



EASTERN AND
SOUTHERN AFRICA

UGANDA

World Bank Group

COUNTRY CLIMATE AND DEVELOPMENT REPORT

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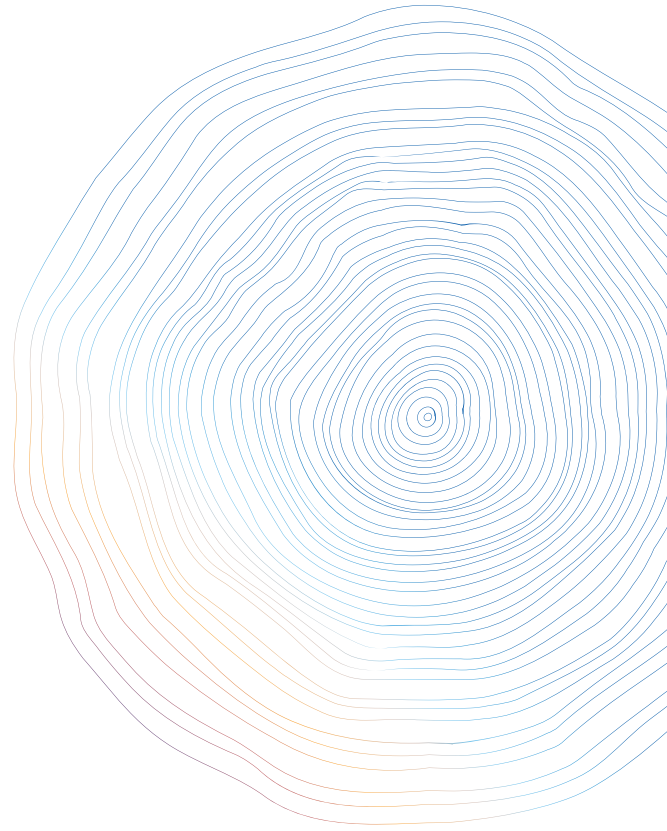
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Abbreviations and Acronyms

ASP	aspirational (scenario)
BAU	business-as-usual (scenario)
BoU	Bank of Uganda
BTVET	business, technical, and vocational education and training
CAPEX	capital expenditure
CCD	Climate Change Department
CDM	Clean Development Mechanism
CFU	Climate Finance Unit
CSA	climate-smart agriculture
DRF	disaster risk financing
DRM	disaster risk management
ESG	environmental, social, and governance
EU	European Union
EV	electric vehicle
FDI	foreign direct investment
FY	fiscal year
GCM	general circulation model
GDP	gross domestic product
GHG	greenhouse gas
GoU	government of Uganda
IFRS	International Financial Reporting Standards
KCCA	Kampala Capital City Authority
LGs	local governments

MDAs	ministries, departments, and agencies
MEMD	Ministry of Energy and Mineral Development
MoFPED	Ministry of Finance, Planning and Economic Development
MRV	monitoring, reporting and verification
MtCO₂e	million tonnes of carbon dioxide equivalent
MWE	Ministry of Water and Environment
NCCA	National Climate Change Act
NCCAC	National Climate Change Advisory Committee
NCFS	National Climate Finance Strategy
NDC	nationally determined contribution
ND-GAIN	Notre Dame Global Adaptation Initiative
NDP	national development plan
NDP IV	Fourth NDP
NEMA	National Environment Management Authority
NPA	National Planning Authority
OPEX	operating expenditure
OPM	Office of the Prime Minister
PES	payment(s) for ecosystem services
PFCC	Parliamentary Forum on Climate Change
PIM	public investment management
PPP	public-private partnership
SCCC	Standing Committee on Climate Change
SCENR	Sectoral Committee on Environment and Natural Resources
SLM	sustainable land management
SME	small- and medium sized enterprise

TVET	technical and vocational education and training
UBA	Uganda Bankers' Association
UBOS	Uganda Bureau of Statistics
UMIC	Upper-middle-income country
UNFCCC	United Nations Framework Convention on Climate Change
WASH	water access, sanitation and hygiene

All dollar amounts (\$) are US dollars.



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Executive Summary

Executive Summary

1. Uganda's growth aspirations are vulnerable to climate change

Uganda's Vision 2040 and Ten-Fold Growth Strategy set out its ambitions of becoming an upper middle-income country (UMIC) by 2040. With a projected population of 61.3 million, achieving this target will require a consistent real annual gross domestic product (GDP) growth rate of about 8.2 percent. To strengthen the economy, the government of Uganda (GoU) aims to harness opportunities in oil and gas, tourism, minerals, digital services, and logistics, increase power production, embrace agroindustrialization, improve productivity in agriculture, natural resources, and industry, and invest in human capital. To achieve this vision and growth strategy, it will need to tackle policy and institutional issues that have resulted in an average 5 percent GDP growth over 2011–24 and significantly increase investments.

To achieve higher growth, the country will need to boost total factor productivity. Uganda's Human Capital Index score is relatively low, at 0.39. Labor market opportunities are limited, with informal employment representing 92 percent of total employment. A large share of the working population works in rainfed agriculture. Uganda needs to create the enabling conditions for a healthy and educated population, to mobilize private financing, and to increase demand for a skilled workforce.

Investing in gray and green infrastructure in urban and rural areas will enhance productivity and boost competitiveness. By 2050, more than 40 percent of Uganda's total population will live in its cities, which should become hubs for future growth. Irrigation infrastructure covers only one-third of the intended target area, and only 25.69 percent of national roads, 6.16 percent of urban roads, and 0.28 percent of district roads are currently paved. As such, the country will need to expand smart planning and infrastructure expansion—including electric and digital—to cater to increased demand for goods and services, and improve rural-urban linkages and increase trade to meet changes in consumption patterns and need for jobs.

Greater private sector engagement can help Uganda finance the transition and create jobs. Having a functioning and reliable energy and road infrastructure, skilled labor, quality services, and a clean environment will help motivate private sector financing. A complementary conducive policy environment can help engage the private sector in making capital investments, providing services, enhancing agricultural productivity, and protecting the environment.

As Uganda enacts policy reforms and invests in faster growth, it cannot overlook the need to address climate change. The impacts of climate change could set back its aspiration of achieving UMIC status and realizing its growth objectives. Uganda is the 14th most vulnerable country to climate change globally and ranks 163rd in terms of readiness to cope with its impacts.¹ With temperatures projected to increase and precipitation becoming more variable, the impacts of climate change could be far reaching, with some sectors and regions hit harder than others. The country's vulnerability stems from the exposure of its productive assets—land, labor, and physical capital—to climate risks. Over the past two decades, heavy rainfall, floods, and droughts have affected, on average, 200,000 Ugandans each year.

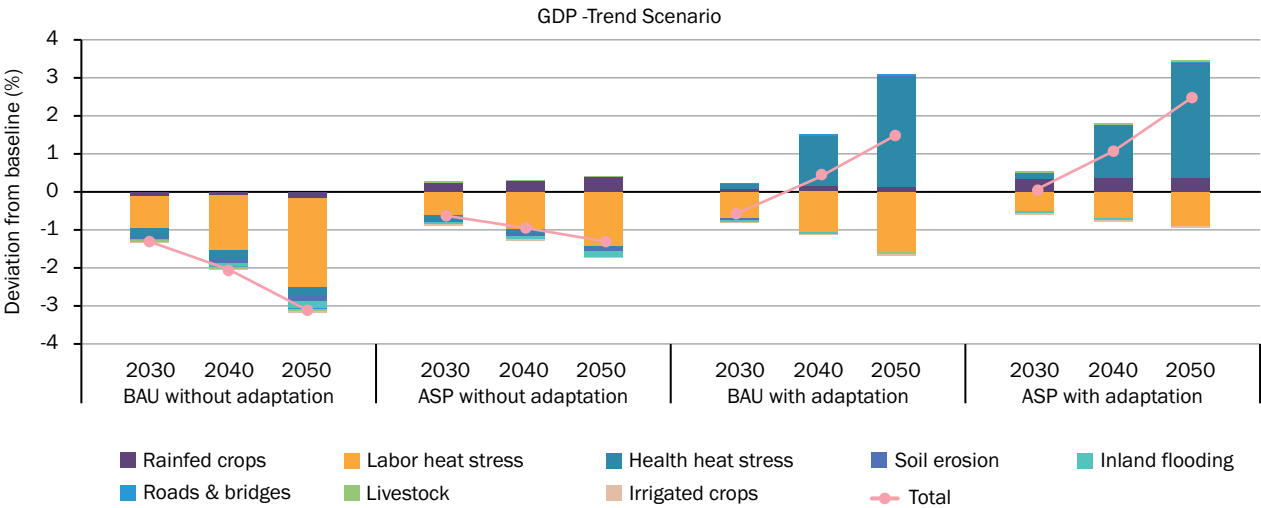
The Uganda Country Climate and Development Report (CCDR) uses a scenario approach to assess options for responding to climate challenges while achieving long-term growth aspirations. It models the impact of six climate change scenarios on two economy futures with and without additional climate action relative to 2023. In the business-as-usual (BAU) scenario, growth and its drivers remain close to historical averages (6.5 percent), and there is little institutional or development progress. In the

1 <https://gain-new.crc.nd.edu/country/uganda#vulnerability>.

aspirational (ASP) scenario, reforms boost higher and more private sector-led growth (8 percent in the long term) with increased growth in agribusiness, manufacturing, professional services, and exports. Both economy futures include the same assumptions on new oil and gas production starting in the next few years. The climate actions considered are aligned with, or additional to, Uganda’s nationally determined contribution (NDC). The climate scenarios represent high precipitation (wet/warm) and high temperature (dry/hot) futures, the consequence of which are transmitted to the economy via channels that impact Uganda’s human, natural, and physical assets.

Economic transformation that supports more and better jobs can be mutually reinforced with climate action that increases resilience to climate risks and lowers the carbon footprint of growth. The impact of climate on labor and health under current policy and investment conditions (BAU) could lower labor productivity by 2.56 percent by 2050 (Figure S1). Economic transformation under ASP, on the other hand, can dampen climate impacts on labor, particularly with dedicated climate action. Overall, tackling Uganda’s development challenges with climate-responsive growth and targeted climate actions can avoid a decline in real GDP of up to 5.6 percent by 2050. Uganda has been a relatively low greenhouse gas (GHG) emitter on the global scale. Going forward, it will need to consider the GHG footprint of growth to avoid emissions rising by 64–90 percent above 2022 levels, which would impact air quality, human health, and congestion.

Figure S1: GDP trends, 2030–50, under four scenarios



Source: World Bank staff calculations, based on data from World Bank 2025d.

2. Adopting multisectoral intervention packages and whole-of-economy measures can support resilient and low-carbon growth

Unpredictable climate impacts are the new normal, so Uganda’s efforts to transform the structure of its economy must integrate interventions and measures that help manage the risks and leverage opportunities. This CCDD recommends four multisectoral intervention packages, whole-of-economy measures, and active private sector involvement to help Uganda increase productivity, create jobs and ensure climate change does not undermine efforts to accelerate and sustain growth. These actions will help smooth structural transformation and enhance the effectiveness of climate actions.

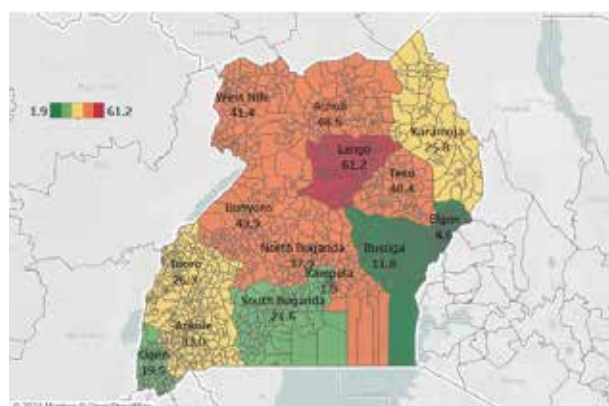
2.1. Intervention Package A: Boost resilience through jobs for youth and services for the poor

Uganda's youth and poor are both exposed to climate shocks. Poor households cope with climate shocks by deploying strategies—such as lowering water use, reducing outdoor work hours, or migrating—which often set them back. Internal migration due to climate change could reach 12 million by 2050, mainly in the Lake Victoria Basin region. A large share of Uganda's labor force works mostly outdoors at risk of heat stress, and the underemployed and unemployed youth lack skills to transition to climate-compatible jobs and develop climate solutions. Package A focuses on well-being, health, and skills.

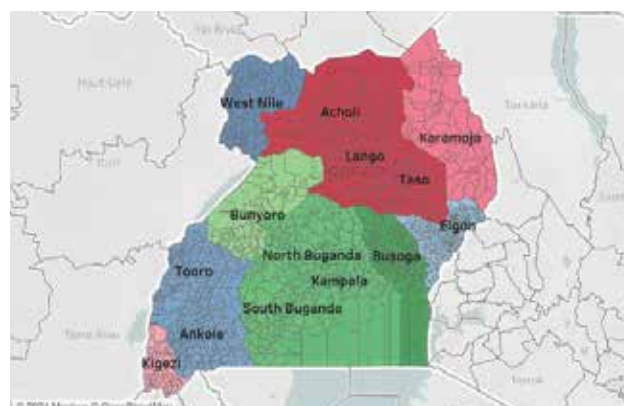
Establishing a shock-responsive social protection system would enable highly vulnerable households to mediate climate shocks. A pilot GoU shock-responsive disaster risk financing (DRF) mechanism resulted in 51 percent savings in overall emergency response and increased adaptive capacity by 37 percent. Expanding the national registry and social protection coverage, increasing the shock responsiveness of its social protection program, using digital payments, and supporting poor and vulnerable households to access affordable financial services would help Uganda shift to a comprehensive shock-responsive social protection system. The program must cover households in the north, northeast, and north central regions who are highly exposed to weather shocks and have inadequate coping strategies (Figure S2).

Figure S2: Exposure and resilience to weather shocks 2019/20

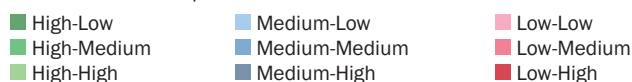
a) Share of population exposed to weather shocks (2020)



b) Combined exposure and resilience (2019/20)



Resilience versus exposure to weather



Source: World Bank staff calculations, based on data from UBOS 2021b.

Operationalizing GoU's Climate Change Health Adaptation Plan 2025–30 would reinforce the preparedness and resilience of Uganda's health services, and its users, to climate shocks. Implementing the plan would build the sector's effectiveness in anticipating, withstanding, and responding to climate shocks, and increase knowledge of climate health risks.

Investing in universal access to basic water, sanitation, and hygiene (WASH) could reduce morbidity and mortality from vector- or waterborne diseases by 2.81 percent compared to the baseline. Investments should prioritize areas where climate change increases the incidence of disease and consider potential changes in demand from internal climate migration. Although climate change should not result in unmet water demand in municipal and industrial sectors overall, local shortages could occur, especially in dry regions with relatively high populations. Incentivizing private financing for WASH investments is vital.

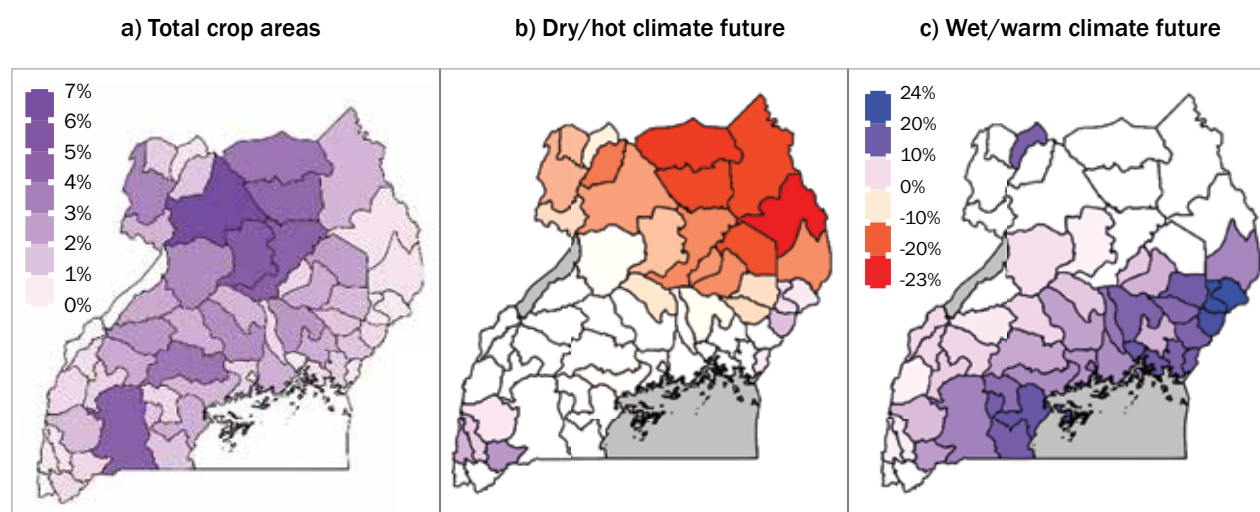
Uganda can work with the private sector to scale up skills and education programs that lower labor force exposure to climate risks. Aligning existing business, technical, and vocational education and training services with private sector needs will help Uganda develop the skills it needs. The private sector can also provide short-term upskilling and work-based skilling programs outside the formal education system. Both public and private sector efforts should aim to help the workforce transition to occupations that are less exposed to climate risks and to engage in decarbonization activities. In the medium to long term, Uganda needs to invest in climate-resilient education services to minimize learning disruptions that result from old and vulnerable education infrastructure and the use of schools as emergency shelters. Supporting climate-informed curricula at all education levels will further increase resilience.

2.2. Intervention Package B: Promote resilient and productive agriculture and natural resources with lower GHG emissions

Uganda can reduce the agriculture and natural resources sectors' vulnerability to climate change while also sustaining development, creating inclusive jobs, and reducing GHG emissions. Package B includes on-farm and landscape measures to promote climate-smart agriculture (CSA), increase productivity, support water resource management, and reduce pressures that degrade and convert wetlands and forests. It also envisages private sector investment in agribusiness and nature-based economic activities.

At farm level, expanding irrigation and improving soil quality can help counter expected increases in crop yield variability due to climate change. Between 2022 and 2050, crop yields could fluctuate between -12 percent and +12.5 percent, compared to the baseline. Climate change-induced soil erosion is expected to compound this volatility, with additional yield decreases ranging from 0–12 percent. Relative negative impacts on crop production are concentrated in the north and northeast (Figure S3). Uganda will need to expand climate-compatible irrigation to moderate volatile yields, noting that in some regions, expanding irrigation will result in unmet irrigation demands. It will also need to develop and operationalize a plan that details infrastructure needs, establishes community-based management of irrigation schemes, controls water abstraction, monitors compliance, and promotes micro-irrigation. In the near term, raising farmers' awareness about soil quality and helping them implement suitable sustainable land management practices will help improve soil health. Complementary efforts to transition farmers to perennial crops and use drought-tolerant seeds could increase productivity by up to 220 percent.

Figure S3: Total crop areas and crop production shocks under a BAU scenario, 2041–50



Source: World Bank 2025d.

Improving livestock feed systems would generate a triple win, improving productivity for 6.8 million households who own livestock, increasing resilience to climate shocks, and lowering methane emissions.

Heat stress and variable feed source availability due to climate change are expected to lower livestock productivity. Developing climate-compatible feed could lower the risk of declining productivity and increase live cattle weight by up to 60 percent. In the medium to long term, support for breed improvements would increase climate resilience, milk production, and live weight. Government facilitation of private extension services and investment in livestock vaccination would also help reduce methane emissions by 40 percent.

Restoring degraded wetlands and forest catchments that provide ecosystem services—such as natural water storage and GHG sequestration—will also help address climate change.

Since 1994, 40 percent of Uganda's wetlands have been destroyed through agricultural expansion and urbanization. To curb further degradation and establish incentives for sustainable management of forests and wetlands, local governments must enforce and manage gazetted wetlands designated as protected critical ecosystems and forests within protected areas. In the medium to long term, Uganda can increase the value of improved wetland management and preserve natural vegetation through well-tested options such as payments for ecosystem services (PES) and more sustainable and locally-led ecotourism.

Uganda must accelerate efforts to stop unsustainable firewood and charcoal sourcing.

Solid biomass (firewood or charcoal) is widely used for cooking in public institutions, restaurants, and more than 90 percent of households. About 66 percent of firewood is sourced directly and unsustainably from forests, and the existing ban on charcoal trade is being circumvented. Internalizing extraction costs and resource rents, and formalizing biomass energy supply and demand could help change current practices. To facilitate this, GoU must modify the charcoal market structure, streamline governance in the sector to a single agency that oversees commercial biomass energy, and define a simplified and enforceable regulatory framework. Establishing regulatory and fiscal measures to increase the use of clean cooking technology would also reduce the use of unsustainable sourced biomass energy.

The private sector can play a key role in scaling up climate-positive agriculture and agribusiness, sustainable forest management, and nature-based tourism.

Establishing independent standards, quality assurance, and certification services can promote expanded access to markets via private input supply networks. At the same time, creating a conducive environment for the private sector would increase their engagement in multiple sectors—including digital and renewable energy-based agricultural technologies, improved seeds, climate-informed extension services, and livestock services—while implementing a robust carbon market regulatory framework would increase private interest in agroforestry, and carbon transactions. Stimulating private sector engagement in nature-based tourism and carbon markets would create jobs and provides the financial rationale for forest and wetland management.

2.3. Intervention Package C: Develop climate-responsive energy, transport, and digital infrastructure

Climate shocks could damage Uganda's power network, roads, and bridges.

More than half of Uganda's electricity transmission and distribution network is exposed to landslide and flood risk, and about 60 and 45 percent of the national and district road networks, respectively, are highly vulnerable to flooding. Flood damage could increase annual road maintenance costs by \$13.6–26 million, on average, in the 2040s, with associated road delays causing 2.6–3.5 million labor hours lost, under optimistic and pessimistic general circulation models of climate change, respectively.

Building climate-resilient and low-carbon infrastructure system is an effective way to increase private investment and leverage international trade opportunities.

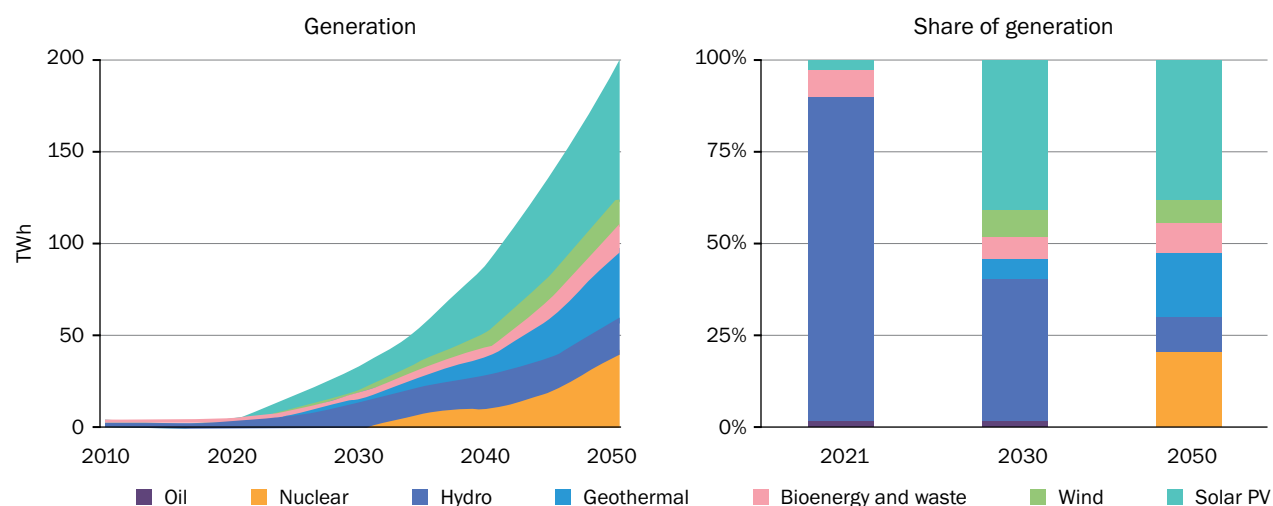
Uganda's economic transformation hinges on trade opportunities. The African Continental Free Trade Area alone can deliver an estimated \$2.5 billion

export boost by 2035, but will require significant improvements in energy, transport, and digital systems. Lowering trading costs that are exacerbated by climate change impacts on infrastructure demands substantial public and private investments.

More supportive trade policies will boost competitiveness. To address climate change vulnerabilities and comply with evolving international regulations, particularly from the European Union, Uganda will need to invest in traceability systems, regulatory capacity, and sustainable green value chains. Other adjustments include low tariffs on environmental technologies, streamlined non-tariff measures, and a strategic framework for leveraging trade to achieve Uganda’s Ten-Fold growth aspirations.

Low-carbon, low-cost generation technologies can contribute significantly to Uganda’s future electricity generation. Under Vision 2040, the country aims to expand power generation from 2,048 to 52,400 megawatts by 2040. This will require private sector participation and improved institutional project management and procurement capacity. The Ministry of Energy and Mineral Development’s power generation and transmission expansion plan for 2025–40 envisages a largely renewable electricity generation mix (Figure S4). Conducting regular updates of the generation expansion plan according to least-cost principles will help ensure the evolution of the power sector follows a cost-optimal approach and demand is fully served. Strengthening the reliability and resilience of the distribution and transmission networks, and enhancing cross-border transmission lines to improve grid reliability and energy security will also help Uganda meet its ambitious demand projections.

Figure S4: Electricity generation in Uganda’s Energy Transition Plan, by technology, 2010–50



Source: IEA 2023b.

In the face of multiple challenges, developing climate-resilient transport infrastructure in Uganda will cost around \$33.98 billion (World Bank 2025k). Improving the transport system is crucial for connectivity and boosting the resilience of the Northern and Central Corridors would facilitate regional trade. Electrifying the transport sector, leveraging renewable energy sources, promoting modal shifts to reduce emissions, and improving logistics infrastructure and regulation would enhance operational efficiency. Public-private partnerships (PPPs) will be essential for these investments.

To unlock the potential of the digital sector, Uganda should focus on policies, institutional capacity, digital literacy, and greening the information technology (IT) environment. Digital transformation is key to overcoming obstacles to trade and structural transformation, particularly high job search costs and limited

access to finance. Improving digital services in labor markets and financial services can significantly reduce information asymmetry and credit constraints, and support climate-informed decision-making. To expand it further, Uganda will require need to create an enabling environment for the use of cloud-based technology and remote sensing to inform decision-making, and disaster prevention and response.

Uganda has about 1.2 billion barrels of recoverable oil reserves, but exploiting the oil and gas sector involves risks. These include the need to keep production costs below \$30 per barrel of oil equivalent, profitability slumps, and stranded assets. Uganda's upstream projects aim for low emissions footprints, but still face gas flaring, methane emissions, and other challenges. When developing the sector, Uganda will need to balance economic benefits with environmental sustainability ensure effective revenue management and transparency. The country's energy transition minerals may also offer an opportunity for further diversification, but the sector is relatively modest in scale.

2.4. Intervention Package D: Foster planned and climate-positive urbanization

To ensure economic growth in its cities keeps pace with population growth, Uganda should rapidly pivot toward developing climate-resilient, low-carbon urban centers. This will require integrating climate considerations into investments in cities' water, transport, energy, nature-based solutions, waste management, health, and education services. Urban investments that boost adaptation and lower GHG emissions are low-regret and offer multiple benefits.

Urban planning must reduce exposure to flooding and heat island effects and ensure infrastructure and buildings are resilient to extreme weather and support low-carbon urban growth. This requires improved climate, meteorological, and hydrological data collection, increased public use of such data, and integration of data analysis in decision-making. Urban governments will also need to rethink intracity and intercity transport and prioritize transport systems with lower GHG emissions, progressively replacing motorcycles with electric vehicles (EVs), rapidly introducing electric minibuses, and improving city buses.

Strengthening local governance structures and supporting decentralization will help increase urban authorities' engagement in efforts to coordinate climate action. To overcome funding constraints, they will need to access international climate finance, rethink existing transfers, and use innovative financing instruments. Engaging citizens, civil society organizations, and private sector actors in planning is also vital.

The private sector can be incentivized to support urban mobility, climate-friendly housing, and other climate-compatible investments. The private sector already offers affordable electric motorbikes through lease-to-own and battery-swapping services. Import duty reductions, VAT exemptions, clearer battery standardization policies, and training programs for EV-related occupations would encourage additional private sector investment. Improving urban planning, reforming land titling and transfer, increasing professional and artisanal construction skills, supporting housing-based PPPs, and improving trade parameters that constrain intermediate input manufacturing can all help grow private sector engagement.

2.5. Whole-of-economy measures to strengthen and operationalize institutions and policies for climate action

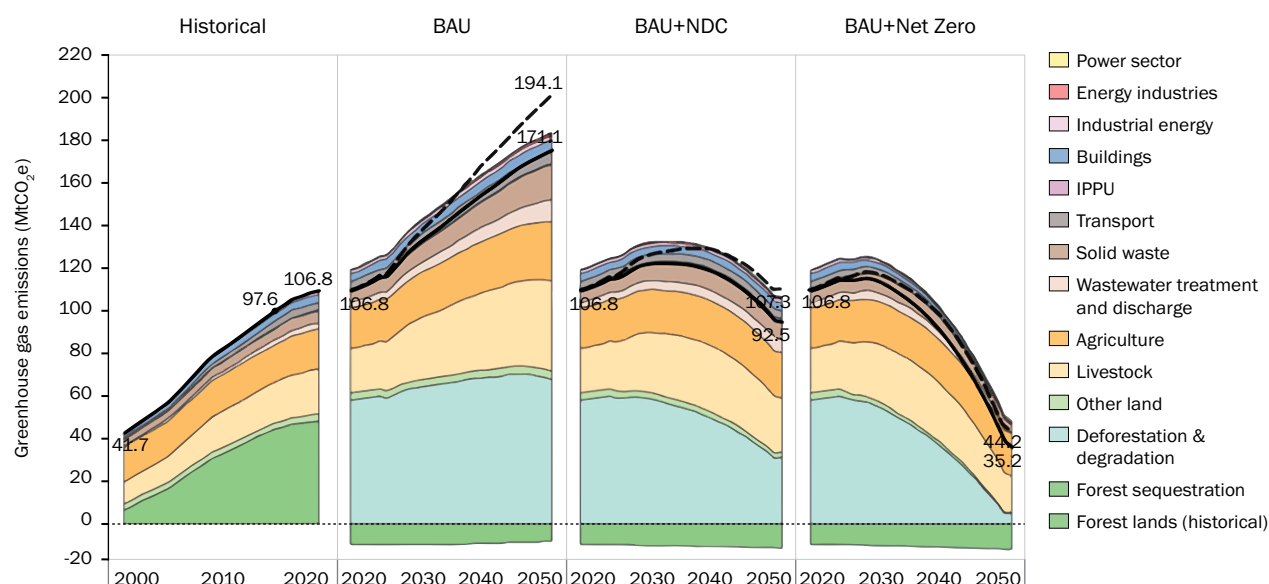
Uganda has developed a comprehensive legal and regulatory framework to implement its ambitious climate change commitments. Its updated NDC commits to reducing national GHG emissions by 24.7 percent below the BAU trajectory by 2030, mainly in agriculture, forestry, and land use, as well as adaptation policies and measures in 13 priority sectors. To coordinate its climate response, Uganda now needs to operationalize its high-level institutional arrangements, strengthen the role and capacity of local governments in climate change planning, and involve women, youth and other stakeholders in the process.

