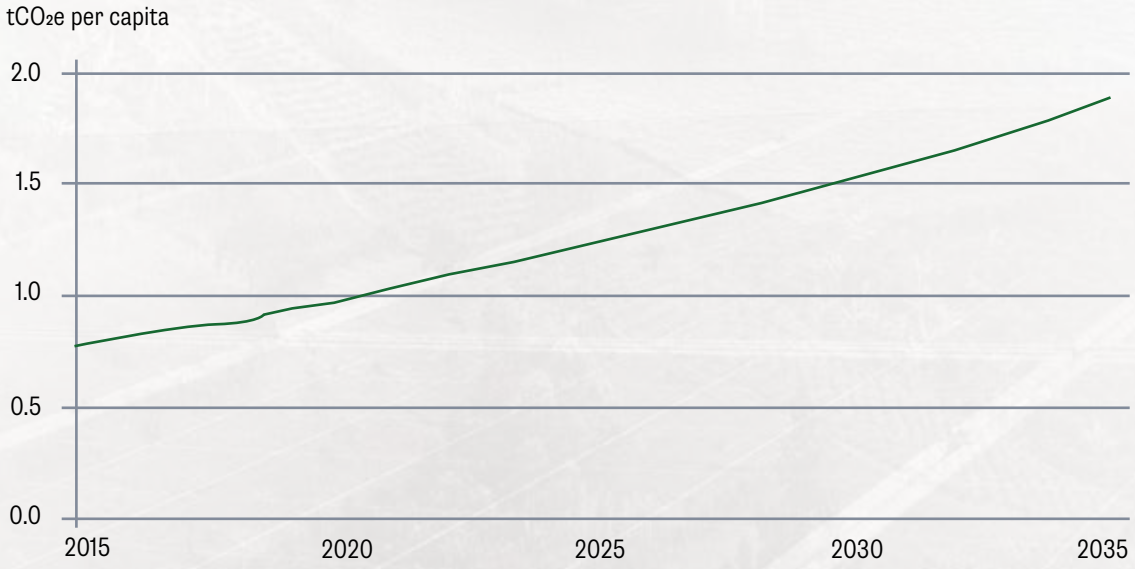


Figure 5.4 shows the country's resulting per capita emissions forecast under the BAU reference scenario. These show how per capita emissions are expected to increase over the coming decade (2025-2035), broadly in line with the trends seen over the previous decade (2015-2025).

Figure 5.4 Rwanda per capita emissions, BAU scenario 2015-2035

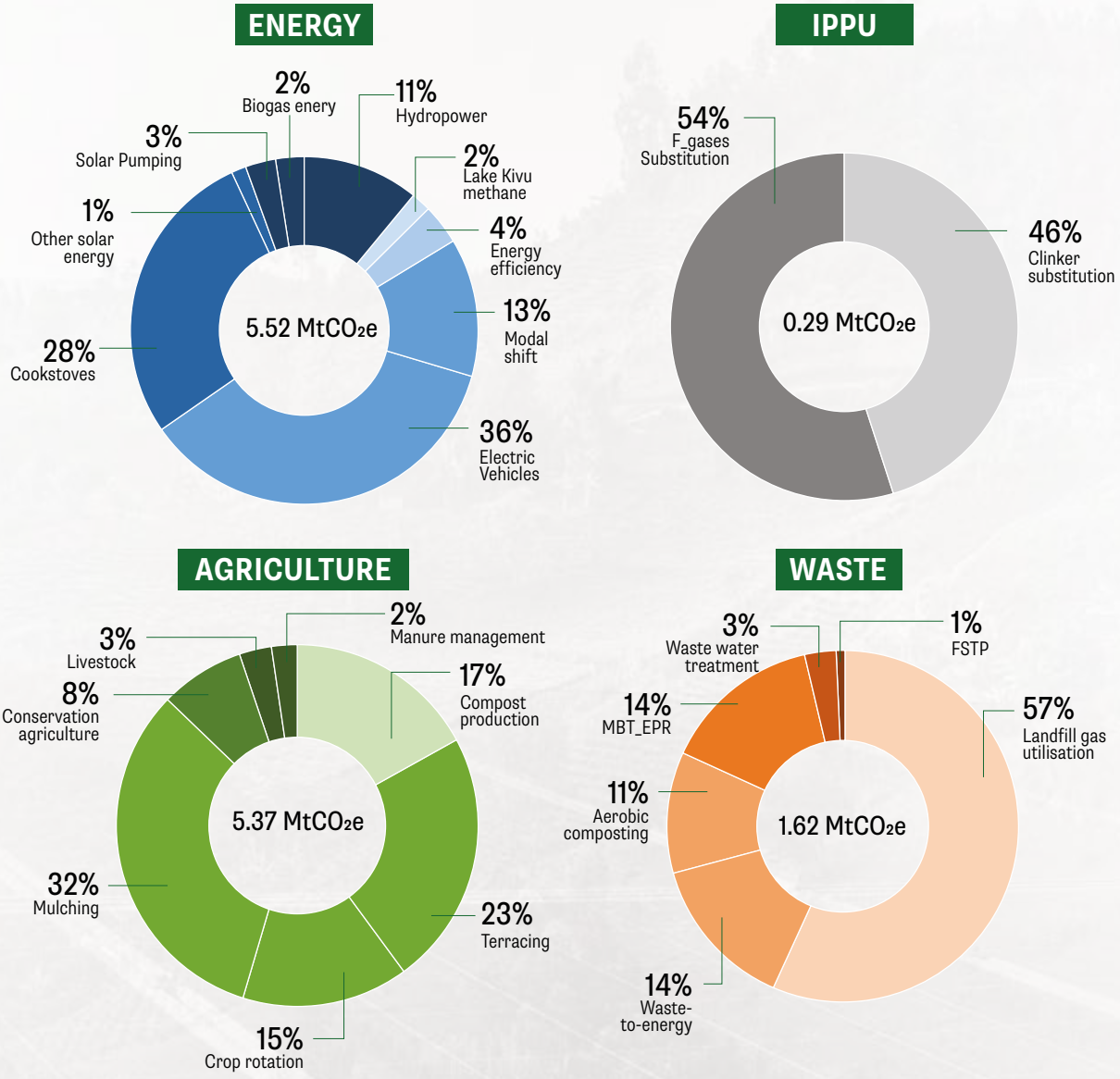


5.3.2. MITIGATION MEASURES

A detailed 'bottom-up' assessment of GHG mitigation measures for Rwanda was undertaken in order to determine which options are most suitable for inclusion within the NDC 3.0.

Figure 5.5 summarises the estimated emissions reduction potential in the target year of 2035 for all mitigation measures excl. LULUCF included within the NDC 3.0. The pie charts show for each key sector the total mitigation potential in million tCO_2e compared to the BAU reference case and also the relative contribution made by each NDC measure. Note that some of the mitigation measures are grouped and simplified for ease of summary communication; further detail and disaggregation is provided for these later in this section.

Figure 5.5 Mitigation potential in 2035 from all mitigation measures (excl. LULUCF)



Measures identified within **energy** use are estimated to have the largest mitigation potential account for the second largest share of total mitigation potential by 2035, contributing up to 5.52 million tCO_2e; a reduction of around 50% compared to BAU. These include a wide range of actions to increase the use of renewable and low carbon energy (so-called 'supply-side' measures) and actions to reduce the use of fossil-based energy use (so-called 'demand-side' measures). The analysis shows how measures implemented within the transport sector have the largest impact, accounting for around one half of the total estimated mitigation potential.

Emissions reductions arising from use of electric vehicles (EVs) are considered to be potentially significant, although delivering the rate of electricity grid decarbonisation planned within the NDC 3.0, from building new low carbon supply to displace existing fossil-based generation, will be key to the net level of mitigation achieved. Modal shift from private vehicle usage to public transport and NMT can also deliver significant benefits.

Increasing the use of domestic and renewable sources to meet the country's increasing energy demand contributes significantly to the mitigation potential. This includes expanding the role of hydropower (both large- and small-scale new generation) and Lake Kivu methane gas as well as the use of solar energy for water heating, pumping for agricultural irrigation and off-grid electricity, and biogas in homes and institutions. The roll-out of clean and cookstove programmes nationwide, covering efficient biomass cookstoves as well as non-biomass (LPG and electric) cookstoves, is considered to have very significant potential accounting for almost one quarter of the total mitigation by 2035.

Measures identified within the **agriculture** sector account for the second largest share of total mitigation, contributing up to 5.37 million tCO_2e in 2035; a reduction of around 37% compared to BAU. Soil conservation measures, which include terracing, conservation tillage (e.g. low, and no-tillage), mulching and multi-cropping and crop rotation practices, account for the majority of the sector's estimated mitigation potential.

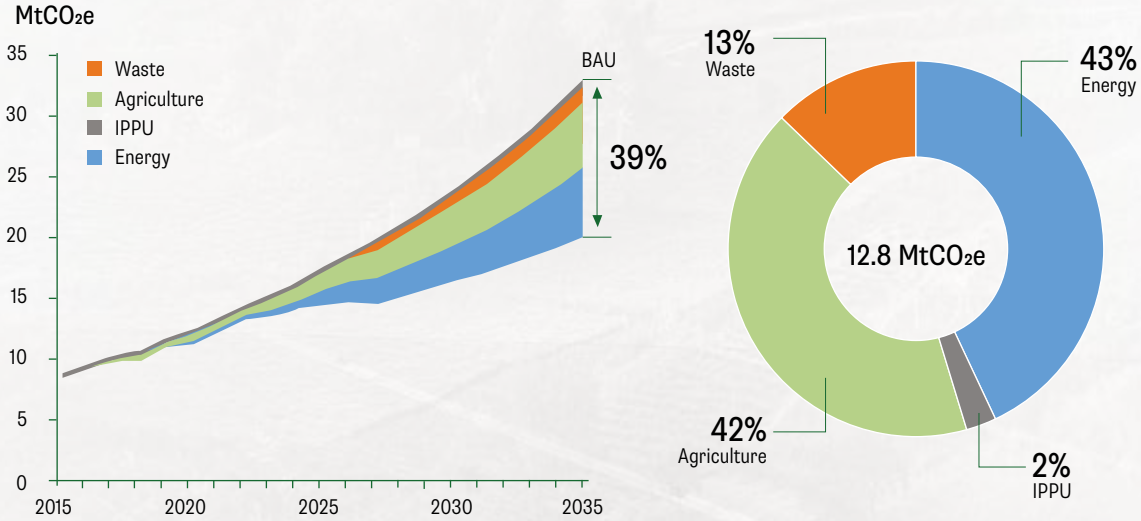
The bulk of the remaining mitigation potential includes measures to reduce enteric fermentation emissions from livestock, including the introduction of new species to replace local herds and improved husbandry and fodders, and the use of sustainable low-carbon composting. Despite livestock representing a large share of Rwanda's emissions, practical challenges to livestock herd replacement and technical limitations to the methane reduction potential mean that these sources are unlikely to be significantly reduced within the NDC 3.0 period.

Within the **waste** sector significant potential is identified within energy utilisation measures such as landfill gas recovery and direct waste-to-energy (WtE) plants. Mechanical and biological treatment (MBT) of waste, aerobic composting, wastewater treatment and the development of faecal sludge treatment plants (FSTP) account for the remaining potential. Combining all measures results in an estimated reduction of around 25% for the waste sector compared to BAU by 2035.

Mitigation potential from **IPPU** sources is by comparison relatively limited, with the majority of emissions reductions arising from increased use of clinker substitute (pozzolanas) within cement production, followed by reduction of fluorinated gases (F-gases) within air conditioning and refrigeration applications – as required under the 2016 Kigali amendment of the Montreal Protocol on Substances that Deplete the Ozone Layer (UN, 1987). Implementation of these measures would reduce sector emissions by around 37% compared to BAU in 2035.

Figure 5.6 shows the estimated total feasible GHG mitigation potential for all NDC 3.0 mitigation measures combined (excluding LULUCF) over the period 2015-2035 compared to the BAU reference scenario. The potential is estimated at around 12.8 million tCO_2e in 2035 against projected BAU emissions in the same year of 32.9 million tCO_2e, representing a 39% reduction. According to the analysis, the mitigation potential identified within energy use accounts for 43% of the total potential, followed by agriculture (42%), waste (13%), and IPPU (2%).

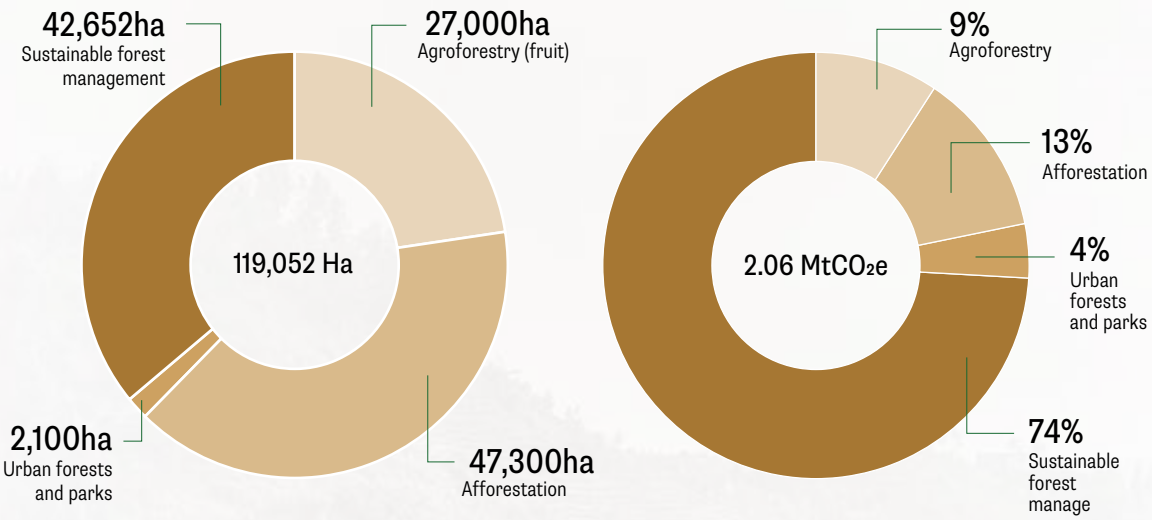
Figure 5.6 Mitigation potential 2015-2035 from all mitigation measures (excl. LULUCF)



As described earlier, the NDC 3.0 updates and enhances the previous NDC 2.0 through its expansion to include all sectors within the GHG inventory. The current NDC therefore includes mitigation measures within the LULUCF category not previously considered within NDC 2.0.

Specifically, these include measures undertaken to protect and enhance the country's carbon stock through a number of forestry-related interventions. These are summarised below in Figure 5.7 in terms of the targeted land area (hectares, ha) and additional annual carbon removal potential; estimated at around 2.1 million tCO_2 in 2035, a 41% net increase in the national carbon sink compared to the BAU scenario.

Figure 5.7 NDC forestry measure targets and associated mitigation potential in 2035



As shown in Figure 5.7, the planned NDC forestry measures cover almost 120,000 ha of the national land area through 2035. These include 47,300 ha of sustainably harvested commercial and conservation afforestation from tree species including Eucalyptus, Pinus and Alnus and the planting of 2,100 ha of new urban forests and parks to increase the "green lungs" of Kigali's expanding urban areas. The planting of Eucalyptus is to be focused on steep slopes requiring protection and which are not considered suitable for agriculture or existing forest land. The choice of suitable species would be confirmed at implementation stage and fully consider ecological impacts.

Agroforestry targets include the planting of 27,000 ha of new fruit and nut trees such as Macadamia, Avocado and Guava at full tree density as well as planting less dense non-fruit woody trees and shrubs in existing agricultural land and in/or between small agricultural plots. The largest carbon removal potential is calculated to be associated with scaling up a range of Sustainable Forestry Management (SFM) practices such as reforesting and restoring existing degraded and harvested forests.

Evaluating the options

The classification of the NDC mitigation actions according to unconditional and conditional measures is summarised in Table 5.2. This provides the basis for Rwanda's revised and enhanced mitigation contribution as set out below.

Table 5.2 Classification of unconditional and conditional NDC mitigation measures

	Mitigation measure	Conditional	Uncond-itional	Mitigation Total 2035 (MtCO2e/yr)
ENERGY	Hydropower			0.60
	Lake Kivu methane			0.10
	Energy efficient water distribution			0.01
	Energy efficient tea and coffee production			0.01
	Energy efficient brick kilns			0.17
	Modal shift			0.72
	Electric motorcycles			0.63
	Other electric vehicles			1.35
	Hybrid vehicles			0.03
	Energy efficient lighting			0.01
	Efficient biomass cookstoves			0.92
	Clean non-biomass cookstoves (electric)			0.18
	Clean non-biomass cookstoves (LPG)			0.44
	Off-grid solar electrification			0.001
	Rooftop solar PV			0.03
	Solar water heating			0.05
	Solar pumping			0.15
	Biogas energy			0.14
AGRICULTURE	Compost production	50%	50%	0.91
	Terracing			1.23
	Crop rotation			0.79
	Mulching			1.74
	Conservation agriculture			0.41
	Improved livestock husbandry	50%	50%	0.16
	Improved livestock species			0.02
	Manure management			0.12

WASTE	Landfill gas utilisation			0.91
	Waste-to-energy			0.23
	Aerobic composting			0.18
	Mechanical and biological treatment (MBT)	70%	30%	0.24
	Waste-water treatment	80%	20%	0.04
	Faecal sludge treatment plants (FSTP)			0.01
IPPU	Clinker substitution			0.13
	F-gases substitution			0.16
LULUCF	Agroforestry			0.19
	Afforestation	80%	20%	0.26
	Urban forests and parks			0.08
	Sustainable forestry management (SFM)			1.53

5.4. MITIGATION CONTRIBUTION

Rwanda's NDC 3.0 mitigation contributions are presented with and without LULUCF for the purposes of transparency and easier comparison with the previous NDC 2.0 which excluded LULUCF.

Figure 5.8 illustrates the emission projections for the BAU baseline scenario and Rwanda's mitigation contribution for domestic 'unconditional' measures and for all measures (unconditional plus conditional). The associated values are shown in Table 5.3. All numbers shown are in million tCO_2e. The left-hand side of the graphic firstly shows emissions are forecast to rise significantly under the BAU projection from 8.7 million tCO_2e in the base year to around 23.8 million tCO_2e in 2030 and further to 32.9 million tCO_2e in 2035. With the domestically supported 'unconditional' measures, emissions in 2035 are forecast to instead rise to around 31.1million tCO_2e, representing a reduction against BAU of around 5%. With both unconditional and conditional mitigation measures included, emissions are instead forecast to rise to around 20.1 million tCO_2e, equal to a reduction of 39% by 2035 against the same reference baseline.

The graphic shows, for this maximum 39% reduction pathway, how the mitigation is expected to be delivered across the different key sectors of energy, IPPU, waste and agriculture. As described above, climate friendly low emission practices in agriculture changes are expected to deliver the largest share of the benefits, closely followed by changes in energy use, including investments in cleaner low carbon fuels and technologies and wide-ranging energy efficiency. Waste and IPPU measures make a smaller albeit important contribution to the total.

Table 5.3 shows the aggregated economy-wide targets through to 2035, including updated targets for 2030.

Figure 5.8 Mitigation contributions against BAU baseline (excluding LULUCF), 2035

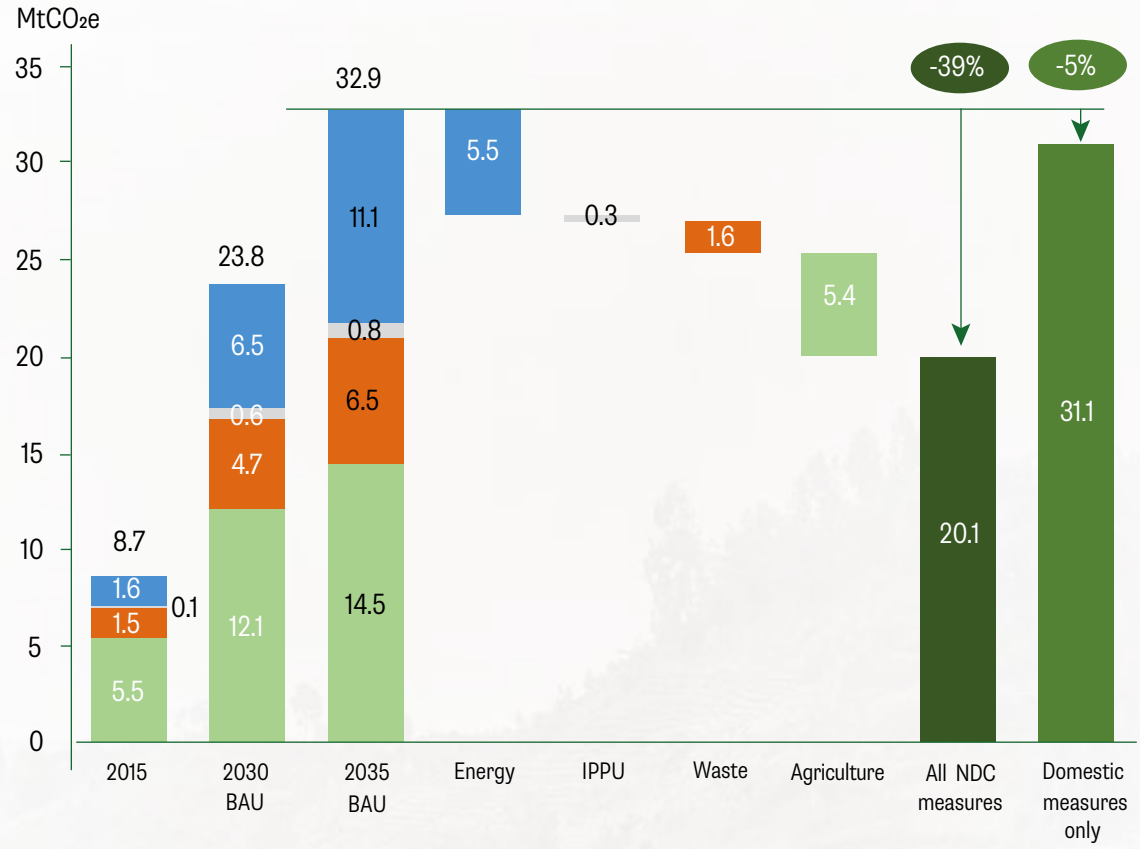
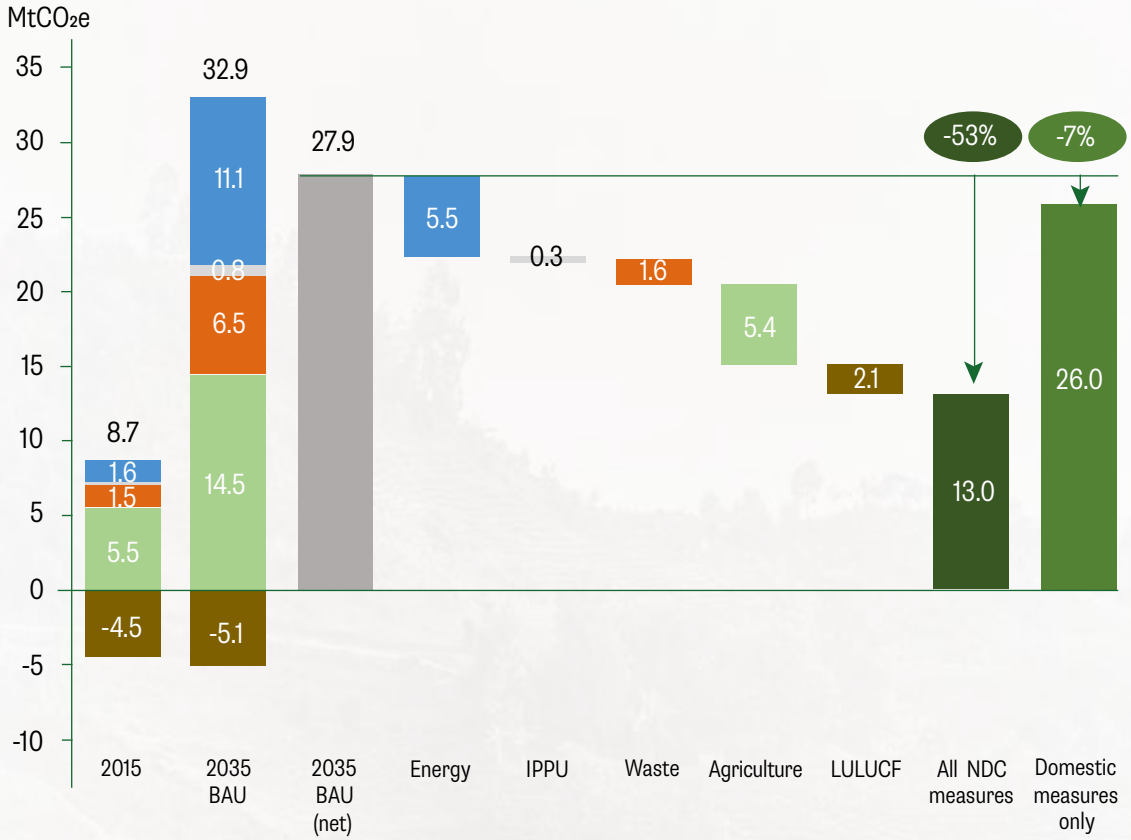


Table 5.3 Mitigation contributions against BAU baseline (excluding LULUCF)

Scenario	2015	2020	2025	2030	2035
Total emissions (million tCO_2e/yr)					
BAU reference case	8.70	12.29	17.42	23.85	32.94
Unconditional measures	8.70	12.17	16.79	22.58	31.15
All NDC measures	8.70	11.25	14.41	16.50	20.14
GHG reduction relative to BAU (million tCO_2e/yr)					
Unconditional measures	-	0.12	0.63	1.26	1.79
Conditional measures	-	0.92	2.38	6.09	11.01
All NDC measures	-	1.04	3.01	7.35	12.80
GHG reduction relative to BAU (%)					
Unconditional measures	-	1%	4%	5%	5%
Conditional measures	-	7%	14%	26%	33%
All NDC measures	-	8%	17%	31%	39%

Figure 5.9 illustrates the BAU scenarios and NDC contributions to 2035 but now including LULUCF. The inclusion of LULUCF means that removals, and some additional emission sources, are now included, thereby including the entire national GHG inventory (i.e. all estimated emissions sources and removals in Rwanda). The net removals from LULUCF are shown by the bars below the x-axis. With the inclusion of LULUCF, which includes removals as well as emissions sources, the contributions are now shown on the basis of net emissions.

Figure 5.9 Mitigation contributions against BAU baseline (including LULUCF), 2035



As with the previous graphic, the left-hand side shows how emissions are forecast to rise significantly under the BAU projection from 8.7 million tCO_2e in the base year to 32.9 million tCO_2e in 2035. Accounting for LULUCF emissions and removals, net emissions (emissions plus removals) are forecast to total 27.9 million tCO_2e in 2035. With the domestically supported 'unconditional' measures, net emissions in 2035 are forecast to instead rise to around 26.0 million tCO_2e, representing a reduction against BAU of around 7%. With both unconditional and conditional mitigation measures included, net emissions are instead forecast to rise to around 13 million tCO_2e, equal to a reduction of 53% by 2035 against the same reference baseline.

Table 5.4 shows the aggregated economy-wide targets through to 2035, including updated targets for 2030.

Table 5.4 Mitigation contributions against BAU baseline (including LULUCF)

Scenario	2015	2020	2025	2030	2035
Total net emissions (million tCO_2e/yr)					
BAU reference case	4.15	7.50	12.45	18.80	27.86
Unconditional measures	4.15	7.39	11.82	17.51	26.02
All NDC measures	4.15	6.47	9.38	10.93	13.00
GHG reduction relative to BAU (million tCO_2e/yr)					
Unconditional measures	-	0.12	0.63	1.29	1.84
Conditional measures	-	0.92	2.44	6.57	13.02
All NDC measures	-	1.04	3.08	7.86	14.86
GHG reduction relative to BAU (%)					
Unconditional measures	-	2%	5%	7%	7%
Conditional measures	-	12%	20%	35%	46%
All NDC measures	-	14%	25%	42%	53%

5.4. IMPLEMENTATION PLAN

This section concludes by summarising an implementation plan for the NDC mitigation measures. The following tables present a high-level summary of each of the mitigation measures set out in this NDC 3.0. They include both unconditional and conditional measures. They are presented according to each key sector and summarised according to key implementation aspects, including the responsible government ministries and implementing lead agencies, the planned timeline, and estimated funding requirements through to 2035. In line with best practice, adaptation co-benefits and linkages with the United Nations (UN) Sustainable Development Goals (SDGs) are also shown.

Table 5.5 Mitigation measures: ENERGY

Measures	Timeline			Line ministry (implementing entities)	Funding estimates 2025-2035	Adaptation benefits	Alignment with SDGs
	2015-2025	2025-2030	2030-2035				
ELECTRICITY GENERATION							
Grid-connected hydropower generation Development of large hydro capacity (capacity >5MW), including Nyabarongo II (43.5 MW) and Rukarara VI (9.76), 28.22MW small and mini hydro projects (capacity <5MW) and 68 MW (Rusizi III) regional projects by 2035. Results in the displacement of GHG emissions from fossil fuel power generation (peat, diesel oil, HFO).	✔	✔	✔	MININFRA (REG, EDCL)	Capital costs estimated at 642 million USD.	Potential for improved water management through flood and drought control. Increase in agricultural production due to improved water management and reduced exposure to extreme climate events.	
Lake Kivu methane electricity generation Expansion of additional generating capacity from the methane gas extracted in Lake Kivu. This results in the displacement of GHG emissions from more GHG-intensive fossil fuel power generation (peat, diesel oil, HFO).	✔	✔	✔	MININFRA (REG, EDCL, RMB)	Capital costs estimated at 220 million USD.	Reduced reliance on imported fossil fuels to provide national energy access.	

Measures	Timeline			Line ministry (implementing entities)	Funding estimates 2025-2035	Adaptation benefits	Alignment with SDGs
	2015-2025	2025-2030	2030-2035				
ENERGY EFFICIENCY IN INDUSTRY AND WATER							
Energy efficient water supply Efforts to reduce losses from non-revenue water (NRW), reducing the need for pumping energy and avoiding fossil fuel use.		✓	✓	MINIFRA (WASAC, RWB)	Efficient water supply and use is accounted for within Adaptation	Reduced reliance on imported energy supply.	
Energy efficiency in coffee and tea production A range of energy efficiency measures focused on reducing firewood and electricity consumption in the coffee and tea sector.		✓	✓	MINICOM, MININFRA (NIRDA, NAEB, REG, EDCL)	1.3 million USD	Increased resilience of tea and coffee plantations. Reduced pressure on forests resources, with reduced impacts from extreme rainfall events.	
Energy-efficient mining Phasing out of diesel gensets for on-site electricity consumption, to be replaced with grid and/or on-site renewable power production.	✓	✓	✓	MoE (RMB, mining companies)	1 million USD	Reduced reliance on energy imports through use of indigenous energy resources.	

Measures	Timeline			Line ministry (implementing entities)	Funding estimates 2025-2035	Adaptation benefits	Alignment with SDGs
	2015-2025	2025-2030	2030-2035				
Efficient brick kilns Phasing out the use of clamp kilns, and applying energy efficiency measures in the brick manufacturing industry.		✔	✔	MININFRA (RHA, NIRDA, CPCIC, RFA, brick companies)	13 million USD	Increased resilience of brick manufacturing industry. Reduced reliance on biomass energy and related air pollution. Reduced pressure on forests.	
LOW CARBON TRANSPORT							
Modal shift A wide range of measures, including bus rapid transport (BRT) projects, bus lanes, non-motorised transport (NMT) lanes, and other modal shift projects, are contained in the Transport Sector Strategic Plan.	✔	✔	✔	MININFRA (RTDA, RURA, CoK, transport operators)	497 million USD (including range of BRT and NMT measures across urban areas).	Increased resilience of transport infrastructure. Improved health and reduction of harmful pollutants, enhacing resilience of population to disease and adverse climate impacts.	
Electric Vehicles (EVs) and hybrids The e-mobility programme plans to phase in the adoption of electric buses, passenger vehicles (cars), and motorcycles from 2020 onwards, with a target of 70% of new vehicle registrations being EVs by 2035. This will result in displaced conventional vehicle sales, transport fuel imports, and associated GHG emissions.	✔	✔	✔	MININFRA (RTDA, REMA, RURA, CoK, transport operators)	Incremental costs of EVs and nation-wide charging infrastructure est. 418 million USD.	Reduction of harmful pollutants, enhancing resilience of population to disease and adverse climate impacts.	

Measures	Timeline			Line ministry (implementing entities)	Funding estimates 2025-2035	Adaptation benefits	Alignment with SDGs
	2015-2025	2025-2030	2030-2035				
BUILDINGS AND AGRICULTURE							
Efficient lighting in buildings Further dissemination of CFL and LED lamps in residential, commercial, and institutional buildings, supported by government subsidies and VAT exemptions on energy-saving lamps, and reduction of grid-based GHG emissions.	✔	✔		MININFRA (REG, RHA)	10 million USD (assumes 3 million CFL replacements with 7-year lifetime and 2 USD unit cost).	Increased opportunities for education, indirectly increasing population resilience to extreme weather events. Reduced household expenditure on energy enhances resilie	
Efficient and clean cook stoves Promotion of tier 3 and tier 4 cooking stoves in rural Areas with a target of 2,449,000 HH, Promotion of tier 4 and tier 5 in urban areas of energy transition in households by using clean non-biomass stoves (Electric, LPG, and ethanol stoves) targeting 1,209,000 HHs by 2035. This will achieve a more sustainable balance between supply and demand of biomass, and reducing firewood and fossil energy consumption for cooking.	✔	✔	✔	MININFRA, MoE, MINEDUC (EDCL, RFA, RGF)	975 million USD (new stoves, training schemes and monitoring).	Reduced dependence on the availability of traditional biomass fuels, which is vulnerable to climate variability. Reduced pressure on forest resources, with reduced impacts from extreme rainfall events. Reduced fossil fuel import dependence.	

Measures	Timeline			Line ministry (implementing entities)	Funding estimates 2025-2035	Adaptation benefits	Alignment with SDGs
	2015-2025	2025-2030	2030-2035				
Off-grid and rooftop solar electrification Penetration of off-grid solar and rooftop solar PV panels is consistent with the ESSP targets of connecting around 223,191 households to off-grid electricity solutions, such as solar home systems, minigrids, and other decentralised energy solutions by 2029, equivalent to 44,639 connections per year. Displacement of grid power, diesel consumption, and associated GHG emissions.	✔	✔	✔	MININFRA (REG, EDCL, EUCL)	19 million USD	Reduced dependence on imported energy and increased resilience and energy security of buildings, households and companies.	
Solar water heater (SWH) programme Installation of solar thermal water heaters within urban residential buildings supported by the use of loans and grants to subsidise purchase costs, as part of the National Green Building Code minimum compliance system.	✔	✔	✔	MININFRA (RHA, EDCL)	SWH costs est. 56 million USD. Support programme est. 10 million USD.	Improved climate resilience of buildings and reduced reliance on material and energy consumption, including energy imports.	

Solar pumping for irrigation Use of solar water pumping systems for irrigation within agricultural production to replace diesel pumps, displacing fossil fuel use and associated GHG emissions.	✔	✔	✔	MININFRA, MINAGRI (RAB, RWRB)	575 million USD.	Reduced dependence on imported energy and increased food security.	
Promotion of biogas for energy Increased use of anaerobic digestion of manure and waste for bioenergy production (bio-digestors).	✔	✔	✔	MININFRA, MINALOC (REG, EDCL, local government, RAB)	71 million USD	Reduced dependence on the availability of traditional biomass fuels, which is vulnerable to climate variability. Reduced pressure on forests and forest biodiversity, as well as food security.	

Table 5.6 Mitigation measures: INDUSTRIAL PROCESSES AND PRODUCT USE (IPPU)

Measures	Timeline			Line ministry (implementing entities)	Funding estimates 2025-2035	Adaptation benefits	Alignment with SDGs
	2015-2025	2025-2030	2030-2035				
CLINKER AND CEMENT PRODUCTION							
Increased pozzolana use in cement Increasing the share of volcanic pozzalanas used within national cement production targeted atr an incremental 27% substitution of clinker with pozzolana through 2035. Results in reduced clinker produciton and associated calcination process CO_2 emisisons.	✔	✔	✔	MINICOM (NIRDA, CPCIC, Cement companies)	Capital costs and pozzolana material costs est. 12 million USD through 2035.	Reduced dependence on imported coal, which results in reduction of cement production costs, thereby contributing to address national cement demand for adaptation to the effects of climate change.	
FLUORINATED GASES SUBSTITUTION							
Fluorinated gases substitution Gradual substitution of F-gases by less polluting substitutes, implemented as part of Rwanda's commitments to the Kigali Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer. F-gases not to exceed the following percentages: (a) 2020 to 2024: 95%; (b) 2025 to 2028: 65%; (c) 2029 to 2033: 30%.		✔	✔	MoE (RSB, REMA, private sector)	Additional capital costs est. 5.6 million USD. Material costs est. 59 million USD through 2035.	Reduction of climate impacts from F-gases with high GWP, which results in enhanced population resilience to adverse climate impacts.	

Table 5.7 Mitigation measures: AGRICULTURE

Measures	Timeline			Line ministry (implementing entities)	Funding estimates 2025-2035	Adaptation benefits	Alignment with SDGs
	2015-2025	2025-2030	2030-2035				
CROPS AND MANAGED SOILS							
Soil and water conservation (crop rotation) Continous crop rotation of up to 850,000 Ha, leading to prevention of soil erosion and reduction of CO_2 and N_2O emissions and carbon sequestration in soils.	✓	✓	✓	MINAGRI, MoE (RAB, RFA, RWB)	40 million USD	Increased food security through enhanced soil fertility, increased crop stability and reduced soil erosion. Cleaner water provision, through reduced nutrient and soil runoff.	
Composting and improved fertilizers Increased use of organic waste in soil fertilizers, supported by the target to apply composting within all agricultural households by 2035, and more judicious fertilizer use and promotion of fertigation to enhance fertiliser uptake.		✓	✓	MINAGRI, MINICOM (RAB, RSB)	6 million USD	Enhanced effectiveness of fertilizer application, thereby supporting agricultural activities of vulnerable farmers. Reduced compostable waste related health risks such as dengue fever. Enhanced soil fertility and reduced soil erosion.	