To implement its current NDC and the forthcoming NDC 3.0, Uganda will need a coordinated and strategic approach to mobilizing climate finance, as articulated in its National Climate Finance Strategy. Uganda has piloted climate change budget tagging (CCBT), ensured its Budget Framework Paper is climate-responsive, introduced climate disaster risk screening requirements in its Public Investment Management (PIM) Framework, and started to formalize the National Climate Finance Strategy. Scaling up CCBT and increasing reporting will increase the predictability of domestic public climate finance flows. But it can take further steps to ensure budgets and investments are climate informed, such as integrating climate change requirements in the PIM Framework, environmental assessments, and public procurement, and aligning project appraisal and PPP frameworks with the National Environment Act by including requirements to assess for climate change and disaster risk (World Bank 2023a). GoU can also leverage the intergovernmental transfer system to strengthen climate change planning, financing, and local-level preparedness for action.

Completing and implementing the national financial protection/DRF strategy would help close the climate risk protection gap. Advancing the passage of the Disaster Risk Management Bill would strengthen the country's legal and policy crisis management frameworks by defining eligibility to DRF instruments, helping prevent natural disasters from becoming crises, defining clear roles and responsibilities in disaster response and preparedness, and improving coordination between government bodies responsible for risk assessments, budgeting, and financial planning.

Improving weather forecasts and real-time disaster preparedness and response management decision support systems would increase resilience across the economy. As well as expanding and upgrading its meteorological and hydrological monitoring networks, Uganda will need to establish a centralized climate data system. This would allow it to collect, store, access, and analyze data from diverse sources to directly inform public sector plans and operations, resource allocation, and households, communities, and the private sector about climate risks. Prioritizing services tailored to the needs of distinct sectors, and making the information user friendly for households, communities and firms, are also vital.

Figure S5: Uganda's emissions trajectories under three scenarios



Source: World Bank staff calculations, based on data from World Bank 2025f.

Note: The solid line corresponds to the historical total and a BAU future; the dashed line corresponds to an ASP future.

Implementing the investments and policy reforms outlined in this CCDR could enable Uganda to deliver on its GHG emissions reduction commitments. Under BAU, implementing NDC mitigation measures from 2023 would cause emissions to peak in 2033 at about 120 million tonnes of carbon dioxide equivalent (MtCO₂e), declining to 92.5 MtCO₂e by 2050 (Figure S5).² Under all ASP pathways, emissions would be 6 percent higher, on average. To progress closer to net zero, Uganda will need to scale up efforts under Package B.

3. Uganda will need to mobilize diverse sources of climate finance

This CCDR estimates that, with climate action, Uganda will need \$13.93–\$52.22 billion under BAU, and \$25.7–\$76.34 billion under ASP, to 2030 and 2050. These estimates include development and climate action in irrigation, transport, energy, WASH, clean cooking, and forest restoration. Accommodating climate actions will require a 37 percent increase in investments under BAU, and under ASP, a 24 percent increase beyond investments needed for economic transformation (Table S2). The identified investments are a subset of Uganda’s current NDC commitments, which are estimated at \$28.1 billion to 2030 (MWE 2022).

Table S1: Estimated investment costs for selected recommended policy actions (\$, millions)

	BAU		BAU+climate action		ASP		ASP+climate action	
	2025–30	2031–50	2025–30	2031–50	2025–30	2031–50	2025–30	2031–50
Intervention Package A: Boost resilience through jobs for youth and services for the poor								
WASH	4,887 (1.62)	34,297 (1.28)	8,418 (2.79)	68,168 (2.54)	9,926 (3.27)	69,667 (2.25)	–	–
Intervention Package B: Promote resilient and productive agriculture and natural resources with lower GHG emissions								
Irrigation expansion	57 (0.02)	189 (0.01)	1,061 (0.35)	456 (0.01)	2,234 (0.74)	3,723 (0.12)	–	–
Forest restoration and agroforestry	NA	NA	379 (0.13)	4,998 (0.19)	455 (0.15)	5,665 (0.18)	–	–
Promoting clean cooking	NA	NA	56 (0.02)	1,444 (0.05)	NA	NA	54 (0.02)	1,450 (0.05)
Intervention Package C: Develop climate-responsive energy, transport, and digital infrastructure								
Low-cost power system	1,589 (0.52)	39,892 (1.49)	1,596 (0.53)	40,546 (2.51)	1,584 (0.53)	89,430 (2.89)	1,782 (0.59)	89,932 (2.9)
Resilient transport networks	2,230 (0.74)	31,723 (1.18)	3,381 (1.12)	24,896 (0.93)	7,753 (2.56)	26,004 (0.84)	16,618 (5.49)	36,427 (1.18)

Source: World Bank staff calculations, based on data from sector experts, World Bank 2025d and Rozenburg and Fay 2019.

Notes: The numbers in parentheses are percentage share of GDP. NA indicates not available; – indicates same as ASP.

Uganda will need to attract external climate finance and private sector investments to fill its financing needs for climate action. Government spending on climate action is lower than needed to meet its NDC spending commitment. But the funding gap is beyond what GoU can cover while maintaining fiscal sustainability as the anchor for macroeconomic stability. GoU is also exposed to a large disaster relief funding gap. The average annual cost of disaster relief is estimated to be \$30.7 million, but the impact of climate change could increase this to \$55.3 million, and by nearly 300 percent for severe events.

² This is consistent with Uganda’s 2022 NDC Update, which estimates a 20% difference between BAU and NDC by 2030, assuming NDC actions begin in 2015.

There are several avenues for increasing private sector engagement in climate action. In the short term, Uganda can focus on green or sustainability-linked loans, with development finance institutions providing credit guarantees for loans tagged as “green” and the Central Bank building awareness among banks to make loans accessible to small and medium-sized enterprises. To strengthen the PPP Framework, GoU can integrate climate change concerns and climate risk analysis, helping to foster public-private collaborations. Discussing and coordinating climate action initiatives, exchanging knowledge, and networking with private sector and other stakeholders can lead to joint projects. Reversing the very low use of insurance to respond to climate shocks and deploying a national insurance policy and microinsurance regulation would help strengthen risk transfer and mobilize private capital for disaster response. Finalizing national carbon market regulations and developing an associated fiscal framework can further unlock carbon finance from regulated and voluntary carbon markets, enabling the private sector to contribute to climate action.

In the medium to long term, Uganda can grow its capital markets by leveraging innovative climate finance sources to supplement mainstream domestic climate finance sources. Finalizing a green taxonomy and introducing climate or environmental and social governance disclosures for large, listed companies can help build its green finance market and increase market transparency. Harmonizing definitions and classification systems, developing incentives for green loans and other products, delivering training in financial institutions and firms, and building financial literacy would help accelerate the rollout of green finance instruments and access to appropriate sovereign sustainable finance instruments.

To increase the amount of international climate finance it mobilizes, Uganda can advocate for larger volumes of adaptation financing as grants and leverage its Green Climate Fund readiness. With support from development partners, Uganda can build its capacity to improve international climate finance tracking and monitoring, and use these funds to unlock private financing, thereby attracting additional resources.

Developing a financing platform and project preparation facility would help Uganda effectively use financing, scale out performance-based climate financing, and develop a pipeline of priority projects. With a financing platform, Uganda could coordinate multiple sources of public and private financing—including foreign direct investment, dedicated climate finance, official development aid, and concessional loans—for interventions that contribute to development while also addressing climate change and scale interventions. Linking the platform to the country’s asset register could improve coordination on spending, especially if the register has comprehensive and reliable information and accounts for climate-related factors (IMF 2024). The platform could strengthen governance of the National Climate Finance Strategy and coordination across Ministry of Finance, Planning and Economic Development, Bank of Uganda, Capital Markets Authority of Uganda, National Planning Authority, Ministry of Water and Environment (Climate Change Department), and Ministry of Local Governments, and help mobilize climate finance jointly with ministries, departments, and agencies (MDAs). The project preparation facility would help operationalize Uganda’s upcoming NDC 3.0.

Although faster growth and structural transformation will increase Uganda’s capacity to withstand climate shocks, implementing mutually reinforcing climate action will further reduce its vulnerability. This CCDD outlines actions across multiple sectors that are mutually reinforcing and, when implemented together, can deliver climate-positive development outcomes. Phasing the actions from the short- to long-term will help ensure investments fuel resilient, low-carbon, and sustained growth, create climate-compatible jobs, boost productivity, ensure cities are competitive and livable, and increase opportunities for climate-positive trade. Although several of the recommended policy reforms are aligned with the country’s fourth national development plan and NDC, their effective implementation will require support to build technical and political readiness. Table S2 presents the recommended policy actions and includes the responsible MDAs (with the lead MDAs in bold) and level of technical and political readiness, ranging from low (red) to medium (yellow) and high (green).

Table S2: Short-, medium-, and long-term priority policy actions for resilient and low-carbon growth

Objective	Recommended policy actions S = short term; M = medium term; L = long term, ▼ = low-carbon; ⓘ = adaptation	MDAs	T	P
Intervention Package A: Boost resilience through jobs for youth and services for the poor				
Adaptive social protection program	S: Develop a costed framework for the Adaptive Social Protection program ⓘ ▼ M: Operationalize and scale up the Adaptive Social Protection program ⓘ	MGLSD		
Skills and knowledge to address climate change	S: Establish short-term upskilling and work-based skilling programs ⓘ ▼ M: Prepare and adopt climate-smart/resilient building standards for education facilities ⓘ L: Prepare modular skilling and work-based skilling curricula for priority skills areas ⓘ ▼	MoES <i>MGLSD</i>		
Climate-responsive health	S: Adopt climate-smart standards for planning, programming, budgeting, financing, health technologies, infrastructure ⓘ M: Build capacity to handle climate health emergencies and climate shocks ⓘ L: Invest in climate and health research at national and local levels ⓘ ▼	MoH, MWE <i>MoES</i>		
Climate-responsive WASH services	S: Develop and adopt a national climate-resilient water investment framework ⓘ ▼ M: Review and operationalize WASH tariff policy and guidelines ⓘ	MWE		
Intervention Package B: Promote resilient and productive agriculture and natural resources with lower GHG emissions				
Scale up climate-compatible irrigation	S: Develop and implement a national irrigation master plan ⓘ M: Develop and implement a strategy to scale up micro-scale irrigation ⓘ	MAAIF, MWE		
Increase productivity via CSA	S: Promote soil management and strengthen market-based incentives to use climate-compatible seeds and feed for crops and livestock ⓘ ▼ M: Adopt and operationalize the National Accreditation System Bill and support livestock breed improvement ⓘ ▼ L: Modernize agricultural extension, leverage private extension, augment access to finance, mechanization and support for farmer cooperatives ⓘ ▼	MAAIF		
Restore ecosystem services	S: Support financing of upfront restoration costs (e.g., tree nurseries, community mobilization) ⓘ ▼ M: Strengthen capacity and local government-community partnerships for wetland and forest management ⓘ ▼ L: Scale out PES schemes to reward effective restoration efforts promote tourism opportunities ⓘ ▼	MWE, NEMA <i>MoLG</i>		
Curb the degradation of natural assets	S: Enforce forest laws and wetland boundaries; simplify governance of fuelwood and charcoal use, and increase incentives to transition to clean cooking ⓘ ▼ M: Develop and implement land use plans for wildlife corridors; expand technical and financial support for commercial production of wood fuels ⓘ ▼ L: Monitor climate change impacts on species and habitats to inform conservation measures; and ensure use responsibly sourced bio-energy ⓘ ▼	MWE, NEMA <i>MEMD, NFA</i>		
Intervention Package C: Develop climate-responsive energy, transport, and digital infrastructure				
Least-cost and competitive power generation	S: Build capacity and institutionalize regular use of least-cost generation and transmission expansion planning ▼ M: Establish a competitive framework for procurement of new generation and transmission capacity ▼ L: Consider climate adaptation in investments across the electricity value chain to increase resilience, enhance security of supply ⓘ	MEMD		
Transition to clean cooking	S: Fully finance clean cooking goals and use social safety nets to promote uptake ▼ M: Develop labeling scheme for clean cooking technology to enhance quality assurance ▼ L: Enforce monitoring to track clean cooking technology use at household, industry, and service levels ▼	MEMD		

Objective	Recommended policy actions S = short term; M = medium term; L = long term, ▼ = low-carbon; ⓘ = adaptation	MDAs	T	P
Low-carbon and climate-resilient transport	S: Establish collaborative frameworks that promote multimodal, low-carbon transport solutions ▼ M: Promote integrated transport, land use planning and urban mobility plans that promote green/public transport and non-motorized transport ▼ L: Build technical and institutional capacity in climate-resilient transport planning ⓘ	MoWT		
Green IT environment	S: Increase use of cloud-based and remote sensing technology for early warning and disaster response management ⓘ M: Strengthen disaster risk and natural asset management by using digital innovations; promote green IT environment ⓘ L: Operationalize the national e-waste policy, promote e-recycling and handset refurbishment ▼	MoICT & NG, NITA-U		
Intervention Package D: Foster planned and climate-positive urbanization				
Climate-resilient cities, municipalities, and town councils	S: Integrate climate resilience in urban plans and policies; develop prioritization framework for climate-smart urban solutions ⓘ M: Prepare local climate-resilient action plans; introduce incentives for green materials; update building codes, and procure green materials ⓘ L: Empower urban authorities to coordinate and implement climate action; promote research to inform green housing guidelines and policies ⓘ ▼	NPA, MoLHUD MoLG, MoWT, LGs, BoU, NHCCCL		
Promote low-carbon urban mobility	S: Develop and operationalize a national multimodal public transport framework ▼ M: Promote boda-boda and minibus electrification; expand public transit and non-motorized transport infrastructure in cities; support EV expansion ▼ L: Prepare green urban mobility masterplans for cities and municipalities ▼	MoWT, MoLHUD, KCCA, NEMA MoFPED, URA		
Whole-of-economy measures to strengthen governance frameworks for climate action				
Coordination and stakeholder engagement	S: Strengthen the Policy Committee on Environment's capacity to direct and oversee national climate action ⓘ ▼ M: Issue regulations to fully operationalize the NCCA ⓘ ▼ L: Strengthen local government capacity to engage in climate action ⓘ ▼	MWE-CCD		
Mainstream climate considerations	S: Develop and institutionalize climate screening criteria in the PIM framework ⓘ ▼ M: Integrate climate risk screening into national and sector development plans and budgeting ⓘ ▼	NPA, MoFPED		
Disaster risk management	S: Upgrade meteorological real-time services for key sectors ⓘ ▼ M: Expand meteorological networks ⓘ ▼ L: Establish centralized, real-time urban meteorological data ⓘ ▼	MWE		
Whole-of-economy measures to improve access to domestic climate finance				
Improve domestic spending on climate action	S: Complete and implement the national financial protection/DRF strategy ⓘ ▼ M: Strengthen governance around the climate finance strategy ⓘ ▼ L: Design and operationalize a climate finance platform ⓘ ▼	MoFPED		
Whole-of-economy measures to increase private sector engagement in climate action				
Increase SME engagement in climate action	S: Establish climate finance facility or window within the Agricultural Credit Facility to support climate-smart agriculture ⓘ ▼ M: Expand access to affordable insurance in climate-sensitive sectors ⓘ ▼ L: Incorporate blended finance tools (e.g., credit guarantees, results-based financing) to enhance bankability and reach smallholder farmers ⓘ ▼	BoU, MAAIF, MoFPED, banks		
Engage private sector in climate-compatible trade	S: Review and reduce tariff peaks on climate-friendly goods and reduce tariffs on environmental goods to zero ⓘ ▼ M: Establish a trade and climate strategy to inform national plans; streamline nontariff measures for environmental goods, services, etc. ⓘ ▼ L: Enhance the monitoring, reporting, and verification system; provide GHG emissions certification and deforestation-free supply chains for SMEs ⓘ ▼	MTIC, MWE MSTI, MEMD		

Objective	Recommended policy actions S = short term; M = medium term; L = long term, ▼ = low-carbon; ⓘ = adaptation	MDAs	T	P
Increase climate financial sector resilience	S: Set up an interministerial taskforce for financial sector authorities ⓘ ▼ M: Deepen capacity building on climate change risks for financial institutions and firms; consider financial sector in climate finance strategy ⓘ ▼ L: Consider introducing climate/environmental, social, and governance disclosures, starting with large, listed companies ⓘ ▼	MoFPED <i>BoU, CMA</i>		
Leverage PPPs	S: Strengthen the PPP framework to include climate-sensitive sectors ⓘ ▼ M: Ensure PPP pipeline contributes to low-carbon and climate-resilient capital investments ⓘ ▼	MoFPED		
Engage the private sector via carbon markets	S: Approve and operationalize a robust carbon market regulatory framework ⓘ ▼ M: Facilitate land tenure formalization, clear rights over assets, and secure land leasing arrangements ⓘ ▼ L: Define carbon rights in the land laws; develop protocols for carbon credit eligibility under customary, leasehold, and freehold regimes ⓘ ▼	MWE, MoLHUD, ULC, <i>ULA, NEMA,</i> <i>MoJCA</i>		
Increase the use of green finance instruments	S: Approve and issue the Green Taxonomy ⓘ ▼ M: Identify sovereign sustainable finance instruments ⓘ ▼ L: Build capacity to implement green finance instruments ⓘ ▼	MoFPED, BoU <i>CMA</i>		
Whole-of-economy measures to improve access to dedicated climate finance				
Sectoral climate finance mobilization	Build capacity of and support sectors (e.g., agriculture, health, education, transport, energy, forests, tourism) to leverage dedicated climate finance to mobilize additional climate financing for implementing the NDC 3.0 (under development) ⓘ ▼	MoFPED <i>All MDAs</i>		

Notes: In the MDA column, those in **bold are lead MDAs**, those in *italic* are supporting MDAs. In the final column, T = technical readiness; P = political readiness; *red* = low readiness, *yellow* = medium readiness; *green* = high readiness. BoU = Bank of Uganda; CCD = Climate Change Department; CMA = Capital Markets Authority Uganda; KCCA = Kampala Capital City Authority; LG = local government; MAAIF = Ministry of Agriculture, Animal Industry and Fisheries; MEMD = Ministry of Energy and Mineral Development; MGLSA = Ministry of Gender, Labor and Social Development; MoES = Ministry of Education and Sports; MoFPED = Ministry of Finance, Planning and Economic Development; MoH = Ministry of Health; MoICT&NG = Ministry of ICT and National Guidance; MoJCA = Ministry of Justice and Constitutional Affairs; MoLG = Ministry of Local Government; MoLHUD = Ministry of Lands, Housing and Urban Development; MoWT = Ministry of Works and Transport; MSTI = Ministry of Science, Technology and Innovation; MTIC = Ministry of Trade, Industry and Cooperatives; MWE = Ministry of Water and Environment; NEMA = National Environment Management Authority; NFA = National Forestry Authority; NHCCCL = National Housing and Construction Company Limited; NITA-U = National Information Technology Authority Uganda; NPA = National Planning Authority of Uganda; ULA = Uganda Land Alliance; ULC = Uganda Land Commission; URA = Uganda Revenue Authority.



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Development and Climate Change Context

1. Development and Climate Change Context

Annual economic growth in Uganda averaged close to 7 percent during 2000–10 and then decelerated to around 5 percent. During 2011–24, economic growth slowed amid weaker enforcement and implementation of policies and growth-oriented public investments, and several weather and external commodity price shocks. Services have been the main driver of growth, largely due to improvements in travel and tourism. Manufacturing grew rapidly (at 6.7 percent annually) between 2000 and 2010 but has since declined to an average of 3.8 percent due to productivity constraints (UBOS 2024b; World Bank, n.d.). Agroprocessing represents most of Uganda’s manufacturing output, with food processing—which includes coffee, fish, cereals, sugar, cocoa, tobacco, vegetable oil, and dairy—accounting for 40 percent. On the demand side, private consumption remained the largest contributor to growth, averaging 18 percent for 2000–10 and 20 percent for 2011–24, although the bulk of firms are small and operate in the informal sector. Over this period, net export share in gross domestic product (GDP) also improved, from a deficit of 11.5 percent to a deficit of 7 percent, supported by fast-growing travel and tourism. With the population growing at 3.3 percent per annum, real GDP per capita grew by only 1 percent per year.

To achieve upper-middle-income country (UMIC)³ status by 2040, as reflected in Vision 2040 and the Ten-Fold Growth strategy, Uganda will have to sustain a real annual GDP growth rate of about 8.2 percent for a projected population of 61.3 million. Vision 2040 includes target sectoral shares of the economy, poverty reduction targets, and expected growth rates (Table 1.1), and calls for a shift in the structure of the economy away from primary agriculture production, which contributed 23.8 percent to GDP at current prices in 2022/23.

Table 1.1: Select targets in Vision 2040

Indicator	Baseline 2010	Status 2024	Target 2040
Per capital income (\$)	506	931.1	9,500
Population below the poverty line (%)	24.5	18.1	5
Agriculture sector share (% of GDP)	22.4	24.7	10.4
Industry sector share (% of GDP)	26.4	24.9	31.4
Services sector share (% of GDP)	51.2	42.5	58.2
Manufacturing as a share of total exports (%)	4.2	9.8**	50
Information and communications technology goods and services as a share of total exports (%)	0	11.7**	40
Per capita electricity consumption (kilowatt hours)	75	90**	3,668
Population growth rate (%)	3.2	2.8***	2.4
Increase in forest cover (% of land area)	15		24

Source: World Bank staff calculations, based on World Bank n.d., World Bank 2025g, UBOS 2024b, and NPA 2013.

Notes: The 2022 population below the poverty line is based on the Uganda National Household Survey 2019/20. Uganda Bureau of Statistics (UBOS) has updated the poverty line, which was criticized as being too low, resulting in a higher poverty rate of 30.1%, which seems adequate. ** = 2022 data; *** = 2023 data.

3 UMIC is one of the four categories used by the World Bank to classify economies for analytical purposes. The classification system uses Gross National Income per capita as a metric to compare countries. The thresholds are updated annually to account for inflation. For the 2025 fiscal year, UMIC countries had a GNI per capita between \$4,516 and \$14,005.

With one of the world's youngest populations, Uganda's youth must be key contributors to growth. The country has one of East Africa's highest fertility rates, but its Human Capital Index (HCI) of 0.39 (World Bank 2025m) is lower than the Sub-Saharan African average of 0.40.⁴ Labor market opportunities are limited, and 92 percent of employment is in the informal sector (World Bank 2025m). Half of working-age Ugandans are active in the labor force, 48 percent of whom are employed. Forty percent of women and 56 percent of men participate in the labor force, and overall labor force participation is lower in rural areas (48 percent) than urban ones (67 percent) (World Bank 2021). Subsistence workers constitute 90 percent of the rural labor force, with a large share (63 percent) concentrated in the Eastern and Northern regions. The share of employment in subsistence activities is larger among women, older individuals, and those with a low level of educational attainment. Increase in private sector paid jobs grew faster, by 58 percent, between 2012/13 and 2018/19 albeit from a low base (World Bank 2022), compared to 9 percent growth in subsistence agriculture. These jobs are mostly in the services sector with very small firms. To leverage its growing youth population, Uganda will need to improve delivery of basic and critical social services, including health, education, and water access, sanitation and hygiene (WASH), to avoid a significant proportion of youth entering the labor market without foundational skills and adequate coping strategies.

The government of Uganda (GoU) envisages achieving UMIC status by strengthening the economy and expanding regional and continental trade. It plans to harness opportunities in oil and gas (including refining oil), tourism, minerals (iron and phosphates), digital services, logistics (by expanding road, rail, air transport, and other sectors), and increasing power production. Economic and market analyses suggest the agriculture sector could grow and diversify by increasing productivity and boosting product quality and complexity. GoU is keen on agroindustrialization and improving the productivity of agriculture, natural resources, and industries, and investing in the nation's human capital. It plans to diversify exports, increase the value and share of manufactured goods in total exports, improve trade facilitation—particularly by streamlining customs procedures—and improve transport interconnectivity. Engaging in the Africa Continental Free Trade Area alone is expected to boost the country's income by 3.3 percent. But the impact on Uganda's economy of climate shocks and recent global economic and social crises, including the COVID-19 pandemic and external conflicts, underscores the importance of ensuring faster growth can be sustained and is inclusive.

To meet its UMIC goal, Uganda will need to prevent the impacts of climate change from setting back growth. The country's climate is largely tropical, with two rainy seasons per year and moderate temperatures year-round. The El Niño-Southern Oscillation phenomenon drives rainfall variability in Uganda, and carries precipitation patterns across the country. As the world's 14th most-vulnerable country to climate change and 163rd most ready to address climate change,⁵ Uganda is vulnerable to floods, droughts, and landslides, which have increased over the last 30 years. Over the last two decades, an average of 200,000 Ugandans were affected annually by heavy rainfall, floods, droughts, and other hazards. According to Uganda National Panel Survey data, 30–40 percent of households experienced drought, irregular rains, flooding, the death of income earner(s), and other shocks over the past 10 years, with rural and the poorest households most affected. Over half of Ugandans surveyed by Afrobarometer in 2024⁶ stated that over the past 10 years, droughts had become more severe. Almost 70 percent reported that crop failure had become more severe, and roughly one-third that floods had become so. Over the past five years, roughly 40 percent have changed their use and sourcing of water, nearly 40 percent have modified the time and way they work outdoors, 23 percent have migrated, 43 percent have changed grazing patterns and reduced the number or changed the type of livestock they own, and 54 percent have changed the crops they plant or food they consume. Floods occur every other year and result in average economic loss of \$140 million, though the impact can be more severe (Dicko, Ndlovu and Mahony 2022).

4 <https://humancapital.worldbank.org/en/economy/UGA>. A score of 0.39 implies that a child born in Uganda today is likely to be only 39% as productive when she grows up as she could be if she enjoyed complete education and full health.

5 According to the Notre Dame Global Adaptation Initiative (ND-GAIN) Index, a measurement tool that uses 20 years of data across 45 indicators to rank over 180 countries annually based on their level of vulnerability and readiness to successfully implement adaptation solutions (<https://gain.nd.edu/our-work/>; <https://gain-new.crc.nd.edu/country/uganda#vulnerability>).

6 2024/25 data show that 64% of respondents in Uganda are knowledgeable about climate change, compared 62% in Kenya and 38% in Tanzania (<https://www.afrobarometer.org/survey-resource/uganda-round-10-data-2024/>).

Combining rapid growth with better development and targeted adaptation interventions can help Uganda achieve its growth objectives and handle the unpredictable impacts of climate change. Uganda is the world's 51st largest emitter of greenhouse gases (GHGs), emitting about 107 million tonnes of carbon dioxide equivalent (MtCO₂e) in 2022.⁷ As it adapts to climate change and builds resilience to climate risks, it should take advantage of the global shift toward low-carbon supply chains and production systems. This Country Climate and Development Report (CCDR) uses a scenarios approach (Box 1.1) to assess how Uganda could achieve its growth aspirations while addressing climate change.

Box 1.1: Economy and climate scenarios used in this CCDR

This CCDR models the impact of six climate change scenarios on two economy futures: business-as-usual (BAU) and aspirational (ASP), and imposes them on Uganda's natural, human, and physical capital. For natural capital, the land cover and land use changes are projected out to 2050 in line with the two economy futures (World Bank. 2025h).

BAU is based on extending the country's historical growth performance out to 2050, while **ASP** represents a growth pathway that puts Uganda close to achieving its Vision 2040 and Ten-Fold Growth Strategy goals by 2050. Both economy futures are simulated with no additional climate actions to those in place in 2023 (referred to as **no adaptation**), and **with climate action** that aligns with (or in a few sectors, exceeds) the country's national determined contribution (NDC).

The six climate scenarios are selected to capture the broadest range of climate change effects across general circulation models (GCM) and result in projected increase in temperatures and precipitation (Table B1.1.1). Two additional emissions scenarios (**pessimistic** and **optimistic**) are considered to allow for comparisons across mitigation scenarios.^a

Table B1.1.1: Scenarios used in this CCDR

Economy scenario				BAU		ASP	
				2031–40	2041–50	2031–40	2041–50
GDP growth rate (%) – starts in 2025				Average 6.5%		Reaching 8% by 2040 and sustained to 2050	
Urban share of population (%)				-	26.3		61.04
Agriculture share of GDP (%)				21.6	17.0		10
Industry share of GDP (%)				27.7	29.4		31
Services share of GDP (%)				45.5	49.2		58
Total factor productivity				2.5		3.5	
Private sector investment				Limited		Increasing	
Capacity for domestic resource mobilization				Constrained		Increasing	
Oil and Gas production				Yes		Yes	
Climate change scenario (relative to baseline)							
Change in average national temperature (°C)				Change in average national precipitation (%)			
	2021–30	2031–40	2041–50	2021–30	2031–40	2041–50	
Dry/hot mean	+0.66	+0.89	+1.34	+0.2	-0.07	+1.6	
Wet/warm mean	+0.42	+0.63	+0.85	+6.1	+7.0	+12.0	

^a The pessimistic case is an ensemble average of SSP3–7.0 GCMs, where warming reaches 4°C by 2100, due to lax climate policies or a reduction in ecosystems and oceans' ability to capture carbon. The optimistic case is an ensemble average of SSP1–1.9 GCMs where GHG emissions reduce in line with limited 1.5°C of warming by 2100.