Measures	Timeline			Line ministry (implementing entities)	Funding estimates 2025-2035	Adaptation benefits	Alignment with SDGs
	2015-2025	2025-2030	2030-2035				
Soil and water conservation (terracing) Installation of 275,000 Ha land protection terracing structures in sloped arable areas to present soil erosion, leading to reduction of CO_2 and N_2O emissions and carbon sequestration in soils.	✓	✓	✓	MINAGRI, MoE (RAB, RWB)	5 million USD (note that some costs fall under Adaptation)	Enhanced effectiveness of fertilizer application, thereby supporting agricultural activities of vulnerable farmers. Reduced compostable waste related health risks such as dengue fever. Enhanced soil fertility and reduced soil erosion.	
Soil and water conservation (mulching and multicropping) Mulching of coffee and bananas of up to 32,000 Ha and 200,000 Ha respectively leading to prevention of soil erosion and reduction of CO_2 and N_2O emissions and carbon sequestration in soils.	✓	✓	✓	MINAGRI (RAB, NAEB)	3 million USD	Increased food security through enhanced soil fertility, increased crop stability and reduced soil erosion. Cleaner water provision, through reduced nutrient and soil runoff.	

Measures	Timeline			Line ministry (implementing entities)	Funding estimates 2025-2035	Adaptation benefits	Alignment with SDGs
	2015-2025	2025-2030	2030-2035				
Conservation agriculture (low tillage) Reduction in vertical movement of soil, leaving more crop residue on the soil surface, thereby reducing soil erosion, reduction of CO_2 and N_2O emissions and carbon sequestration in soils.	✔	✔	✔	MINAGRI (RAB)	8 million USD	Increased food security through enhanced soil fertility, increased crop stability and reduced soil erosion. Cleaner water provision, through reduced nutrient and soil runoff.	
LIVESTOCK							
Improved livestock husbandry Promotion of better livestock feed (i.e. legume fodder species) and training in better livestock management, under the Rwanda Livestock Master Plan. Reduction in CH_4 emissions from enteric fermentation.	✔	✔	✔	MINAGRI (RAB)	295 million USD	Increased food security through enhanced yields.	

Measures	Timeline			Line ministry (implementing entities)	Funding estimates 2025-2035	Adaptation benefits	Alignment with SDGs
	2015-2025	2025-2030	2030-2035				
Improved manure management Adoption of more efficient manure management systems, including use of cover material for manure storage pits, increased addition of straw, expansion of daily spread systems and training, under the Rwanda Livestock Master Plan. Reduction in GHG emissions from manure management.	✔	✔	✔	MINAGRI (RAB)	120 million USD	Increased food security through enhanced yields.	
Improved livestock species: Replacement of 400,000 domestic cows with 200,000 improved cow species; expansion of fish farming, poultry and other small livestock to increase protein food supply without increasing cows; and change in livestock mix. Reduction in CH_4 emissions from enteric fermentation.	✔	✔	✔	MINAGRI (RAB)	210 million USD	Increased food security through introduction of more drought resistant livestock species and enhanced yields.	

Table 5.8 Mitigation measures: WASTE

Measures	Timeline			Line ministry (implementing entities)	Funding estimates 2025-2035	Adaptation benefits	Alignment with SDGs
	2015-2025	2025-2030	2030-2035				
SOLID WASTE							
Landfill gas utilisation Extraction and utilization of landfill gas (LFG) for power generation in connection to semi- or fully-controlled landfills for urban areas. Reduced CH_4 emissions from landfill sites and avoided CO_2 emissions from displacement of fossil-based electricity use.		✔	✔	MINAGRI, MoE (RAB, RFA, RWB)	40 million USD	Increased food security through enhanced soil fertility, increased crop stability and reduced soil erosion. Cleaner water provision, through reduced nutrient and soil runoff.	
Waste-to-energy (WtE) plants Development of WtE plants in Kigali and other urban areas through energy recovery options other than LFG. Avoided CO_2 emissions from displacement of fossil-based electricity use.		✔	✔	MININFRA, MINALOC (WASAC, RURA, CoK and Districts)	Total costs est. 107 million USD	Creation of revenue generation opportunities of stakeholders in the waste management process chain. Increased access to electricity and reduced dependency on traditional biomass energy.	

Measures	Timeline			Line ministry (implementing entities)	Funding estimates 2025-2035	Adaptation benefits	Alignment with SDGs
	2015-2025	2025-2030	2030-2035				
Aerobic composting Development of commercial scale aerobic composting systems for agricultural and forestry residue, manure, food processing, household kitchen and garden waste, and biosolids (organic solids from treated sewage). Reduction in CH_4 emissions, since methane-producing microbes are not active in the presence of oxygen.	✔	✔	✔	MININFRA, MINALOC (RAB, WASAC, RURA, CoK, and Districts)	Capacity building and program implementation costs 5 million USD. Annual costs est. 6 million USD.	Improved retention of soil fertiliser and enhancing soil buffering capacity. Increased food production and nutrition security. Creation of revenue generation opportunities for local communities.	

Measures	Timeline			Line ministry (implementing entities)	Funding estimates 2025-2035	Adaptation benefits	Alignment with SDGs
	2015-2025	2025-2030	2030-2035				
Mechanical and biological treatment (MBT) of waste Implementation of MBT facilities to separate recyclables, organic waste, and residual waste before disposal. The process includes mechanical sorting for material recovery and biological treatment (composting or anaerobic digestion) for organic waste, reducing landfill waste volume and emissions. Reduced CH_4 emissions by diverting organic waste and lowering CO_2 through increased recycling.		✓	✓	MININFRA, MINALOC (WASAC, RURA, CoK, and Districts)	Total capital and operating costs estimated at 45 million USD through 2035	Reduces landfill volumes and limits leachate risks and protects groundwater quality. Recovered compost enhances soil health and supports local food security in drought-prone areas. Decentralized MBT facilities also create jobs and income, strengthening community resilience to climate shocks.	

WASTE WATER TREATMENT AND RE-USE							
Waste-water treatment plants (WWTP) Investment in wastewater treatment and reuse technology, reducing methane emissions from wastewater and providing a nutrient-rich digestate that can be used as a sustainable fertilizer. Reduction of CH_4 and CO_2 emissions.	✔	✔	✔	MININFRA, MINALOC (RURA, CoK and Districts, WASAC)	Capital costs 1 million USD per WWTP. Annual costs est. 1.5 million USD. Total cost est. 110 million USD.	Reduced water contamination. Increased agriculture production and groundwater recharge. Increased food production and nutrition security.	
Faecal sludge treatment plants (FSTP) Development of sludge treatment facilities to manage and treat faecal sludge from on-site sanitation systems. Reduced CH_4 and CO_2 emissions through controlled sludge treatment, biogas recovery, and improved waste-to-resource conversion. Reflected in the Water and Sanitation SSP (2024-2029).		✔	✔	MININFRA, MINALOC (RURA, CoK and Districts, WASAC	Total capital and operating costs estimated at 46 million USD through 2035	Converting sludge into nutrient-rich biofertilizer that improves soil moisture and crop yields. Energy production via gas combustión, thereby reducing improving energy security and resilience	

Table 5.9 Mitigation measures: FORESTRY AND LAND USE

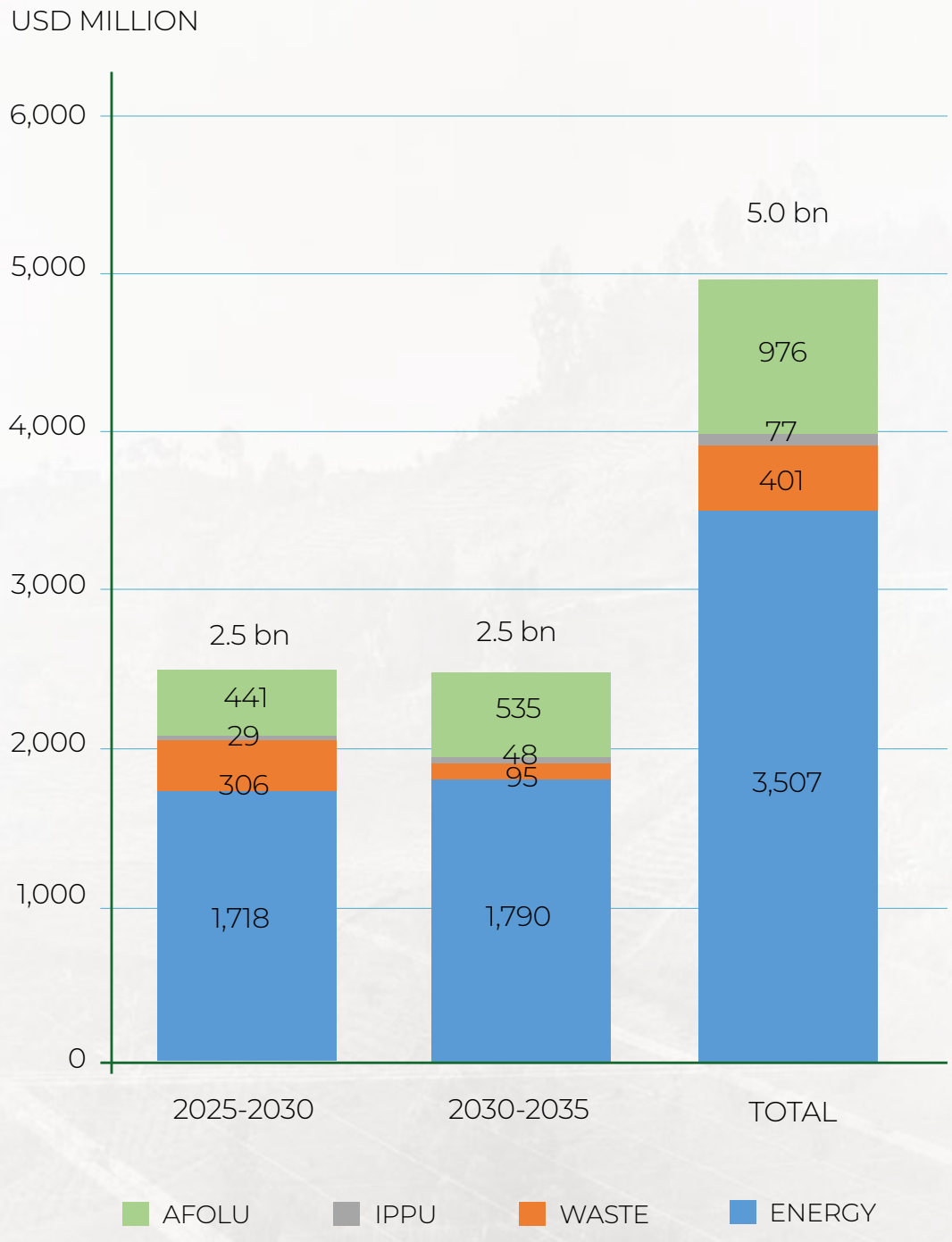
Measures	Timeline			Line ministry (implementing entities)	Funding estimates 2025-2035	Adaptation benefits	Alignment with SDGs
	2015-2025	2025-2030	2030-2035				
FORESTRY							
Agroforestry Planting of 27,000 ha of new fruit and nut trees such as macadamia, avocado, mangoes and guava at full tree density as well as planting less dense non-fruit woody trees in existing agricultural land and in or between small agricultural plots	✓	✓	✓	MoE, MINAGRI (RFA, RAB)	Planting and operating costs estimated at 211 million USD to 2035	Recovery, soil conservation and slope stabilisation, promotion of gender integration, food diversification and sources of income among agroforestry system practitioners.	
Afforestation Planting 47,300 ha of sustainably harvested commercial and conservation afforestation from tree species including eucalyptus, pinus and alnus		✓	✓	MoE (RFA)	Planting and operating costs estimated at 40 million USD to 2035	Increased biodiversity in the afforested areas and improved access to the ecosystem services provided by the forests, such as non-timber forest products, conservation and recovery of soil fertility, water regulation; improved soil conservation and erosion reduction. Support of nesting environments for birds, which are agriculture pest predators.	

Measures	Timeline			Line ministry (implementing entities)	Funding estimates 2025-2035	Adaptation benefits	Alignment with SDGs
	2015-2025	2025-2030	2030-2035				
Urban forests and parks Planting of 700 ha of native species and 1,400 ha of bamboo in river bank zones by 2035		✔	✔	MoE MINALOC (RFA, CoK, Districts)	Total costs estimated at 2 million USD to 2035	Improved soil conservation and erosion reduction. Improved microclimate and air quality.	
Sustainable forestry management (SFM) 42,652 ha of harvested and degraded forest area undergoing reforestation, rehabilitation and protection of steep slopes		✔	✔	(RFA, CoK, Districts)	Total costs estimated at 37 million USD to 2035	Restoration of biodiversity in the revegetated areas and improved access to the ecosystem services provided by the reforested areas, such as non-timber forest products, conservation and recovery of soil fertility, water regulation; improved soil conservation and erosion reduction.	

5.5 FUNDING REQUIREMENTS

Table 5.10 below shows the funding requirements associated with all NDC mitigation options, estimated at 5 billion USD through 2035. These represent the incremental capital investment costs required for example for new plant, technology, infrastructure and equipment as well as items such as programme set-up, training and other implementation costs.

Figure 5.10 Estimated funding requirements for all NDC mitigation measures 2025-2035 by sector



The investment levels for each sector are also shown. Mitigation measures within energy use are seen to account for the majority of the funding needed over the next decade. Clean energy interventions in buildings and home account for the largest share of the total and include measures such as solar water heating and efficient cookstoves.

These are followed by increasing the use of clean and renewable energy supply account for most of the remaining amount, including for example expanding renewable grid power generation (hydropower and Lake Kivu methane). Policies and measures with the transport sector account for the remaining share, around one quarter of the sector total, mainly associated with the incremental costs of EVs and fuel-efficient vehicles, and investments in charging infrastructure, public transport and NMT infrastructure.

Funding requirements within AFOLU account for 20% of the total estimated needs, associated with a wide range of forestry, sustainable agriculture and livestock interventions. Investments in waste facilities such as landfill gas recovery equipment and waste-to-energy units account for the bulk of the remaining requirement. In order to achieve the projected mitigation outcomes, around one half of the total 5 USD billion will be required in the period 2025-2030 and the remaining half in the period 2030-2035. Note that the estimated investment required for NDC 3.0 is cumulative and incorporating the commitments made under the 2020 NDC (NDC 2.0).

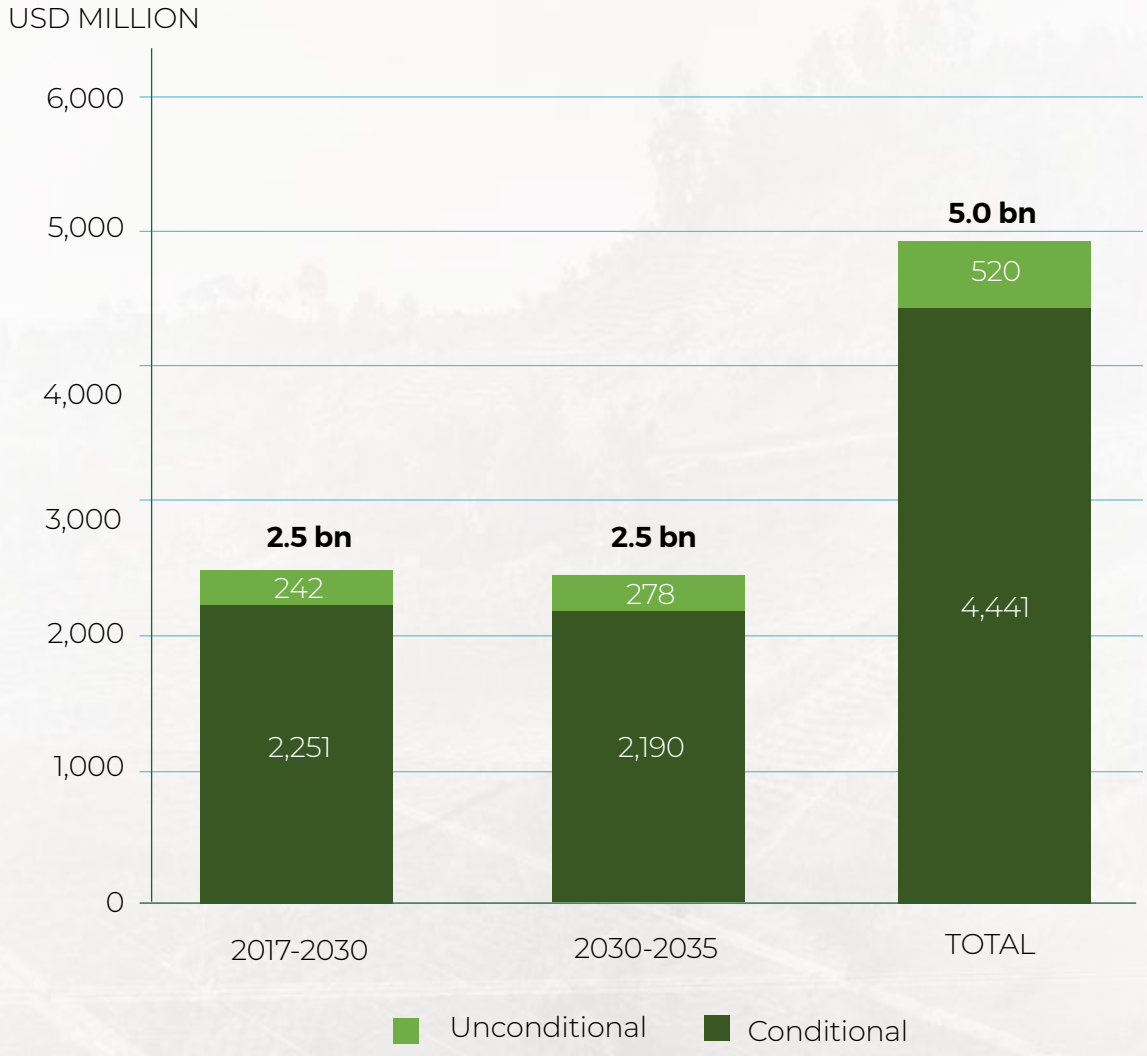
Table 5.10 Investment requirements for all mitigation measures (USD million)

Sector	2025-2030	2030-2035	TOTAL
Electricity	70	792	862
Manufacturing, industry and construction	3	12	15
Transport	237	678	915
Buildings	797	273	1,070
Other energy use	610	35	645
Energy total	1,718	1,790	3,507
IPPU total	29	48	77
Crops and managed soils	92	89	181
Livestock	218	287	505
Forestry and land use	111	142	290
AFOLU total	420	518	976

Solid waste	171	74	245
Wastewater treatment and re-use	134	21	156
Waste total	306	95	401
Total	**2,472**	**2,451**	**4,960**

Figure 5.11 shows the estimated funding requirements according to the unconditional and conditional contributions. The unconditional contribution to be implemented by Rwanda through a range of domestic public and private funding sources (e.g. consumers, companies, government budgets) accounts for an estimated 10% of the total requirement through 2035.