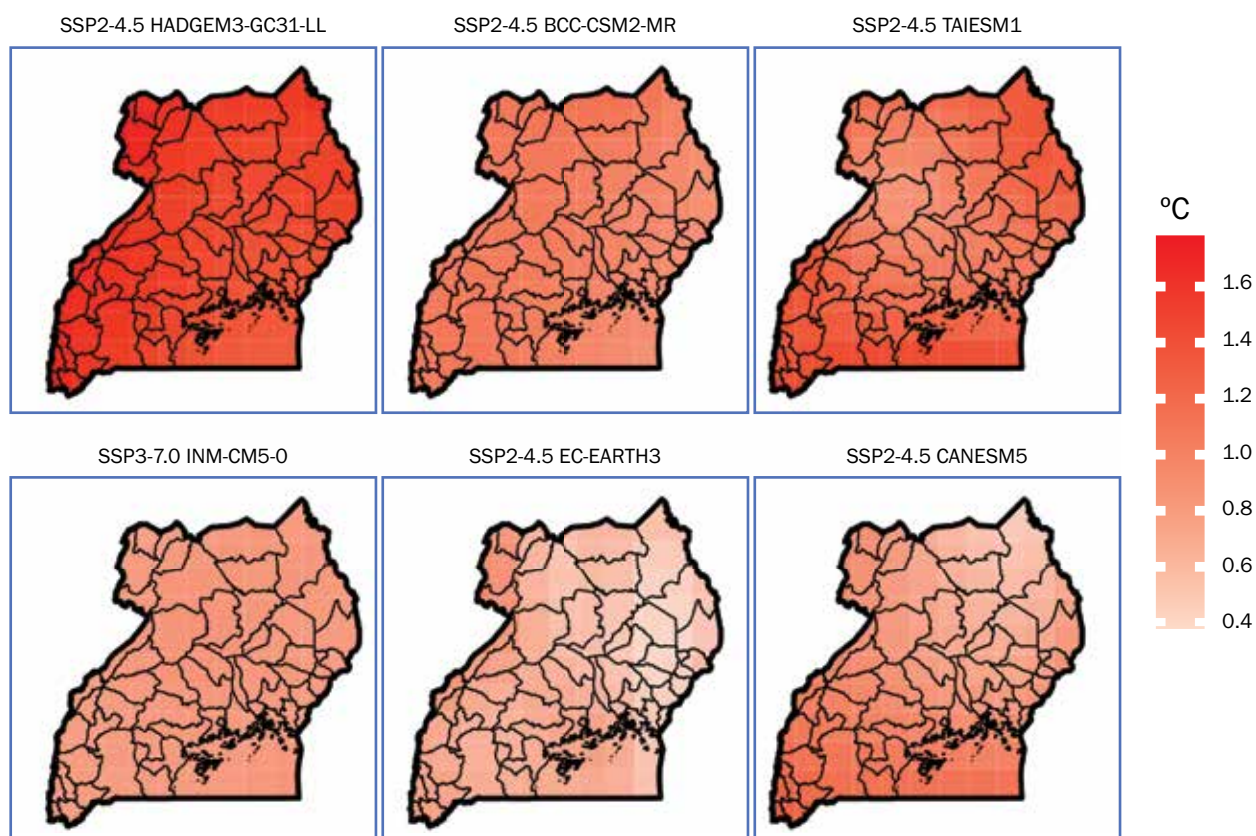
7 https://scorecard.worldbank.org/en/data/indicator-detail/EN_ATM_GHGT_GT_CE?orgCode=ALL&refareatype=REGION&refareacode=ACW&age=_T&disability=_T&sex=_T.

1.1. Climate change in Uganda

In Uganda, climate change has wide-ranging consequences for the key sectors that catalyze growth. Models indicate that Uganda will experience increases in temperature and greater variability in precipitation across the six climate scenarios. Impacts on land, water, and native vegetation will have consequences for agriculture, nature-based tourism, forestry, and ecosystem services. Intense precipitation events and high temperatures could also damage transport infrastructure, digital connectivity, and data infrastructure, and affect power transmission and distribution networks, causing disruptions in logistics, transport, digital services, and power systems. Urban centers will be vulnerable to fluvial and pluvial flooding, and people will be more exposed to heat stress and vector- and waterborne diseases. But the distribution of change in precipitation and temperature varies across the country (Figure 1.1).

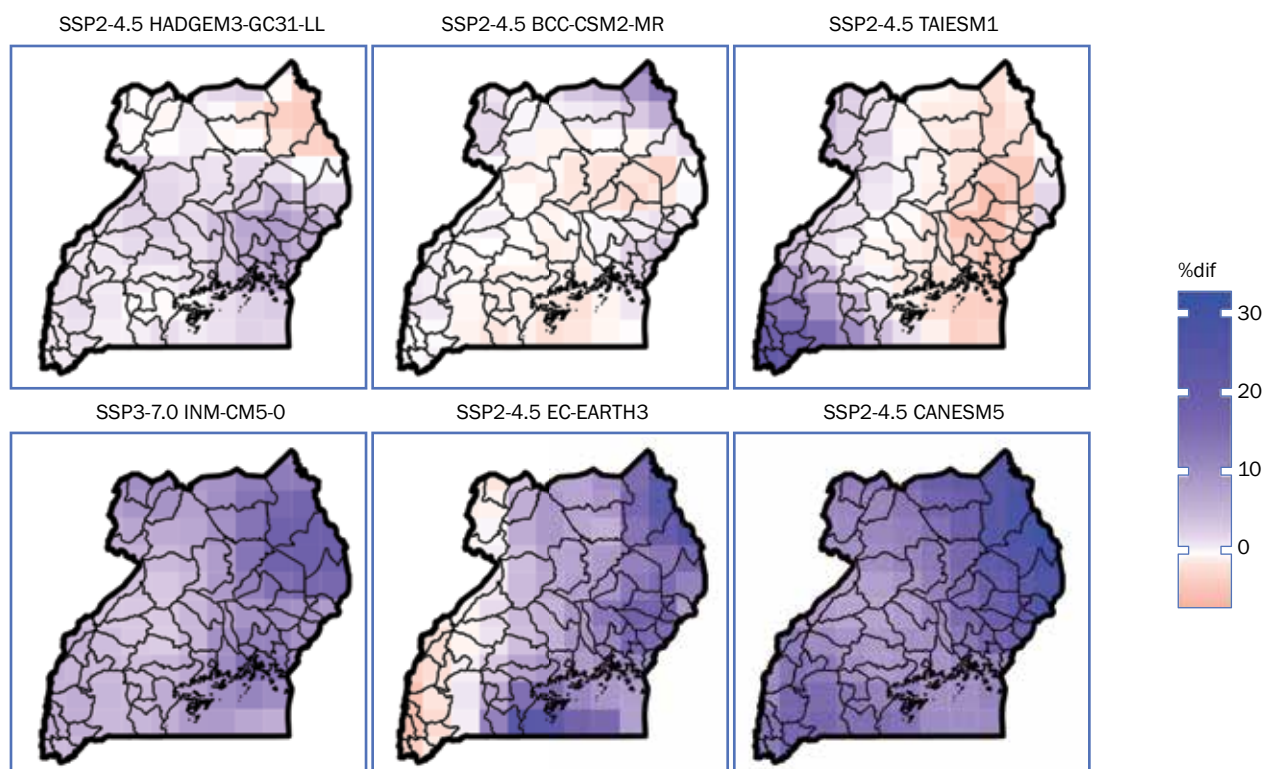
Figure 1.1: Change in mean temperature and precipitation, 2041–2050, relative to 1995–2000 baseline

a) Temperature by climate scenario



Source: World Bank 2025d.

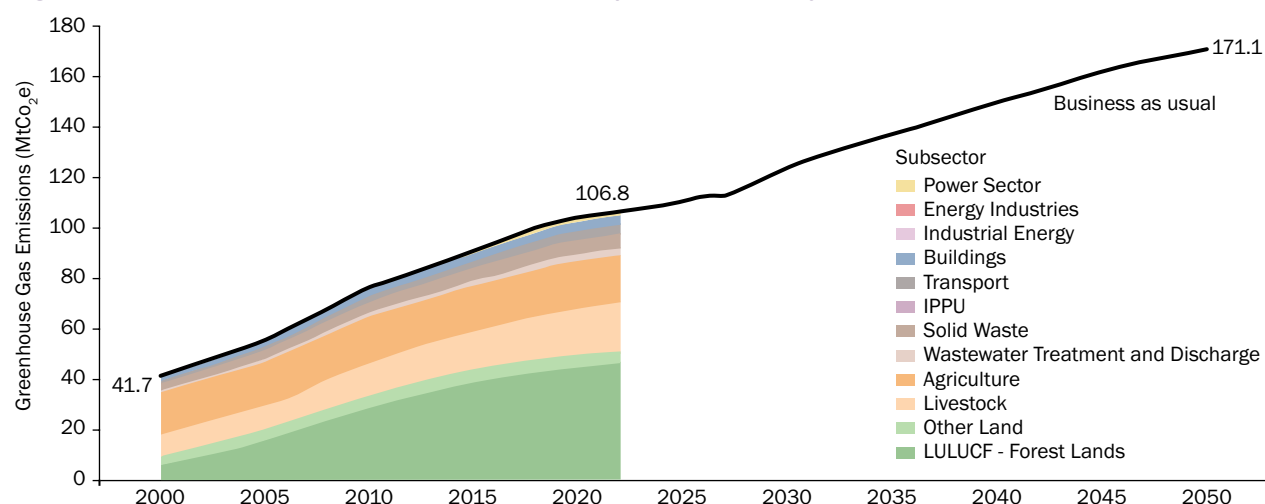
b) Precipitation by climate scenario



Source: World Bank 2025d.

Uganda has had a low-carbon development pathway to date. Its 2020 emissions are estimated to be 0.11 percent of global emissions. Between 2000 and 2022, GHG emissions have increased slowly, from 41.7 to 106.8 MtCO₂e. In 2022, 33.6 percent of the country's emissions were from agriculture, 47 percent from land use change and forestry, 8.4 percent from the energy sector (building, power and transport), and 7.7 percent from waste (World Bank 2025f). Since 2010, emissions have increased from land use change and forests, agriculture, energy, and waste by 53, 20.1, 52.7, and 44.1 percent, respectively. Extrapolating BAU to 2050 would result in Uganda increasing GHG emissions by 60 percent (Figure 1.2).

Figure 1.2. Historical GHG emissions (2000–22), by sector, and projections to 2050 under BAU



Source: World Bank 2025f.

In its updated NDC, issued in 2022, Uganda made ambitious climate change commitments to 2030.

GoU commits to reducing national GHG emissions by 24.7 percent below a BAU trajectory in 2030, to 112.1 MtCO₂e by lowering emissions in five categories: agriculture, forest, and land use; transport; energy; waste; and industrial processes and product use. The agriculture, forest, and land use sector is expected to contribute 80 percent of these reductions through climate-smart agriculture (CSA), sustainable fuelwood and commercial charcoal production, large-scale commercial timber plantations, restoring natural forests in the landscape, energy efficiency, livestock management, wetlands, and peatlands. In the transport sector, the NDC proposes changing energy consumption, promoting road transport fuel efficiency, switching fuels, and investing in non-motorized transport infrastructure, public transport, and passenger, light, rail, meter gauge, and standard gauge railways. In the energy sector the NDC includes measures related to energy generation, energy use (industry, commercial, institutional and residential), and electricity generation. It also specifies adaptation policies and measures across 13 priority sectors—agriculture; forestry; energy; health; ecosystems (wetlands, biodiversity, and mountains); water and sanitation; fisheries; transport; manufacturing, industry, and mining; cities and built environment; disaster risk reduction; tourism; and education—with 48 actions and targets for 2025 and 2030 (MWE 2022).



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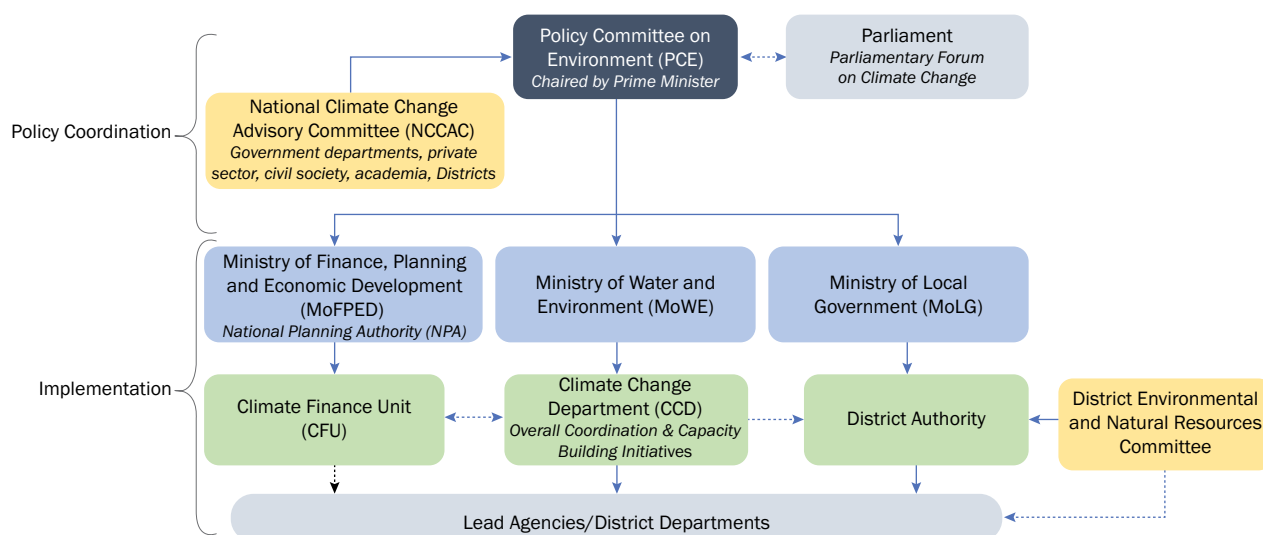
Institutional and Policy Readiness for Climate Action

2. Institutional and Policy Readiness for Climate Action⁸

Uganda has a comprehensive policy, legislative, and regulatory framework, anchored in international and regional commitments. The country is a party to major international and regional agreements, including the United Nations Framework Convention on Climate Change (UNFCCC), Paris Agreement, Africa Convention for the Conservation of Nature and Natural Resources, and East Africa Community Climate Change Policy (2011). The UNFCCC, its Protocol, and the Paris Agreement have the force of law in Uganda, while the constitution enshrines the right to a clean and healthy environment and mandates the state to promote sustainable natural resource management. Uganda has developed a policy framework to put into effect the National Climate Change Policy (2015), Green Growth Development Strategy (2017/18–2030/31), National Climate Change Act (NCCA) (2021), and other constitutional provisions. Sections 4–8 of the NCCA mandates the development of a national climate change framework to guide formulation of national and subnational climate change action plans.

An institutional framework outlines roles and responsibilities for climate response at all levels (Figure 2.1), but it needs to be strengthened to become fully operational. The Policy Committee on Environment, established under the National Environment Act, offers guidance on policy formulation, harmonization, and legislative proposals, and liaises with the cabinet on environment and climate change issues. At sectoral and local government levels, ministries, departments, and agencies (MDAs) must designate focal points, report on progress, and are held accountable for implementing policy responses relevant to their mandates. District environment and natural resource committees, along with local government climate change committees, are responsible for monitoring, evaluating, and reporting on climate change activities within their jurisdictions.

Figure 2.1: Institutional arrangements for climate action



Source: World Bank staff.

Note: Other stakeholders include the National Environment Management Authority (NEMA), Uganda National Meteorological Authority, National Forestry Authority (NFA), and the Ministry of Lands, Housing and Urban Development (MoLHUD).

The Climate Change Department (CCD) within the Ministry of Water and Environment (MWE) is the primary coordination unit for climate action. The department assesses the adaptation and mitigation actions of lead agencies, individuals, and private entities to harmonize and guide prioritization of climate action. It also provides technical assistance and information to districts and urban authorities in support of their climate action plans. The NCCA envisages a multistakeholder National Climate Change Advisory

⁸ This chapter offers a brief summary of regulatory and institutional aspects. A more in-depth assessment can be found in World Bank 2025c.

Committee (NCCAC) to provide independent technical advice on climate change science, technologies, interventions, and best practices for risk assessments. The CCD plans to activate NCCAC operations.

While the CCD oversees climate action coordination, implementation is a collaborative effort involving several key ministries. The Ministry of Finance, Planning, and Economic Development (MoFPED) has been growing its role in assessing macroeconomic risks arising from climate change and mobilizing resources for climate action. As outlined in the approved Climate Change Risk Policy, the Bank of Uganda (BoU), has institutionalized the integration of climate risk and the broader sustainability agenda into its strategic plan and operations. The National Planning Authority (NPA) is starting to ensure that national development plans (NDPs) and budgets are climate responsive. The Climate Finance Unit (CFU), housed within MoFPED's Directorate of Budget, is responsible for climate finance initiatives. MDAs have the mandate to design and implement measures for climate change in accordance with national strategies. The Ministry of Local Government, responsible for local economic development, is a key stakeholder in supporting adaptation measures and district authorities in implementing their climate action plans.

At legislative level, several committees have been established to oversee climate strategies and interventions. In FY2021/22, Uganda introduced a Standing Committee on Climate Change (SCCC) in its Parliament, alongside the Sectoral Committee on Environment and Natural Resources (SCENR) and Parliamentary Forum on Climate Change (PFCC). The SCCC's focus is on strengthening legislative and regulatory processes for climate change. The SCENR, whose members are also part of the SCCC, reviews climate considerations in the budget. The PFCC vision recognizes the need to strengthen parliamentarians' capacity to integrate climate change considerations into national development agendas. Its goal is to craft inclusive, gender-sensitive climate legislation with integrated risk management and promote gender-inclusive, climate-aware budgeting and appropriations. The PFCC has been at the forefront of promoting climate change dialogue and reforms in Uganda.

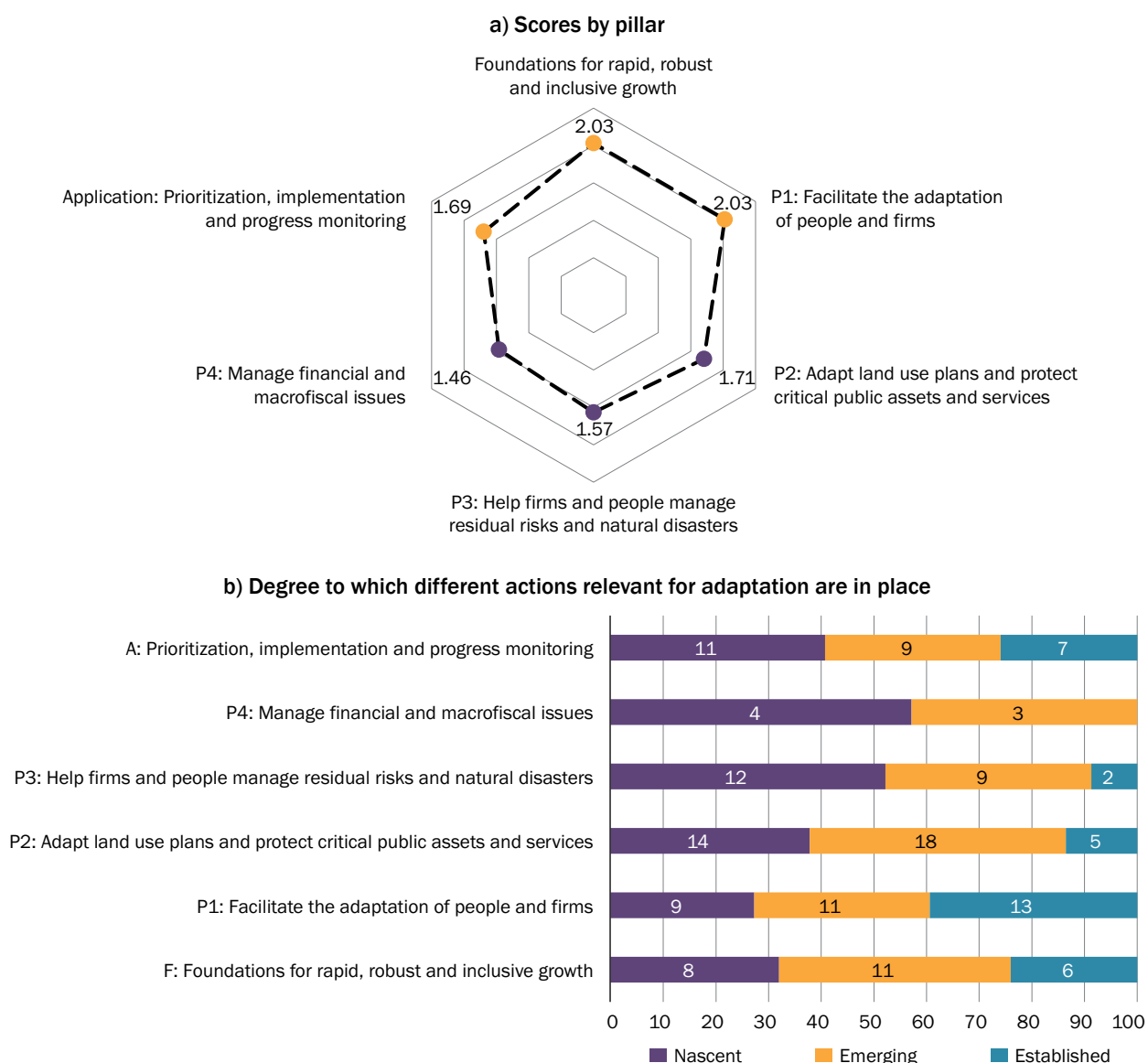
Uganda has recently started to integrate and track climate-related allocations in its budgeting system.

MoFPED's budget call circular guidance requires all MDAs, districts, cities, and municipalities to mainstream environmental and climate change issues in their detailed budget estimates for the upcoming financial year. MDAs and local governments (LGs) must incorporate clear interventions for environmental conservation, climate change adaptation, and mitigation, develop workplans with specific environmental and climate change outputs and outcomes, and allocate sufficient resources. In consultation with the NPA, MWE evaluates and certifies that the Budget Framework Paper is climate-responsive and contains adequate allocation to fund climate change measures.⁹ This compliance assessment is conducted early in the planning process and does not guarantee the allocation of funds required for interventions, especially during periods of fiscal strain. GoU has also implemented pilot climate change budget tagging initiatives. After MoFPED introduced two climate change budget output codes in FY2024/25—one for mitigation and one for adaptation—into the Program Budgeting System, 13 government entities used the codes to report information, rising to 84 in FY2025/26. The Integrated Financial Management Information System and Chart of Accounts have also been updated to enable tracking of climate-related allocations and actual spending.

The World Bank Adaptation and Resilience (A&R) Diagnostic revealed that, although Uganda has established many measures that are key for adaptation, their implementation is lagging and more needs to be done (World Bank 2025I). Based on A&R scoring, Uganda has put several key foundational measures in place for rapid, robust, and inclusive growth, facilitating the adaptation of people and firms, and enabling prioritization, implementation, and progress monitoring, and needs to implement these. But government actions related to managing financial and macrofiscal issues, helping firms and people manage residual risks and natural disasters, adapting land use plans, and protecting critical public assets and services are less established (Figure 2.2).

⁹ The compliance assessment of the FY 2023/24 budget focused on 10 priority programs selected due to their real or potential contribution to climate change and their strategic importance to the development process.

Figure 2.2: Summary of A&R performance for Uganda



2.1. Stronger governance frameworks are needed for climate action

Strengthening GoU's climate change governance frameworks and implementation would enhance the effectiveness of climate change action. For example, GoU can develop regulations to operationalize NCCA provisions, improve coordination and engagement, operationalize the National Climate Finance Strategy (NCFS), and integrate climate considerations into public investment. Integrating climate and disaster risks into planning and budgeting, and improving target-setting, tracking, financing, and capacity building will help lessen macroeconomic climate impacts and inform a long-term adaptation strategy.

2.1.1. Enhance coordination and stakeholder engagement

GoU would benefit from operationalizing the NCCA and allocating adequate funds and staff for required interventions. Developing regulations and legal provisions to operationalize the NCCA would help strengthen nascent initiatives, while amending policies that predate the NCCA can fill gaps and strengthen alignment with the country's climate change objectives. Adequate staffing and enhanced technical expertise will also strengthen the enforcement and compliance capacity of MDAs and LGs, allowing them to implement their climate mandates effectively.

Fully operationalizing the Policy Committee on Environment and NCCAC and strengthening the CCD and CFU would enhance coordination. The Ministry of Public Service needs to complete its evaluation of whether CCD could be a directorate. Determining the CCD's organizational structure and aligning its staffing with needs would help enable it to provide substantial technical support to MDAs, LGs, and state-owned enterprises. Defining the CFU's coordination role and responsibilities related to mobilizing financing for climate and green investments will clarify how it complements CCD.

A functioning monitoring, reporting, and verification (MRV) tool would improve transparency and accessibility of climate information. Uganda has developed an integrated MRV tool¹⁰ on a web-based platform hosted by MWE, tailored to meet domestic and international climate action reporting requirements. The MRV system is supported by a structured institutional framework, with nodal officers in each lead agency responsible for coordinating data collection, verification, and reporting, including LG data. MRV implementation across sectors, however, requires additional resources.

Strengthening LG roles and capacity in climate change planning is imperative. The NCCA mandates every district to develop its own climate change action plan within a year from the development of the National Climate Change Action Plan, but in FY 2023/24, only 2 of 176 districts had developed one (World Bank 2025c). District environmental and natural resource committees are responsible for integrating climate matters into development plans, projects, and budgets for approval, as part of district development plans. But many LGs lack the capacity to develop climate-responsive priorities and activities and often have insufficient funds¹¹ to develop and align their own climate change mitigation and adaptation strategies with national frameworks. The CCD also lacks the resources to provide LGs with technical assistance and information for their climate change action plan.

Efforts to enhance stakeholder engagement should seize opportunities to involve women as change-makers for climate change adaptation. Droughts and floods have significant impact on women's access to water and energy sources, their productivity, including in the agricultural sector, and the challenges created by climate hazards and food insecurity lead to an increase in gender-based violence within households. Women hold the capacity to make a significant impact in critical decision-making roles related to the climate change-gender-labor nexus. Women in Uganda hold key positions in local politics, work in the health and education sectors, and make up a large share of the self-employed. For example, in Bukedea, half of the 24 subcounty councilors are women. Increasing efforts to augment the number of women in decision-making roles and creating platforms where women can voice their needs would unlock their role as change-makers through climate action.

¹⁰ The tool is composed of five key components: the GHG inventory for all major emitting sectors, NDC implementation for mitigation actions, NDC implementation for adaptation actions, climate finance flows, and impacts on Sustainable Development Goals. It also facilitates the development of climate change reports, including the annual NDC report and the biennial transparency report, while ensuring data integrity through embedded quality control and assurance mechanisms.

¹¹ In FY 2022/23, LGs financed only 5% of public investments from their own revenue, with the remaining 95% of their budgets funded by central government and donor contributions (IMF 2024).

2.1.2. Operationalize the National Climate Finance Strategy

Implementing the updated NDC will require a coordinated and strategic approach to mobilizing climate finance. Uganda has committed to source \$4.1 billion (15 percent) of its total NDC costs from domestic sources and is seeking international support for the remaining \$24 billion (85 percent). Currently, 61 percent of its climate finance is sourced from multilateral development banks, 27 percent from GoU, and the remainder from bilateral sources. Private sector contributions to climate finance are modest, at around 3 percent, or \$26.5 million annually (MoFPED 2024).

GoU needs to operationalize the NCFS, which has been approved by MoFPED top management.

The strategy proposes a set of interventions and a wide range of instruments for mobilizing financing (Chapter 5) to enhance climate finance mobilization, integrate climate change into development planning, and create a supportive environment for climate-related investments. It also proposes strengthening the capacity of selected LGs by identifying key gaps in institutional capacity for accessing and mobilizing climate finance and sensitizing LGs on effective climate-responsive budgeting. Operationalizing the NCFS would allow GoU to conduct the necessary analysis and test the implementation arrangements for the strategy, as well as timeline feasibility, cost assumptions, and institutional arrangements.¹² There is also a need to align the NCFS with the upcoming NDC 3.0 investment needs and instruments and analyze their prioritization.

Addressing gaps in the climate development planning and budgeting frameworks is vital. To better integrate climate change into development planning, GoU can: include high-impact, climate-related projects in national and sector plans, allocating resources to priority projects; enhance planning capacity across government and introduce climate change targets in the NDPs; expand MoFPED's efforts to quantify the specific fiscal risks and long-term fiscal implications of climate change and include these in the country's fiscal risk statement; and use NDC targets as a reference tool for setting national targets, including for crosscutting issues. Budget call circulars have been inconsistent in their prioritization of climate change, often making climate considerations secondary or dropping them depending on availability of domestic resources.¹³ GoU should scale up climate change budget tagging and enhance reporting in the medium term to improve tracking of resources. Once most MDAs adopt the climate budget codes, reporting can be further expanded by distinguishing between climate-related recurrent and investment expenditures. GoU can also leverage its intergovernmental transfer system to support climate change planning and financing and improve local-level preparedness and action.

2.1.3. Integrate climate considerations into public frameworks and policies

Uganda could further develop its project appraisal framework and public-private partnerships (PPPs) policy. To avoid agencies addressing climate change risks in an ad hoc manner (IMF 2024), Uganda can update its Public Investment Management (PIM) and PPP frameworks to include requirements and guidelines for assessing climate change and disaster risk implications, in line with the National Environment Act No. 5 of 2019 and its associated regulations (World Bank 2023a). Public investment appraisal and selection processes should also consider climate change-related impacts. As an initial step, MoFPED has integrated the requirement to assess climate risks into the Development Committee Guidelines, creating an opportunity to strengthen climate considerations in public investments. Expanding the integration of climate risk assessments in the PIM manual and PPP guidelines as a standard requirement will strengthen appraisal processes and ensure project preparation budgets are sufficient to implement the required studies.

¹² World Bank feedback on draft NCFS, June 6, 2024.

¹³ In FY 2023/24, they prioritized wage and statutory obligations, fixed costs, multiyear commitments, and older policy commitments.

The public procurement framework should establish clear criteria to determine which products or services are responsive to climate change. GoU's procurement function is not climate-responsive, except for the procurement of works that fulfil specific environmental and social criteria. The Public Procurement and Disposal of Public Assets Authority is developing a sustainable procurement framework to integrate climate change considerations into the procurement system and enhance service delivery. It will also be important to increase awareness of sustainable public procurement as outlined in the Public Procurement and Disposal of Public Assets Act, build capacity in this area, and ensure guidelines and bidding documents incorporate these practices. GoU will also need to develop procedures and rules for the transfer and disposal of climate-sensitive non-financial assets.