Figure 5.11 Estimated requirements for all NDC measures by contribution (USD million)



06

6. ADAPTATION CONTRIBUTION

6.1. INTRODUCTION

Rwanda's adaptation actions are guided by the 2019 National Environment and Climate Change Policy, which aims for "Rwanda to have a clean and healthy environment resilient to climate variability and change that supports a high quality of life for its society" (MoE, 2019). The adaptation actions are also guided by NST2. This is the main implementation document to deliver Rwanda's Vision 2050 and it recognizes environment and climate change are cross-cutting areas that must be addressed to achieve inclusive and sustainable development (GoR, 2024b).

In response to the growing challenges of climate change, Rwanda has established a comprehensive and robust legal, policy, and strategic framework which prioritizes adaptation across eight key sectors: agriculture; water resources; land and forestry; human settlements; health; transport; mining, and cross-sectoral activities. This sectoral approach has been consistently adopted in strategic documents, including the revised GGCRS (GoR, 2023a) and the sector strategic plans related to the Climate, Environment and Natural Resources (CENR), agriculture, urbanization and human settlement, transport, and water, sanitation and hygiene (WASH), health, education, among others.

Rwanda's NDC 3.0 includes a clear results framework and financial needs assessment for its adaptation priorities. This includes quantified targets, a criteria-based evaluation of priority interventions, and the development of a monitoring, evaluation, and learning framework for adaptation actions. This framework aims to strengthen national capacity for implementing actions, as well as resource mobilization, over the planned 2025-to-2035-time horizon.

6.2. RWANDA'S CLIMATE CHANGE RISKS AND ADAPTATION PRIORITIES

Rwanda identified a set of 24 adaptation priorities in the previous NDC 2.0 (GoR, 2020a). Since then, Rwanda has experienced rising climate impacts, as set out in Section 2 with rising loss and damage (see Section 7). This includes the impact of the 2023 floods and landslides, which led to 131 fatalities (MINEMA, 2023) and estimated damages of RWF 518.58 billion (USD 415 million) to recover from the damages and economic losses (MINECOFIN, 2023).

Additional information has also emerged on the potential future impacts of climate change to Rwanda, which indicate much higher economic costs than previously identified, and thus greater adaptation needs. This includes the analysis in the World Bank's Country Climate and Development Report (World Bank, 2022) which estimates that without adaptation, climate change could reduce annual GDP by 5–7% below baseline levels by 2050.

This indicates that Rwanda needs to increase the rate and ambition of adaptation, to address rising impacts and higher future risks. Rwanda's updated NDC 3.0 aims to do this by:

- **Addressing Sectoral Exposure and Vulnerability** through targeted, evidence-based interventions in the eight sectors.
- **Mobilizing Finance,** both domestic and international, to scale up adaptation implementation.
- **Strengthening Institutional Capacity,** including data systems, local governance, and inclusive decision-making, to ensure that adaptation gains are sustainable and equitable.
- **Aligning adaptation priorities with NST 2** and sector strategic plans (e.g., CENR, agriculture, WASH, urbanisation and human settlements, transport, cross-cutting areas).
- **Strengthening all sectors by adding new adaptation interventions and SMART indicators** across education, health, WASH, urbanization, human settlements, and other cross-cutting areas.

Through this integrated approach, blending ecosystem-based measures, technological innovation, and community engagement, Rwanda seeks to turn its geographic and climatic challenges into opportunities for resilient development and economic growth, aligned with the Vision 2050 goals.

6. 3. PRIORITISED MEASURES

The prioritised adaptation measures are set out below, for each of the eight thematic areas and cross-cutting areas.

- **Water Resources:** NDC 3.0 accelerates Rwanda's transition to Integrated Water Resources Management (IWRM). It includes catchment restoration, using terracing and agroforestry, with a target to rehabilitate over one million ha of degraded land by 2030. This will reduce run-off and floods risks, and help regulate water flows including dry-season flows. It also includes increased water storage to enhance water security, as well as improved efficiency of water use. This is be supported by a target to increase water-quality monitoring from 51 to 76 water bodies by 2030 and to 101 by 2035. At the same time, flood protection investments will be increased to help protect 40% of high-risk households by 2030 and 60% by 2035. The NDC will also support sustainable expansion of irrigation, with a target to expand the irrigated area from 102,000 hectares in 2025 to 200,000 ha by 2030, to support agricultural production and food security from the impacts of rainfall variability.

- **Agriculture:** Rwanda's drive towards climate-resilient and sustainable agriculture will combine on-farm water security (within the IWRM framework above) with an increase in solar irrigation, combined with climate-resilient seeds and livestock breeds. The increasing impacts of heavy rainfall and soil erosion will be tackled by soil conservation using terracing and agroforestry. Priorities along the value chain have also been identified, with storage and processing hubs utilizing solar dryers and biogas proposed to reduce post-harvest losses. These actions are complemented with a National Agriculture Insurance Scheme for crop and livestock insurance (MoE, 2024). Together, NDC3.0 measures can create a resilient and sustainable agri-food system. The adoption of improved seeds (LSF) is proposed to rise from 85.7% of farmers (today) to universal uptake by 2030 and targeted, climate-resilient varieties to rise to 5% of farms in 2030 and 77% in 2035). Post-harvest storage capacity is proposed to double to 551,000 metric tons by 2030, reducing losses from 13.8% currently to under 5%, while insurance schemes are proposed to expand and cover over 90,000 ha by 2030, providing smallholders with a safety net to extreme events.

- **Land Administration & Forestry:** By 2030, NDC 3.0 sets at target that all districts will implement hazard-informed land-use plans through a national spatial-data infrastructure, steering development away from flood- and landslide-prone zones. Payment-for-Ecosystem-Services schemes will

reward communities and will restore over 40,000 ha of forests by 2030 and nearly 70,000 ha by 2035, while agroforestry plantings are planned to exceed one million ha by 2030, collectively reducing flood intensity and sustaining river baseflows.

- **Urbanization & Human Settlements:** Rwanda's NDC 3.0 requires that every aspect of urban and development planning from new roads and buildings to public services explicitly accounts for climate change and disaster risk. To meet this requirement, the Government will transform informal, flood-prone neighbourhoods into planned, resilient communities by embedding stormwater drains, rain gardens, and parks into city master plans while actively mobilising climate finance through the Green Climate Fund, Adaptation Fund, and other mechanisms to support locally led upgrading and climate-resilient housing projects. Progress will be tracked not only by the proportion of residents living in risk-informed settlements and the amount of green space per capita but also by the share of informal settlement upgrading initiatives that secure dedicated climate finance.

  Relocation of homes and community facilities in high-risk areas will occur only as a last resort, following careful planning, meaningful community consultation, and guaranteed access to climate-resilient shelter, basic services, and livelihood support in the new zones. Updated land-use regulations will establish buffer strips along waterways, enforce minimum ground-elevation standards, and require straightforward flood-proofing measures. By coupling spatial planning with targeted finance for local implementation, these measures will reduce flood impacts, protect lives and property, and guide Rwanda's cities toward a low-carbon, climate-resilient future.

- **WASH:** Frequent floods, landslides, erosion, and droughts threaten Rwanda's progress towards universal water and sanitation access, diverting resources to emergency repairs rather than service expansion (Malik et al., 2024). In response, NDC 3.0 commits to delivering universal, climate-resilient WASH by 2030: every village will benefit from improved water supply networks and solar-powered treatment facilities, capacity will double, and non-revenue water losses will be reduced by half. At baseline, 92 per cent of households already have adequate sanitation; the goal is to reach and then sustain 100 per cent coverage by 2030. Currently, none of the sewerage systems in flood-, landslide-, or erosion-prone areas are climate-proofed. Under NDC 3.0, two high-risk systems will be retrofitted by 2030 and five by 2035, incorporating flood defences, slope stabilisation, and erosion control measures (WASAC, 2024a; 2024b; MINEDUC, 2024).

- **Health:** NDC 3.0 addresses the growing risks of climate change to vector-borne diseases. At baseline, the incidence of malaria is 76 cases per 1,000 people. Under NDC 3.0, the aim is to reduce this rate to 41.4 cases per 1,000 by 2030 by integrating real-time Meteo-Rwanda alerts into health facilities, alongside complementary interventions.

- **Transport:** NDC 3.0 focuses on climate-proofing primary road corridors with slope stabilization, elevated embankments, and upgraded drainage, while rolling out climate-smart, public transport routes. To improve the resilience of transportation and connectivity during extreme weather, NDC 3.0 will retrofit primary roads, bridges, and urban corridors with slope stabilization and raised embankments.

- **Mining:** Rather than viewing mining as a vulnerable sector to climate risks, NDC 3.0 positions it as a resilience partner, with the ambition that 90% of operations will adopt climate-compatible practices, such as water-efficient processing and dry-stack tailings, by 2030. Abandoned sites will be rehabilitated into green buffer zones, and mandatory flood-impact assessments will prevent contamination during extreme events.

- **Cross-cutting:** Under NDC 3.0, a real-time, multi-hazard network will connect meteorological data to every district post and enabling pre-emptive actions and planned evacuations ahead of climate hazards.

The table below summarizes the prioritized sector adaptation interventions, including corresponding indicators, baselines, and targets for 2030 and 2035. It also outlines indicator categories, responsible government ministries, implementing lead agencies, estimated adaptation finance requirements, mitigation co-benefits, and alignment with relevant SDGs. For a small number of indicators, targets are currently presented up to 2030 only. In these cases, targets beyond this timeframe will be agreed following further discussions with relevant organisations and included within the next updated NDC.

The indicators in are organised into two groups. **Category A** comprises metrics adopted from global adaptation-reporting frameworks, specifically, the definitions and performance targets required by international climate finance bodies such as the Adaptation Fund, the Green Climate Fund, and the UNFCCC. **Category B** encompasses indicators used to monitor and evaluate domestic adaptation projects, reflecting the reporting standards and logical frameworks applied at the national level. This dual approach ensures compatibility with both international investment fund requirements and in-country project reporting practices.

Table 6.1. Adaptation measures

SN	Intervention	Indicator	Baseline	Line Ministry (implem-enting entities)	Target		Category of indicator	Funding estimate 2025-2035 (USD)	Mitigation co-benefits	Align-ment with SDGs
					2030	2035				
WATER RESOURCES										
1	Enhance National Water Security through water storage and efficient water use	Water storage per capita (m^3/ capita)	5.3	MoE/ MINAGRI (RWB, RAB, Private sector)	12	17.6	B	1.5 billion	Enables greater hydropower use and reduces diesel backup generation Improves reservoir-fed hydropower, cutting grid emissions Optimizes treatment plant operations, lowering energy use.	
		Artificial water storage per capita (m^3/ capita)	5.8	MoE/ MININFRA (RWRB, WASAC, Private sector)	45	55	B			
2	Improve water monitoring and pollution control	Number of water bodies monitored for ambient water quality and water quantity	51	MoE (RWB/ Private sector)	76	101	B	2.25 million		

SN	Intervention	Indicator	Baseline	Line Ministry (implem-enting entities)	Target		Category of indicator	Funding estimate 2025-2035 (USD)	Mitigation co-benefits	Align-ment with SDGs
					2030	2035				
3	Build flood protection and improve water drainage systems around homes in risk areas	% of households in high-risk areas protected from flood-related hazards	9	MININFRA (RWB, Private sector, districts)	40	60	B	2.2 million	Avoids rebuilding and associated emissions.	
4	Enhance water user registration and compliance by increasing official permits and regular payment of environmental fees	Water users equipped with permits and compliant with environmental fees	1,020	MOE (RWRB/ Private sector)	1,500	2,000	B	0.8 million	Reduces pump-powered extraction and associated GHG emissions.	
5	Implement catchment restoration (hillside terracing and agroforestry in erosion-prone areas) to reduce runoff, stabilize soil, and restore degraded land	Area of land at high risk of soil erosion restored (Ha)	332,861	RWB, REMA	550,000	640,000	B	700 million	Increases soil and biomass carbon sequestration and lowers carbon and N_2O from erosion.	

SN	Intervention	Indicator	Baseline	Line Ministry (implementing entities)	Target		Category of indicator	Funding estimate 2025-2035 (USD)	Mitigation co-benefits	Alignment with SDGs
					2030	2035				
AGRICULTURE										
6	Restore degraded critical ecosystems (wetlands, lakeshores, riverbanks and natural forests)	Area of degraded critical ecosystems and riparian areas restored and managed (Ha)	1,852	MoE (RWB, RFA, REMA)	3,300	4,414	B	107 million	Rehabilitated wetlands and riparian zones act as carbon sinks	
7	Climate-resilient crops for agri-food systems	% of farmers using improved seeds (LSF)	85.7	MINAGRI (RAB, NAEB, Private sector, Civil society)	100	100	B	100 million	Reduces input-intensive replanting and fertilizer use.	
		% of farmers using improved seeds (SSF)	35.9		52.8	66.9	B			
		Mt of improved quality seeds used	7,576		10,635	12,762	B			
		% of farmers using climate resilient seed varieties	33		100	114	B			

SN	Intervention	Indicator	Baseline	Line Ministry (implementing entities)	Target		Category of indicator	Funding estimate 2025-2035 (USD)	Mitigation co-benefits	Alignment with SDGs
					2030	2035				
8	Sustainable animal breeding	Number of functional centres of excellence for animal genetics	0	MINAGRI (RAB, NAEB, Private sector, Civil society)	2	3	B	30.88 million	Improves efficiency, reducing enteric methane per unit output.	
		Number of animal breeding centres operational	15		22	27	B			
9	Upgrade post-harvest storage facilities to increase capacity and reduce losses	National storage capacity of food crops in MT	318,025	MINAGRI (RAB, NAEB, Private sector, Civil society)	417,025	436,825	B	775.4 million	Reduces food waste, improving efficiency and reducing -production emissions.	
		% of post-harvest losses on food crops	13.8		8	4.8	B			
10	Develop sustainable land management practices (climate-smart agriculture)	Area of land under terraces-Ha (Radical)	142,318	MINAGRI (RAB, NAEB, NLA, Districts, Private sector, Civil society)	165,143	169,708	B	174.1 million	Enhances soil carbon sequestration and reduces N_2O emissions.	

SN	Intervention	Indicator	Baseline	Line Ministry (implem-enting entities)	Target		Category of indicator	Funding estimate 2025-2035 (USD)	Mitigation co-benefits	Align-ment with SDGs
					2030	2035				
		Area of land under terraces-Ha (Progressive)	1,032,282	MINAGRI (RAB, NAEB, NLA, Districts, Private sector, Civil society)	1,096,082	1,108,842	B	174.1 million	Enhances soil carbon sequestration and reduces N_2O emissions.	
11	Expand area under irrigation and improve water management	Area of land under irrigation (Ha)	71,549	MINAGRI (RAB, NAEB, Districts, Private sector, Civil society)	132,619	144,825	A	1,107 million		
12	Strengthen agriculture de-risking for resilience (crop and livestock insurance	Ha of crops under insurance	33,269	MINAGRI (RAB, NAEB, Banks, insurance companies, Private sector)	83,425	100,110	B	267 million		
		Cattle insured	48,962		64,858	77,830	B			
		Pigs insured	7,300		173,030	207,636	B			
		Poultry insured	274,506		521,957	626,348	B			

SN	Intervention	Indicator	Baseline	Line Ministry (implem-enting entities)	Target		Category of indicator	Funding estimate 2025-2035 (USD)	Mitigation co-benefits	Align-ment with SDGs
					2030	2035				
Land and Forestry										
13	Enhance land administration and management	Number of operational geospatial information systems integrated with environmental protection and land value	1 (NDSI)	MoE (NLA (Lead)),	4 (NSDI with LAIS, Land value and IBPMIS; Compliance monitoring system)		B	30 million	Prevents deforestation-and related CO_2 releases.	
		Number of expropriated parcels registered[1]	599,221	MoE, MININFRA (REMA, RHA)	699,221	699,221	B	3 million		

1 The "Number of expropriated parcels registered" indicator captures an adaptation measure, but its scope extends beyond expropriations in formally mapped disaster-prone or risk areas. In our project, parcels are expropriated and registered in locations that are strategically identified for climate-resilient land-use interventions—such as sites earmarked for green infrastructure (wetland buffers, urban green corridors), managed aquifer recharge zones, or nature-based floodplain restoration—regardless of whether they fall within pre-classified hazard maps.

SN	Intervention	Indicator	Baseline	Line Ministry (implem-enting entities)	Target		Category of indicator	Funding estimate 2025-2035 (USD)	Mitigation co-benefits	Align-ment with SDGs
					2030	2035				
		Updated spatial boundaries of agriculture, water, forestry and other land uses including biodiversity areas, urban settlements and rural settlements (Ha)	10,000	MoE (Lead), REMA, NLA, RWB	237,805	118,902	B	26.39 million		
		Ha of resilience physical plans developed that align with district and national land use and development master plan	2,375	MoE (NLA, MINALOC, District)	8,564	4,282	B	9.31 million		
		Number of households in green model villages or green cities	1,200	MoE (,RHA, REMA, Districts)	2,400	3,600	B	24.5 million		

SN	Intervention	Indicator	Baseline	Line Ministry (implem-enting entities)	Target		Category of indicator	Funding estimate 2025-2035 (USD)	Mitigation co-benefits	Align-ment with SDGs
					2030	2035				
14	Manage forestry resources sustainably	Area (Ha) of land restored or maintained under a Payment for Ecosystem Services (PES) scheme	3,000	MoE (RFA, District)	40,000	68,460	B	92.1 million	Expands long-term carbon sinks.	
		Area (Ha) of agroforestry trees planted	525,000	MoE (RFA, Districts)	1,058,920	1,469,605	B	110 million	Increases farm-level carbon sequestration.	
		Area (Ha) of forest managed under the Forest Monitoring and Evaluation System (FMES)	91,284	MoE (RFA (Lead), Districts)	724,695	1,211,922	B	4 million		
		Number of tree nurseries well managed at cell level	1,800	MoE (RFA)	2,000	2,154	B	1 million		

SN	Intervention	Indicator	Baseline	Line Ministry (implementing entities)	Target		Category of indicator	Funding estimate 2025-2035 (USD)	Mitigation co-benefits	Alignment with SDGs
					2030	2035				
Urbanisation and human settlements										
15	Increase access to decent housing and enhanced resilience of communities	Percentage of urban population living in unplanned settlements	60	MININFRA (RHA, NISR, Districts)	51.2	44	A	400 million	Promotes compact, energy-efficient construction with lower heating/ cooling emissions.	
		Percentage of rural households living in integrated planned rural settlements	65.4		84.2	100	B			
16	Develop inclusive, climate resilient Cities and Towns	Percentage of land (ha) with detailed physical plans that are risk-informed	(2024)	MININFRA, MoE(CoK & Districts)	100	100	B	8.35 million	Integrates low-carbon cooling	
		% of the built-up area of cities that is open space and green space for public use	19.8		30	30	A			

SN	Intervention	Indicator	Baseline	Line Ministry (implementing entities)	Target		Category of indicator	Funding estimate 2025-2035 (USD)	Mitigation co-benefits	Alignment with SDGs
					2030	2035				
Water, sanitation and hygiene (WASH)										
17	Increase access to improved drinking water	Percentage of villages with access to improved drinking water	80	MININFRA, MINALOC (WASAC, WASH partners)	100	100	A	640 million	Plugging leaks and stopping unauthorised withdrawals reduces treatment and pumping requirements, enhancing energy efficiency and lowering greenhouse gas emissions	
		Daily water production (m^3/day) capacity increased	329,652	MININFRA (WASAC, WASH partners)	688,686	987,881	B			
		Non-revenue water reduced	39.5	MININFRA (WASAC, WASH PARTNERS)	25	23	B			
		Number of high-risk water systems (plants, pipeline,s and pumping stations) to be climate-proofed	0	MININFRA (WASAC, wash partners)	3 WTPs	5 WTP	B			

SN	Intervention	Indicator	Baseline	Line Ministry (implementing entities)	Target		Category of indicator	Funding estimate 2025-2035 (USD)	Mitigation co-benefits	Alignment with SDGs
					2030	2035				
Health										
18	Strengthen preventive measures and create capacity to adapt to disease outbreaks	Annual incidence rate for malaria (cases per 1,000 population)	76	MINISANTE, (RBC, Meteo Rwanda, Civil society)	41.4	-	A	100 million		
Transport										
19	Improved transport infrastructure and services to increase resilience to climate change	Reduced length (km) of roads vulnerable to landslides	67,683 (2022)	MININFRA / MINEMA (RTDA, RHA, Meteo Rwanda; Districts)	384 km	-	B	640 million	Supports modal shift to low-carbon public transit. Lowers per-capita transport emissions.	
		% of population conveying with public transportation (total/urban/rural)	21		23	24	B			

SN	Intervention	Indicator	Baseline	Line Ministry (implem-enting entities)	Target		Category of indicator	Funding estimate 2025-2035 (USD)	Mitigation co-benefits	Align-ment with SDGs
					2030	2035				
Mining										
20	Climate compatible mining	Percentage of companies deploying climate-compatible mining practices	74.5	RDB/ MINICOM (RMB, RWB, Private Sector, Civil society)	90	100	B	23.2 million	Implements energy-saving processes and dry-stack tailings.	
		Number of abandoned mining and quarrying sites rehabilitated	0		994	NA	B			
Cross-cutting areas										
21	Develop a multi-hazards early warning system and strengthen meteorological services to improve disaster preparedness	Number of pilot early warning systems developed (flood, lightning, windstorms, forest fires)	2	MINEMA (Lead), RWB, RFA, METEO RWANDA	22	22	B	258 million	Drives adoption of climate-smart, low-emission agricultural practices. Limits large-scale, high-emission disaster responses.	

SN	Intervention	Indicator	Baseline	Line Ministry (implementing entities)	Target		Category of indicator	Funding estimate 2025-2035 (USD)	Mitigation co-benefits	Alignment with SDGs
					2030	2035				
		Number of socioeconomic sectors with co-produced weather and climate services integrated in their planning instrument	4		34	-	B			
22	Establish and operationalize district emergency command posts	Number of district emergency command posts established and operational	8	MINEMA (Lead), Districts, CoK	28	30	B	7.4 million		
23	Schools with climate infrastructure and sustainable practices	Number of schools with climate resilient infrastructure (only retaining walls).[2]	617 retaining walls constr-ucted (2021/22)	MINEDUC (RHA, REMA, REB, Rwanda TVET)	2,828	7,325	B	20.12 million		

2 Climate-resilient infrastructure in schools refers to structures that protect school environments from climate hazards such as flooding, landslides, and soil erosion. Currently, the indicator focuses on retaining walls, as data is available for this aspect. These walls help stabilise school grounds and prevent disruption during heavy rains. As more data becomes available, the definition may expand to include features such as flood-proof drainage, heat-ventilated classrooms, rainwater harvesting, and green building materials.

6.4. MONITORING, EVALUATION AND LEARNING (MEL) FOR ADAPTATION

There are currently no standardised metrics for adaptation; however, some suggestions are expected to arise from the Global Goal on Adaptation, alongside a list of indicators developed under the UAE framework on global climate resilience. In practice, the relevant metrics will vary with context, and each country must define what constitutes adaptation and how it will be monitored and evaluated (Leiter, T. 2017).

NDC 3.0 proposes a set of Rwanda specific metrics for monitoring adaptation and extends beyond this to include a Monitoring, Evaluation, and Learning (MEL) framework. This framework represents an ongoing process of adaptive management, where findings and lessons are used to continuously refine, improve and change actions over time.

Learning is a critical component of this adaptation MEL system, and involves analyzing collected data and using this information to adjust decisions. This process can identify what has worked, what has not, and help scale-up adaptation actions to improve development outcomes against a background of rising climate hazards (MINECOFIN, 2021).

6. 5. FUNDING REQUIREMENTS

Rwanda's NDC 2.0 (2020) estimated total financing needs of USD 11 billion-USD 5.7 billion for adaptation and USD 5.3 billion for mitigation. To date, approximately USD 4.8 Billion, or 38% of that total, has been mobilised for both adaptation and mitigation efforts. The remaining gap is attributed to slow international disbursements, limited direct access for national institutions, fragmented project-based funding, and constrained domestic fiscal space.

The estimated total funding requirements for the adaptation measures are summarised in Table 6.2 and Figure 6.2. Over the 2025–2035 period, Rwanda has identified adaptation financing needs of around USD 7 billion to deliver the priorities above, of which 23% (USD 1.6 billion) is anticipated to come from domestic budgets (unconditional), and 77% (USD 5.4 billion) is contingent on external financing (conditional). Agriculture (35% of the total) and Water Resources (33%) represent the largest shares of the financing needs, reflecting their critical roles in food security and water security, followed by WASH (9%), Transport (9%), Urbanisation and Human Settlements (6%) and Cross-Cutting (4%) Land and Forestry, Health and Mining together account for the remaining 4%.

Table 6.2 Funding requirements for adaptation measures (USD million)

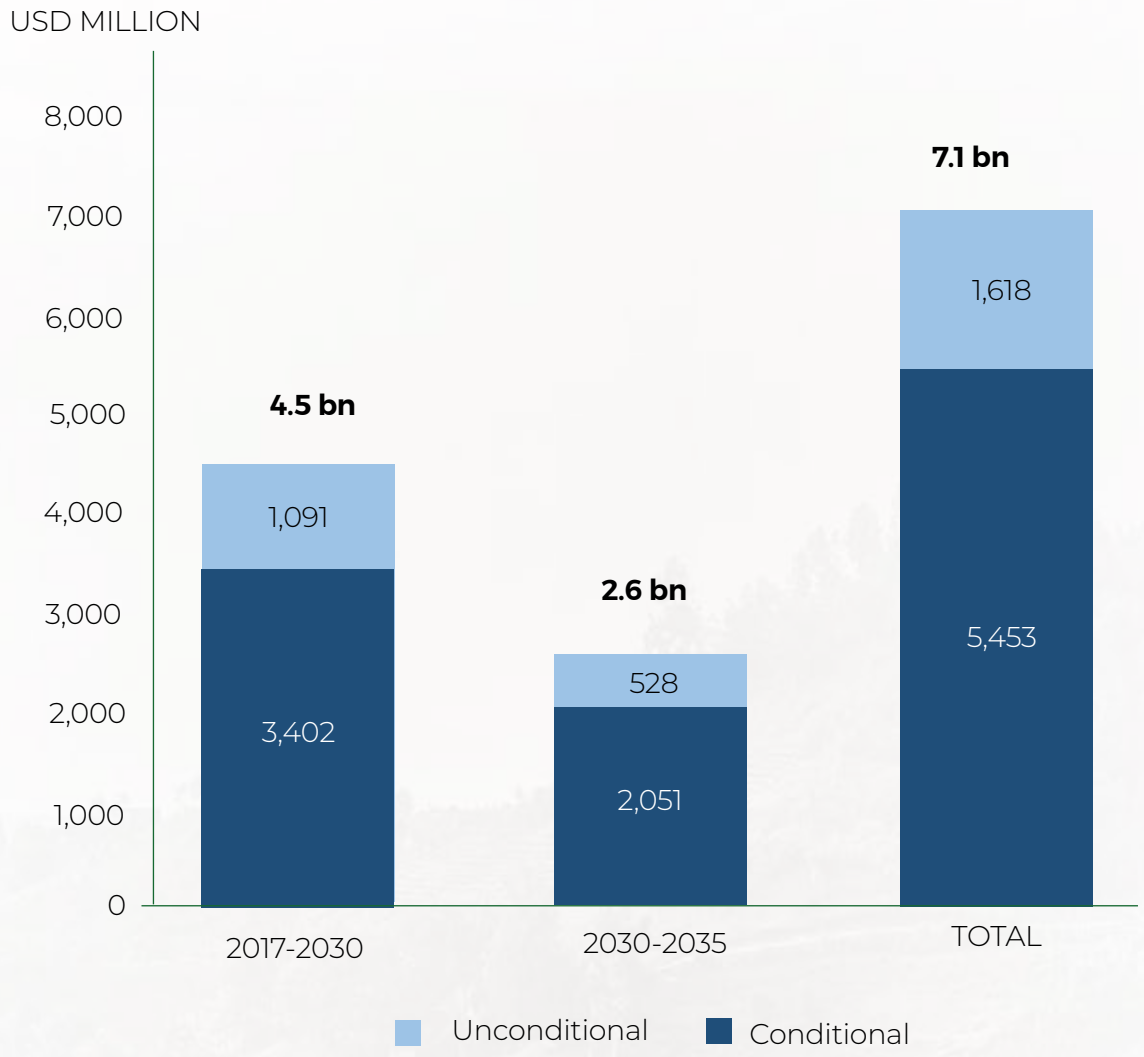
Sector	2025–2030	2030–2035	Total
Water resources	1,565	748	2,312
Agriculture	1,116	1,339	2,455
Land & Forestry	117	90	207
Urbanisation and Human Settlements	224	185	408
Water, Sanitation and Hygiene	548	92	640
Health	100	0	100
Transport	533	107	640
Mining	19	5	23
Cross-cutting	271	14	286
Total	**4,492**	**2,579**	**7,071**

Domestic budgets should prioritise agriculture, water resources, and WASH to ensure positive outcomes in food, water, and health. In contrast, external financing should focus on supporting infrastructure and cross-cutting systems that require significant capital and partnerships. This balanced approach will help to close the adaptation gap, protect vulnerable communities, and enhance resilience across all development sectors.

Building on the lessons from NDC 2.0, the financing framework for NDC 3.0 adopts a more integrated approach that includes programme-based strategies, performance-based conditional finance, expanded direct access for national institutions, innovative blended finance models, and enhanced mainstreaming of adaptation into national budgets. The emphasis is placed on high-impact priorities such as agriculture, water resources, WASH, and resilient infrastructure, which align with NST2 and Vision 2050.

To mobilise the external share of funding requirements, Rwanda will implement a performance-based model that ties disbursements to measurable outcomes in key areas, including catchment restoration, post-harvest storage, PES-backed forest restoration, urban green retrofits, resilient WASH systems, climate-proofed roads, and early-warning systems.

Figure 6.2 Funding requirements for adaptation measures (USD million)



07

7. LOSS AND DAMAGE

7.1. OVERVIEW

Over the past four decades, Rwanda has experienced a clear warming trend, as well as shifts in rainfall patterns (Meteo Rwanda, 2023). This is already leading to increases in slow-onset events with rising impacts. During the same period, Rwanda has experienced a significant rise in the number and severity of extreme weather events. For example, the floods and landslides during May 2023 resulted in 131 fatalities and US several hundred million in economic damages and economic losses (MINEMA, 2023; World Bank, 2023). There is increasing evidence that these extreme events can be attributed to the changing climate.

These trends indicate that Rwanda's residual impacts; Loss & Damage (L&D); are growing faster than international mitigation and domestic adaptation measures can address. Without a dedicated policy response, these impacts will exceed both the "soft limits" (where options may exist but are currently not available) and "hard limits" (where no adaptive actions are possible to avoid intolerable risks), though these will vary with different levels of warming/future climate scenarios.

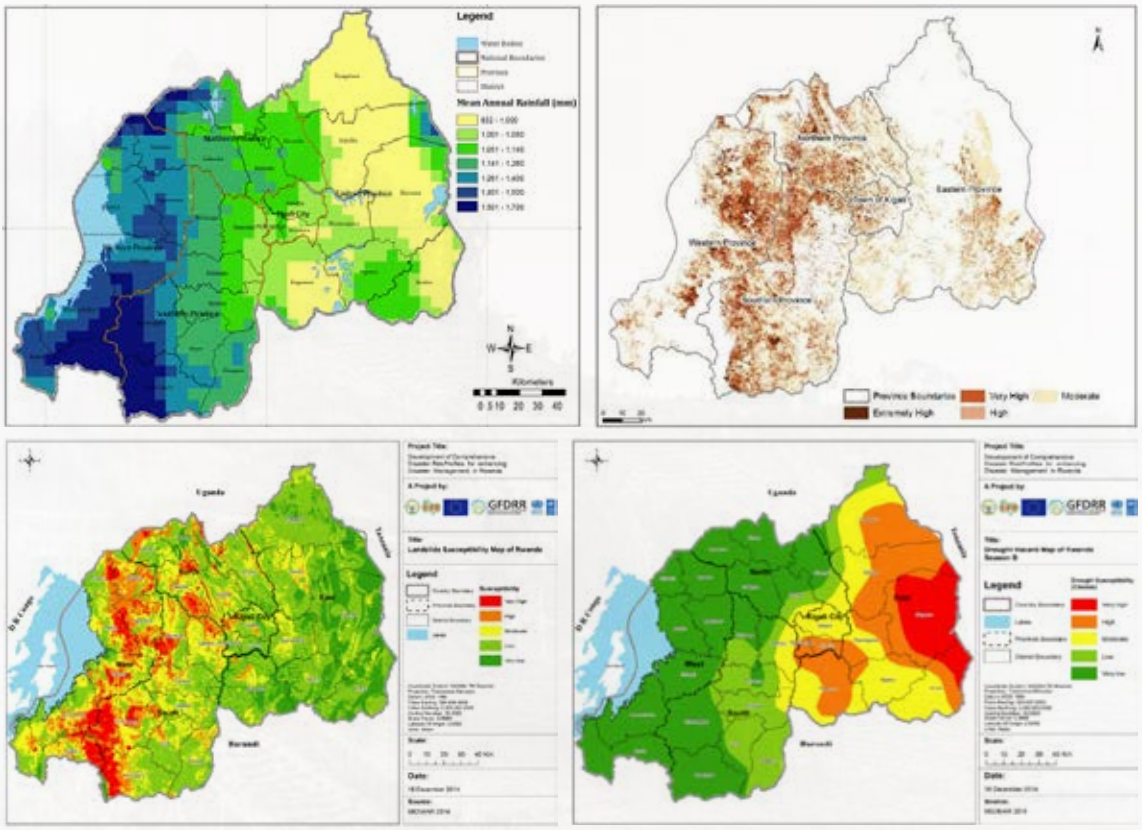
To bridge this gap, Rwanda had Rwanda has included action to address loss and damage in the NDC 3.0 and aligned it with emerging international mechanisms, namely the COP28 Loss & Damage Fund, the Warsaw International Mechanism, and support from the Santiago Network. By integrating these frameworks into a coherent national strategy, Rwanda seeks to build capacity and mobilize finance to address unavoidable climate impacts.

This section defines Loss & Damage in Rwanda's context, quantifies the current and projected magnitude of slow-onset and extreme weather events, reviews institutional and policy responses, and proposes interventions, indicators, and targets for NDC 3.0.

7.2. CLIMATE DRIVERS FOR LOSS AND DAMAGE

Rwanda's topography and climatic zones create distinct geographic patterns of L&D across the country, as shown in the figure below. The western highlands, with over 1,500 mm of annual rainfall and steep slopes, are hotspots for slow-onset erosion and rain-triggered landslides. In contrast, the eastern lowlands receive less than 800 mm of rain annually and face recurrent meteorological and agricultural droughts. The mid-country have moderate erosion risks and also experience episodic flash-flood hazards along major river corridors.

Figure 7.1 Distribution of L&D Risks. Rainfall (top left), Soil erosion (top right) Landslides (bottom left) and Drought [Season B] (bottom right)



Sources: Meteo Rwanda, 2024; RWB and IUCN, 2022; MIDIMAR, 2015.

7.3. MAGNITUDE OF CURRENT LOSS AND DAMAGE OF SLOW ONSET EVENTS

Slow-Onset Events (SOE) are risks that unfold gradually over time. The UNFCCC has identified eight slow onset events (Decision 1/CP.16), but as a landlocked country, Rwanda is not affected by sea-level rise or ocean acidification, and it does not have glaciers. The main SOE are considered below.

7. 3. 1. SOIL EROSION

In Rwanda's steep, hilly landscapes, one of the most important slow onset events is land degradation, particularly soil erosion. National level analysis estimate that over 1 million ha of the country are at high risk of soil erosion, with average topsoil losses of 25 tonnes per ha per year. This includes more than 56,000 ha which are affected by gully formation and 55,000 ha by rill erosion (RWB & IUCN, 2022), processes which irreversibly change the local terrain. This soil erosion leads to significant economic and non-economic losses. The direct impact of soil erosion on crop yields in Rwanda has been valued at approximately USD 53 million annually, with additional costs from the loss of topsoil and downstream damages to hydroelectric facilities (RWB & IUCN, 2022). In addition to these market impacts, the release of soil-stored carbon and the loss of biodiversity represent substantial non-economic losses, undermining ecosystem services that are essential for rural communities, including water filtration, nutrient cycling, and climate regulation.

While soil erosion is determined by many factors (including vegetation cover, topography, gradient, land management and soil type), it is driven primarily by rainfall and especially heavy rainfall (due to its erosivity). Climate change increases rainfall intensity, due to the general relationship that higher temperatures increase the water holding capacity of air by approximately 7% per degree Celsius of warming (Coumou et al., 2024). These increases are also seen in the ENACT's data, which reports rising trends of heavy rainfall intensity in Rwanda. Climate change is therefore already a major contributing factor to rising soil erosion and current loss and damage, and these are projected to rise in the future with climate change, increasing the impacts above.

7. 3. 2. DROUGHTS

The east of Rwanda has low rainfall levels and experiences periodic droughts, amplified by ENSO cycles. A major drought event happened in 2016, and there have also been smaller events in more recent years. The impact of droughts are not captured within the national recording system. The economic losses of these events are associated with the agricultural losses (crops and livestock) while the non-economic losses include fatalities, injuries and disease outbreaks, as well as damage to biodiversity and habitats. Earlier studies estimate annual average agricultural, livestock and dairy losses are USD 65 million per year (2.2% of total agricultural production value) (Giertz et al., 2015; MIDIMAR, 2015), and also lead to non-economic impacts such as malnutrition, waterborne diseases.

There have been attribution studies on drought extremes and rainfall variability in East Africa, though these show varied conclusions, with some but not all studies identifying a contributing role of climate change (Clarke et al. 2023).

7. 3. 3. OTHER SLOW ONSET EVENTS

The rising temperatures and increasing numbers of hot days in Rwanda are starting to have additional slow onset impacts, including rising economic losses from increased cooling demand and electricity use, reduced labour productivity and negative impacts on crop yield, as well as non-economic losses including the effects on heat-related mortality and morbidity. There are projections of the future economic costs of these impacts in the CCDR (World Bank, 2022), which shows these will be significant, with rising L&D unless mitigation and adaptation actions are scaled up. There are also growing risks of L&D from rising temperatures and climatic shifts on Rwanda's unique biodiversity and the ecosystem services these provide.