2.1.4. Integrating adaptation into macrofiscal policies and improving monitoring

Uganda has several options for integrating adaptation into macrofiscal policies, which will enable it to develop a robust long-term strategy to mitigate macroeconomic impacts. Doing so requires an understanding of the economic costs of climate change and disasters, and reflecting these in fiscal policies, budget allocation, and public investments. To integrate adaptation in its macrofiscal policies, Uganda can use long-term climate risk assessments to inform fiscal policy and contingent liability measurements in budget documents or adopt tax policies that reduce reliance on climate-vulnerable sectors. On monetary policy, BoU monetary policy analysis models have incorporated climate change.

A long-term adaptation strategy would help Uganda progress with and accelerate the implementation of adaptation measures. Uganda should include a long-term vision and implementation plan for mainstreaming adaptation and resilience in its first national adaptation plan, which is under development. It should also establish a system for continuously and systematically tracking progress over time, regularly reviewing and revising its adaptation and resilience strategy. It can build on the integrated, web-based MRV tool hosted by MWE to enhance data collection and reporting, and to track key components and NDC performance indicators. Developing subnational MRV systems and linking these with the national system will also facilitate monitoring, evaluation, and learning.

2.2. Preparedness for climatic hazards and resilience to climate risks

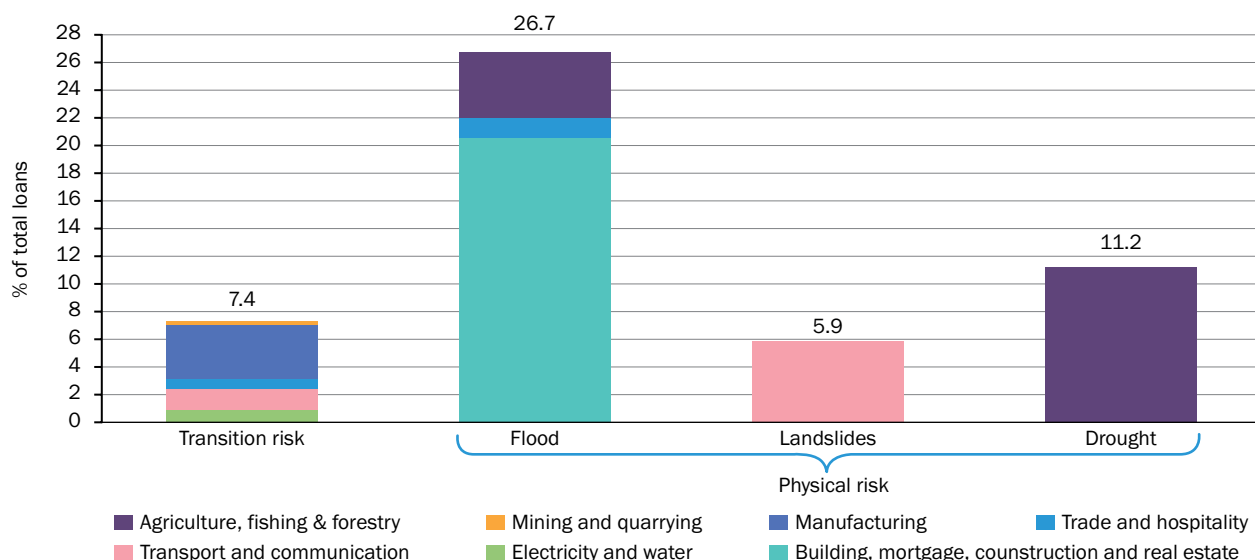
Uganda's vulnerability to climatic hazards can impact its fiscal resources. Over the past two decades, the frequency of disasters has increased, with economic losses often uninsured and concentrated in sporadic, severe events. This can pose risks to Uganda's fiscal resources, resulting in direct financial impacts such as reduced tax revenues and unforeseen expenditures on relief, recovery, and reconstruction efforts. In FY2016/17, supplementary budgets amounted to \$7.04 million for relief to disaster victims, and foregone tax revenue amounted to \$0.51 million. Between FY2016/17 and FY2018/19, GoU allocated an average of \$272.2 million to disaster-related expenditures, a significant share of which was spent on relief/humanitarian assistance. Most of this was financed through supplementary budgets, contributing to poor budget performance (Dicko, Ndlovu and Mahony 2022).

Although Uganda has established disaster risk management (DRM) procedures, it would benefit from enhancing its operational and financial preparedness for DRM. The Office of the Prime Minister (OPM) is responsible for disaster preparedness, management, and prevention, and the National Emergency Coordination and Operations Centre coordinates disaster response efforts. When a disaster occurs, district disaster management committees, with support from sectoral ministries, alert the national center, which then convenes and coordinates the response with national and development partners. But district LGs need support to boost their technical capacities and financial resources for effective disaster preparedness and prevention. Gaps in early warning information and poor coordination between early warning systems hamper the government's ability to effectively reduce risk and respond to hazards (World Bank 2023c).

The passage of the DRM Bill is important for strengthening Uganda’s overall legal and policy crisis management frameworks. Under development since 2016, the bill could fill several gaps in the National Policy for Disaster Preparedness and Management. GoU could use the bill to define the difference between a state of disaster and state of emergency to facilitate access to disaster risk financing (DRF) instruments and clarify measures to prevent natural disaster situations from escalating into crises. The bill could also define MOFPED’s role and responsibilities in disaster response, strengthen the capacity of OPM and other agencies to prioritize and elevate the importance of ex-ante crisis preparedness, and improve coordination between the OPM and other government entities responsible for assessing fiscal risks arising from disasters, appropriate budgeting, and financial planning.

Uganda’s financial sector faces moderate exposure to climate risks (Figure 2.3). Transition risks stem mainly from loan exposure to transition-sensitive activities in the manufacturing and transport sectors. A preliminary analysis of loans also showed that the buildings sector is significantly exposed to flood risk, while agriculture and transport are moderately exposed to droughts and landslides.¹⁴

Figure 2.3: Share of loans exposed to transition and physical risks



Source: World Bank staff calculations, based on BoU data.

Note: Classification of sectors exposed to physical and transition risks follows World Bank 2021.

Uganda has an ambitious policy agenda to address climate risks in the financial sector, yet most initiatives are nascent, and implementation may be challenging. BoU’s strategic priorities include: integrating climate-related risks in macroprudential analysis and risk-based supervision; integrating climate-related risks in the monetary policy framework; adopting sustainability factors in its portfolio management; addressing data gaps in climate analyses; and enhancing capacity building to improve climate risk analysis. To drive the financial sector’s support to the economy’s green transition, BoU and the Uganda Bankers’ Association (UBA) jointly launched and monitor compliance with the Environmental, Social and Governance (ESG) Industry Framework for the Banking Sector in Uganda. BoU has also revised its micro and macro prudential supervisory processes to incorporate climate-related financial risk assessments and evaluation of compliance with the framework. There has been some progress on reporting on climate risks and ESG in general, with UBA submitting an implementation progress report for the first quarter of 2025.

¹⁴ It is important to note that data gaps prevented a comprehensive assessment, due to a lack of readily available granular data (e.g., geographical breakdown of credit, subsectoral breakdown of credit, or whether banks take risk mitigation measures).

Uganda would benefit from strengthening capacity to address climate risks in the financial sector. In April 2025, BoU issued guidance to commercial banks on adapting the International Financial Reporting Standards General Requirements for Disclosure of Sustainability-related Financial Information (IFRS S1) and Climate-related Disclosures (IFRS S2). It is also prioritizing strengthening capacity and engaging with UBA and the Uganda Institute of Banking and Financial Services to conduct training for banks on ESG industry framework work streams, such as materiality risk assessments. It actively participates in the Network for Greening the Financial System. Before moving to supervisory measures, it could focus on strengthening data collection, risk assessments, and capacity and knowledge through international networks and mobilizing technical assistance.



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3

**Climate-resilient, Low-carbon
Growth and Development**

3. Climate-resilient, Low-carbon Growth and Development

Uganda can build resilience to climate shocks through a combination of faster growth, better development, and targeted climate actions. A higher GDP per capita will help lower the share of population in extreme poverty and provide better access to basic, critical, and financial services, helping people and communities cope with shocks. But if faster growth does not consider climate change, it could increase risk and result in higher recovery costs. Climate-informed policies and targeted climate actions can avoid climate change setting back development gains (World Bank 2024b). Examples of such policies and actions include resilient low-carbon urban planning and infrastructure design, skills development support in climate-positive occupations, and curbing deforestation in landslide and flood-vulnerable areas. Such actions support both growth and low-carbon, climate-resilient development.

A third of the actions in Uganda's Fourth National Development Plan (NDP IV) overlap with its updated NDC, reflecting recognition of the interlinkages between development and climate change. The execution of NDP IV would benefit from recognizing the need to prioritize high-vulnerability geographies and sectors and, in some situations, implementing additional targeted adaptation interventions. For example, as well as adopting climate-informed urban planning, Ugandan cities in high-risk areas may need to upgrade their river flood defenses to respond to expected changes in hydrology due to climate change. Implementing better development and targeted climate action aligns with the sentiment shared by many Ugandans who, in a recent survey,¹⁵ indicated that they want the government to immediately address climate change, regardless of the cost and impact on jobs and the economy.

Implementing four mutually reinforcing multisectoral intervention packages jointly with the private sector can help Uganda achieve its development goals in a climate-positive manner. Composed of short-, medium-, and long-term measures, these packages include actions that can buttress development because they lower unpredictable risks, augment productivity, and help create jobs. Many of these are also aligned with NDP IV and the NDC. The packages should be implemented alongside whole-of-economy measures for strengthening Uganda's climate change governance framework (Chapter 2) and mobilizing finance (Chapter 5). They are:

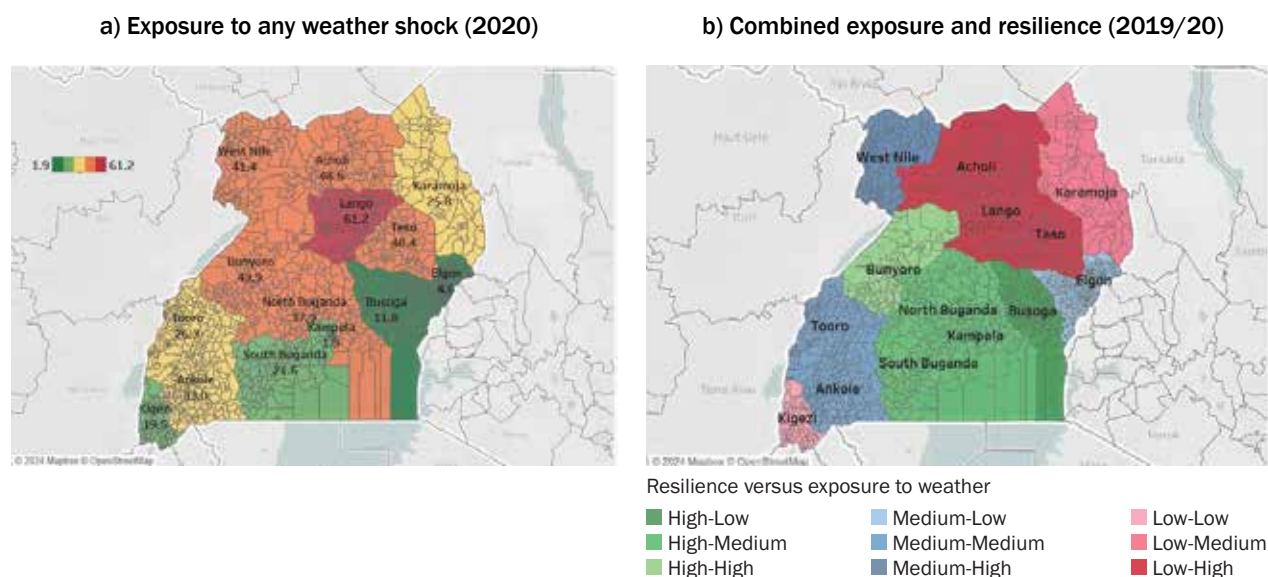
- **Intervention Package A. Boost resilience through jobs for youth and services for the poor:** Provides climate-vulnerable households and youth with sustained access to services and support to handle climate risks and improve occupational productivity.
- **Intervention Package B. Promote resilient and productive agriculture and natural resources with lower GHG emissions:** Increases productivity, addresses climate change, and creates better and more jobs to enhance the contribution of agriculture and natural assets to the economy.
- **Intervention Package C. Develop climate-responsive energy, transport, and digital infrastructure:** Fosters growth and job creation by supporting adequate access to climate-resilient and low-carbon infrastructure services (electricity, transportation, and telecom and digital), unlocking opportunities for households, communities, and firms in logistics and trade.
- **Intervention Package D. Foster planned and climate-positive urbanization:** Supports resilient and low-carbon urban areas that can serve as centers for economic transformation.

¹⁵ <https://www.afrobarometer.org/survey-resource/uganda-round-10-data-2024/>.

3.1. Intervention Package A: Boost resilience through jobs for youth and services for the poor

In Uganda, as in many countries, the impact of climate change is unequal, and the poor is the most vulnerable Climate change affects everybody and, in Uganda, 30 percent of the poorest households and 6 percent of the wealthiest households have experienced climate shocks; of these, 80 percent of the poorest and 60 percent of the wealthiest households have incurred income losses as a result. Many households have reported involuntarily changing their consumption to cope with drought, despite 40 percent of all respondents to the Uganda High Frequency Phone Survey¹⁶ reporting that they were already dealing with food insecurity. In the same survey, among the poorest households, 55 percent reported that they have poor or borderline food consumption, compared to one-third in the wealthiest quintile. The Uganda National Household Survey 2019/20 revealed that exposure to one or more weather shocks¹⁷ was highest in the northeast, where households also have limited coping strategies (Figure 3.1).¹⁸ The same survey noted that while 10 percent of all households reported experiencing a drought in 2019, in eastern and northern Uganda, this increased to 16 and 20 percent, respectively.

Figure 3.1: Exposure and resilience to weather shocks (share of population) 2019/20



Source: World Bank staff calculations, based on Uganda National Household Survey 2019/20 data (https://www.ubos.org/wp-content/uploads/publications/06_2021UNHS2019-20_presentation.pdf).

Climate change could more than double its impact on labor productivity and supply between 2021 and 2050. Higher temperatures are expected to lower labor productivity, especially in outdoor sectors, such as agriculture and construction. The decline in three-year moving average of aggregate labor productivity compared to baseline could reach 1.8–2.7 percent by 2050 (Figure 3.2). In agriculture, labor productivity could drop by 3.3–4.8 percent due to heat stress. Compounding the impact of heat stress is the increased exposure to communicable diseases. Waterborne diseases and malaria are expected to increase by

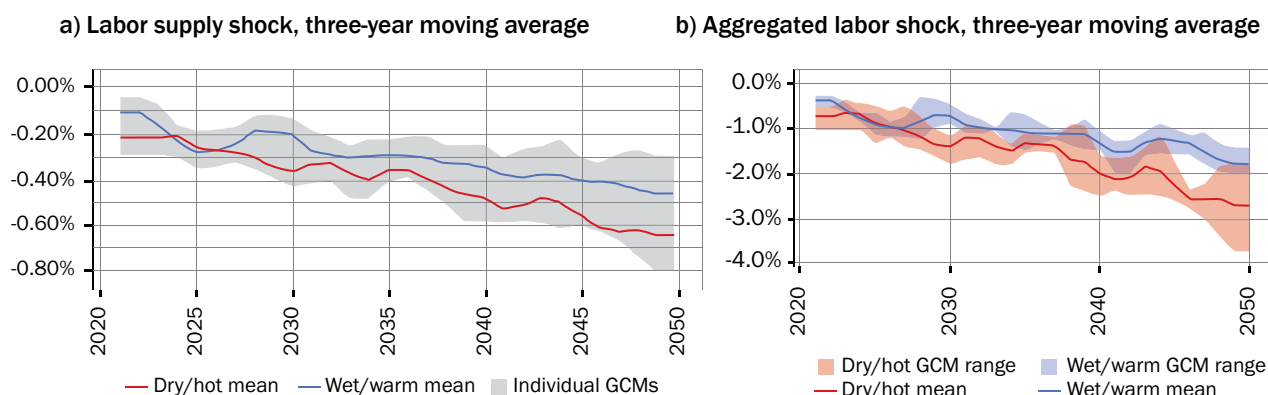
¹⁶ Conducted in March 2025.

¹⁷ These include drought greater than 30% of land affected in any season in rural areas, with a return period of 20 years; flood greater than 0.5 meters, with a return period of 100 years; and a three-day running mean maximum Wet Bulb Globe Temperature of more than 28 °C.

¹⁸ This aligns with findings from the ND-GAIN country index (<https://gain.nd.edu/our-work/country-index/>), which reveals that social readiness to climate risks has declined, with both education and innovation contributing less to readiness.

18.6 and 4.2 percent, respectively, due to climate change.¹⁹ By 2041–50, there could be up to 3.5 and 3.1 more deaths per 100,000 people from waterborne diseases and malaria, respectively. Climate change impacts on health are expected to negatively impact labor supply.

Figure 3.2: Impacts of climate change on labor productivity under different climate scenarios and BAU



Source: World Bank 2025d.

3.1.1. Provide shock-responsive social protection to help the poor cope with climate shocks

In the short term, social protection programs can help households avoid coping strategies that set them back. Uganda's major income support program only covers 3 percent of the population, less than any other East African country. But from 2016 to 2020, through the Third Northern Uganda Social Action Fund Project for Uganda (NUSAF 3) project, GoU piloted a shock-responsive DRF mechanism in Karamoja, supporting 75,457 people (World Bank 2020). The mechanism allowed labor-intensive public works programs to temporarily expand, providing immediate assistance to poor and vulnerable households in the aftermath of crises or shocks, mainly droughts.

Intervention Package A recommends GoU develop a comprehensive shock-responsive social protection system with ex-ante financing instruments. The spatial variability of climate change impacts on vulnerable households reinforces the importance of expanding a shock-responsive social protection system to locations with the highest levels of vulnerability and risk. Drawing on the NUSAF 3 pilot, GoU can invest in developing a dynamic national registry, increase the shock responsiveness of current social protection programs, finalize the national DRF strategy, and transition to digital payments for rapid response. Improving poor and vulnerable households' access to affordable financial services—such as insurance products, savings mechanisms, and credit lines—would strengthen their capacity to manage and recover from climate shocks.

3.1.2. Ensure universal and climate-proof access to critical services

Improving household access to critical services, including WASH and health care, can reduce exposure to health risks and benefit labor supply. But climate change will impair their provision. Most aspects of Uganda's health care—including infrastructure, workforce capacity, and access to services—and therefore progress toward universal health coverage are expected to be impacted by climate-related

¹⁹ The health impact channel in this CCDD only considered waterborne, vector borne, and heat-related diseases. Some of the other pathways found in the literature that link climate change impacts on health—including disruption of food production, distribution and consumption patterns; impacts on air quality and respiratory diseases; and mental health complications of extreme weather events—were not considered due to the absence of necessary data for estimating productivity impacts from health effects. The impacts of climate change on crop production are integrated in the analysis through a land productivity channel instead. These differences can result in varied estimates across documents on the impact of climate change on human health. As data systems improve, these areas should be studied more deeply in the future.

hazards (Table 3.1). Climate change in Uganda is associated with increased prevalence of water-related and infectious diseases, public health emergencies, and food insecurity/malnutrition, increasing both sick days and work loss. The changing weather patterns also exacerbate Uganda’s health gender gap, with low rainfall increasing illness likelihood by 8 and 6 percent among women and men, respectively.

Table 3.1: Impact of climate-related hazards on health care facilities

Affected component	Share of facilities impacted (%)			
	Drought	Flood	Heatwave	Landslide
Health workforce	76.5	79.6	78.6	71.4
WASH and health care waste	73.6	71.1	35.7	75.0
Energy services	31.1	56.7	0.0	41.7
Infrastructure, technologies, products, and processes	44.3	68.0	64.3	70.2

Source: World Bank staff calculations based on data from Isunju et al. 2023.

Package A recommends implementing the strategies outlined in the Climate Change Health Adaptation Plan (2025–30) to address climate health risks. These include: adopting climate-smart health policies, programming, planning, budgeting, and financing; investing in climate-resilient health systems, early warning systems, and preparedness; adopting climate-resilient and public health emergency-responsive and sustainable infrastructure and technologies; investing in health and climate research, including climate vulnerability, capacity, and adaptation assessments; expanding climate and health financing; actively managing climate-related health emergencies; improving health workforce knowledge on climate health risk; and strengthening governance and leaderships. Such efforts will foster progress in universal health coverage by 2030. Improving access to quality WASH services at household level and in health facilities and other institutional settings is also critical.

Investing in WASH infrastructure will reduce the effect of climate change on waterborne diseases and, in turn, labor supply. In 2019, 79 and 69 percent of the country’s urban and rural populations, respectively, had access to improved drinking water sources (United Nations 2020). Under BAU, Uganda achieves its intermediate WASH targets and continues this trend through 2050, reducing the incidence of waterborne diseases²⁰ and increasing labor supply by nearly 1 percent, on average, by the 2040s for both climate futures. Under ASP and NDC scenarios, more significant waterborne disease reductions can be achieved through targeted WASH improvements, with labor supply gains of up to 1.7 percent (ASP) and 2.4 percent (NDC). These gains exceed what is needed to offset shocks from all modeled diseases. When improving WASH coverage, Uganda should consider where access is most constrained and improvements could provide the most benefit from mitigating climate vulnerability.

Due to prioritized water allocations, climate change is not expected to result in unmet water demand for municipal and industrial sectors, but local shortages could occur.²¹ Despite its abundant water resources, water stress in Uganda is considered moderate, primarily due to certain dry regions with relatively high populations (USAID 2021). Expanding the piped water network can therefore ensure more households benefit

20 Due to data limitations, the impact channel modeling used in the CCDD assesses only the impact of WASH investments on vector-and waterborne diseases.

21 The climate impact model considers the impact of climate change across the Nile Basin but does not consider the change in transboundary inflows from development. Accordingly, it may suggest that Uganda can support more water-dependent development than is feasible, which has implications for irrigation. Its lakes, rivers, and wetlands, which serve as reservoirs, would partly mitigate upstream impacts, and the Protocol for Sustainable Development of the Lake should protect against a major abstraction upstream.

from connections (Tsimpo and Wodon 2019). Improving the management, and/or regulatory oversight, of public tap operators and ensuring fair prices for people who source their water from them can also deliver benefits. Uganda will need to address its aging systems, poor maintenance, and inability to repair to broken-down equipment to ensure existing water facilities are working properly (Tsimpo and Wodon 2019).

GoU should revisit the allocation of public funding for WASH in rural areas. While WASH spending has increased in real terms, it remains low in comparison to needs.²² In urban areas, GoU could review tariff structures and set rates in line with operating costs, as tariff subsidies have primarily benefited wealthier households because so few poor households have access to piped schemes (Tsimpo and Wodon 2019). Options for increasing service coverage for the poor include: lowering fees for domestic connections; introducing installment plans for fee payment; offering subsidized connections during the construction phase; and offering lower-cost alternatives to house connections for domestic customers.

3.1.3. Support the labor force to be more productive and competitive in climate-compatible occupations

Given expected population growth—including in the working age youth population—Uganda will need to address barriers to engaging its citizens, especially its youth, in raising productivity and sustaining development. But a large share of the population is engaged in or reliant on rainfed agriculture and outdoor work (including in the services sector). As such, they are exposed to climate change risks and may have low or inadequate skills. Uganda can build resilience to climate risks by integrating climate considerations into ongoing and planned efforts to build human capital, which would also benefit firms and the economy.

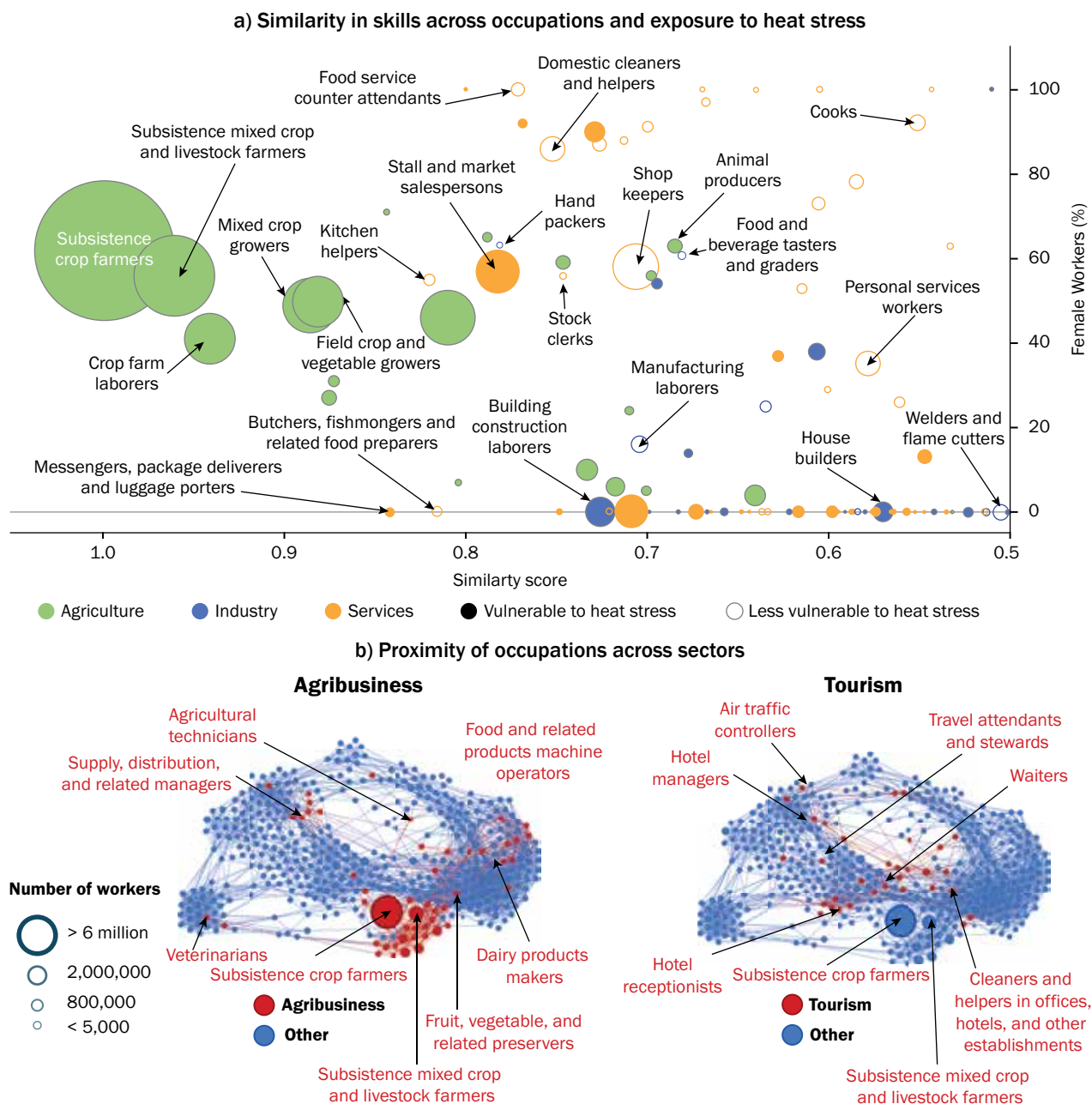
In the short and medium term, Uganda could increase productivity among agriculture and service workers (World Bank 2025m) by providing access to productivity-enhancing technologies and practices and upskilling services. In the near term, it can boost productivity among its large outdoor labor force. To encourage workers to transition across occupations with similar skills, Package A includes short-term actions focused on improving outdoor workers' access to productivity-enhancing technologies and practices within agriculture and service sector jobs. It also recommends upskilling workers to transition to more productive occupations that are similar to their current jobs (Figure 3.3a). Combining skills programs with access to finance and market information can also enhance the performance and productivity of the workforce in micro and small enterprises. Interventions that encourage entrepreneurialism, build networks, improve management skills, and support links with markets and exports value chains are known to have positive impact.

To accommodate a growing and younger workforce, Uganda will benefit from working in partnership with private sector players to improve productivity (World Bank 2025m). There are multiple climate-positive opportunities for private sector involvement in the agribusiness sector—particularly in fisheries, dairy, and maize—including CSA activities based on agritech and digital farming, developing resilient seeds and sustainable inputs, regenerative and conservation agriculture, and climate insurance and risk management (IFC 2022). There are also opportunities for greater private sector investment in the transport and construction sectors, particularly in e-mobility, green building materials, and energy-efficient construction (IFC 2022).

Upskilling and training support should be tailored and available for women. More than half (57.3 percent) of Uganda's subsistence farmers are women (UBOS 2021a), so approaches for improving these farmers' labor productivity must be gender sensitive. Upskilling women to service sectors, which are less exposed to heat stress and already have a relatively large share of women (Figure 3.3) is one option. Some jobs in agribusiness and tourism could also offer feasible and more productive alternatives.

22 2024–25 Budget speech indicates UGX 3.335 trillion (\$908.4 million) was allocated for WASH.

Figure 3.3: The challenge of transitioning across occupations: network map of occupations



Source: World Bank staff analysis, based on 2016 Household Budget Survey data and 2019 Household Panel Survey data for Uganda.

Notes: The analysis uses International Standard Classification of Occupations (ISCO) code (with 4 digits). The nodes are occupations; the node size represents the number of workers; the lines connect different occupations based on similarity in tasks associated with each occupation. Occupations that are close together have similar tasks.

Business, technical, and vocational education and training (BTJET) institutions have the potential to equip Uganda's workforce with the skills needed to drive productivity and growth. Public BTJET enrolment tripled between 2012/13 and 2018/19, yet overall participation remains low.²³ Although the government has advanced the sector by strengthening governance and launching targeted youth training programs in agriculture, construction, tourism, oil, manufacturing, and other key industries, high costs, inadequate

²³ Enrolment increased from approximately 34,000 to 96,000 between 2013–17, according to data from the Annual School Census, Ministry of Education and Sports, with GoU 2018 and 2019 figures. There are 145 public and about 670 private BTJET institutions.

career guidance, limited progression opportunities, and weak industry ties continue to make BTVET less attractive. This contributes to a shortage of skilled labor that hampers economic transformation. The 2025 Technical and Vocational Education and Training (TVET) Act presents an opportunity to better align training with private sector needs. It establishes a TVET Council to oversee provider standards, certify trainers, accredit courses, and ensure effective trainee assessment—key steps toward improving relevance, quality, and access across the sector. Ensuring the act’s successful implementation through adequate funding, strong institutional capacity, and private sector engagement will be crucial. Short-term upskilling and work-based skilling programs—such as apprenticeships and on-the-job training—implemented outside the formal education system are also essential. Collaboration between the private sector and educational institutions could inform the development of programs that build capacity across all sectors. Uganda must also establish a robust labor market information system. This will require increasing analytical capacity and tools and developing institutional arrangements and networks to build a repository of data collection on returns to employment, and productivity for evidenced-based programming. Co-creating the system with private sector would improve the information and intermediation it offers.