Rwanda has nine protected areas covering 9% of the country, but also targets to expand national parks to contribute to the global target of protecting 30% of land (and sea) by 2030. The country has extremely diverse habitats and ecosystems that range from humid montane forests to savannahs, lakes, rivers and wetlands, and this includes iconic species, notably the mountain gorilla, which are important for tourism revenue. These ecosystems are extremely vulnerable to climate change and may face hard limits of adaptation in the future.

7.4. MAGNITUDE OF CURRENT LOSS AND DAMAGE OF EXTREME WEATHER EVENTS

Rwanda experiences high levels of extreme weather events. The country set up a network of data collection and a systematic recording system in 2016, which provides robust evidence on the impact of these events.

7. 4. 1. LANDSLIDES

Intense rainfall on steep slopes, especially along the Nile-Congo watershed, triggers frequent land movements and landslides. These lead to economic losses from damage and destruction of properties, as well as to crops, roads, bridges and other infrastructure.

They also lead to non-economic losses including fatalities, injuries, and damage and destruction of the environment and cultural sites (MIDIMAR, 2015). While landslide risk is determined by a number of factors (slope, land cover, soil type, etc.) rainfall is a major factor in landslide risk, both from heavy rainfall but also the cumulative rainfall over time, and climate change is projected to increase these extremes (see soil erosion discussion above).

Rwanda experienced particularly devasting landslides during 2023 (see Box 1), though there were also many and major landslide events during 2016, 2018 and 2020 (see Figure 7.2). Attribution analysis of the 2023 event (Kimutai et al., 2023) investigated the role of climate change, especially given the unprecedented rainfall levels: this concluded that an increase in intensive precipitation was in line with climate change projections, but that it was not possible to conclusively attribute a role to the 2023 because of data gaps, though this would now be possible with the ENACT data.

7. 4. 2. HEAVY RAINFALL, FLOODS AND RAINSTORMS

River and surface (flash) floods are a regular occurrence in Rwanda, though they tend to increase during El Niño episodes. The primary economic losses are associated with property and infrastructure damage as well as damages to agricultural production, while the non-economic losses include fatalities, injuries and disease outbreaks, as well as damage to the environment and cultural heritage. Climate change has the potential to increase the intensity as well as the frequency of floods events (affecting the return periods of major events), though as with other extremes, the impact (L&D) of any event is influenced by exposure and vulnerability, and underlying socio-economic trends and land-use policy.

Besides 2023 (see Box 1), there was major flooding in Rwanda in 2016, 2018 and 2020, and most recently the floods during 2024. Kimutai et al. (2024) identified that the heavy rains and flooding in East Africa in 2024 were made twice as likely, and 5% more intense due to human influence on the climate.

Box 1. Case study: The May 2023 floods & landslides

In May 2023, Rwanda experienced severe floods and landslides triggered by heavy rainfall. This event, along with high rainfall in late April and early May, led to unprecedented landslides and floods, particularly along the Nile-Congo divide. There were 131 reported fatalities and over 110 injuries (MINEMA, 2023). The floods and landslides damages costed an estimate of USD 160 million and losses of USD 34 million (MINEMA, 2023).

The disasters caused significant macroeconomic losses, reducing direct production by USD 34 million and GDP by 0.2%. Losses to infrastructure were subsequently estimated at USD 156 million, equivalent to about 0.55% of the total capital stock (World Bank, 2023). A post-disaster needs assessment by the Government of Rwanda estimated it would need RWF 518.58 billion (USD 415 million) to recover from the damages and economic losses (MINECOFIN, 2023).

7. 4. 3. OTHER EXTREME WEATHER EVENTS

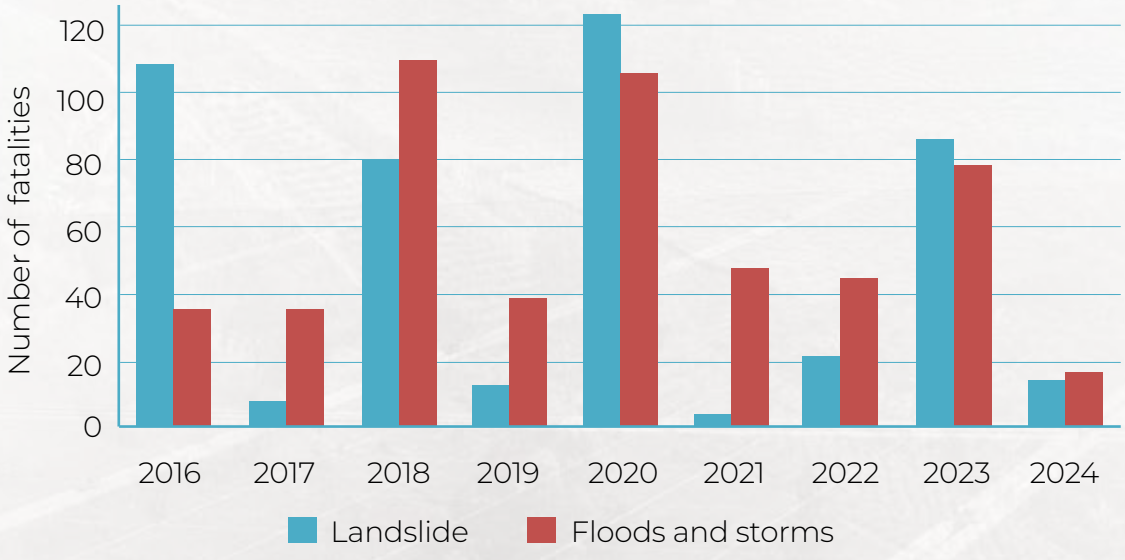
Rwanda experiences strong windstorms, which can lead to fatalities, and damage roofs, power lines, and crops. There are also hailstorms which particularly damage agricultural crops. Wildfires were infrequent, but are increasing, though annual costs are modest at present. Rwanda has not historically experienced very hot days and heatwaves, and the main impacts are associated with slow onset warming (see above).

7. 4. 4. ECONOMIC AND NON-ECONOMIC LOSSES

Based on the recorded data, between 2016 and 2023, extreme weather events in Rwanda caused 979 fatalities, including 463 deaths from landslides and 516 from floods, heavy rains and storms. It also caused 970 injuries (238 from landslides, 639 from floods, heavy rain and rainstorms, and 92 from windstorms) (MINEMA, 2023).

These direct impacts translate into economic losses, lost wages, healthcare and funeral costs, asset repair, non-economic losses, grief, reduced well-being and weakened community cohesion. However, this does not account for wider effects such as service disruptions (e.g. transport delays, power outages), macroeconomic burdens (displacement, reconstruction spending), livelihood interruptions (agricultural and informal sector losses) or cultural and psychosocial damages. Moreover, poorer households face even greater risk because they often live in landslide- and flood-prone areas, occupy less durable housing, and depend heavily on agricultural livelihoods.

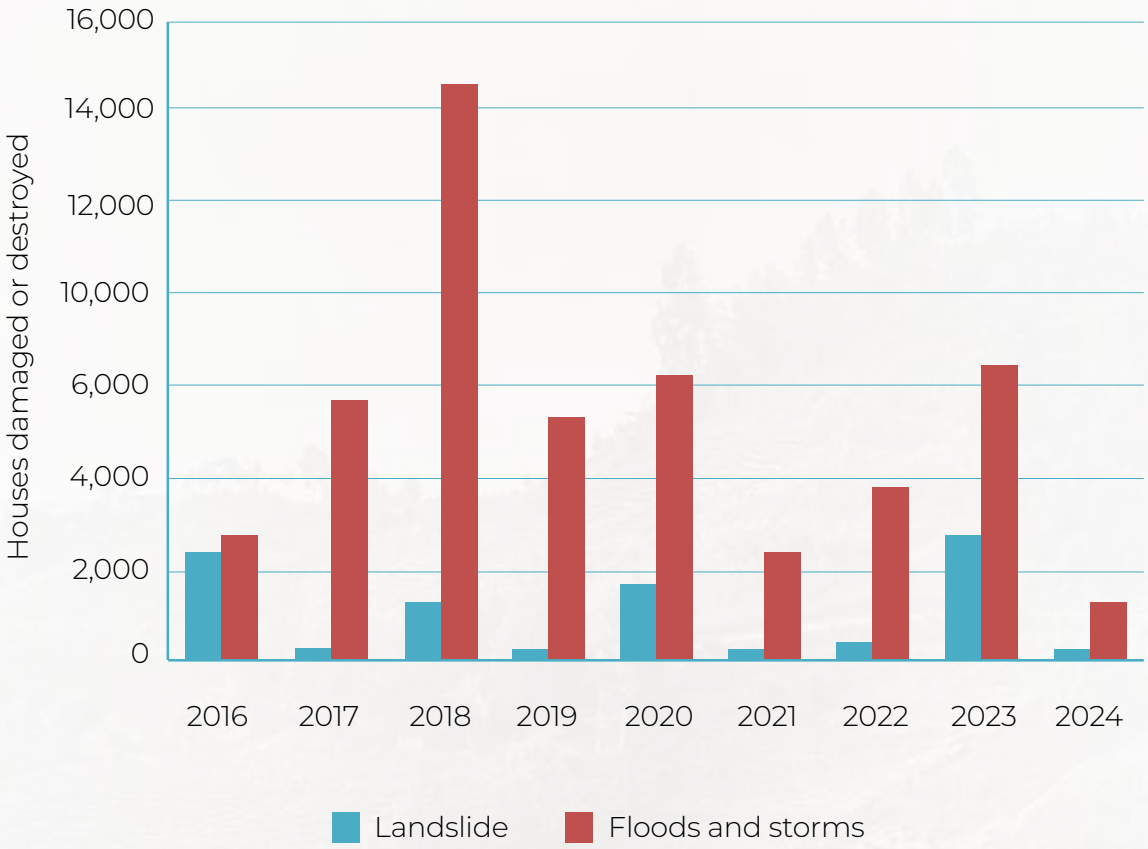
Figure 7.2 Annual deaths by extreme events in Rwanda



Source: MINEMA, 2023

Over the same period (2016 to 2024), extreme weather events damaged or destroyed 58,760 homes, an average of 6,500 per year, but with peaks in 2018 and 2023 (MINEMA, 2023). These lead to direct economic costs from the damage to property. They also lead to significant non-economic losses, for example, these impacts lead to the displacement of large numbers of people (with 18,000 alone moved to temporary accommodation in 2023) with associated health, well-being and livelihood impacts.

Figure 7.3 Annual properties damaged or destroyed by extreme events in Rwanda



Source: MINEMA, 2023

These extreme weather events also had major impacts on infrastructure. There was damage recorded to 443 road segments and 446 bridges, which required major repairs and disrupted travel. There was also damage to 105 water-supply installations and water treatment plants, and to 438 electrical transmission lines. These events also damaged 22 health centres and 136 local administration buildings. This damage also affected infrastructure services, including transport power provision, water supply and sanitation, and critical emergency response capacity (MINEMA, 2023).

Year	Roads section	Bridges	Water supply	Transmission lines	Health centres	Administrative offices
2016	2	40	39	1	1	9
2017	13	49	10	73	3	17
2018	32	64	1	25	3	11
2019	30	40	6	70	1	20
2020	154	103	26	87	4	17
2021	43	39	11	58	3	12
2022	71	39	1	69	1	19
2023	31	32	8	25	5	24
2024	67	40	3	30	1	7
Total	**443**	**446**	**105**	**438**	**22**	**136**

Source: MINEMA, 2023

These extreme events also affect the agriculture sector. Between 2016 and 2024, the combined effects of landslides, heavy rain, floods, rainstorms, windstorms and hailstorms led to the damage of 50,000 ha of crops (an annual damage of 5,530 ha), and there were additional impacts on livestock. These were compounded by the periodic droughts, discussed above, which had much higher impacts in major drought years, especially because over 90% of agriculture is rain-fed.

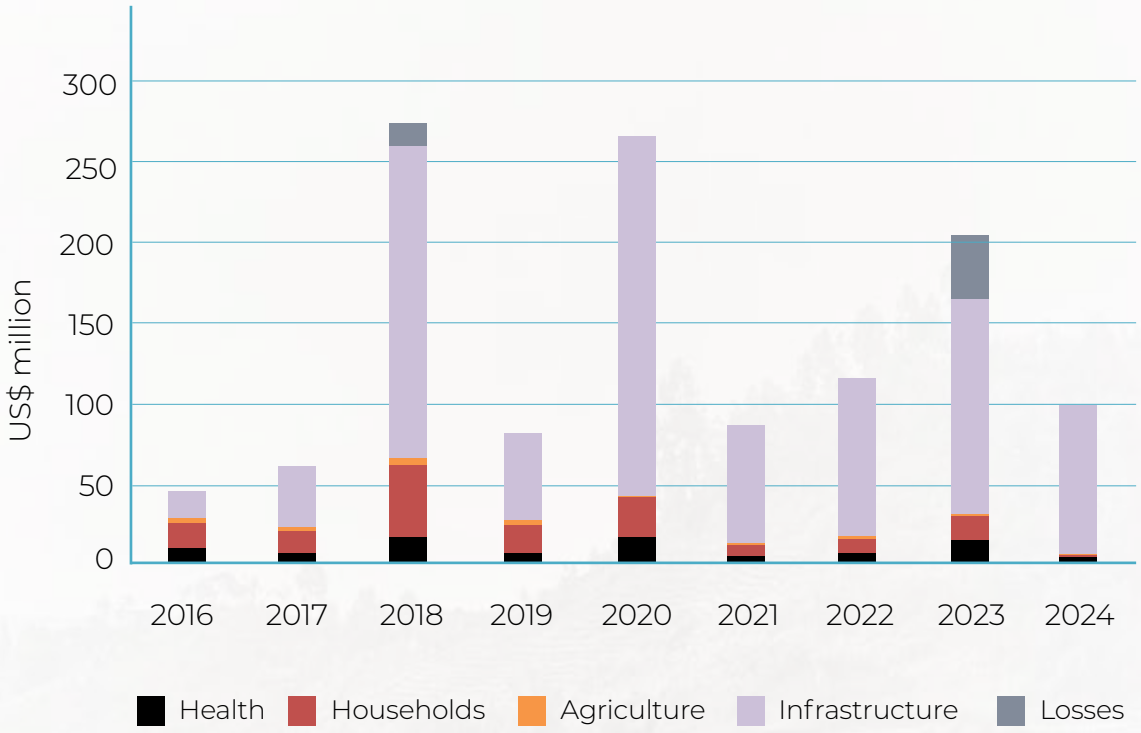
To assess the scale of these extreme weather events, the NDC Secretariat used the data above and assessed:

- **Economic loss and damage.** This assessed the market-based impacts of extremes, including property damage, crop losses and infrastructure damage, using repair and replacement costs.
- **Non-economic loss and damage.** This assesses the non-market impacts and changes in the risk of fatalities, and lost productivity and treatment costs for injuries.

Note that this analysis does not include the wider losses, including disruption to services (e.g., travel time disruption, lost electricity load) or the wider macro-economic impacts of these events. However, for a number of the extreme event years, notably 2018, 2020 and 2023, additional information does exist with additional information from post disaster needs assessments (GoR, 2018; 2023) and economic analysis (World Bank 2022; 2023).

The analysis estimates a cumulative Loss and Damage of approximately USD 1.2 billion over the period of 2016–2024, an average of USD 135 million per year. However, the impacts were very severe in major disaster years (e.g., 2018, 2020 and 2023) which experienced intense weather extremes (NDC Secretariat, 2024).

Figure 7.4 Annual Loss and Damage due to extreme events in Rwanda



Note: Analysis based on MINEMA database and unit costs, with additional infrastructure damages and losses for 2018, 2020 and 2023, and extrapolated infrastructure damages for other years.

It should be stressed that this loss and damage does not affect all households equally. A recent household survey has been undertaken in Rwanda to assess the economic and non-economic impacts of extreme events (ECONOGENESIS, 2025). This finds the economic and non-economic losses are much higher (in relative terms) among women and among the poorest households, as a proportion of income. This highlights the urgent need for L&D support to address the most vulnerable.

Finally, climate change will exacerbate these extremes in future years and Rwanda will experience more intense rainfall, increasing flood risks, and more extreme heat. This will increase the exceedance of the soft limits of adaptation and brings increased risk of also exceeding the hard limits of adaptation.

7.5. INSTITUTIONAL ARRANGEMENTS

Rwanda's institutional framework for Loss & Damage includes climate governance, finance, disaster risk management, and social protection:

- **Climate governance & finance:** REMA leads the Paris Agreement negotiations, while the Rwanda Green Fund mobilizes climate finance under the Ministry of Environment.
- **Disaster management:** MINEMA manages disaster preparedness, response, and recovery through a coordinated planning and emergency operations structure.
- **Extreme-event risk reduction:** There is a Multi-Hazard Early Warning System (MHEWS) working experts network called the National Emergency Command Center under the MINEMA. Under the MHEWS, Rwanda Meteorology Agency issues warning on wind, rain, and thunderstorm then the flood monitoring and warning are conducted by Rwanda Water Resources Board.

Despite these measures, the increasing frequency and severity of events require more resources. To enhance resilience and support affected communities, NDC 3.0 must establish a dedicated Loss & Damage finance stream, separate from mitigation and adaptation budgets. Table 7.2 below outlines four priority interventions to strengthen Rwanda's L&D response. The interventions create a cohesive L&D response framework integrating financing, early warning systems, technical expertise, and data integration.

Rwanda has identified the need for finance through the period to 2035 to address critical gaps in its loss-and-damage architecture, distributed across the following strategic interventions:

- **Loss & Damage Financing:** Rwanda aims to position itself to effectively access resources from the FRLD through the Rwanda Green Fund window. This will be achieved by actively engaging in global climate negotiations, enhancing national readiness, and identifying strategic pathways for developing high-quality proposals. These proposals will be aligned with the emerging access modalities for climate-related loss and damage financing, ensuring that Rwanda can mobilize timely and impactful support for vulnerable communities.

Success will be measured by the percentage of international funding proposals approved and the total resources secured, directly advancing SDG 13 on climate action and Sendai Framework Target 2 on enhanced financial protection against disaster losses. The financing will earmark funds for projects that provide rapid assistance to the most vulnerable households to minimise loss and damage impacts, especially through nationally led existing mechanisms (including social protection systems) where possible.

- **Real-Time NDIMS Upgrade (USD 28 million):** Transforming the National Disaster & Incident Management System from a 24-hour reporting lag to sub-six-hour responsiveness requires a GIS-enabled dashboard, AI/ML hazard detection, and nationwide sensor integration. This investment strengthens Sendai Priority 4 on preparedness and SDG 9 by embedding resilient, innovation-driven infrastructure into national disaster management.

- **Santiago Network Technical Assistance (USD 4.7 million):** Partnering with the UNFCCC's Santiago Network, Rwanda will co-develop and pilot a Technical Assistance Roadmap by 2030—delivering five to ten cross-sector workshops and initial risk assessments—and fully operationalize support by 2035. Progress will be tracked by the number of workshops delivered and assessments completed, aligning with SDG 17 on global partnerships and Sendai Priority 1 on risk understanding.