3.1.4. Support youth to develop climate solutions

Uninterrupted access to primary and secondary education is key to providing Uganda’s youth with the solid cognitive and socioemotional foundational skills they need to adapt to changing skills demands.

But climate change can disrupt learning by damaging school buildings, destroying learning materials, and limiting access to schools (Kasese District Local Government 2022). Displacement of families due to floods has also resulted in numerous school dropouts due to a lack of access to education in resettlement areas and language and cultural barriers (UNICEF 2022; Kumala Dewi and Dartanto 2019). Acute malnutrition, absenteeism, migration, early marriage, and a need for more labor to support the household can also lead to school dropout, especially among girls.

To increase the ability of youth to benefit from and be resilient to climate change, Uganda’s education infrastructure and opportunities to learn must be shock-proof, and to transfer climate-relevant knowledge.

Independently of climate change, Uganda needs to improve school infrastructure and address classroom overcrowding, which both impact overall learning outcomes.²⁴ Overcrowded classrooms also increase heat stress,²⁵ and poor ventilation is correlated with children missing class days and reduced performance.²⁶ The expected rise in temperatures across Uganda threatens student learning and attendance. Roads that connect students and schools must also be made more resilient to landslides and floods, and it is vital that converting school buildings into shelters during emergencies does not disrupt learning. Uganda needs comprehensive strategies for investing in climate-resilient school infrastructure and implementing heat-diffusing measures, raising community awareness of the importance of safeguarding children’s education in the face of a changing climate and investing in all-weather roads to schools. The 2013–22 Uganda National Climate Change Learning Strategy has made progress in integrating climate-relevant curriculums at all levels, including in TVET settings.²⁷ There is also opportunity to enhance digital skills across the education system and beyond.

24 Most schools are overcrowded, with pupil-classroom ratios exceeding the government standard of 53:1 (more in rural areas and districts with high poverty, particularly in the north and east). Rates of teacher and student absenteeism are higher in overcrowded schools than in those without overcrowding. It is estimated that an additional 292,800 classrooms will be required by 2040 to keep up with projected population increases (World Bank 2025e).

25 UNICEF (2021) reports that over 33% of children globally are exposed to heatwaves that affect their education.

26 Increased classroom temperatures have acute effects on the physiology of students and are linked to reduced accuracy and speed in cognitive tests, translating into diminished learning outcomes (Barbic et al. 2022; Vu 2022)

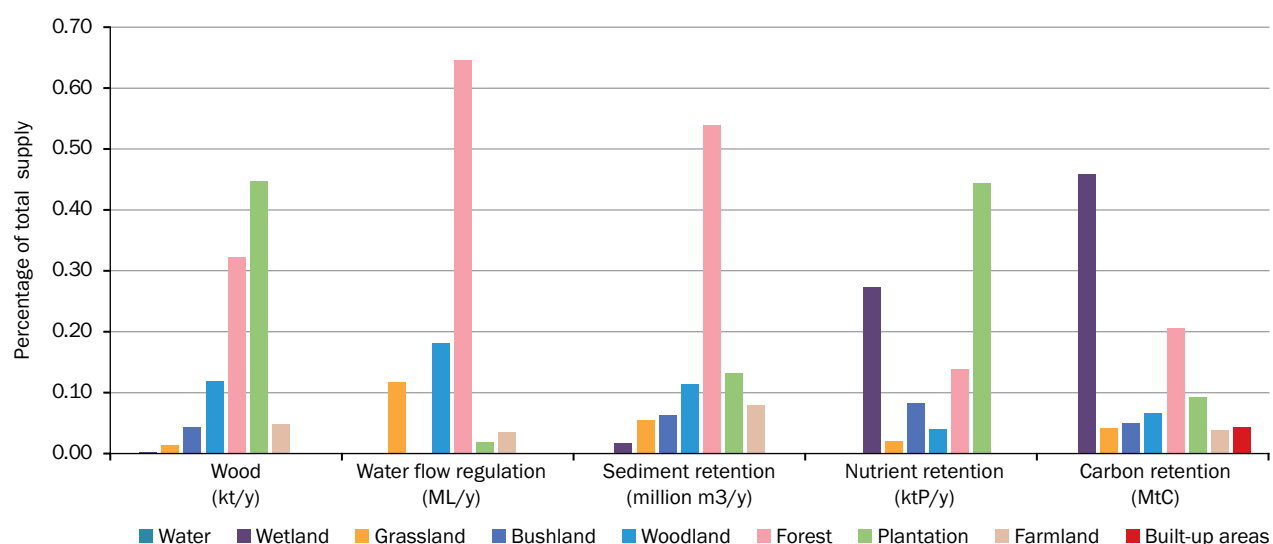
27 The strategy advocates for integrating climate change topics across various disciplines in tertiary institutions. At primary level, topics to build climate change awareness and resilience among children are included in science and environmental education and social studies, while at secondary level, the focus is on environmental awareness, emphasizing learners’ awareness and concern for protecting the environment and climate change (NCDC 2019), and climate change aspects are covered in specific subjects (e.g., Biology, Geography) under the newly revised curriculum aimed at equipping students with the knowledge and skills they need to address environmental challenges. At tertiary level, there are crosscutting undergraduate courses on climate change issues and tailored postgraduate courses geared at addressing the impacts of climate change.

Innovation hubs and incubators could help engage young entrepreneurs in developing climate solutions. Support should include facilitating technology development and demonstration; helping develop markets; providing business support services; enhancing access to finance; and coordination, networking, and capacity-building. A network of hubs and incubators can further catalyze innovation.

3.2. Intervention Package B: Promote resilient and productive agriculture and natural resources with lower GHG emissions

Uganda’s potential to leverage its land and natural resources gives it a comparative advantage over its regional peers. Over one-third of the land is arable, and Uganda boasts more species for its size than nearly any other country in Africa (Pain et al. 2005). Its wetlands, forests, grasslands, and other terrestrial natural systems also provide ecosystem services that are essential for a functional economy and increase resilience to climate shocks. These include retaining nutrients that are important for crop production; regulating water flow, which helps control floods; providing *green water* (soil moisture from rainfall), which makes water available during periods of limited precipitation; and trapping carbon, which helps lower GHGs (Figure 3.4).

Figure 3.4: Contribution of different land covers to ecosystem service production



Source: UBOS 2023, as cited in World Bank 2025i.

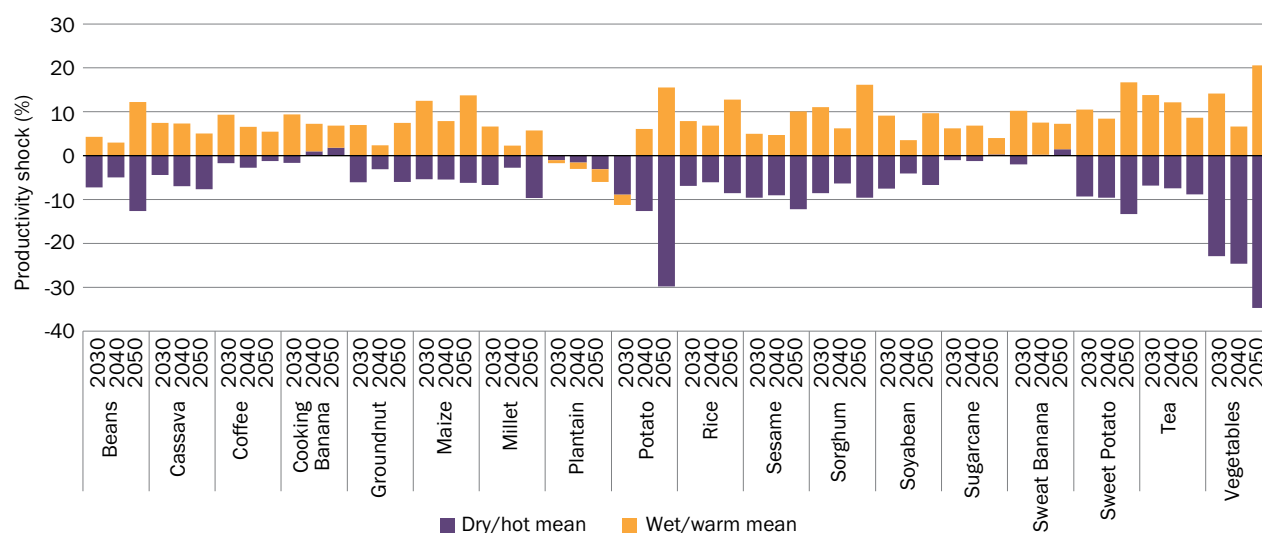
Notes: kt/y = kilotons per year; t/y = tons per year; ML/y = million liters per year; m³/y = cubic meters per year; ktP/y = kilotons Phosphorus per year; MtC = million tons of carbon.

But prevalent land and natural resource uses—such as low-productivity rainfed agriculture, extensive livestock grazing, wood for fuel and charcoal production—are diminishing ecosystem services, exposing associated economic activities to climate risks. Vulnerability to climate events causes continued unsustainable land and natural resource use, resulting in a vicious cycle. In 2020, approximately 7.18 million households engaged in primarily rainfed agriculture and livestock rearing. Rainfed agriculture and extensive livestock production systems will become increasingly exposed to soil erosion and unpredictable crop and livestock yields due to changes in precipitation and temperature (Figure 3.5).

3.2.1. Increase the resilience of agriculture while also increasing productivity

From 2022 to 2050, climate change results in aggregate crop yields that fluctuate between - 12 percent and +12.5 percent compared to the baseline. A dry/hot climate future could result in rainfed crops experiencing a drop in yields, ranging from 3 percent for millet and tea to 30 percent for vegetables, though some crops, such as coffee, cooking banana, sugarcane, and sweet banana, are expected to see average increases of 0–4 percent.²⁸ Under a wet/warm future, yields could be positive, increasing, on average, by 2–16 percent, with the exceptions of sesame (no change) and vegetables (a drop of 10 percent). Soil erosion compounds the impact of temperature and rainfall, decreasing yields by 0–12 percent.

Figure 3.5: Change in rainfed crop productivity resulting from climate change under BAU, 2030–50

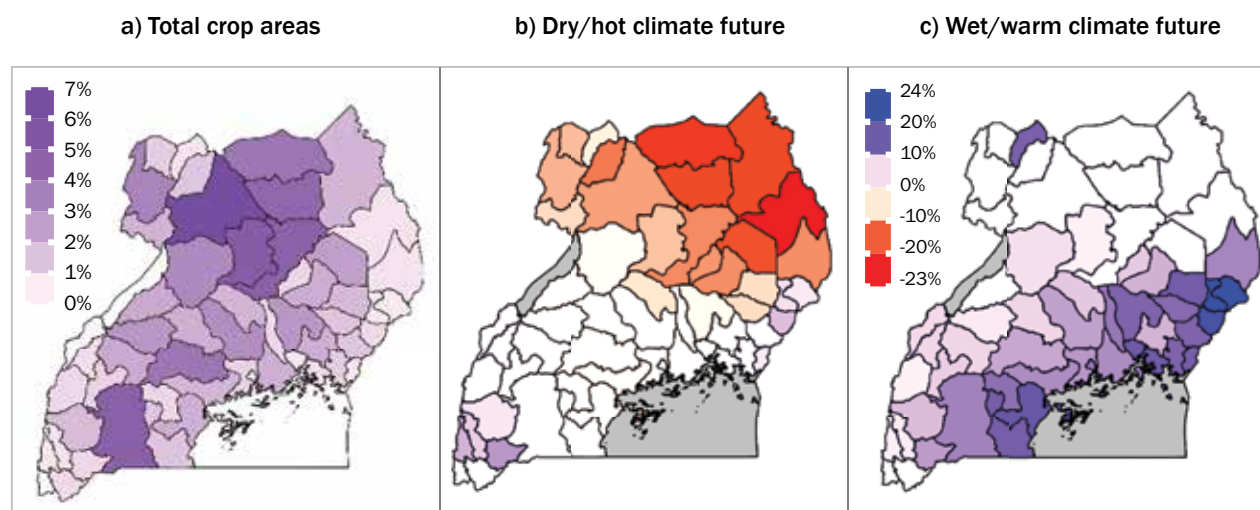


Source: World Bank staff calculations, based on data from World Bank 2025d.

The impact of climate change on rainfed crops will vary by region. While historically concentrated in the north and southwest, crops areas are found across the country. Under the dry/hot climate future, the highest production shocks are expected in the northeast, reaching -23 percent in Moroto district by the 2040s, with areas in the southwest and some eastern areas seeing small production gains. Under the wet/warm climate future, the highest production gains are expected in the east, reaching +24 percent in Sironko district (Figure 3.6).

²⁸ These changes in mean crop yield shocks are from water availability and heat effects in a dry/hot climate future. For coffee, the results indicate a mean yield shock is near 0%, notably differing from Jassogne, Laderach and van Asten's (2013) estimate of 10–50% climate-induced coffee yield losses, affecting Uganda's foreign exchange revenue by \$15–80 m per year.

Figure 3.6: Total crop area and expected production shocks, by district, under BAU, 2041–50



Source: World Bank 2025d.

Efforts to boost food and export crops will also be challenged by climate-induced reduction in yields and Uganda will need to explore alternatives to irrigation. Total irrigated area is estimated at 63,600 hectares, with various levels of expansion planned by 2050 under the different development scenarios. Irrigation, which is more prevalent for cash crops, is helping buffer the consequences of climate change. Under BAU, average climate shocks to irrigated crops are expected to be around -0.1 percent for both the dry/hot and wet/warm climate scenarios in 2041–50. Irrigation expansion must be done with due consideration for climate change, as evidenced by the productivity shocks to irrigated agriculture under ASP, which are worse than under BAU at -2.5 and -1.3 percent for the dry/hot and wet/warm climate futures, respectively. Irrigation increases significantly in ASP, but also creates higher unmet irrigation demands. In the Albert Nile, Lake Kyoga, and Victoria Nile sub-basins, irrigation demand is high relative to comparatively limited water resources, and unmet demand in the sector is expected to persist in the decades to mid-century. Under both climate futures, there will be a small reduction in unmet irrigation demands by 2041–50 compared to projections without any further change in climate. Exploring alternatives to irrigation is imperative considering the importance of agroindustrialization in Uganda’s development plans.

Efforts to enhance the resilience of low-productivity, rainfed farming systems should prioritize improving soil health with sustainable land management (SLM) practices. Green manure, cover crops, perennial plants, minimum tillage, crop rotation, mulching, and erosion control can all improve soil health. For example, increasing perennial crops can improve soil carbon stock from 16.6 to 23.1 percent, lower the risk of soil erosion, and increase green water while also increasing productivity (see discussion in section 3.2.3). Implemented jointly with microirrigation and appropriate fertilizer use, SLM can increase crop productivity by more than 220 percent. In the presence of shocks, the package of practices reduces yield losses by 9–14 percent. Promoting SLM will require expanding the reach of extension services, as current adoption is low due to limited understanding of soil quality and the benefits of SLM: 56 percent of agricultural parcels have poor soils and only 2 percent have good soils, yet only 13 percent of farmers think they have poor soil (World Bank 2025a). Considering the high share of women in agriculture, and their lack of financial and decision-making power, all extension efforts and technology promotions must be gender inclusive.

Increasing the area under irrigation can dampen the impact of climate change on rainfed crop yields. Irrigation can reduce the negative impact of climate change on rice, sesame, and vegetables yields by 88, 44, and 93 percent, respectively. Without irrigation, farming tends to shift into wetlands,²⁹ creating negative

²⁹ Data show the share of agricultural parcels in wetlands increasing from 1.69% to 2.2% (World Bank 2025a).

environmental externalities. Under BAU with climate action, the impacts of expanding irrigation are slightly worse (-0.3 percent) under the dry/hot climate future and slightly better (+0.03 percent) under the wet/warm climate future than under BAU without climate action, because of the unmet demands under the dry/hot mean. Similarly, under ASP with climate action—that is, expanding irrigation and improving the response to heat and water stress through CSA) the expected shocks are lower than ASP without climate action, resulting in shocks of -1.9 and -0.7 percent for the dry/hot and wet/warm climate futures, respectively. To reduce unmet demand, Uganda will need to implement nature-based and gray infrastructure solutions for water storage alongside efficient irrigation scheme management, regulation of water abstraction and water quality, and increased compliance monitoring. Tackling limited budgets and insufficient planning, management, and data collection capacity in water resource management entities would enable them to operationalize changes in irrigation and water management and fulfill their mandates.

Promoting the use of drought-tolerant seed varieties alongside irrigation would further increase resilience and productivity. Less than 10 percent of households use improved seeds for all crops (except for maize and cotton) despite evidence of increased yields and the availability of improved seed varieties in the marketplace, including 19 drought-tolerant varieties of maize (World Bank 2025a). In the short term, GoU could adopt an electronic voucher system with a credible exit strategy to incentivize farmers to deploy improved practices, alongside strengthening quality assurance processes and certifying and enforcing seed standards. In the medium term, it could invest in laboratories to test agro-inputs and tissue culture, while in the long term, it will need to continue raising awareness about CSA practices via extension services.

Uganda needs well-functioning weather alert systems and approaches for implementing effective soil management and irrigation at low-cost and scale to increase commercial farmers' resilience to climate shocks. Clarity and enforced land tenure will help unlock commercial farmers' investments in agroforestry practices that improve soil health. Tenure formalization and boundary demarcation will facilitate long-term land-based investments and secure confidence in long-term returns. It can also motivate engagement in carbon farming, providing a source of revenue from better management practices. Ignoring climate change could reduce impact yields of export crops, leading to estimated losses of up to \$1.5 and \$1.4 billion by 2050, respectively.

3.2.2. Lower GHG emissions from livestock

A major source of methane emissions, livestock are directly and indirectly impacted by heat stress and reduced availability of feed sources. Nearly 7 million households (72.8 percent) keep at least one type of livestock (UBOS 2024a). Agriculture is the primary source of methane emissions in Uganda, and 86 percent of these come from livestock, partly due to poor quality feed sources. Under a dry/hot climate future, changes in feed availability are expected to lower cattle, goat, and sheep meat production by 0.6–0.9 percent, and under a wet/warm climate future, to increase production by 2.1–2.4 percent. The impact of heat on milk and egg production is expected to be negative under both climate futures, and could reach 0.7 and 1.7 percent, respectively, under a dry/hot future.

Economic transformation will result in increased consumption of meat and dairy products, pointing to the need to boost productivity in the livestock sector while reducing GHG emissions. Supplements and selective breeding can help improve feed, productivity, animal health, and fertility while lowering GHG emissions. Improvements in feeding systems should be prioritized, as they can increase the live cattle weight by 60 percent (World Bank 2025b). Medium-term measures can include breed improvements, which can help increase productivity- by up to 54 percent for milk and 30 percent for live weight. If herd sizes are not increased, such measures could also reduce methane emissions from livestock by up to 23 percent (World Bank 2025c). Faster transition to climate-friendly livestock management practices will require government support for specialization and intensification. GoU can promote and help improve access to

low-carbon, low-cost feed, feeding strategies, cattle genetics, breeding practices, and livestock vaccinations. With 60 percent of livestock farmers largely reliant on private sector extension services, GoU should also support additional private sector-led extension services.

3.2.3. Curb natural habitat loss and forest degradation, and promote watershed management

Improving the management of natural resources (biodiversity, forests, land, water) will require broader landscape measures to generate ecosystem services that are vital for resilience to climate risks and lowering GHG emissions. Landscape management measures will also benefit nature-based tourism, a key growth sector in Uganda. Landscape measures can reinforce on-farm measures to improve productivity and address climate change. Many landscape measures are suitable for private sector engagement and can both improve and create jobs.

Restore wetlands to help water flow regulations³⁰

Uganda's primary water sources include Lake Victoria and the River Nile, and it shares about 35 percent of its water resources with neighboring countries. It is party to the Protocol for Sustainable Development of the Lake Victoria Basin, under the Lake Victoria Basin Commission, which promotes the principles of using water resources without causing significant harm. Over 90 percent of the country's groundwater resources are made up of low-yield hard rock aquifers. Industry, agriculture, and domestic and municipal use account for 8, 41, and 51 percent of all freshwater abstractions, respectively, and the oil and gas sector relies on surface water in the Lake Albert Basin.

Uganda's lakes, rivers, and wetlands serve as reservoirs, storing water during the wet season, and slowly releasing it back into river system during the dry season. For Lake Victoria, Uganda determines the outflow according to the agreed discharge curve that modifies the amount of water released from Lake Victoria based on the lake level to maintain the natural flow.³¹ Uganda's extensive wetlands cover 9 percent of the country, but 40 percent have been lost to agricultural expansion and urbanization since 1994.

Climate change is not expected to significantly change runoff seasonality trends from 2041–50, though the magnitude of runoff will likely increase. Under all climate scenarios, runoff peaks are projected to continue to occur during March–May and August–November. Although the magnitude of flows will vary, they will increase overall under all climate futures, particularly under a wet/warm mean, with higher peaks in April and August–November. The dry/hot climate future is also projected to be wetter, except for small reductions in August–October. These futures point to the importance of naturally regulating water flows.

Reducing (and eventually halting) wetland conversion to agriculture requires the enforcement of land use regulations. NEMA has designated 8,613 gazetted wetlands in Uganda as protected critical ecosystems where encroachment, drainage, and pollution are strictly prohibited. The Uganda Wetlands Atlas (GoU 2016) provides useful proposals, including forming wetland restoration committees and promoting revenue-generating activities, such as nature-based and leisure tourism, where feasible. LGs need to actively manage the natural assets within their jurisdictions with improved planning, management (including demarcation) and enforcement against conversion (GoU 2016). Performance-based climate grants could help align district priorities with climate resilience.

³⁰ This section is based on IPCC (2022).

³¹ A new water release and abstraction policy for Lake Victoria is under development, which will require studies for a strategic impact assessment and environmental and social impact assessment that account for both current and future water demands across all riparian states, considering NDPs and climate change. The draft policy was based on Uganda's Vision 2040 but is rapidly being overtaken by emerging developments, such as those in the oil and gas sector. The countries involved are also developing a regional water resources policy. In the interim, the MWE recommends continued use of the agreed curve that correlates Lake Victoria's water levels with discharge rates at Jinja.

Reduce conversion of forests by tackling unsustainable fuelwood and charcoal production

Forest loss in Uganda is consequential for addressing climate change and lowering emissions.

Extrapolating changes in forest land cover since 2019, well-stocked and low-stocked tropical high forests and woodlands are expected to decline in area by 2050 under BAU. The main drivers of natural forest conversion range are wildfires, wood extraction for energy and construction materials, smallholder agricultural expansion, and large-scale commercial farmland. Under BAU, deforestation emissions grow by 16 percent and carbon sequestration from forests declines by 15 percent by 2050.

To curb forest degradation and conversion, Uganda needs to address unsustainable firewood and charcoal production and use, and accelerate the transition to clean cooking.³²

More than 20 percent of households use charcoal as their primary cooking fuel, and 73 percent use firewood. Of the latter, around 66 source their wood directly from forests, contributing to degradation pressures. Solid biomass satisfies 80 percent of energy demand in the industrial sector—with brickmaking accounting for the largest share—and 95 percent of energy demand in the services sector.³³ There is a ban on charcoal trade in the country, but this is often circumvented. Transitioning away from current levels of firewood and charcoal use will require evidence-based policy reforms, a new market structure for charcoal (UBOS 2020) that internalizes extraction costs, and transitioning from informal to formal activities. Simplifying the governance framework and revenue collection system by assigning a single agency to oversee commercial woodfuels, and using, for example, independent, performance-based agents to collect fees and levies could help (MWE 2019). Enforceable regulations and standards for charcoal, technical and financial support for commercial tree-growing on private land, and incentives for industrial use of sustainably sourced fuelwood, pellets, and woodchips could create a well-functioning market.

Efforts to accelerate the uptake of modern cookstoves are also urgent. GoU must ensure the Clean Cooking Unit within the Ministry of Energy and Mineral Development (MEMD)³⁴ is adequately resourced to strengthen local institutional capacity for clean cooking strategy coordination and implementation. Lowering the cost of liquefied petroleum gas adoption and use, including via credit schemes and pay-as-you-go technology, and providing commercial incentive packages for manufacturers and importers of high-tier cookstoves to meet GoU standards could help improve uptake.

Enrichment planting and active restoration of degraded natural forest will help increase carbon sequestration. Restoration will require investments, incentives, and local community involvement. Restoring western Uganda's indigenous forests to their 1990 levels, in line with Vision 2040, could result in a return on investment as high as 21.5 percent (Turpie et al. 2023). The net present value of a \$153 million investment in restoration is approximately \$3 billion. LG support for and collaboration with local communities in protecting community and local forest reserves will be vital. LGs could scale out effective payment for ecosystem service (PES) schemes to reward forest restoration outside of protected areas and assist with tree seedlings and active tree planting during the initial years.

Manage wildlife habitat and research impact of climate change on fisheries

Temperature increases may change the spatial distribution of flora and fauna, with consequences for nature-based tourism. The spread of invasive species and greater incidence of forest fires will cause

32 Another key strategy is CSA (section 3.2.1).

33 Biomass is used primarily for cooking and water heating in schools and other public institutions. On average, a day school with 500 students consumes about 12 tons of firewood per term (36 per year), and a boarding school of about 1,000 students, 70 tons per term (210 per year). In 2017, Uganda had 20,305 primary schools and 2,995 secondary schools (UBOS 2023, as cited in World Bank 2025e).

34 The unit has launched awareness campaigns, undertaken public consultations, and developed targeted incentives to increase women's participation in the clean cooking supply chain. It also provides tax incentives and business development support for clean cooking businesses, sets performance targets for cookstove thermal efficiency and emissions factors, and developed a cookstove testing facility to determine compliance with performance tiers developed through the International Organization for Standardization.

vegetation shifts, including afro-alpine vegetation moving to higher altitudes and invasive species, such as *Lantana camara* and *Harrisonia Abyssinia*, displacing pastures (USAID 2014). These climate change impacts will be consequential for several national parks and forest reserves. Changes in wildlife habitats or range will modify the distribution of wildlife, impacting prey species such as ostrich, zebras, kudu, hartebeest, and eland, and predator species such as lions, leopards, and cheetahs. Animals will migrate to new areas as current habitats become uncondusive for grazing. Climate change impacts on range (Table 3.2) and wildlife populations in Greater Virunga Landscape could cause endemic and threatened species to decline by as much as 70 percent by 2070, negatively impacting ecotourism revenues (Plumptre et al. 2017).

Table 3.2: Percentage loss of species range due to climate change

Status	Species	Average range in 2070 (km ²)	Average range loss due to climate change (%)
Endemic (68 species)	Birds (27)	1,446	74.6
	Large mammals (3)	704	61.9
	Plants (38)	1,164	70.4
Landscape and threatened species (38)	Birds (11)	2,864	68.5
	Large mammals (11)	22,561	83
	Plants (17)	2,725	83.2

Source: Plumptre et al. 2017.

The impact of climate change on fisheries in Lake Victoria—and in turn the national fisheries industry, which contributes 1.5 percent of Uganda’s annual GDP (2018/19)—needs further analysis. Surveys of fishing communities report an increased prevalence of unpredictable intense drought events and strong wind storms, and higher occurrence of short, intense, and unpredictable flash flooding events, resulting in low fish catches and sales (Nyboer et al. 2022). If small opportunistic fish species that can exploit the changes in climate prevail, then an increase in the stocks of *Silver Cyprinid (Dagaa)* in Lakes Victoria and Kyoga and *bredoi* in Lake Neobola could cause the loss of other fish species. Further studies linking the likely direct and indirect economic impacts of climate change on fisheries production in Lake Victoria are needed to guide investments to enhance the sector’s resilience to climate change.

National park and wildlife reserve management and restoring degraded protected natural forests can help preserve natural habitats and support biodiversity (World Bank 2025i). Natural forest generation and enrichment planting with indigenous tree species will be important and could involve local communities. However, converting farmland inside illegally encroached protected areas back to indigenous forest will require more investment than restoration, as Uganda’s law requires compensation for relocated settlers (Turpie et al. 2023). Increasing opportunities for income generation from nature-based tourism could provide the incentive to restore and manage habitat.

3.2.4. Engage the private sector in nature- and climate-positive measures

Expanding the private sector’s role in agriculture input supply networks and low-carbon and resource-efficient technology provision will help accelerate the shift to CSA. The private sector can provide key inputs for climate-smart, resilient, and productive agriculture, including drought-resistant and early-maturing seed varieties and organic fertilizer. They can also facilitate the use of digital tools for mobile advisory and payment platforms (agritech and digital farming) that help modernize extension services, increase digital data collection and application, explore the feasibility of pay-for-results programs for agriculture extension

service providers, and support mechanization. Digital platforms like Agrishare, which enable farmers to rent agricultural equipment, land, and labor on demand, and SunCulture, a pay-as-you-grow financing model that allows farmers to acquire solar-powered irrigation systems with minimal upfront cost, can make modern irrigation accessible and financially viable for smallholder and low-income farmers. Private entities can also support more off-grid renewable energy solutions.

Private sector actors can help boost the resilience of nature-based tourism, generating climate co-benefits and jobs. Uganda has a lot of untapped potential to develop new products and tourist attractions with private investments.³⁵ More than half of the country's tourist revenue comes from wildlife products, particularly gorilla permit sales (NPA 2020),³⁶ and is concentrated in Albertine (80 percent of leisure tourists), Kidepo Valley, the Rwenzori Mountains, and Mount Elgon. If 100,000 additional leisure tourists had visited Uganda in 2019, tourism exports would have increased by \$100 million; and if each tourist had spent one additional night in Uganda, they would have increased by \$67 million, equaling 1.5 and 1 percent of total exports, respectively. To incentivize private sector engagement in protected area management to preserve important habitats and their associated ecosystem services, GoU should invest in roads and digital infrastructure in priority tourism attraction sites, control wildlife poaching and illegal trade, establish wildlife corridors, and protect wildlife. This would motivate private financing for eco-friendly hospitality and services, integrating renewable energy, water-efficient technologies, and robust waste management systems. Other incentives include implementing training programs on sustainable tourism practices, providing technical support for energy and water efficiency, and reinforcing efforts to eco-certify tourism operators through mandatory sustainability reporting. Making such investments in areas with wildlife tourism potential could create up to 55,000 jobs from tourism opportunities, and up to 88,000, if consumer spillover is included (World Bank 2025i).

Crosscutting reforms on land tenure would support greater private sector involvement. Tenure security will help incentivize long-term investments—for example, in agroforestry, soil stabilization, land fencing, pasture management, and water supply—that increase climate resilience in agriculture and natural resources. GoU could streamline the acquisition of customary and occupancy certificates and lower the cost of land titling to increase private sector engagement. It could also identify viable ways of aggregating land parcels, including through suitable and secure lease arrangements. Supporting land markets would create productivity gains, but it will be imperative to ensure no unintended negative distributional impacts.

More accessible agroclimatic information and support for PPPs would also stimulate private engagement. Budget and capacity support are needed to develop publicly accessible meteorological and agroclimatic information, which would enable private sector innovation and improve risk assessment in agrifinance and water monitoring and management. Agribusiness would benefit from investment in temperature-controlled logistics and storage, including through deliberately designed PPPs. Efforts to increase clean cooking and transition industry from biomass energy to alternatives, such as bagasse, could also leverage PPPs. Enhancing the capacity of the PPP Unit and establishing robust carbon trading mechanisms will also be important (IFC 2025), as will improving trade facilitation at the border to increase access to regional markets.

35 Tourism in Uganda was a star growth sector in 2019, with international arrivals reaching 1.5 million and tourist exports grew by 15.2% between 2012 and 2019. An input-output analysis showed that including indirect effects, the tourism sector generated a value added of \$387 million, or \$1,074 million if both indirect and induced effects are included, corresponding to 0.8% and 2.3% of GDP, respectively (MTWA 2019). The COVID-19 pandemic caused the value of tourism exports to drop by 44% in 2022 compared to 2019, from UGX 4,580 billion to 2,571 billion and employment to drop from 670,000 to 610,000 (MoTWA/UBOS 2023).

36 Between 2012 and 2019, total expenditure by international tourists on park entrance and value assigned to transactions on other products and services increased from approximately UGX 34.5 to 96.5 billion (World Bank 2025i).

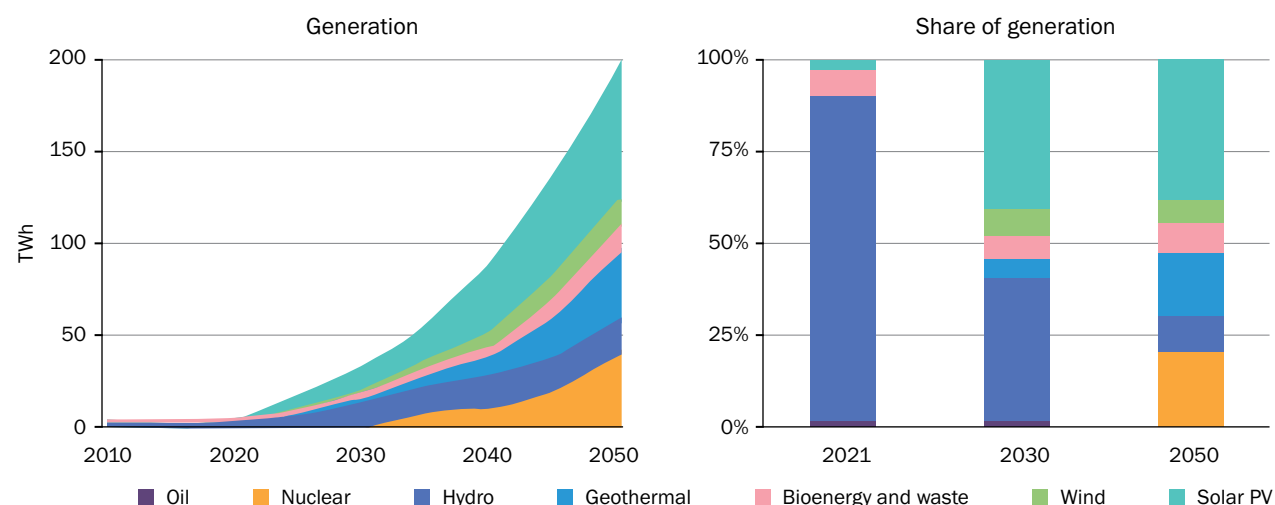
3.3. Intervention Package C: Develop climate-responsive energy, transport, and digital infrastructure

Stimulating private sector engagement in green and climate-resilient value chains would position Uganda to benefit from opportunities in a decarbonizing world while creating jobs in sectors with higher productivity and opportunities for knowledge and technology transfer. Its low tariffs on environmental goods, especially renewable energy technologies, enable the private sector to adopt sustainable production practices and align with emerging global standards. Uganda will need to improve logistics, energy, transport, and digital systems, and make them resilient and low carbon to address high trading costs and reap emerging trade opportunities. Integrating its untapped critical minerals reserves into sustainable supply chains would align Uganda with rising global demand for green technologies and further diversify trade opportunities.

3.3.1. Promote a least-cost, competitive, and climate-resilient power system

With 90 percent of Uganda's electricity coming from hydropower, its generation mix is already low carbon, but further developing renewable energy resources would help it meet the expected increase in demand. In 2024, installed generation capacity stood at 2,048 megawatts. GoU expects demand to increase to 52,400 megawatts by 2040, in line with expected growth in industrial activity, rising living standards, population growth, and higher shares of end-use electrification as outlined in Vision 2040. Electrification in all end-use sectors is projected to reach 56 percent by 2050, a notable leap from 3 percent today. The Uganda Energy Transition Plan indicates that by 2050, the country will need about 200 terrawatt hours of electricity (IEA 2023b). This is a significant increase from 2024, when consumption was under 10 terrawatt hours, with demand met largely by low-emissions sources (Figure 3.7). MEMD is developing Uganda's 2025 Integrated Generation and Transmission Plan, which aims to identify investments in generation and transmission over 2025–40. Based on the MEMD generation and transmission expansion model, two scenarios were modeled for this CCDR: BAU and ASP with 10 and 14 percent annual increase in demand, respectively.³⁷ The growth in electricity demand and associated generation requirements are ambitious and

Figure 3.7: Electricity generation in the Energy Transition Plan, by technology, 2010–50



Source: IEA 2023b.

³⁷ Similar to the macroeconomic scenario, ASP is the Ten-Fold Growth scenario until 2050. While these figures are ambitious, existing generation capacity is low (approximately 2,000 megawatts) and investments in generation tend to be lumpy.

there is a possibility that the demand projections will not materialize as expected. Regular updates of the generation expansion plan according to least-cost principles are necessary to ensure the evolution of the power sector follows a cost-optimal approach and demand is fully served. To also ensure continued energy security and optimal pricing outcomes for end consumers, planning should also consider the costs and lead times of primary energy options and technologies, some of which may require additional regulatory oversight and conformity to international treaties. Based on least-cost planning outputs, additional power generation procurement should be initiated timeously.

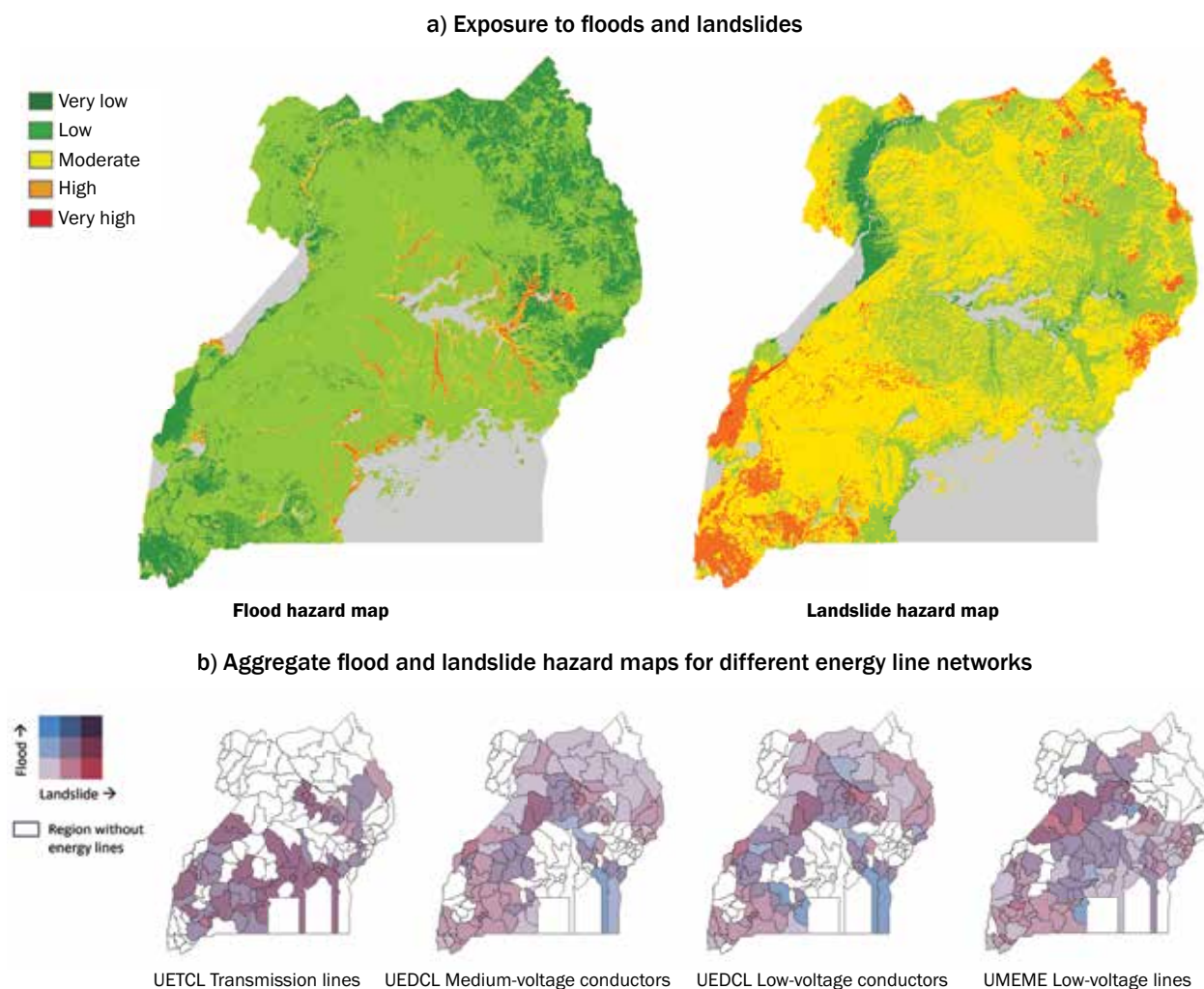
Uganda boasts excellent hydroelectric and solar resources, with an average practical potential of 4.46 kilowatt hours per day, which is higher than Spain, China, and other leading solar generation markets (IEA 2023b). These low-carbon, low-cost generation technologies could contribute significantly to Uganda's future energy mix under different climate futures. Uganda's hydropower system is considered resilient to climate variability, largely due to its dependence on the River Nile's regulated flow. Most large hydropower plants—such as Bujagali, Kiira, and Nalubaale—are on the Nile, and the bulk of Uganda's hydropower potential originates from the river's outlets from Lake Victoria to Lake Kyoga and Lake Kyoga to Lake Albert (Directorate of Water Resources Management 2013). These lakes stabilize the river's flow and mitigate the negative impacts of climate change, such as droughts and floods. Lake Victoria has enough water storage potential to satisfy short-term electricity demands and optimize mid-term power production. Interannual and monthly variation will be high, suggesting certain periods could experience declines in production, but hydropower generation is anticipated, on average, to increase overall by 2050, even under a dry/hot climate future. Several small and medium hydropower sites in the west and east are not currently in use,³⁸ but runoff variability may make it difficult for smaller plants that are not on the River Nile and do not have upstream reservoirs to maintain consistent generation without turbine upgrades, improved forecasting systems, and other mitigation measures.

As the Ugandan economy becomes more electrified, the importance of having a robust and reliable transmission and distribution network infrastructure becomes more pronounced. An assessment shows that 78.1 percent of the transmission grid is at very low or low risk of flooding, 14.6 percent is at moderate risk, and 7.4 percent is at high or very high risk. Transmission line exposure is limited, but 11 percent of the distribution grid is at high risk of flooding. Areas north of Lake Albert, the valleys surrounding Lake Kyoga, and Lake Victoria's northwestern shoreline are particularly vulnerable to high and very high flood risks, while the southwestern and northeastern regions are generally at low risk (Figure 3.8). Approximately 87 percent of Uganda's transmission and distribution network—totaling 46,259 kilometers—is exposed to very low to low flood hazard, and 11 percent to high hazard. Flash floods are a localized but serious threat to the grid, particularly around Lakes Kyoga and Kwanja. In the Kyoga Basin, 21 percent of transmission lines are highly exposed to flash flood hazards, 79 percent are at moderate to low risk. Medium-voltage conductor lines are particularly vulnerable.

Nearly half of Uganda's power lines (20,216 kilometers) are exposed to moderate landslide risk, and 89.8 percent of the transmission grid is at low to moderate landslide risk. Only 5.6 percent of Uganda's power lines are at high risk, and 44 percent are at low risk, while 61.6 percent of the transmission grid is at very low to low risk; 29.5 percent is at moderate risk, and 8.7 percent, at high to very high risk. Landslide risks are concentrated in the mountainous regions, with high and very high risks in Zombo, Kasese, and other northern counties, the southern and northern border regions, and Mbale near Mount Elgon. Central Uganda, including Kampala, faces moderate landslide risks.

38 https://www.hyposo.eu/pdf/4_Nabutsabi_DM.pdf.

Figure 3.8: National maps of hazards



Source: World Bank staff calculations, based on World Bank Energy Sector Management Assistance Program and European Space Agency's Global Development Assistance Programme modeling 2024.

Notes: UEDCL: Uganda Electricity Distribution Company Limited; UETCL: Uganda Electricity Transmission Company Limited; UMEME: Umeme Limited.

Adding to the climate challenges, increased demand from the industry, transport, and other sectors may substantially impact the reliability of the distribution grid. The 2021 National Electrification Strategy shows that grid extension and densification should enable 4.63 million connections by 2030. A distribution network expansion plan that identifies and prioritizes more predictable investments—for example, to facilitate the national electrification strategy and scale up e-mobility—could help mitigate these impacts. Developing cross-border transmission lines can also increase energy security, support grid stability, facilitate increased regional energy trading, and increase revenue for the power sector.

Off-grid systems will be important for achieving universal access and will need to account for 5.5 million connections. Solar mini-grids will allow for 230,000 connections with solar home systems providing the rest (MEMD 2021). Universal access will facilitate the transition to clean cooking technologies, providing health, economic, social, environmental, and climate benefits. These systems can also contribute toward community resilience, through early warning messaging systems, refrigeration and pumping systems for improved health and food security, and post-disaster response and recovery.³⁹

39 <https://blogs.worldbank.org/en/energy/how-grid-solar-solutions-are-key-climate-adaptation-and-resilience>.

To meet the country's development agenda, Uganda will have to significantly invest in expanding its generation and transmission infrastructure. Between 2030 and 2050, the sector will require around \$14 billion under BAU, and \$30 billion under ASP.⁴⁰ Through to 2030, the Energy Transition Plan states that \$850 million per year will be needed to achieve universal access to electricity and clean cooking. Almost 90 percent of this will be for electricity provision, financing grid expansion, off-grid solar home systems and mini-grids. After 2030, it will also be necessary to transition remote communities to mini-grids or grid connections, as demand increases.

Institutionalizing least-cost generation and transmission expansion planning and updating the plan every two years will ensure it adapts to changes in demand, incorporates appropriate technologies, and optimizes costs. The plan should form the basis for allocating projects between the public and private sector, since public financing alone is unlikely to meet the investment requirements. To increase private sector engagement at the scale required, GoU will need to enhance institutional capacity to procure and manage energy sector investments and develop its capacity to engage in competitive bidding for private sector investments. Private sector players can play a major role in maximizing the efficiency of and financing solar mini-grids, which could also provide an opportunity for generating carbon credits.

3.3.2. Invest in resilient and low-carbon transport infrastructure

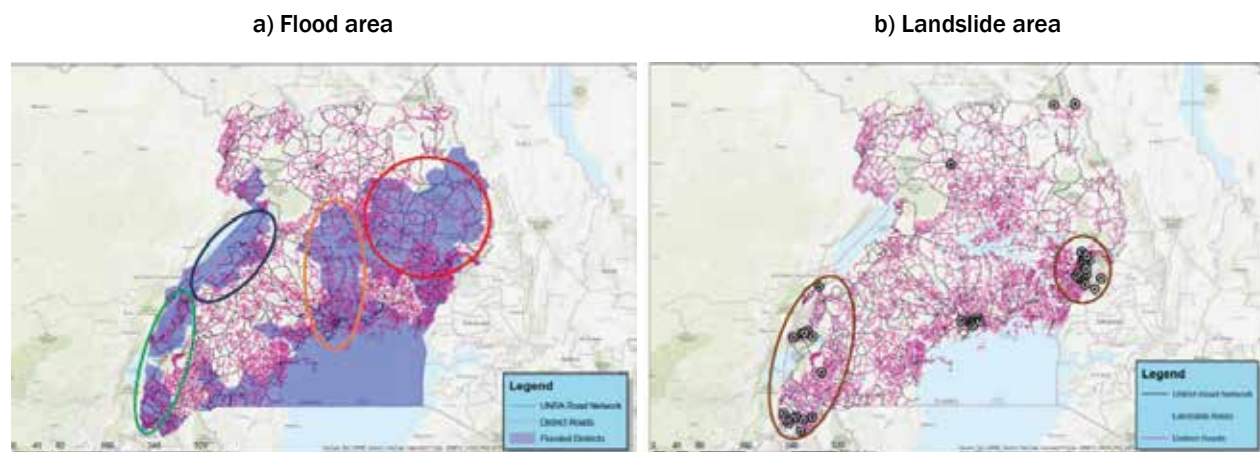
Uganda's structural transformation agenda calls for greater investment in new, resilient infrastructure, which is central for economic transformation. Flooding and other climate effects on Ugandan roads impact trade, including of agricultural products, causing losses of nearly \$33 billion. The bulk of the climate risks to transport stem from road surfaces in the subnational network. Only 25.69 percent of national roads, 6.16 percent of urban roads, and 0.28 percent of district roads are paved. No community access roads are paved. With community and district roads making up 76 percent of the country's road network, this means less than 5 percent of the entire network is paved.

Flooding accounts for more than 52 and 62 percent of total damages under the SSP2–4.5 and SSP3–7.0 scenarios, respectively, followed by precipitation and temperature-related damages. Annual maintenance costs are expected to increase, on average, by approximately \$13.6 million and \$26 million in the 2040s, relative to the historical baseline, under SSP2–4.5 and SSP3–7.0, respectively. The high share of tertiary gravel roads are vulnerable to the impacts of flooding and precipitation. During 2041–50, climate change is expected to increase road delays by 2.6–3.5 million hours and increased road repairs will have negative labor supply shocks of approximately 0.01–0.02 percent.

The impacts of climate change on roads vary across the country. They are expected to be most severe in the southwest, with damages peaking at \$8,200 per kilometer under the SSP3–7.0 ensemble mean. Ntungamo, Rukungiri, and other southwestern districts are expected to experience sizable damages, ranging from \$4,000–7,000 per kilometer (Figures 3.9 and 3.10).

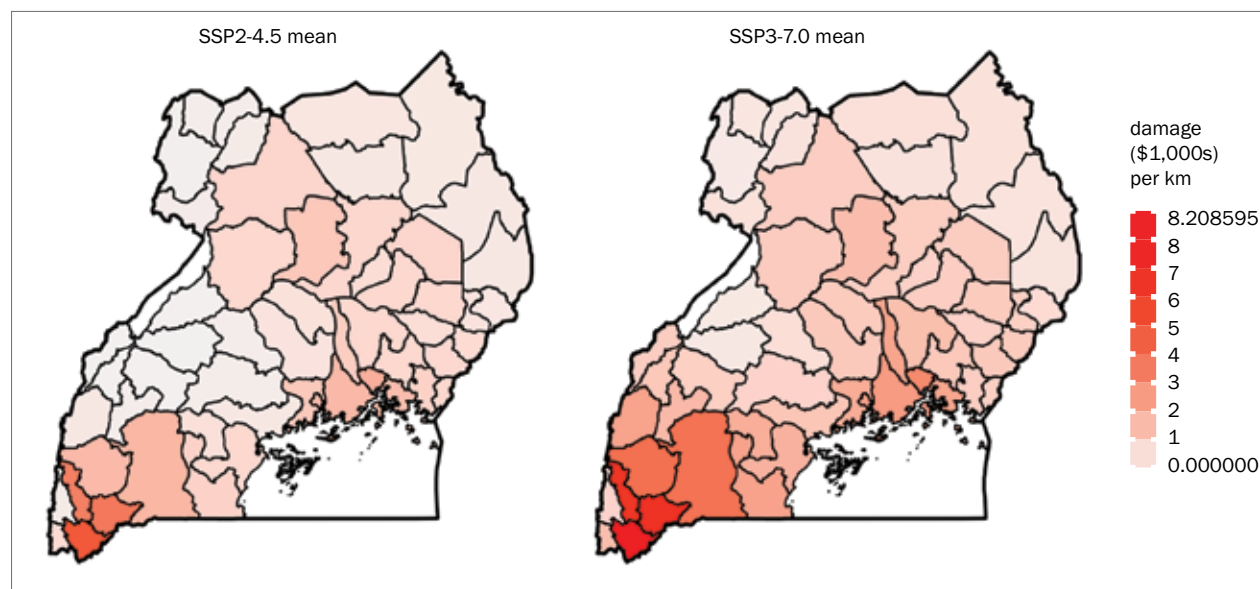
⁴⁰ To ensure consistency and comparability with other sectors, the investments are reported in constant prices, discounted to present value using a 6 percent real discount rate.

Figure 3.9: Exposure to floods and landslides



Source: World Bank 2025d.

Figure 3.10. Additional annual damages, relative to the baseline, by district, under BAU



Source: World Bank 2025d.

The impact of climate change on bridges stems from changes in the recurrence of peak precipitation events, which cause increased moisture, washaways, and overtopping from flooding events. Annual expected damages are estimated to increase by \$5 million, while a single 25-year flood is estimated to cause \$87 million in damage to bridges, increasing to \$150 million by 2050. A 100-year flood event is projected to result in around \$200 million in bridge damage by the 2040s.

Ensuring Uganda's infrastructure is climate-resilient is estimated to cost \$33.98 billion as of 2024 (World Bank 2025k). New construction accounts for 76–80 percent of total costs, and the rest is for additional maintenance. Segments to prioritize include the two transit corridors that facilitate import and export activities in the region: the 1,700-kilometer Northern Corridor, which starts in Mombasa and serves Kenya, Uganda, Rwanda, Burundi, and eastern Democratic Republic of Congo; and the 1,300-kilometer Central Corridor, which begins at Dar es Salaam and serves Tanzania, Zambia, Rwanda, Burundi, Uganda,

and eastern Democratic Republic of Congo. Investment financing could include debt financing, equity financing, and grants/subsidies. These include government funding, when funds are directly allocated from the government budget; corporate/on-balance sheet financing, when businesses fund infrastructure through their own resources, as seen in the oil and gas sector; project financing, such as the Entebbe Airport expansion; and alternative climate financing models, such as PPPs and green bonds.

Modal shift presents opportunities for strengthening trade while lowering the transport sector's carbon footprint. GoU has plans for an integrated multimodal (air, rail, road, and water) transportation hub and an inclusive mass rapid transport system, comprising light rail transport, bus rapid transit/mass bus transport, and cable cars. It also plans to enforce loading limits and rehabilitate, upgrade, and extend the meter-gauge railway. The rail subsector is set to be upgraded to standard gauge rails, to allow for higher operational speeds and harmony with regional railways. Although Uganda's logistics infrastructure is undergoing development, regulating the industry and addressing inefficiencies within the system would help close gaps in operational efficiency and infrastructure quality, reduce the cost of doing business in Uganda, and integrate the logistics industry with the region.

3.3.3. Green the information technology (IT) environment

Better digitalization can help Uganda overcome some of the key obstacles to trade and structural transformation, such as high job search costs and low access to finance, to speed up growth. Uganda faces comprehensive challenges in digital access and usage, some of which are driven by policy. The country ranks 81st out of 90 economies on key Digital Intelligence Index metrics,⁴¹ including infrastructure access, digital inclusion, institutional readiness, and level of innovation in the digital economy. Compared to its regional peers, Uganda ranks particularly low on access and fulfillment infrastructure (supply conditions) and innovation, even as it exhibits average demand conditions (digital access and inclusion). Digital taxation is a key constraint to broad market development of the digital economy and digitalization of export value chains. Similarly, the tax on mobile money withdrawals is regressive and constrains market development. Improving digitalization requires a combination of regulatory and market development policies that are independent of climate change. Investing in institutional capacity, digital literacy programs, and other soft infrastructure as well as expanding digital infrastructure and network access for women, youth, rural residents, and other underserved populations will help Uganda capitalize on its advantages and regional market opportunities. Removing or reducing taxes on enabling services would lower the cost of digital devices and services, making them more accessible to all.

Although many sectors are using digital systems in ways that help address climate change, this is rudimentary in some cases, and there are opportunities for further development in early warning systems and disaster preparedness and response. The gaps in Uganda's early warning information and poor coordination among existing systems is impacting GoU's effectiveness in reducing risks and responding to hazards (Chapter 2). Increasing the use of digital systems to deliver timely and easy-to-interpret early warning messages to people, communities, and firms could help reduce exposure to climate events across sectors. The data are also important for sectors to determine how to prepare for, and respond to, disasters. There are opportunities for using digital systems to better share information on weather, increase the reach of extension services, align supply and demand for specific skills, track users, and provide incentives. Making digital platforms more ubiquitous could stimulate innovation and generate cost savings.

Climate change impacts on Uganda's digital infrastructure requires further examination, and it is important to ensure increased use of digital systems does not generate environmental negatives. For example, adopting low-carbon technologies, such as solar-powered transmission towers and energy-efficient data centers, could reduce carbon dioxide emissions by 1,200 metric tons annually, which is

41 <https://digitalplanet.tufts.edu/digitalintelligence/>.

equivalent to planting 28,000 mature trees.⁴² Similarly, deploying solar charging stations as part of mobile affordability program for citizens would preserve ecosystems and amplify the resilience of Uganda's digital transformation. For example, solar-powered hubs in off-grid regions like Karamoja enabled uninterrupted e-health services during extreme weather events, safeguarding 98 percent uptime for telemedicine platforms during the 2022 drought (Ministry of ICT 2023). Lowering the environmental footprint of digital expansion calls for continued attention to ensuring all National Backbone Infrastructure projects comply with environmental impact assessments to help ensure the expansion of digital infrastructure does not come at the expense of critical ecosystems and biodiversity, which are important for addressing climate change and the economy. As the use of digital systems expands, supporting e-waste management would reduce overall energy consumption in the long run, avoiding direct GHG emissions, and reducing the environmental impact of natural resource extraction.

3.3.4. Trade policy⁴³

Uganda's economy is relatively small and incomes are low, so it needs access to other markets, including to import essential inputs that it cannot produce domestically. Its economic transformation has been slowed by sizeable distortions and frictions, and enhancing trade can help eliminate these or restrain their consequences for growth and transformation. Having a primarily green power sector, Uganda is well positioned to leverage green trade opportunities if it can maintain its low-carbon footprint.

With agricultural exports, such as coffee and tea, dominating its trade portfolio, Uganda must be aware of climate-related vulnerabilities that threaten agricultural productivity and trade. For example, rising temperatures can foster pests and diseases such as coffee rust. The potential impact of climate change on key export crops and the agriculture industry needs to be further analyzed to ensure the country can put the necessary measures to build resilience to shocks in place.

Uganda's exports, particularly to the European Union (EU), face compliance challenges under new environmental regulations that account for climate change and carbon emissions. These include the EU Deforestation Regulation and the EU Corporate Sustainability Due Diligence Directive, which require exporters to ensure deforestation-free supply chains and align with environmental and human rights standards. This creates new challenges for, and places pressure on, small- and medium-sized enterprises (SMEs). Uganda's dairy and chemical sectors, with their high GHG emissions, are more exposed to global climate policies, but other key exporting sectors and products, such as crops and nonferrous metals, have relatively low GHG emissions intensity, providing an opportunity to enhance green trade competitiveness.

Reliance on the EU market, particularly for coffee exports,⁴⁴ necessitates proactive measures to comply with stringent environmental and sustainability standards to maintain market access. This includes aligning with EU regulations by investing in robust traceability systems, enhancing regulatory capacity, and fostering PPPs for deforestation-free certification. Policies should prioritize developing critical minerals and sustainable green value chains, particularly in domestic processing capacity, to align with the EU Critical Raw Materials Act and support Uganda's competitiveness in green technology markets.

The African Continental Free Trade Area offers a significant opportunity for Uganda to expand its trade footprint and contribute to growth. By 2035, the free trade agreement could boost Uganda's exports by \$2.5 billion, fostering regional trade in agricultural and agroprocessed products. To facilitate regional trade under the agreement, Uganda should focus on expanding environmentally friendly goods and services and integrating climate mitigation policies into regional trade strategies. Reducing tariffs and streamlining nontariff barriers on environmental goods will also enable the private sector to adopt green technologies

42 https://climatepromise.undp.org/sites/default/files/research_report_document/UNDP%E2%80%99s%20Climate%20Promise%202022.pdf.

43 This section leverages World Bank (2025j), which has more detail on constraints to structural transformation and the importance of trade.

44 The EU is the destination for 66% of the \$792 million worth of coffee Uganda exports globally, highlighting its considerable reliance on this market.

and sustainable production practices. Aligning trade policies with global climate priorities would allow Uganda to buffer economic risks, harness green growth opportunities, and position itself to be competitive in sustainable trade in the region.

To adapt and be resilient to the effects of climate change on trade, Uganda could develop trade policies that:

- Reduce tariffs on environmental goods to zero by formally applying for a “stay of application” under the East African Community Common External Tariff framework, to ensure such technologies remain accessible and affordable for the private sector, allowing them to embark on greening their production processes.
- Streamline nontariff measures for environmental goods, services, and technologies that help the Uganda’s transition to lower emissions and adapt to climate change.
- Enhance measurement and verification systems to close implementation and data gaps, enabling firms to demonstrate their carbon efficiency and deforestation-free traceability, and assess opportunities for regional cooperation and coordination on such systems.
- Empower regulatory bodies and market participants to accurately measure, track, and certify carbon emissions and goods as deforestation-free across mining, agriculture, and manufacturing, with a focus on supporting SMEs, which face the greatest hurdles.
- Formulate and implement a strategic framework to bolster the development of critical minerals and sustainable green value chains at regional level, ensuring collaboration, innovation, and investment that align with environmental and socioeconomic goals.
- Establish a trade and climate strategy on how trade can help it achieve its NDC and National Adaptation Plan commitments, with a clear roadmap, monitoring and evaluation process, and well-defined outcomes.