- **Integrated Loss & Damage Data Platform (USD 18 million):** A unified National Climate-Risk Database will be operational by 2030, standardizing data-sharing among MINEMA, MINALOC, REMA, Meteo-Rwanda, and NISR, and will be upgraded by 2035 for real-time feeds, quarterly analytics, and a 50% improvement in assessment accuracy. This platform underpins evidence-based planning under SDG 11 on resilient cities and fulfils Sendai Priority 2 on strengthened risk governance.

Table 7.2. Priority areas: Loss and Damage

SN	Intervention	Indicator	Baseline	Targets		Funding estimates (USD)	Alignment with SDGs and Sendai framework
				2030	2035		
1	Rwanda will position itself to effectively access resources from the Fund to Respond to Loss and Damage through the Rwanda Green Fund window.	Number of proposals submitted and funded through the Loss & Damage Fund	Proposals submitted: 0	1	3 cumulative proposals	9.5 million	SDG 13 on climate action and Sendai Framework Target 2 on enhanced financial protection against disaster losses
2	Upgrade Rwanda's NDIMS into a real-time, GIS-enabled platform with AI/ ML analytics and countrywide early-warning links	Time (hours) from hazard detection (sensor or report) to its appearance in NDIMS	~24 hours	Upgrade NDIMS to a fully operational system that includes real-time data collection, an interactive dashboard, ≤ 6 hours	-	28 million	Sendai Priority 4 on preparedness and SDG 9 by embedding resilient, innovation-driven infrastructure into national disaster management.

SN	Intervention	Indicator	Baseline	Targets		Funding estimates (USD)	Alignment with SDGs and Sendai framework
				2030	2035		
3	trengthen institutional capacities and engage with the Santiago Network on loss and damage to access technical expertise in climate risk assessment, capacity building, and loss and damage evaluation	Completion and operationalization of a technical assistance roadmap. Number of capacity-building workshops and technical assessments completed with Santiago Network support.	No technical support has been provided by the Santiago Network, leaving gaps in climate risk assessments and capacity development.	Develop and pilot a Technical Assistance through delivering five to ten cross-sector workshops and initial risk assessments	101	2.25 million	SDG 17 on global partnerships and Sendai Priority 1 on risk understanding.
4	Enhance coordination among key institutions (MINEMA, MINALOC, REMA, Meteo-Rwanda, NISR) for data integration to consolidate loss and damage data for improved risk assessments	Existence of an operational, integrated national climate risk assessment database. Frequency of data sharing and coordinated reporting among institutions	Coordination between institutions is limited, resulting in fragmented loss and damage data collection	Establish a national climate-risk database for loss and damage with standardized data-sharing and coordinated reporting.	Upgrade database for real-time integration, quarterly reports, and a 50% increase in assessment accuracy.	18 million	SDG 11 on resilient cities and fulfils Sendai Priority 2 on strengthened risk governance.


08
ANNUAL REPORT

8. TRACKING THE NDC

8.1. TRACKING PROGRESS

The Enhanced Transparency Framework (ETF) established by the Paris Agreement requires an MRV system to transparently report progress made towards the targets defined in Rwanda's NDC and to track the implementation of mitigation and adaptation measures, as well as means of implementation including climate finance.

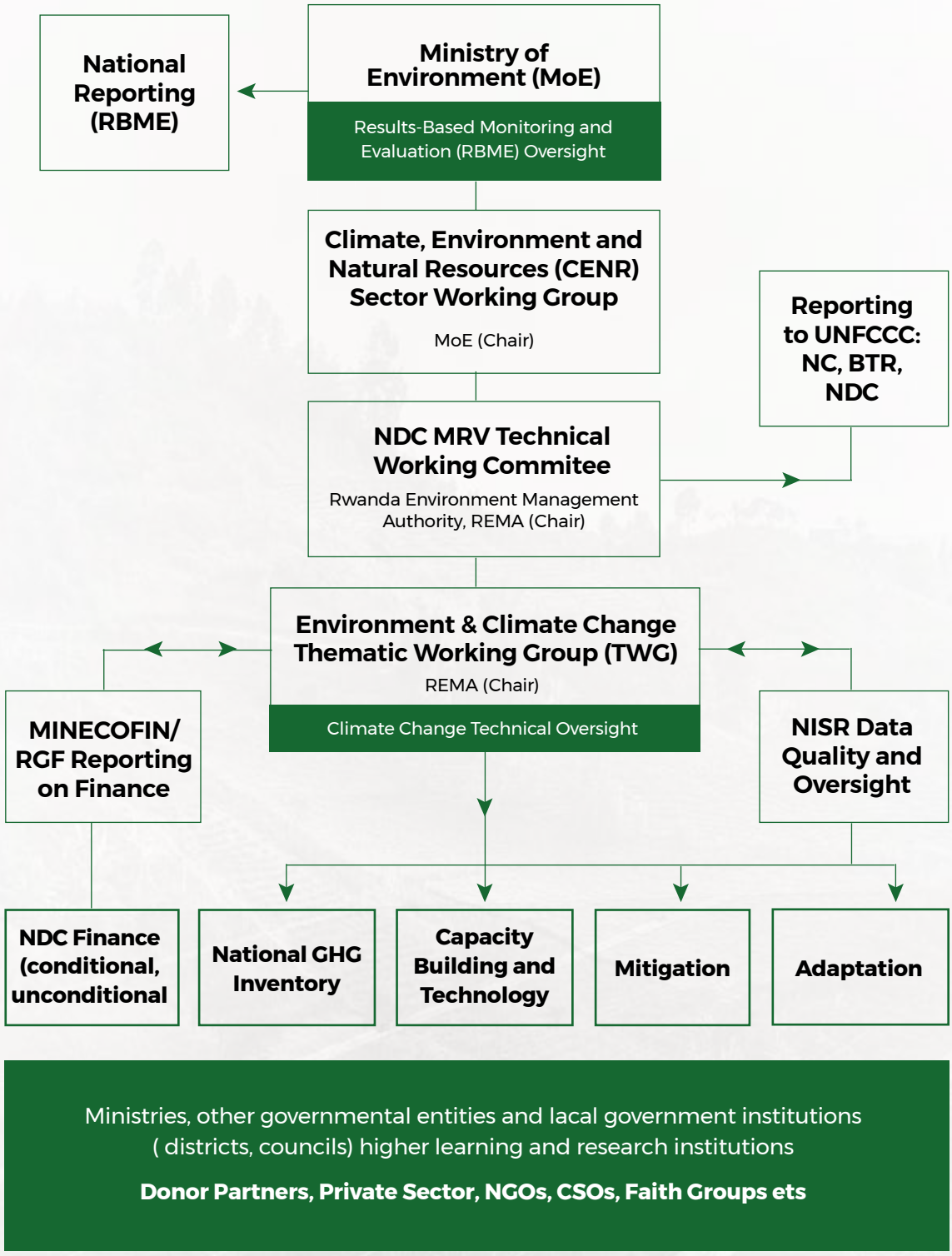
Under the ETF, Parties to the Paris Agreement are required to submit Biennial Transparency Reports (BTR) every two years. These provide the principal means by which Parties report on their NDC implementation progress. Rwanda's first BTR (BTR1) was submitted in December 2024 and included information on its national GHG inventory, progress towards NDC implementation, policies and measures, climate change impacts and adaptation, levels of financial, technology development and transfer and capacity-building support, capacity-building needs and areas of improvement.

The national MRV framework developed for the 2020 NDC has been revised and updated to be consistent with these and more recent international requirements. This will allow Rwanda to more effectively track progress of its mitigation and adaptation measures consistent with the Paris Agreement ETF and the MPGs.

8.2. INSTITUTIONAL ARRANGEMENTS

Figure 8.1 below summarises these institutional arrangements for tracking NDC implementation.

Figure 8.1. Institutional arrangements for tracking Rwanda's NDC implementation



Rwanda has put in place a robust national planning process coordinated by the Ministry of Finance Economic Planning and Research (MINECOFIN) through which Sector Working Groups (SWGs) track the implementation of sector priorities. The SWGs hold semi-annual meetings and workshops for progress reporting through Joint Sector Review consultative sessions.

The Ministry of Environment (MoE) chairs the Climate, Environment and Natural Resources (CENR) SWG that has the responsibility to monitor and evaluate the implementation of the NDC through regular stakeholder consultative engagement. Under MoE, agencies organise Thematic Working Group (TWG) sessions to supports policy implementation including the monitoring and evaluation, and progress reporting on sub-sector priorities. Rwanda Environment Management Authority (REMA) has the overall responsibility for, and chairs, the Environment and Climate Change Thematic Working Group (E&CC TWG) with technical oversight over implementation of the country's climate change priorities.

The E&CC TWG provides the platform for guiding the analysis, development and updating of Rwanda's mitigation and adaptation priorities. As the Chair of the E&CC TWG, REMA appoints the members of the Steering Committee that endorses the national NDC MRV framework. Therefore, the E&CC TWG forum working through the NDC MRV Steering Committee serve as the national coordinator for all national institutions that implement mitigation and adaptation measures, as well as finance, capacity building and technology transfer arrangements to support the operationalize of the NDC.

These arrangements, and the specific organisational roles, are described in further detail below.

8.3. ROLE OF THE NDC MRV TECHNICAL WORKING COMMITTEE

REMA acts as the chair of the Technical Working Committee for Rwanda's NDC MRV, and its members are nominated by respective NDC sector institutions. The Committee's mandate includes the following:

- Review and establish objectives for the committee(s), Terms of Reference, membership and overall working modalities of the committee, including the endorsement and subsequent reporting of the NDC MRV at both national and international levels;
- Provide advice and feedback on scope, schedule, cost and quality concerns, or guidance on program priorities, that arise during the planning, design and implementation of the NDC measures;

- Facilitate access to resources necessary to review and report on NDC tracking and approve measures and projects at key milestones;
- Review and examine studies and research activities in line with the NDC to facilitate quality assurance and alignment with strategic priorities;
- Develop and operationalize effective NDC MRV communications plans; and
- Review mid-term progress toward NDC 3.0 targets.

8. 3. 1. NDC MRV DATA AND INFORMATION MANAGEMENT

The Results-Based Monitoring and Evaluation (RBME) system is the principal platform for information and data monitoring and management for the CENR SWG chaired by MoE. All climate change relevant data including that related to the NDC MRV framework as managed and reported by the E&CC TWG will be processed and accessed through the RBME. The NDC MRV Technical Committee plays a critical role in national level data and information generation and reporting and is involved in data gathering, transparency, and verification. The committee ensures that Rwanda's NDC MRV system links mitigation, adaptation, and finance as well as support for capacity building and technology transfer as critical aspects of NDC implementation.

The National Institute of Statistics Rwanda (NISR) is central to national data collection and management process and has the role of validating all published national statistics. MINECOFIN has the role of tracking NDC-related finance flows. RGF as the national fund for environment and climate change, liaises with MINECOFIN to manage data on finance and provides a platform to access finance data and information for national reporting. Gender mainstreaming is a priority at all levels of policy and implementation and the NDC MRV will ensure gender disaggregated data is captured and reported.

The information required for MRV of the NDC is consolidated and managed using appropriate reporting protocols and formats for national level as well as international reporting. At the national level, data are monitored, analyzed, and reported semi-annually at the E&CC TWG and the CENR SWG (uploaded on the RBME system) using a national planning driven process coordinated by MINECOFIN to inform policy and strategic planning. REMA has longstanding experience in reporting to UNFCCC through National Communications (NC), BURs and BTRs.

The NDC MRV Technical Working Committee chaired by REMA is building on these experiences to coordinate the national agencies responsible for data generation and management of NDC reporting to the UNFCCC.

Based on the above, the tables shows the key data providers for tracking the NDC 3.0 according to mitigation, adaptation, loss and damage, and finance and support.

Table 8.1 Key data providers for tracking Rwanda's NDC 3.0: Mitigation

Mitigation			
Line Ministry	**Activity / Indicator**	**Lead Agency**	**Key data providers / stakeholders**
MININFRA	Energy related indicators	REG	REMA, RHA, RDB, MINECOFIN, RRA, RGF, MINALOC, RSB, MoH, private sector, civil society
	Transport related inidcators	RTDA	RURA, MINALOC, CoK, MINECOFIN, RGF, operators, REMA, MoE , Private sector transport operators, financial institutions, civil society
	Waste related indicators	WASAC	CoK, Districts, RURA, RHA, MoE , REMA, Private sector, NGOs
MINICOM	IPPU related indicators	MINICOM	MINECOFIN, MINAGRI, MoE, REMA, RGF, WASAC, NIRDA,RDB, REG, MINALOC, Private sector, civil society
MINAGRI	Agriculture related indicators	RAB and RFA	REMA, RFA, RURA, Private Sector, civil society, WASAC, LODA, Districts, higher learning and research institutions.
MoE	Forestry related indicators	RFA and REMA	RFA, REMA, NISR, RWB, RAB, Private Sector, civil society, higher learning, and research institutions.

Table 8.2 Key data providers for tracking Rwanda's NDC 3.0: Adaptation

Adaptation				
Theme	**Line Ministry**	**Activity/Indicator**	**Lead Agency**	**Key data providers / stakeholders**
Water storage security	N/A	Water storage per capita (5.3 → 17.6 m^3/ capita by 2035	RWB	MoE; MINAGRI; MININFRA; Meteo Rwanda; REMA; RAB; WASAC; NLA, CoK, Districts
Catchment restoration	N/A	Erosion-prone land restored (332, 861 → 640, 000 ha by 2035)	RWB	MoE; REMA; RAB; districts; private sector, Districts
Climate-resilient crops	MINAGRI	% of farmers using improved seeds (LSF: 85.7 → 100%; SSF: 35.9 → 66.9 %)	RAB	NAEB, REMA, private sector, civil society, extension services, Districts
Irrigation expansion	MINAGRI	Area under irrigation (71 549 → 204,915 ha by 2035)	RAB	Districts, private sector, NLA, NAEB, RWB
PES-based forestry	MoE	Area under PES schemes (3,000 → 68 460 ha by 2035)	RFA	REMA; districts; private sector
Risk-informed planning	MINALOC	% land with detailed risk-informed plans (0 → 100 %)	CoK and districts	MININFRA; MoE; district planners
Decent housing access	MININFRA	% urban population in planned settlements (40 → 60 %)	RHA	NISR; districts; private developers, CoK

Improved drinking water	MININFRA	% villages with improved drinking water (80 → 100 %)	WASAC	MININFRA; WASH partners; MINALOC, MoH
Landslide resilience	MININFRA	km of roads vulnerable to landslides (67,683 → 384 km by 2035)	RTDA	Meteo Rwanda; districts; CoK, MINEMA, RHA
Disease outbreak prevention	MoH	Annual incidence rate for malaria (cases per 1,000 population)	RBC	Meteo Rwanda; Civil Society; MINALOC; local health units
Digital health and infrastructure	MoH / MINICT	% of facilities using fully functional Electronic Medical Record (EMR) systems	MINICT	MoH; hospitals; health centres
NCD adaptation & early detection	MoH	Probability of premature mortality from NCDs (% dying between 30–70)	MoH	MoH; NISR; academic institutions; civil society
Green mining practices	RDB	% mining companies with climate-compatible practices (74.5 → 100 %)	RMB	private sector; civil society
Multi-hazard early warning	MINEMA	Number of pilot EWS developed (2 → 22 by 2035)	MINEMA	Meteo Rwanda; RWB; RFA; district emergency units

Table 8.3 Key data providers for tracking Rwanda's NDC 3.0: Loss and damage

Loss and damage				
Intervention	**Line Ministry**	**Activity/Indicator**	**Lead Agency**	**Key data providers / stakeholders**
Loss & Damage Financing	MoE	3 of proposals submitted and funded	Rwanda Green Fund	MINECOFIN; RFL
Upgrade NDIMS to real-time, GIS-enabled early-warning platform	MINEMA	Detection-to-dashboard time (≈24 h → ≤ 6 h by 2030)	MINEMA	Meteo Rwanda, REMA; RWB; CoK, district emergency units; MINICT
Engage Santiago Network for technical assistance	MoE	Number of workshops & risk assessments completed (0 → 5–10 by 2030; roadmap operational by 2035)	REMA	National institutions; private sector; academia; Santiago Network, MINEMA
Integrate loss & damage data across institutions	MINEMA	National climate-risk database operational & reporting frequency (fragmented → real-time, quarterly reports)	MINEMA	MINALOC; REMA; METEO Rwanda; NISR; RWB
Enhanced Coordination for Climate-Induced Loss & Damage	MINEMA	Operationalisation of NADIMATEC, NPDM, DIDIMACs & SEDIMACs (0 → 4 platforms operational by 2035); six joint response protocols (0 → 6); officials trained (0 → 500)	MINEMA	NADIMATEC; NPDM; DIDIMACs; SEDIMACs; district and sector authorities

Table 8.4 Key data providers for tracking Rwanda's NDC 3.0: Finance and support

Finance and support			
Line Ministry	**Activity/Indicator**	**Lead Agency**	**Key data providers / stakeholders**
MINECOFIN	Total amount of finance mobilized for Green Investments (by major category – climate change mitigation; green Energy etc.)	MINECOFIN	REMA, RGF, BRD, MoE
MoE	Capacity building technical support and technology transfer	REMA, RGF	MoE, RGF and all NDC supporting institutions and organizations; MINECOFIN

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9. MEANS OF IMPLEMENTATION

In order to fully implement the mitigation and adaptation measures contained in this NDC, Rwanda will require finance, capacity building, and technology transfer. This section provides an overview of these means of implementation.

Rwanda's NDC 3.0 builds on a solid foundation of institutional integration, policy alignment, and climate investment mechanisms established since the revised NDC of 2020. The updated NDC recognizes that successful implementation of its mitigation and adaptation objectives depends on strengthening three core enablers: finance, capacity building, and technology transfer. These pillars are crucial for translating national ambition into effective and locally responsive action, fully aligned with the country's development priorities under the NSTs.

NST1 delivered important progress but also faced persistent gaps in climate implementation. Key challenges included an estimated climate finance gap of USD 6.2 billion, capacity deficits, particularly at district level where implementation occurs, and limited access to and use of appropriate technologies. The lack of adequate technical capacities, monitoring tools, and institutional coordination at subnational levels slowed the pace of NDC integration. In response, NST2 emphasizes resilience-building, catalysed by, among other climate change challenges, the devastating climate-related disasters of May 2023 that claimed over 130 lives and caused damages exceeding USD 415 million in the northern, western, and southern provinces. These events underscore the urgency of operationalizing climate interventions to meet set targets at all levels, particularly through risk-informed planning, enhanced capacities, and scaled-up finance.

NDC 3.0 is strategically designed to address these implementation barriers. On finance, Rwanda has transitioned from ad hoc project funding to a programmatic, blended-finance approach. Key platforms include the IMF-supported Resilience and Sustainability Trust (RST), which has already mobilized USD 319 million; the Ireme Invest facility scaling up to USD 500 million by 2028; and the Intego, set up as an NDC financing platform serves as a concessional finance window supporting public sector climate projects.