3.3.5. Hydrocarbons

GoU is interested in expanding its oil and gas sector to contribute to its growth agenda. Uganda’s hydrocarbon reserves around Lake Albert could number 6.5 billion barrels of oil (1.2 billion of which are recoverable), 7.1 billion cubic meters of associated gas, and 9.5 billion cubic meters of non-associated gas (IEA 2023a). Barring any further delays, the first oil could come as early as 2026/27, with peak daily production for ongoing projects reaching about 200,000 barrels (compared to 1.5 million in Nigeria and 1.1 million in Angola). The 60,000-barrel-per-day refinery in Kabaale Hoima and the East African Crude Oil Pipeline to Tanzania will connect the Lake Albert upstream developments with demand centers.

Efforts to grow the oil and gas sector need to be mindful that the global hydrocarbon outlook presents risks to all producers. The agreement at UNFCCC 28th Convention of Parties, which calls for all countries to transition away from fossil fuels in their energy systems, raises questions regarding prospects for the sector. There is also heightened market scrutiny on reducing production emissions, particularly through gas flaring, venting, and fugitive methane. This attention is expected to grow, considering global oil production stabilized at 102.8 million barrels a day in 2024,⁴⁵ and flare gas volumes are expected to remain on the elevated levels observed since the global pandemic. Low production emissions will likely become a critical access criterion for certain markets.⁴⁶ The trend is expected to intensify as the energy transition accelerates and related replacement effects gain momentum.

45 <https://www.eia.gov/international/data/world/petroleum-and-other-liquids/annual-petroleum-and-other-liquids-production>; https://www.eia.gov/outlooks/steo/report/global_oil.php.

46 For example, EU Regulation (2024/1787) aims to reduce methane emissions in the energy sector, starting with measurement and reporting requirements for energy imports and expanding into threshold intensity requirements for imported fuels.

Like other emerging hydrocarbon producers, Uganda faces significant challenges compared to traditional producers when it comes to the shared use of sector-specific infrastructure and domestic supply of skilled workers. Capital expenditure estimates for the Tilenga and Kingfisher blocks and the East Africa Crude pipeline are around \$10 billion according to current estimates, which are expected to be covered upfront mostly by private sector operators such as Total Energies and the China National Offshore Oil Corporation. The country will have to develop most, if not all, facilities from scratch. Uganda is also working to increase the domestic supply of skilled contractors and workforce, through technical training institutions including the Uganda Petroleum Institute and Uganda Technical College. If implemented well, local hiring requirements might help, but a continued need for imported skilled labor and services in the short and medium terms will increase development costs for new hydrocarbon assets, necessitating sustained high market prices for oil and gas to achieve profitability and avoid unprofitable or stranded assets.

The potential contribution of the oil and gas sector to sustained growth requires closer examination. For Ugandan hydrocarbon exports to remain profitable even in a low oil price environment, it will need to achieve breakeven costs on par with the more competitive global producers. A viable threshold is widely seen by experts to be around \$30 per barrel.⁴⁷ Only producers with a natural advantage in terms of the location and size of their reservoirs, combined with favorable operational conditions, can sustainably produce below this level. Given the sector's inherent price volatility, the feasibility of achieving and maintaining competitive production costs will need to be closely examined as profitability could slump and, in the worst-case scenario, result in stranded assets if hydrocarbon prices continuously drop due to replacement effects from the energy transition.

As a nascent oil and gas producer with a strong export component, Uganda will need to produce at a low carbon footprint to gain and maintain its share in an increasingly environmentally-conscious market. Its upstream oil and gas projects—including the Tilenga and Kingfisher projects—can be characterized as oil projects with substantial amounts (7.1 billion cubic meters) of associated gas. If Uganda is to pursue production, it will have to find a sustainable solution for these gas volumes early on to prevent them from being routinely flared or vented. Section 100 of the Petroleum (Exploration and Production) Act 2013 contains high-level provisions for gas flaring and venting, but none for fugitive methane. Replicating the experiences of other producing countries can help Uganda avoid costly and harmful mistakes that could lead to long-term legacy issues. For example, adopting zero routine flaring asset development concepts can optimize domestic resource use and provide access to energy while also creating opportunities to access export markets with stringent carbon footprint requirements for hydrocarbon imports. If Uganda opts to pursue oil and gas, in the short term, it would need to:

- Work with operators to identify and implement solutions for productive use of associated gas.
- Act on the gas flaring and venting provisions as presented in the 2013 law.
- Prepare upgraded implementation regulations with the necessary technical details and introduce a penalty system for unauthorized flaring and venting.
- Develop enforcement capabilities to ensure legal compliance across the sector.
- Address the issue of fugitive methane early and ensure operators maintain standards for regular leak detection and repair campaigns to prevent large-scale fugitive emissions.

International experience with stimulating growth from extractives has been mixed, with advantages contingent on the underlying quality of governance. The 'resource curse' can result in countries that are abundant in extractives experiencing slower growth and worse development outcomes than others. Key aspects include an unhealthy dominance of hydrocarbons in the economy causing disproportional

⁴⁷ <https://oilprice.com/Energy/Energy-General/Oil-Majors-Pursue-Projects-with-30-Breakeven.html>.

vulnerability to global price fluctuations, increased corruption, and weakened institutions. To prevent this, Uganda has been developing an institutional framework for revenues from extractives for more than a decade, including the Oil and Gas Revenue Management Policy in 2012 and the Public Finance Management Act 2015. But the policy was developed under a very different domestic and global environment and updating the governance framework will allow Uganda to manage its hydrocarbon resources effectively.

The potential of Uganda's rare earth minerals, which are crucial for the global shift toward renewable energy and low-carbon technologies, also requires close review. Uganda's critical mineral deposits represent a modest share of global reserves, at 0.1 percent for cobalt and 0.2 percent for graphite. Although annual exploration budgets for energy transition minerals tripled in 2022–24 compared to the previous 10 years, they remain limited, at less than \$10 million. While exploring the potential to exploit its critical mineral deposits, Uganda will need to align these activities with environmental, social, and governance (ESG) standards and lower perceived political, economic, legal, tax, operational, and security to attract responsible investments and avoid ecological degradation. Skilled labor shortages, a complicated land tenure system, and local content requirements all raise questions regarding the potential contribution of mineral exploitation to sustained growth. As part of a closer examination of this sector, Uganda may want to explore building its ability to contribute to value addition, considering its strategic location in East Africa to supply global markets.

3.4. Intervention Package D: Foster planned and climate-positive urbanization

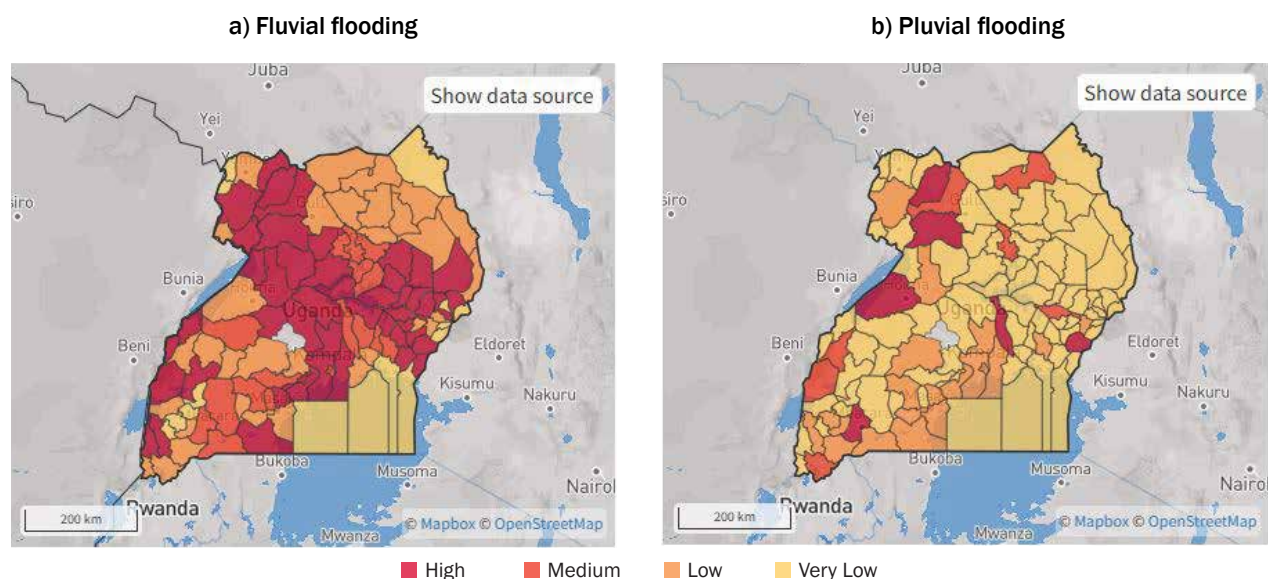
By 2050, more than 40 percent of Uganda's total population could be living in cities, with urban populations expected to grow to 42 million—that is, 30 million more than in 2023. The spread of people across Uganda's urban centers⁴⁸ is uneven, particularly between secondary towns and the rapidly growing metropolitan area of Kampala. GoU strategy is to promote 10 secondary cities (Fort Portal, Arua, Gulu, Jinja, Mbarara, Mbale, Masaka, Hoima, Lira, and Soroti) as regional hubs for job creation and improved social services and another upgrade five urban areas (Entebbe, Kabale, Moroto, Wasiko, and Nakasongolo) to cities as alternative migration destinations to Kampala.⁴⁹ These are all situated along growth corridors. The expected urban growth has implications for health care, education, public transportation, and other urban services, which already struggle to keep up with demand. Uganda has an acute housing shortage, and 66 percent of the population lives in slums and informal settlements, where over 70 percent of urban housing units are made from temporary materials. Often located in environmentally vulnerable areas, these settlements and the urban poor who live there are susceptible to climate change impacts and natural disasters. Uganda will need 180,000 new accommodation units per year to keep pace with urban household growth.

Climate change is expected to increase the risk and intensity of pluvial and fluvial flooding in cities (Figure 3.11). The potential for flooding is heightened by the country's rich network of rivers, lakes, and wetlands. The flooding risk is compounded during the March–May and August–November rainy seasons, which typically bring the most intense and sustained rainfall.

48 According to an ongoing World Bank study on building climate-resilient cities for sustainable development, Uganda's 259 urban centers include 11 cities, 23 municipalities, 163 town councils, and 62 town boards.

49 According to an ongoing World Bank study on building climate-resilient cities for sustainable development.

Figure 3.11: Exposure to fluvial and pluvial flooding



In rapidly urbanizing cities like Kampala, inadequate and poorly maintained drainage systems are unable to cope with the volume of runoff during heavy rains. Widespread waterlogging is a problem, especially in areas with limited elevation and impervious surfaces. With up to 85 percent of the city's population living in slums and informal settlements, climate change impacts are amplified. Nearly 45,000 people are impacted every year by river flooding in Uganda, but fortunately, only around 40 education and health care facilities are inundated (World Bank Group, GFDRR and ACP-EU 2019). In contrast, 10- and 50-year floods can inundate as many as 200 and 250 facilities, respectively, causing \$150–250 million in damage to buildings alone.

Expected annual damages from inland flooding amount to more than \$60 million, or 0.1 percent of capital by 2050 under the SSP3–7.0 mean climate future. By the 2040s, losses are expected to increase to around 1.4, 2, and 2.3 percent of capital for 25-, 50-, and 100-year flooding events, respectively. Relative to the historic baseline, this represents increases of up to 27, 25, and 21 percent for 25-, 50-, and 100-year events, respectively. A 100-year flood results in 0.22 percent more damage to the capital city (an additional \$391 million) under an ASP future than under BAU.

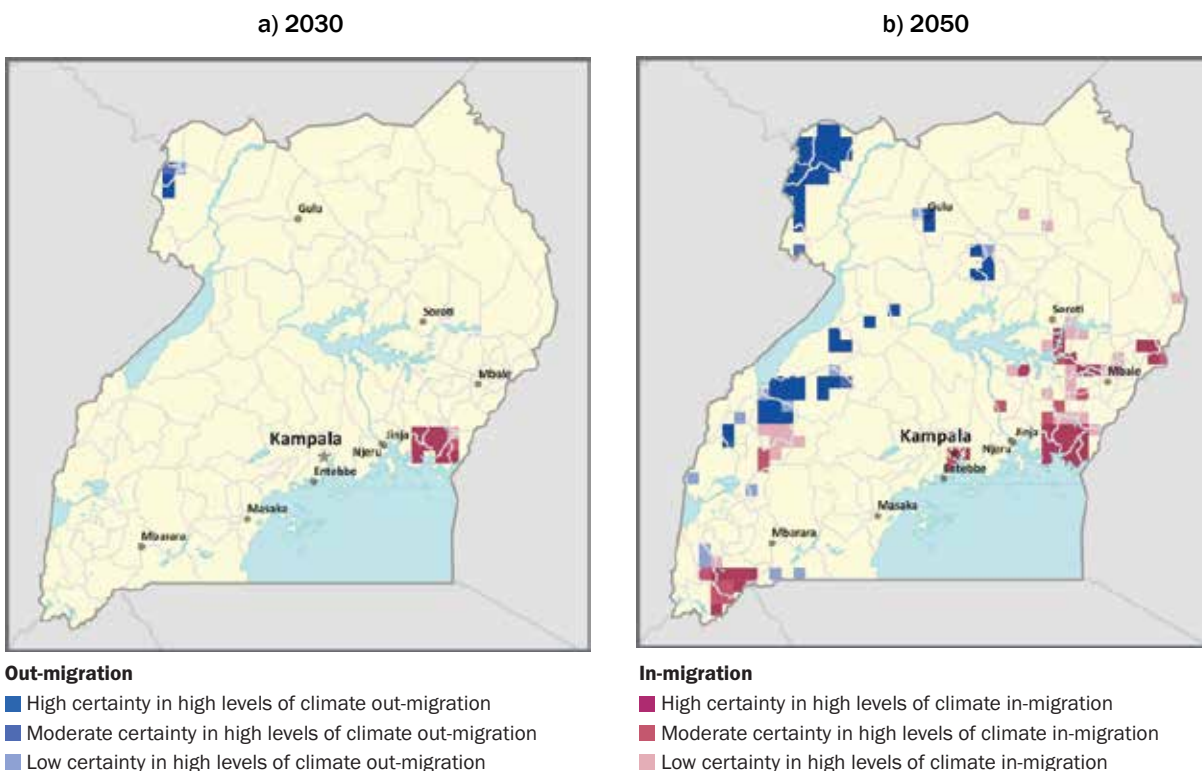
The projected temperature increases raise concerns regarding urban heat islands in major cities, particularly Kampala. High building density compounds the urban heat island effect, increasing energy consumption (as people rely on air-conditioning to combat heat) and GHG emissions, and the risk of heat-related illnesses and chronic conditions, such as heatstroke and asthma.

Urban centers are also exposed to landslides and drought. Disregard for the natural landscape when building roads and housing development destabilizes the terrain, and can result in landslides when climate events occur. Cities built on hilly terrain, such as Mbale, Fort Portal, Kasese, Kabale and Kisoro, are all prone to landslides after heavy rains. Less predictable rainfall patterns due to climate change also create periods of reduced precipitation during the rainy seasons, leading to water scarcity in urban areas. Drought hazard is highest in the semi-arid regions in the northeast, the West Nile region, and the Karamoja subregion (UNCDF 2024). Outdated water supply infrastructure can aggravate the situation.

Climate change also impacts migration. By 2050, internal climate migrants could reach up to 12 million in the pessimistic scenario—the second-highest among the Lake Victoria Basin countries—and 7.1 million in

the optimistic scenario. Climate in- and out-migration hotspots will emerge as early as 2030 and continue to increase in strength and spread geographically (Figure 3.12). Water stress, crop failure, and net primary production losses are key climate-related factors that will influence the patterns and scale of internal migration in the country over the next decades.

Figure 3.12: Projected climate in- and out-migration hotspots in Uganda



Source: Rigaud et al. 2021.

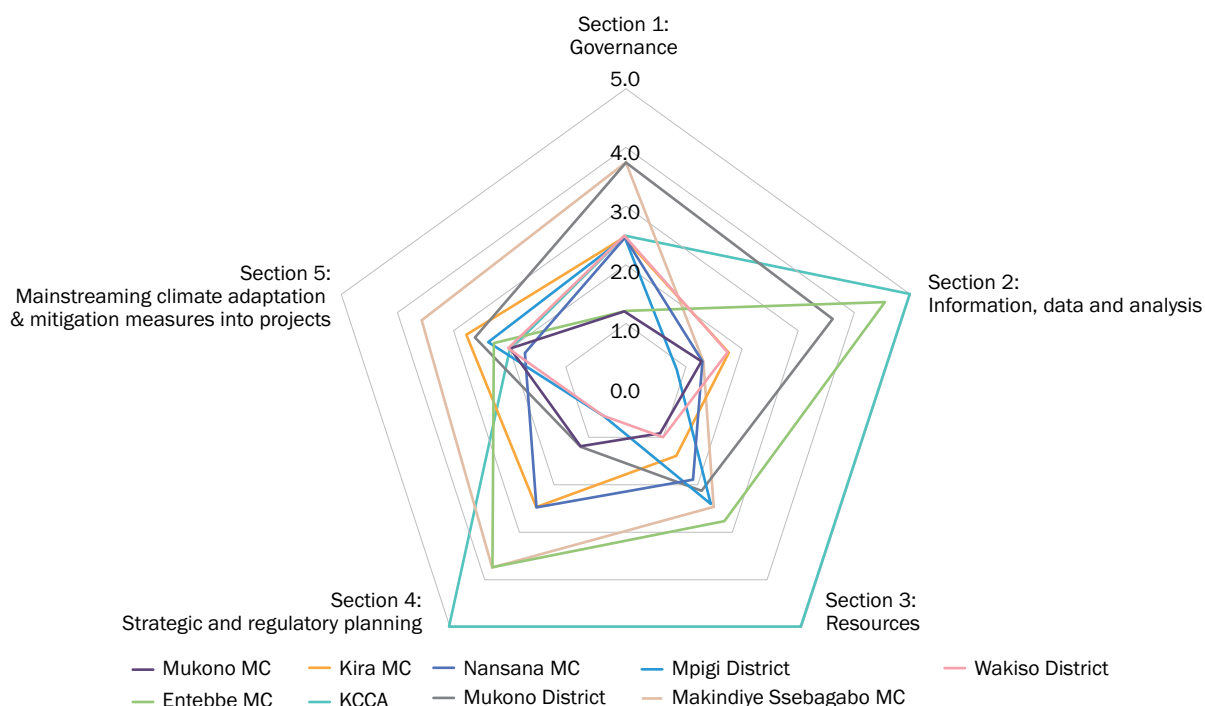
Uganda can transition its urban areas into climate-resilient, low-carbon economic centers. To ensure they have robust strategies that address both current and future climate impacts, urban plans should incorporate climate change projections or risk assessments to make infrastructure and buildings more resilient to extreme weather events. Uganda's cities need to improve data collection, assessment, and dissemination, and integrate these data in decision-making. As it works to upgrade its services, the country's meteorological services should include improved weather forecasts and real-time decision support systems for flood management. Expanding and upgrading its meteorological and hydrological monitoring networks, and developing a centralized system for collecting, storing, accessing, and analyzing climate data from diverse sources will help Uganda create an effective early warning system that can provide timely and vital alerts about impending climate-related hazards, enabling communities and authorities to take preemptive actions. The system should include hazard detection and monitoring, data analysis and forecasting, and robust communication channels, involve local communities in interpreting early warning signs, and be accompanied by well-developed emergency response plans and efforts to continuously update and improve the system.

Key areas for increasing urban governments' adaptive capacity⁵⁰ includes stronger institutional frameworks and governance structures, technical expertise, and capacity building (Figure 3.13). Although

⁵⁰ Referring to local authorities' and institutions' capacity to anticipate, prepare for, respond to, and recover from the impacts of climate change, adaptive capacity is crucial for ensuring urban resilience and sustainable development in the face of increasing environmental uncertainties.

Uganda has several policies and strategies for addressing climate change and promoting sustainable urban development, it needs to increase focus on strengthening local governance structures and supporting decentralization to convert the national policies into local action. Urban authorities need support to bolster their technical expertise in climate risk assessments and resilient infrastructure design, LG planning, climate adaptation projects implementation, access to accurate and real-time climate data from meteorological services, and local climate information systems.

Figure 3.13: Institutional performance of municipalities in Greater Kampala Metropolitan Area (GKMA)



Source: World Bank 2024a.

Community engagement and private sector participation is vital for resilient urban areas. Urban governments need to foster inclusive planning processes that engage citizens, civil society organizations, and private sector actors to enhance their adaptive capacity. This can help ensure adaptation measures are suited to the local context and plans reflect residents' needs. Urban governments can play a crucial role in educating the public about adaptation measures and promote sustainable practice through campaigns, educational programs, and community workshops.

Uganda needs an up-to-date, comprehensive, approved national transport policy. In KCCA, commuters lose 24,000-person hours each day due to traffic congestion, and the working population spends approximately 52 days per year in traffic jams.⁵¹ Most road users in Uganda travel by nonmotorized transport—mainly walking and cycling—but the transport infrastructure does not provide the minimum level of service for pedestrians and cyclists in urban and in rural areas, and road fatalities are high.

Uganda will need to revisit intracity and intercity transport to lower GHG emissions and congestion in its cities. Across all urban areas, 98 percent of transport is by road, and around 55 percent of all the country's vehicles are within Kampala Capital City Authority (KCCA), the country's largest city. In Kampala, private vehicles comprise 36.6 percent of vehicles and transport 8.8 percent of passengers; *boda-boda*

⁵¹ <https://www.kcca.go.ug/news/634/kcca-launches-construction-of-a-traffic-control-center>.

(motorcycles) comprise 42.4 percent of all vehicles and transport 8.5 percent of passengers; while *matatus* (14-seater minibus taxis) account for 21 percent of vehicles and transport 82.6 percent of all passengers. As in most of Uganda's urban areas, KCCA's public transportation system consists mainly of *matatus* and *boda-boda*. Public transport services are not timetabled or integrated, and vehicles are generally poorly maintained. The majority of vehicles in the country originate from Japan, imported as reconditioned units, and are more than five years old. The 2022/2023 motorized vehicle fleet numbers approximately 1,823,000, and the average age of vehicles is more than 15 years old. KCCA is the leading consumer of fossil fuels in Uganda, which are all imported (World Bank 2025k).⁵²

Investments are needed in sustainable transport systems, such as public transit, cycling, and pedestrian infrastructure to ease congestion and lower GHG emissions.⁵³ Such investments should progressively replace 60 percent of the *boda-boda* fleet with electric alternatives (Box 3.1) by 2035 and increase the ratio of *matatus* to *boda-bodas* with a rapid introduction of electric minibuses into the current fleet by 2035. They should also introduce 1,000 high-quality city buses in the Greater Kampala Metropolitan Area, together with bus shelters, terminals, and depots, establish bus routes with defined frequency, and work with the taxi industry to achieve service quality improvements and operator consolidation. Over time, Uganda's transport sector should also transition to electrification. The private sector can participate in sustainable transport by investing in charging infrastructure and battery swapping networks, battery leasing, and energy storage solutions, as well as local manufacturing and assembly of electric vehicle (EV) components.

Box 3.1: Growing e-mobility with affordable electric motorcycles

Uganda's motorcycle taxi industry employs approximately 1.6 million people. Government incentives, including tax exemptions on EVs and charging equipment, are boosting investor confidence in Uganda's e-mobility sector. Zembo, a Ugandan e-mobility company, is revolutionizing the *boda-boda* industry by offering affordable electric motorcycles through lease-to-own and a battery-swapping service through a network of 27 stations in Kampala. This model eliminates the need for riders to own batteries, reducing upfront costs and operational expenses. Zembo riders save up to 50 percent on fuel costs compared to traditional motorcycles. The company's expansion into local motorcycle assembly and maintenance supports employment in Uganda's green economy. Increasing the number of battery-swapping stations, especially outside of Kampala, is a necessary step to support the growing number of electric motorcycles, while import duty reductions, tax exemptions, and clearer battery standardization policies would accelerate adoption. Expanding training programs for EV mechanics, battery engineers, and fleet technicians will build sector capacity.

The private sector could help achieve the necessary shifts in the housing sector. Private sector actors could increase their participation in housing development and construction, intermediate input provision, the real estate sector, and financing for housing. Uganda could incentivize the use of sustainable materials and energy-efficient construction methods, such as compressed earth blocks and bamboo, which reduce emissions and lower costs and encourage people to adopt solar-integrated roofing, smart insulation panels, high-performance windows, and other energy-efficient solutions to make new buildings more sustainable. Increased private investment in energy-efficient upgrades, and cost-effective, low-carbon housing models would help enhance sustainability and reduce operating costs. To encourage private investment, GoU will need to tackle some of the systemic constraints in the sector and develop climate-specific measures. It could

52 Uganda imports all the fuels used in all sectors of the economy, and the transport sector is the largest consumer of imported fuels. According to the MEMD, which disaggregates fuels used by sector, petrol, diesel, and aviation fuel imports for the transport sector increased from 240, 360, and 92 to 656, 504, 108 kilotonnes of oil equivalent between 2010 and 2022, respectively.

53 The scenario assessed in the transport study were selected in consultation with government counterparts and staff from the African Development Bank, considering the measures and priorities outlined in Uganda's NDC and other relevant documentation.

do this by lowering the share of nonconstruction-related costs in total housing development costs, reducing the challenges to obtaining formal land titling and transfer processes, and investing in professional and artisanal construction skills development. It can revisit the PPP framework to support housing PPPs, improve trade parameters to ease imports of intermediate inputs for manufacturing, and develop clear regulations for sustainable construction, including mandates for climate-friendly building materials in national building codes to facilitate private sector participation in green housing. Incentives for climate-resilient construction practices would also help, while fostering local production of climate-friendly materials (Box 3.2) and creating specialized financial products tailored for sustainable construction could reduce imports and create jobs.

Box 3.2: Advancing green building materials in Uganda

Uganda's construction sector is expanding at a rate of 5.7 percent annually, presenting significant opportunities for green building materials. Eco Concrete manufactures eco-friendly building materials, including low-carbon cement and concrete blocks, and provides sustainable construction solutions. The company optimizes logistics with on-site material production and enhances construction management through digital tools. Eco Concrete's materials cut construction-related emissions by up to 40 percent, while also enhancing structural durability. Supporting local supply chains, the company fosters job creation and skills development in sustainable construction. GoU's National Construction Policy promotes the use of locally-produced materials, aligning with Eco Concrete's model. Expedited standardization and tax incentives can accelerate green cement adoption, while blended finance instruments and risk-sharing mechanisms would scale production and expand market reach. Education initiatives can drive consumer trust and wider industry adoption.

Cities can transform addressing climate risks into opportunities for delivering better development.

Uganda's cities need investments in clean water, resilient transport infrastructure, energy efficiency and renewable energy, urban planning, nature-based solutions for flooding and heat island effect, a circular approach to waste management, and resilient health and education services. Priority should be given to low-regret investments,⁵⁴ flexible adaptation options,⁵⁵ and nature-based solutions.

Uganda will need to improve the institutional landscape and financing that underpins urban development. Dedicated climate change units within urban authorities will help coordinate climate change responses, develop strategies, and integrate climate consideration in all sectors. At the same time, urban technical staff—including environment officers, planners, and engineers—need capacity building on climate change adaptation and resilience planning. Although collaborations between urban authorities and national institutions, nongovernmental organizations, private sector actors, and research organizations will help enhance technical capacity and access to climate finance, municipalities must have the budget or instruments for mobilizing financing to invest in infrastructure upgrades and disaster preparedness initiatives. For example, in 2020, climate-proofing road transport infrastructure cost \$11–13 million a year, but by 2050, this could rise to \$380–485 million. Urban authorities rely heavily on central government allocations, which are often inadequate for comprehensive climate adaptation initiatives. They have limited access to international climate finance, partly due to a lack of capacity to develop and submit competitive project proposals. Uganda should rethink existing transfers and come up with innovative financing mechanisms to mobilize resources (see Chapter 5).

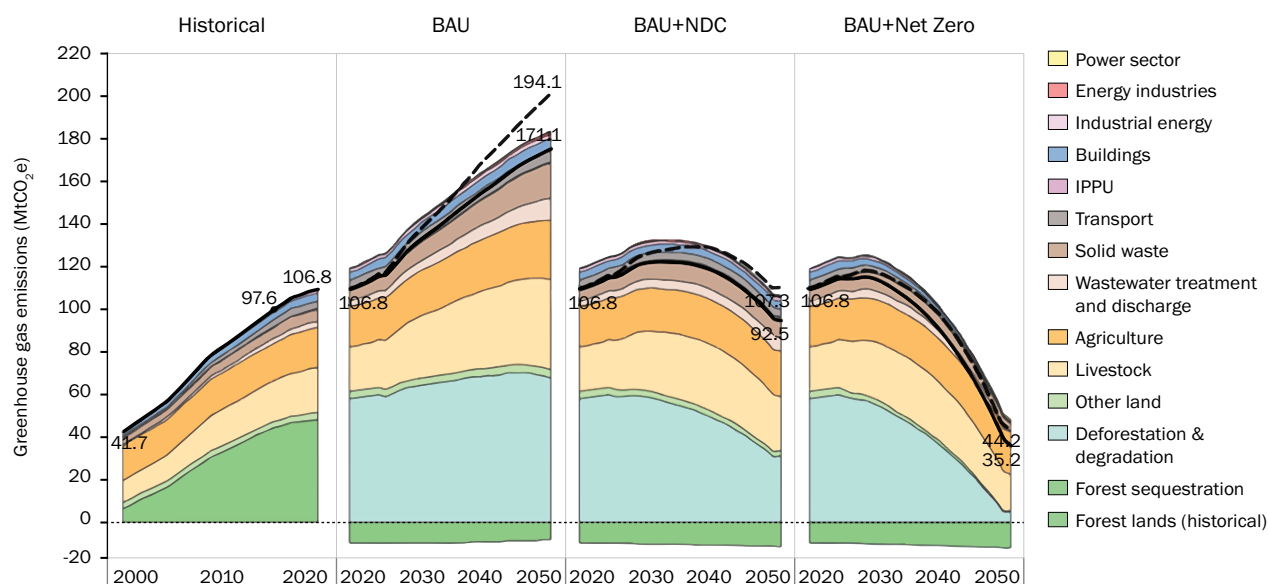
⁵⁴ *Low-regret options* are measures with modest costs that yield significant benefits if projected climate changes occur.