These mechanisms are reinforced by the Rwanda Green Taxonomy and the recently launched climate budget tagging system embedded in all national budget entities. Collectively, these measures will contribute to meeting the NST2 projection of USD 3 billion in climate finance by 2029, while supporting Rwanda's ambition to accelerate and diversify climate finance flows toward 2030

On capacity, Rwanda is intensifying support to local governments to plan, implement, and monitor climate actions. The Green Climate Fund-supported "Strengthening Climate Resilience of Rural Communities in Northern Rwanda" (Gicumbi Project) is a flagship example. It delivers integrated landscape restoration, climate-resilient agriculture, and community infrastructure, serving as a model for district-driven adaptation nationwide. Lessons from the Gicumbi Project have informed guidelines for scaling local adaptation and are being adapted across other districts through among other avenues, the RGF's Intego facility. In addition, the World Bank supported the mainstreaming of climate action into District Development Strategies (DDSs) through a pilot initiative financed under the Climate Action Enhancement Package (CAEP). This pilot, implemented in four secondary cities, focuses on integrating Rwanda's NDC into district-level development plans provided key lessons and will serve as input towards strengthening local climate planning and action.

On technology, NDC 3.0 supports both transfer and diffusion of adaptation and mitigation technologies, including water harvesting systems, early warning tools, e-mobility platforms, and low-emission agricultural technologies. Rwanda has deployed a national carbon registry and satellite-enabled MRV system, enabling real-time data to support implementation, transparency, and access to high-integrity carbon markets.

In summary, Rwanda's NDC 3.0 provides a robust, results-oriented framework to support the full delivery of NST2 climate priorities. By scaling climate finance, deepening institutional and local capacities, and facilitating accelerated technology uptake as described under the following specific headings, it creates a practical and country-owned pathway to achieve enhanced climate resilience and low-carbon development.

9.1. FINANCE REQUIREMENTS

Rwanda's NDC 3.0 builds on the foundations of the 2020 NDC, which outlined an estimated investment need of USD 11 billion by 2030 to achieve a maximum 38% emissions reduction target compared to BAU from conditional and unconditional measures.

As of 2024, approximately USD 4.8 billion had been mobilized through a mix of domestic sources (private and public), bilateral and multilateral partnerships, and innovative instruments, leaving a climate finance gap of USD 6.2 billion to close by 2030.

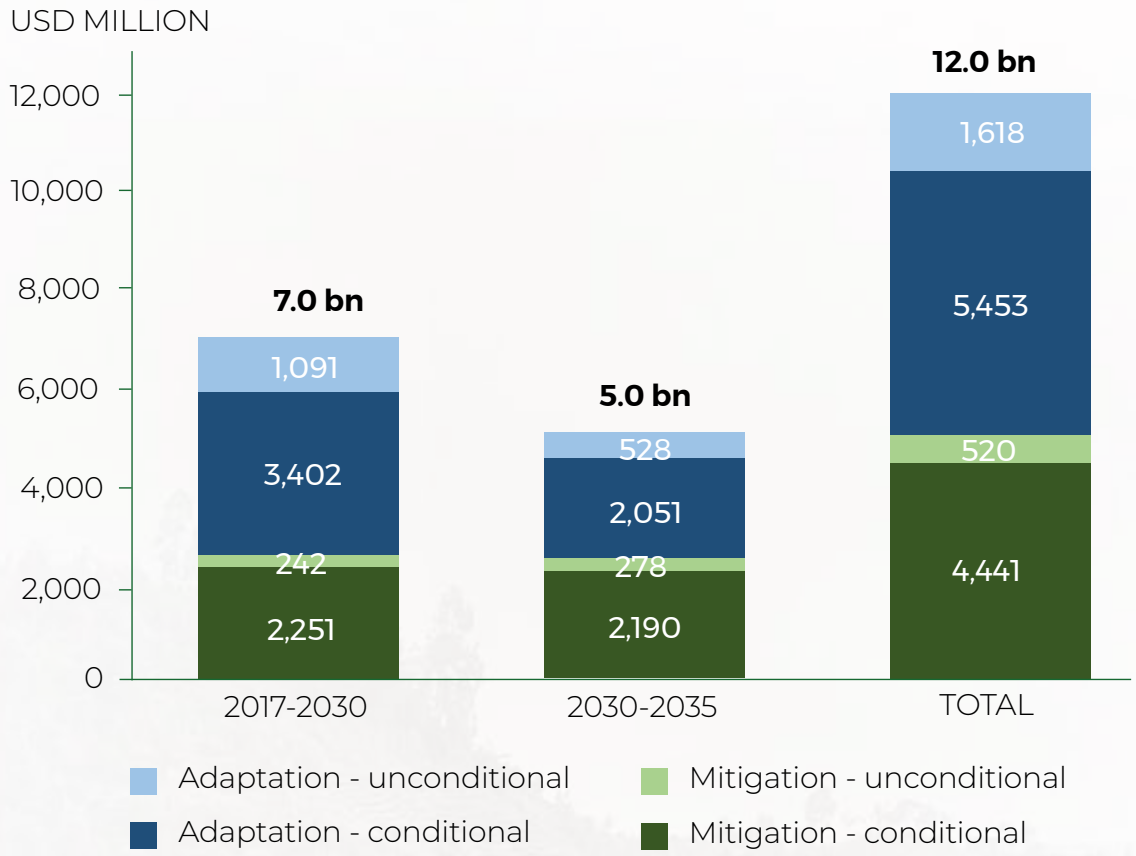
Key achievements include the operationalization of Ireme Invest, which is leveraging blended finance to crowd in private sector capital for green growth sectors, and Intego, under the RGF, which anchors public climate finance flows, including for Nature Based Solution (NBS), biodiversity, and adaptation infrastructure. Strategic milestones such as Rwanda's access to USD 319 million from the IMF's RST, and the rollout of the Rwanda Green Taxonomy (phased in through 2023 and 2025), have enabled clearer investment classification and policy alignment. The mainstreaming of Climate Budget Tagging (CBT) into national and district budget systems has institutionalized the tracking of climate-related expenditures, while the NDC Implementation Framework now links priority actions directly to financing pathways. These backward-looking gains provide a robust springboard for Rwanda's forward-looking ambition to scale up climate finance in support of its revised emissions reduction targets and climate-resilient development.

Despite these achievements, a significant scaling up of finance will be needed to implement the measures included in the NDC 3.0. The total cost for Rwanda's identified NDC mitigation measures through 2035 is estimated at around USD 5 billion, and around USD 7 billion for adaptation priorities, representing a combined funding requirement of some USD 12 billion. Table 9.1 and Figure 9.1 below summarise the estimated funding needs over the two five-year periods through to 2035.

Table 9.1 Estimated funding needs for NDC 3.0

USD million	2025-2030	2030-2035	Total (2025-2035)
Mitigation measures			
Unconditional	242	278	278
Conditional	2,251	2,190	2,190
Total	2,493	2,467	2,467
Adaptation measures			
Unconditional	1,091	528	1,618
Conditional	3,402	2,051	5,453
Total	4,492	2,579	7,071
Combined total	**6,986**	**5,046**	**12,032**

Figure 9.1 Estimated funding needs for NDC 3.0



9.2. STRATEGIC PRIORITIES FOR CLIMATE FINANCE

Rwanda's strategic priorities for climate finance to implement NDC 3.0 build upon institutional reforms and strategic investments initiated during the implementation of the NDC 2.0. Key structural shifts, such as the adoption of the Climate and Nature Finance Strategy (CNFS), the development of the Rwanda Green Taxonomy, and the nationwide rollout of CBT, have been instrumental in aligning financial flows with national climate priorities.

The transition to a programmatic financing approach is guided by the Green Growth and Climate Resilience Strategy (GGCRS), emphasizing integrated, results-based financing aligned with national priorities. Operationalized through the NST2 for 2024–2029, this approach integrates climate resilience as a core pillar of development and serves as a framework to implement the revised GGCRS. In practice, this model ensures that NDC 3.0 actions are embedded into medium- and long-term development plans, facilitating the bundling of interventions into coherent investment packages eligible for blended finance, concessional support, and carbon market participation.

Platforms such as Ireme Invest and Intego exemplify this approach by de-risking investments, aggregating demand, and linking project-level actions to national-level priorities. To achieve these objectives, Rwanda targets scaling up domestic resource mobilization, leveraging concessional funds, expanding access to market instruments, and operationalizing carbon finance through Article 6 mechanisms.

Rwanda's Climate Nature Finance Strategy (2024–2030) has defined strategic priorities for climate finance implementation targeting among other areas:

1. Domestic Fiscal Leverage: Expand Climate Budget Tagging (CBT) to all ministries and districts; implement the Rwanda Green Taxonomy and introduce green fiscal incentives.

2. Programmatic approach: The revised National Investment Policy provides a programmatic orientation to climate-proof national investment. Implementation of NDC3.0 will scale up programmatic investment plans building on sustainable land management, climate-smart agriculture, and the development of sustainable cities.

3. Blended Finance Vehicles: Scale Ireme Invest to USD 500 million and Intego to crowd-in private and concessional capital, respectively.

4. Capital and Carbon Markets: Issue Rwanda's first sovereign green and sustainability linked bonds; and make use of Paris Agreement Article 6 framework to generate verified credits.

5. International Access and Guarantees: Maximize direct access through MoE and BRD accreditations with GCF; negotiate second IMF-RST tranche; and explore debt relief measures including debt-for-climate swaps.

6. Governance and Transparency: Operationalize Rwanda's Climate Finance Cluster under the Public Finance Management Sector Working Group (PFM SWG) and Dashboard; implement ISSB-aligned disclosure and third-party audits.

Central to Rwanda's strategic focus is the establishment of a predictable pipeline of investible projects through a programmatic approach. This strategy enables the bundling of interventions across sectors and regions, enhancing alignment with national priorities, achieving economies of scale, and attracting blended finance. By embedding investment plans within Sector Strategic Plans (SSPs) and District Development Strategies (DDSs), Rwanda ensures that climate actions are integrated into medium- and long-term development frameworks.

Complementing Rwanda's programmatic approach to climate finance, the Climate Finance Dashboard serves as a critical tool for tracking financial flows. By providing real-time data and insights, it enables policymakers, investors, and stakeholders to assess progress, identify funding gaps, and make informed decisions to ensure alignment with Rwanda's NDC 3.0 and NST2 objectives (CNFS, 2024).

The role of international carbon markets

As described above, Rwanda's NDC 3.0 targets for both mitigation and adaptation comprise of unconditional and conditional components. The following sources of funding can be considered relevant to the conditional component:

- Grants and philanthropy (e.g. non-recourse project finance, which could especially be anticipated in the LULUCF sector).
- Market-based mechanisms (e.g. through the crediting of specific project activities with emission reductions units (ERs) under Article 6.2 or Article 6.4 of the Paris Agreement, and including transfers of ERs under the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), with their treatment as international transfers of mitigation outcomes; ITMOs).
- Other types of international funding mechanisms (e.g. results-based finance, without ITMOs, which may encompass 'mitigation contribution' A6ERs under Article 6.4 of the Paris Agreement; non-market mechanisms under Article 6.8 of the Paris Agreement; unauthorised voluntary carbon market (VCM) transfers of credits originating from domestic project activities).

9.3. CAPACITY BUILDING AND TECHNOLOGY TRANSFER

It is critical that the Paris Agreement's capacity building provisions are implemented successfully in Rwanda. Technology transfer and capacity building will be required to fully implement the mitigation and adaptation contributions committed in this NDC.

Capacity Building Strategy for Rwanda's NDC 3.0 Implementation (2025–2035)

Rwanda's revised NDC (2020) recognized capacity building as a foundational enabler for effective climate action. While progress was made in technical training and awareness at the central level, gaps remained in institutional coordination, subnational implementation, and sector-specific technical capabilities.

NDC 3.0 places a renewed emphasis on strengthening national and local capacities through the Capacity Building Strategy (2025–2035) to deliver on the increased ambition, particularly with a view to integrating climate and nature across development priorities, budgets, and investment pipelines.

The table below summarizes the thematic areas that will be supported by the pertinent institutions through implementation of the key actions (Table 9.2).

Table 9.2 Priority Areas for Capacity Enhancement (2025–2030)

Thematic Area	Activity/Indicator	Lead Agency
Subnational Capacity	Identify and institutionalize climate focal points and develop programmatic climate investment plans that are implementable in all 30 districts.	MINALOC, REMA, RGF, Districts
Climate Planning & MRV	Train planners, statisticians and relevant government officials on climate budget tagging, MRV, greenhouse gas inventories and NDC reporting aligned with Enhanced Transparency Framework (ETF)	MINECOFIN, NISR, MoE
Green Investment Readiness	Develop a certified green finance training programme for financial institutions, public sector officers, and SMEs	RFL, BRD, CMA, Rwanda Bankers Association
Nature-Climate Linkages	Build capacity of environment and land officers to integrate NBS and biodiversity indicators into sector and district plans	MoE, REMA, RDB, Land Use Commission
Climate-Resilient Health Systems	Enhance capacity of health professionals and planners to assess, manage and respond to climate-sensitive health risks (e.g. disease surveillance, early warning, etc)	MoH, RBC, REMA, WHO, Meteo Rwanda
Disaster Risk Preparedness	Equip district-level DPCs and local responders with climate-informed disaster planning and emergency response tools	MINEMA, Rwanda Red Cross, RISA

In addition, to enable the scale-up of long-term resilience and decarbonization, Rwanda will:

- Strengthen institutions and coordination to drive the successful implementation of NDC3.0, ensuring Rwanda's full ownership of climate action and ambitious goals.
- Include climate finance and low-emissions development in civil service induction training.
- Develop online modular courses (CPD-accredited) on Article 6, green taxonomy compliance, starting with operationalization of the implementation plan/roadmap launched in September 2025, and climate-smart technologies.
- Partner with universities to expand climate and sustainability curricula, including executive training.
- Create a public–private skill-sharing initiative to match sectoral needs (e.g., EV mechanics, solar installation, climate-smart agronomy).

Monitoring and Evaluation

A results-based monitoring framework will be established to track capacity-building activities under the NDC Implementation Framework. Key indicators will include: number of trained officials disaggregated by gender and level; number of districts with integrated climate plans; number of green finance-certified professionals; and incorporation of ETF-aligned indicators into sectoral MRV.

9.4. TECHNOLOGY TRANSFER STRATEGY FOR NDC 3.0 IMPLEMENTATION (2025–2035)

Strategic Overview

Rwanda's NDC 2.0 made initial strides in deploying climate-relevant technologies, most notably solar photovoltaics, e-mobility pilots, and select precision agriculture solutions. However, adoption was constrained by financing gaps, limited technical capacity, and underdeveloped innovation ecosystems. NDC 3.0 elevates technology development and deployment as a central pillar of implementation, addressing both mitigation (e.g., renewables, sustainable transport, industrial efficiency) and adaptation (e.g., precision irrigation, early warning systems, and regenerative agriculture).

Current Progress and Scaling Opportunities

Technology adoption is gaining momentum under Rwanda's broader climate strategy. In the energy sector, the government targets universal electricity access by 2029, up from 75% in 2023, with 25% to be sourced from off-grid renewable systems by 2030 (GoR, 2024c).

In transport, Rwanda's e-mobility transition is supported by fiscal incentives, including tax exemptions on EVs and reduced tariffs for charging infrastructure. Over 500 electric motorcycles have been deployed in Kigali, and EV charging systems are being integrated into flagship developments such as the Green City Kigali project (GoR, 2023b).

In the agriculture sector, climate-smart technologies are being rolled out in alignment with national priorities. These include drones for precision farming, solar-powered irrigation, and digital platforms for weather and pest forecasting. PSTA5 sets a target of 8,000 ha under solar irrigation by 2029 and prioritizes the digitalization of extension services and agro-advisory platforms.

Within the health sector, Rwanda is demonstrating innovation through drone-based delivery of medical supplies, currently serving more than 400 remote health facilities. These interventions not only reduce emissions from logistics but also enhance the resilience of health systems (MINISANTE, 2023).

Looking forward, NDC 3.0 will deepen technology transfer by accelerating private-sector involvement, expanding innovation ecosystems, and localizing manufacturing where feasible. These measures will be supported by institutional reforms, including the establishment of a national climate technology innovation hub, enhanced MRV systems for tracking technology uptake and impacts, and stronger regional and "South–South" cooperation to access emerging solutions. Below is a summary table (Table 9.3) highlighting the priority interventions and the institutions that will support their adoption/deployment.

Table 9.3 Priority Technology Actions (2025–2030)

Thematic Area	Activity/Indicator	Lead Agency
Energy	Deploy rooftop solar on public buildings; introduce grid-tied battery pilots in 3 districts	REG, MININFRA, BRD
Transport	Establish national e-mobility innovation hub; roll out 2,000 e-motorcycles with smart charging stations	MoE, MINICOM, BRD, RURA
Agriculture	Scale precision irrigation and conservation agriculture via ag-tech start-ups and cooperatives	MINAGRI, RAB, NIRDA, ICT Chamber
Water and Disaster Management	Operationalize IoT-based flood sensors and AI-powered early warning systems in 10 high-risk zones	RISA, MINEMA, MoE, Meteo Rwanda
Urban Systems	Deploy nature-based cooling solutions (e.g., green roofs, shaded corridors) in 4 secondary cities	MININFRA, RHA, City of Kigali, MoE
Waste and Sanitation (Circular Economy)	Introduce circular economy hubs in urban centres to recover, reuse, and recycle waste; deploy biodigesters and composting facilities	MoE, MININFRA, RHA, REMA, Private Sector

Enhancing Technology Access and Adaptation (2025 – 2035)

As Rwanda advances towards its climate resilience and low-carbon development objectives, the period from 2030 to 2035 is pivotal for scaling up the deployment and localization of climate technologies. Building upon the foundations laid in the previous decade, Rwanda aims to transition from technology adoption to innovation and manufacturing, fostering a robust ecosystem that supports climate tech entrepreneurship, research, and regional collaboration. This strategic shift is essential to meet the nation's NDC targets and to stimulate green economic growth. Rwanda aims to:

- Leverage the Climate Technology Centre and Network (CTCN) by 2030 to operationalize the National Cleaner Production and Climate Innovation Center (CPCIC).
- Introduce climate tech accelerators and dedicated venture capital funds for green start-ups.
- Localize manufacturing for priority technologies (e.g., solar kits, EV motorcycles) through Public-Private Partnerships (PPPs).
- Expand "South–South" cooperation with CTCN and leading climate tech countries for R&D and exchange programmes.
- Integrate Climate Technology Incubators into all Innovation Hubs and Tech Parks.

The following steps will help to support implementation:

- Assess existing innovation infrastructure to identify integration opportunities.
- Develop tailored incubation programs focusing on climate resilience and sustainability.
- Monitor and evaluate the performance of incubated ventures to inform policy and program adjustments.

By implementing these practical actions, Rwanda aims to build a dynamic climate technology ecosystem that not only supports the achievement of its NDC targets but also positions the country as a key regional actor in climate innovation and sustainable development. Finally, the deployment of Artificial Intelligence (AI) through 2025-2035 could help Rwanda fight climate change in several ways. First, it can quickly analyse huge amounts of data, such as maps from satellites and records of greenhouse gas emissions, to identify the causes of warming and environmental damage.

Next, it can run fast computer models that show where floods, heatwaves, or droughts are most likely to occur. AI can also power early warning systems that detect unusual weather or disease risks and send alerts to communities or health centres immediately. By creating virtual copies of cities and landscapes, AI allows planners to test different adaptation ideas, such as where to build stronger roads or plant trees, before spending money. Finally, AI-driven tools can manage renewable energy more smoothly and predict when machines need maintenance, reducing breakdowns and additional emissions. In these ways, AI accelerates both the discovery of solutions and the strengthening of our communities against climate impacts.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