⁵⁵ *Flexible adaptation options* are strategies that are scalable and can be adjusted as new information on climate change becomes available (e.g., modular infrastructure projects and continuous research initiatives).

3.5. The multisectoral intervention packages can lower GHG emissions

Several of the actions associated with the key multisectoral intervention packages align with GoU's NDC commitments. The emissions trajectories displayed in Figure 3.14 reveal that under the BAU, if Uganda implements the NDC priority mitigation measures beginning in 2023, emissions would peak in 2033 at about 120 MtCO₂ (10 percent lower than BAU), and then decline to 92.5 MtCO₂ by 2050.⁵⁶ This is roughly consistent with Uganda's 2022 NDC update, which estimates a 20 percent difference between BAU and NDC by 2030, but assumes that NDC actions begin in 2015. Under ASP, emissions would be about 6 percent higher, on average, under all pathways. To progress much closer to net zero, Uganda would need to significantly curb deforestation, requiring a significant scale-up of efforts to curb the degradation caused by fuelwood and charcoal use and increase agricultural productivity, and further mitigate emissions from livestock and waste sectors (World Bank 2025f).

Figure 3.14: Uganda's emission trajectories under BAU, with NDC actions and net zero



Source: World Bank 2025f.

Note: Solid line corresponds to historical total and BAU future; dashed line corresponds to ASP future.

⁵⁶ This analysis uses the SISEPUDE framework (Kalra et al. 2023) to estimate the emissions pathways for all nonenergy sectors—including industrial processes and product use and agriculture, forest, and land use—to determine the implementation of these measures on the country's emissions trajectory. For the power sector, it uses results from the World Bank's Electricity Planning Model. As neither model evaluates emissions from buildings and transport, historical emissions for these sectors are assumed to evolve based on pathway-specific adjustment factors. The analysis includes six emissions scenarios based on three levels of mitigation policies and investments (current policies, NDC priority mitigation measures, and increased ambition toward net zero), evaluated under BAU and ASP.



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4

Macroeconomic Impacts of Climate Change

4. Macroeconomic Impacts of Climate Change

The economic transformation needed to reach Vision 2040 and the Ten-Fold Growth goals will itself increase the country's resilience to climate effects. For Uganda's growth and development aspirations to materialize, it needs a new growth model with policies and investments that improve competitiveness, boost productivity growth, especially in the agriculture sector, and accelerate structural transformation by creating jobs in higher value-added sectors like agrobusiness and services. As shown in this chapter, changing the structure of the economy by moving away from subsistence agriculture will make it less vulnerable to climate effects. To get there, the country needs to address connectivity constraints, improve the business environment, promote a healthier and more skilled labor force, and attract private investment from domestic and foreign sources.

In addition to more resilient growth, economic transformation will deliver more and better jobs. To meet its aspirations of higher and more resilient growth, GoU must secure more and better jobs for Uganda's youth. Priorities include creating more waged jobs, improving mobility and connectivity, and accelerating the transformation of the agriculture sector by developing commercial farming and value chain linkages (World Bank 2019). Initial stages of accelerated economic transformation will require increasing agriculture productivity and commercial farming in the most fertile parts of the country and stimulating off-farm jobs in secondary towns. As such, the climate and jobs agendas are critically linked.

Uganda faces critical questions on how to respond to climate change to achieve its long-term growth aspirations. How intensively should it work to adapt to predicted effects caused by climate change, given the expected worsening of negative climate impacts and its own development aspirations? Can the aspirational development objective be achieved without climate action, and what are the challenges for managing fiscal costs of adaptation? This chapter considers these questions by modeling the macroeconomic impacts of climate change and the potential benefits of adaptation measures in supporting Uganda's development goals. The primary tool used is the Climate Change Macro-Fiscal Model for Uganda (UGAMOD), which analyzes the impact of climate change and adaptation actions on economic and poverty outcomes.⁵⁷

4.1. Scenarios and impact channels

A scenario-based approach is applied to assess the impacts of climate change. The analysis considers two policy scenarios (BAU and ASP) and six hot/dry and warm/wet climate futures (Box 1.1). One important assumption is that oil production will take off under both scenarios, which could create macroeconomic instability and governance challenges such as rent-seeking and corruption if oil revenues are not well managed. The BAU scenario projects that Uganda's growth will follow recent trends, with an average annual growth of around 6.5 percent between 2025 and 2050. Productivity is low, at about 2.5 percent, labor force participation stays below 50 percent, and private investment is limited as the business environment does not improve and domestic resource mobilization is insufficient. The ASP scenario forecasts higher economic growth, reaching 8 percent in the medium term and sustained through 2050. The higher growth is driven by structural transformation, with higher labor productivity (3.5 percent) as the workforce transitions to more productive sectors, such as industry and services, with large private sector investment. The six climate futures are applied to each policy scenario.

The analysis is structured around key impact channels through which climate change affects Uganda's macroeconomy. These channels, listed below, represent the pathways that translate climate shocks into economic impacts on human, natural, and physical capital.

⁵⁷ UGAMOD is a structural macroeconomic model used to simulate aggregate economic effects of global climate scenarios and consider offsetting climate actions through 2050. It uses the main identities of the economy (national accounts, balance of payments, labor markets, and financial sectors), and the relationships are consistent with economic theory and the observed dynamics of the economy.

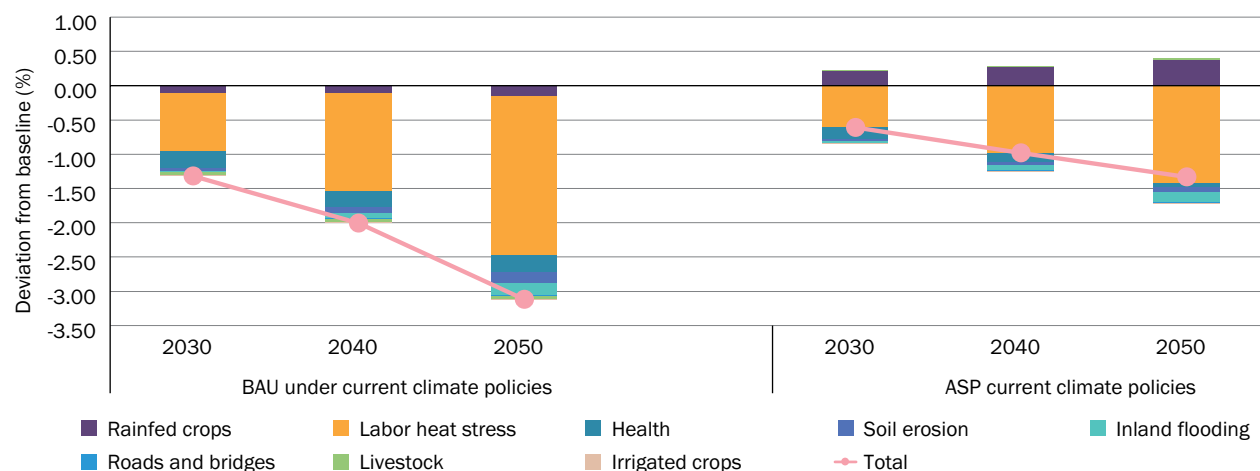
- **Crops** (rainfed and irrigated): Crop yields can be affected by extreme heat and changes in rainfall patterns/irrigation water availability, increasing evaporative demands. This is critical in Uganda, where the majority of the population relies on rainfed subsistence farming for food and income.
- **Health:** Increased incidence of deaths from vector-borne, heat-related, and waterborne diseases influence the total labor supply. Improving access to WASH is crucial for dealing with these climate impacts.
- **Labor heat stress:** Increasing workday temperatures can decrease the number of hours an individual can work. This is critical in Uganda, where a large share of the workforce is employed in agriculture and regularly exposed to high heat conditions.
- **Soil erosion:** Erosion can strip topsoil nutrients, causing declines in agricultural production, and intensifying climate change impacts.
- **Inland flooding:** Increasing the frequency, intensity, and duration of storm events can exacerbate flooding, while flood damage and exposure are also influenced by changes in land use and cover.
- **Roads and bridges:** Increased temperatures, precipitation, and flooding cause roads to deteriorate faster, which in turn influences infrastructure repair and maintenance costs and causes delays for passengers. In Uganda, flooding is expected to be the primary driver of road and bridge damages (World Bank 2025d)
- **Livestock:** Increasing heat stress on animals causes reductions in productivity, while climate change can also cause potential reductions in the availability of feed sources.

4.2. Impact of climate change

Implementing structural reforms and climate change adaptation measures is crucial for building Uganda's resilience. Such reforms, especially those driving structural transformation, can shift the economy from climate-sensitive, low-productivity sectors like subsistence agriculture to more resilient, higher-productivity sectors, such as manufacturing and services, enhancing both competitiveness and climate resilience. The impacts of climate change adaptation are analyzed here for the two policy scenarios, with a focus on the dry/hot climate future, which has the greatest impact for Uganda. In the wet/warm (optimistic) climate future, the impacts of climate change are less severe because higher precipitation, an inherent feature of this future, supports crop production, which supports GDP growth.

Under current policies, or if no further climate action is taken, Uganda's real GDP is projected to fall, with the most significant impacts coming from reduced labor productivity due to heat stress, soil erosion, inland flooding, and a lack of rain for rainfed crops. Under a dry/hot climate future, GDP will deviate by 1.3–3.1 percent from the baseline between 2030 and 2050 under BAU, and 0.6–1.3 percent under ASP, which involves structural transformation and improvements in WASH (Figure 4.1). The economic losses due to climate change will mainly originate from a decline in labor productivity due to labor heat stress channels, health impacts, and declining agricultural output due to crop yield losses and soil erosion. Labor productivity will decrease because of heat stress, with losses of 2.3 percent under BAU and 1.4 percent under ASP by 2050. The health channel contributes 0.3 percent loss under the BAU scenario leading to shocks to labor supply from changes in the incidence and mortality of vector-borne, waterborne and temperature-related diseases. Soil erosion contributes a 0.2 percent loss under the BAU scenario by degrading arable land and driving unsustainable practices such as deforestation as farmers seek fertile land to farm. Inland flooding will also reduce GDP by 0.2 percent, affecting agriculture, infrastructure, and livelihoods. Rainfed crop losses will further reduce GDP by 0.2 percent. The combined effects of extreme temperatures, land degradation, and disrupted growth conditions highlight the urgent need for targeted adaptation measures.

Figure 4.1: Deviation in real GDP from baseline due to climate change impacts in the dry/hot climate future scenario under current climate policies



Source: World Bank Staff calculations, based on World Bank 2025d.

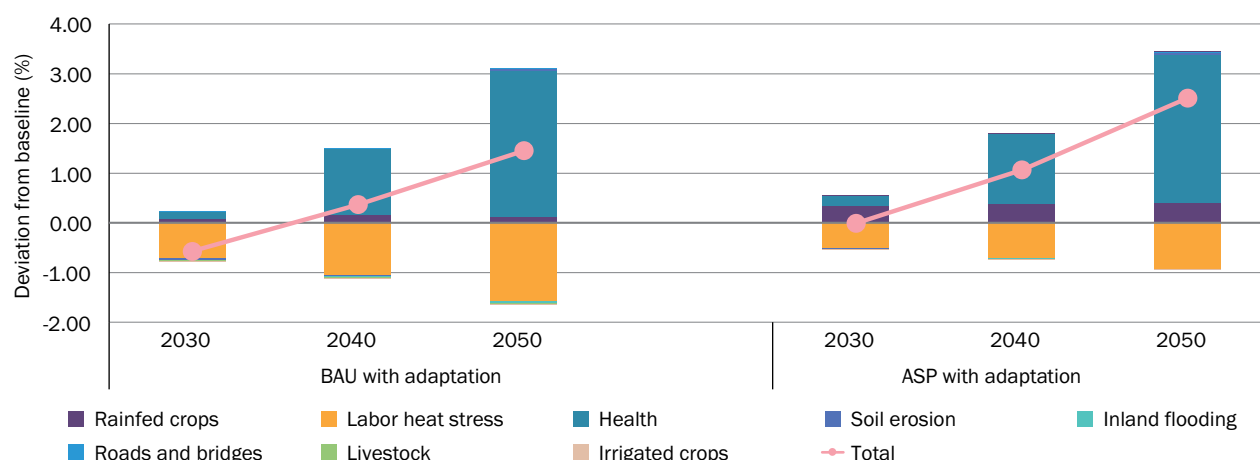
4.3. Adaptation actions can have a strong positive impact

In a dry/hot climate future, adaptation measures under both BAU and ASP contribute positively to real GDP growth. GDP gradually rises steadily above the baseline by 1.5 and 2.5 percent by 2050 in both policy scenarios, reaching about 8 percent by 2050. With adaptation, the cumulative effect of climate action on Uganda's GDP from 2020 to 2060 is positive, showing that adaptation can improve GDP (Figure 4.2).

The contributions to GDP growth are largely driven by WASH investments, which contribute nearly 3 percentage points to GDP gains by reducing health-related heat stress and expanding irrigation. Improved access to safe WASH in Uganda is expected to reduce the adverse impacts of climate change by lowering mortality and morbidity from waterborne diseases. This leads to a healthier and more productive labour force, contributing significantly to sustained productivity gains and overall GDP growth (World Bank 2025d). Figure 4.2 reveals that the negative impact of labour heat stress on GDP persists in both BAU and ASP, even with adaptation measures in place. This is because, irrespective of the structural transformation that occurs across the scenarios, with labour shifting to higher-value-added sectors, such as industry and services, a substantial proportion of workers across all sectors remains exposed to outdoor heat, highlighting their continued vulnerability to climate-related risks.⁵⁸ Under ASP, changes in land use and land cover are expected to exacerbate erosion risk, resulting in more severe crop production impacts than under BAU (World Bank 2025d). This emphasizes the need for including land management practices in adaptation measures.

⁵⁸ The impacts to labor productivity from heat stress are relatively high in Uganda due to its moderately hot and humid climate and the large proportions of outdoor workers across sectors. While smaller labor productivity effects are projected for the industry and services sectors, agriculture is consistently more severely impacted than other sectors due to a higher proportion of workers performing high physical activity tasks, and higher outdoor temperature exposure (World Bank 2025d).

Figure 4.2: Deviation in real GDP from baseline due to climate change impacts in the dry/hot climate future with adaptation



Source: World Bank staff calculations, based on World Bank 2025d.

Investment needs under ASP with adaptation are larger than under BAU with adaptation, particularly from the mid-2030s onward, reflecting the scale of financing required to manage the cost of climate adaptation. Not only would these investments support climate adaptation; they would also contribute to sustainable and resilient economic growth. While absolute investment levels are higher under ASP, investment needs as a share of GDP are broadly similar between both policy scenarios because the additional growth under ASP is primarily driven by higher total factor productivity, which enables higher output without a proportionate increase in investment as a percentage of GDP.

4.4. Managing the cost of climate adaptation

Uganda has a track record of fiscal and debt sustainability that underpins macroeconomic stability, but recent shocks and weak revenue mobilization present new challenges. Uganda's public debt has remained sustainable with moderate risk of debt distress, as shown through successive World Bank/IMF debt sustainability analyses. But recent shocks, increasing expenditure demands, and a tax-to-GDP ratio that has stagnated at around 13 percent have triggered needed fiscal consolidation and a refocus on domestic resource mobilization reforms. Coupled with improved public expenditure efficiency, such reforms are assumed to pay off under ASP, financing increased public services and infrastructure investments while maintaining long-term fiscal sustainability.

Fiscal costs for adaptation beyond the ASP baseline scenario are substantial. Costs related to heat stress, roads and bridges, and crops—the impact channels that account for the larger share of adaptation spending—rise steadily from 2025 to 2050. The largest share of costs is associated with crop-related adaptation, particularly irrigation, highlighting the sector's high priority in Uganda's development. Costs for addressing heat stress are approximated to the cost of installing air conditioning systems to deal with the heat, and it rises sharply over time. These rising fiscal costs of adaptation reflect the increasing impact of climate change and the need for sustained investment in climate adaptation to improve economic growth and resilience overtime.

GoU will not be able to finance these additional adaptation costs and maintain fiscal sustainability and macroeconomic stability, so private sector support and climate finance will be crucial. Investing in climate adaptation is essential to safeguard Uganda from climate-related disasters, but if these investments are not well-coordinated, high adaptation costs could undermine long-term fiscal stability. To ensure climate

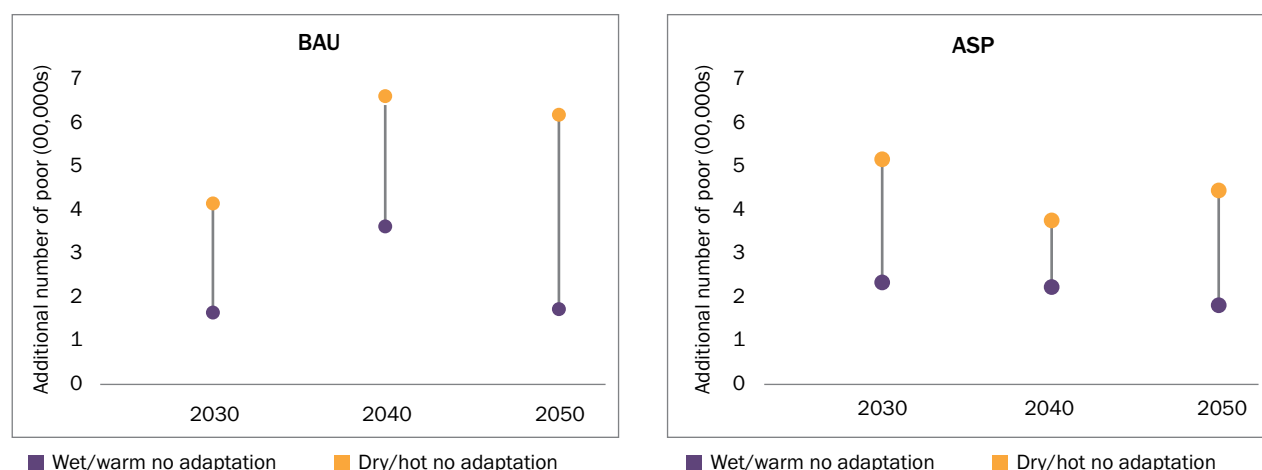
actions are met, Uganda will need the private sector to cover some of the adaptation costs. It will also need to leverage climate finance to ensure the government can expand public goods provision and essential service delivery, where private sector support is weak or absent. This underscores the importance of mobilizing private investment and external climate finance (Chapter 5).

4.5. Poverty impacts of climate change shocks

Uganda’s poverty trajectory is strongly influenced by climate change, its ability to effectively lessen the impacts of climate change—particularly on poor and vulnerable people, who are disproportionately affected—and the broader macroeconomic environment. Under the BAU baseline with no additional climate actions beyond those in place in 2023, relatively strong real GDP per capita growth is expected to reduce poverty, as measured by the \$2.15 2017 purchasing power parity international poverty line, from 40.9 percent in 2030 to 24.8 percent in 2040 and 11.8 percent in 2050.⁵⁹ Under a wet/warm scenario, poverty is projected to be higher in all years compared with the baseline scenario, with 175,200, 365,000, and 175,200 additional Ugandans pushed into poverty in 2030, 2040, and 2050, respectively. Under the dry/hot scenario, this is even higher, with an additional 408,800, 657,000 and 613,200 people pushed into poverty over the baseline numbers respectively (Figure 4.3).

Stronger growth can help lower poverty rates, but poverty will still be influenced by the impacts of climate change and the effectiveness of practices to build resilience to climate risks and adapt. In the ASP baseline scenario, poverty rates for 2030, 2040, and 2050 are 39.5 percent, 20.3 percent, and 10.1 percent, respectively, lower than under BAU. With no adaptation and in a wet/warm scenario, poverty rates under ASP are expected to be higher than the baseline but lower than under BAU, at 39.9, 20.6, and 10.3 percent, respectively (Figure 4.4). Under the dry/hot future, an additional 233,600, 219,000, and 175,200 people could be pushed into poverty, while under a wet/warm future, this rises to 525,600, 365,000, and 438,000.

Figure 4.3: Additional people pushed into poverty over the baseline, under various scenarios



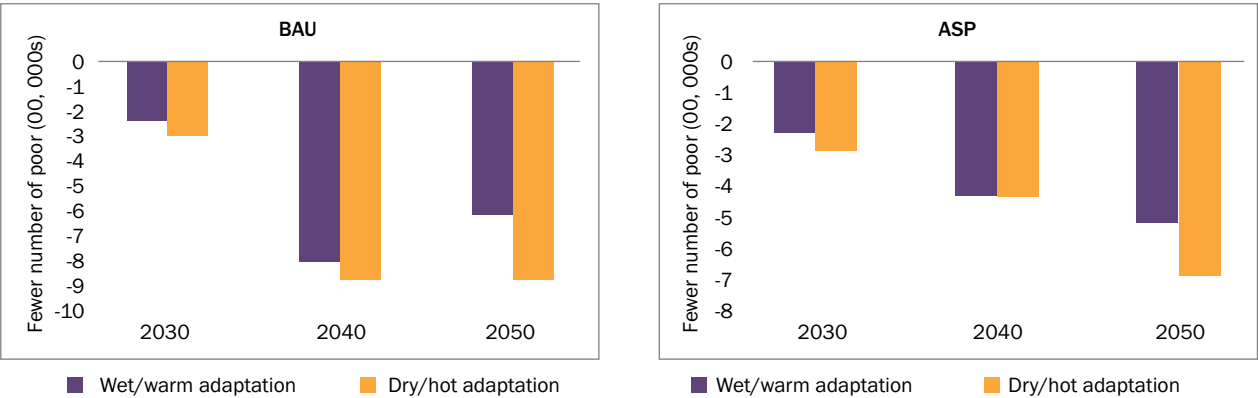
Source: World Bank staff calculations.

Note: Uses the \$2.15 2017 PPP international poverty line.

⁵⁹ Accounting for population growth, this corresponds to 23.9, 18.1, and 10.3 million Ugandans falling below the poverty line in 2030, 2040, and 2050, respectively.

Adaptation is expected to help moderate the impacts of climate change. Under BAU with adaptation, the number of poor people is expected to reduce by around 233,600, 803,000, and 613,200 in a wet/warm future, and by 292,000, 876,000, and 876,000 in a dry/hot scenario, in 2030, 2040, and 2050, respectively (Figure 4.4). Similar trends are seen when comparing ASP and ASP with adaptation under a wet/warm and dry/hot scenario.

Figure 4.4: Reduction in poverty under BAU and ASP with adaptation measures, 2030–50



Source: World Bank staff calculations.
 Note: Uses the \$2.15 2017 PPP international poverty line.



5

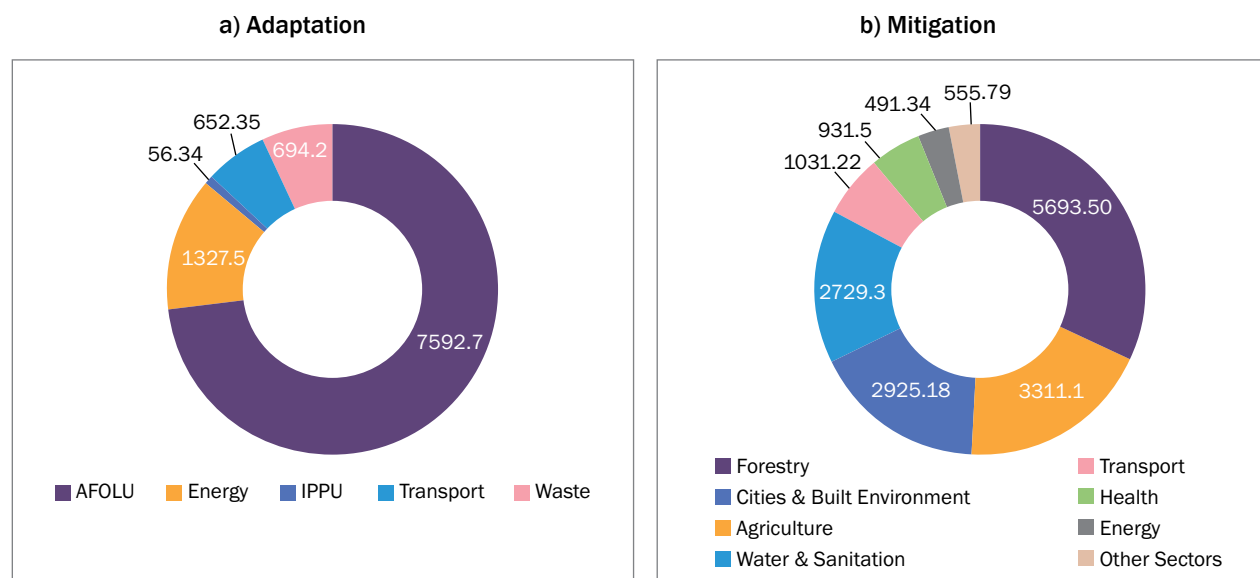
Mobilizing Climate Finance

5. Mobilizing Climate Finance

The adaptation and mitigation measures outlined in Uganda's updated NDC are estimated to cost **\$28.1 billion between 2022 and 2030, and the average annual cost of disaster relief is estimated at \$30.7 million per year.** The NDC estimates that adaptation will cost approximately \$17.7 billion, with 14 percent funded domestically (unconditional), and mitigation will cost around \$10.3 billion, 15 percent of which is unconditional (MWE 2022). The NDC implementation plan includes more details on the funding required for adaptation and mitigation in the priority sectors (Figure 5.1). The impacts of climate change could increase the average annual cost of disaster relief to \$55.3 million, and the cost for severe events by nearly 300 percent (Dicko, Ndlovu and Mahony 2022).

For purposes of this CCDR, which includes modeling out to 2050, investment needs are estimated for “big-ticket items” associated the multisectoral intervention packages under BAU and ASP, with and without additional climate action. These estimates (Table 5.1) provide indicative investment volumes required to 2030 and 2050, to show the “additional” financing needed for climate action. Where data permit, the table differentiates capital expenditure (CAPEX) and operating expenditure (OPEX). The exclusion of sectors in the table is due to insufficient data⁶⁰ (for example, on low-carbon transport, which will require charging stations, private investment, and so on), or available data not being sufficiently granular—for example, the National Health Action Plan notes requires \$63.1 million over a period of five years, but does not disaggregate by years, OPEX and CAPEX.⁶¹

Figure 5.1: Sector shares of NDC cost estimates



Source: World Bank staff calculations, based on data from GoU 2023.

60 Although NDP IV includes sector investment data, the granularity was not enough to estimate requirements under the different scenarios and out to 2050. Where necessary, the estimations are based on studies that have examined investment requirements across countries in the region and determined the share of GDP required for the sector expansion.

61 This includes \$19.1 million for climate-resilient infrastructure, technologies, and supply chains; \$16.6 million for transformative climate leadership and governance which would integrate climate considerations into planning processes and enhancing coordination; and \$1 million for health and climate research to help build long-term, systemic resilience.

Table 5.1: Estimated investment needs for elements of the intervention packages outlined in this CDDR (\$, millions)

	BAU		BAU+climate action		ASP		ASP+climate action		Δ BAU	Δ ASP	ASP vs BAU	ASP+NDC vs BAU+NDC
	2023-30	2031-50	2023-30	2031-50	2023-30	2031-50	2023-30	2031-50				
Intervention Package A. Boost resilience through jobs for youth and services for the poor												
WASH												
CAPEX	3,554 (1.18%)	24,944 (0.93%)	6,122 (2.03%)	49,577 (1.85%)	7,219 (2.38%)	50,667 (1.64%)	7,219 (2.38%)	50,667 (1.64%)	0.91	0.00	0.86	0.06
OPEX	1,333 (0.44%)	9,354 (0.35%)	2,296 (0.76%)	18,591 (0.69%)	2,707 (0.89%)	19,000 (0.61%)	2,707 (0.89%)	19,000 (0.61%)	0.34	0.00	0.32	0.02
Intervention Package B. Promote resilient and productive agriculture and natural resources with lower GHG emissions												
Irrigation expansion												
CAPEX	48 (0.02%)	161 (0.01%)	902 (0.3%)	388 (0.01%)	1,899 (0.63%)	3,165 (0.1%)	NA	NA	0.04	0.00	0.14	-0.04
OPEX	9 (0%)	28 (0%)	159 (0.05%)	68 (0%)	335 (0.11%)	558 (0.02%)	NA	NA	0.01	0.00	0.03	-0.01
Forest restoration and agroforestry												
CAPEX	NA	NA	280 (0.09%)	2,175 (0.08%)	346 (0.11%)	2,546 (0.08%)	NA	NA	-0.01	0.00	0.00	-0.08
OPEX	NA	NA	99 (0.03%)	2,822 (0.11%)	108 (0.04%)	3,119 (0.1%)	NA	NA	-0.01	0.00	0.00	-0.09
Promoting clean cooking												
CAPEX	NA	NA	56 (0.02%)	1,444 (0.05%)	NA	NA	54 (0.02%)	1,450 (0.05%)	0.05	0.04	0.00	0.00
Intervention Package C. Develop climate-responsive energy, transport, and digital infrastructure												
Power system												
CAPEX	346 (0.11%)	28,597 (1.07%)	365 (0.12%)	29,706 (1.11%)	598 (0.2%)	66,159 (2.14%)	796 (0.26%)	68,261 (2.2%)	0.04%	0.07%	1.11%	1.15%
OPEX	1,243 (0.41%)	1,1295 (0.42%)	1,231 (0.41%)	10,840 (0.4%)	986 (0.33%)	23,271 (0.75%)	986 (0.33%)	21,670 (0.7%)	-0.02%	-0.05%	0.84%	0.76%
Resilient transport networks												
CAPEX	-	-	1,350 (0.45%)	2,250 (0.08%)	5,903 (1.95%)	9,838 (0.32%)	14,932 (4.93%)	24,887 (0.8%)	0.12	0.71	0.46	1.06
OPEX	2,230 (0.74%)	31,723 (1.18%)	2,031 (0.67%)	22,646 (0.85%)	1,851 (0.61%)	16,166 (0.52%)	1,686 (0.56%)	11,540 (0.37%)	-0.31	-0.14	-0.47	-0.34

Source: World Bank staff calculations.

Notes: All values are presented at constant 2025 prices with a discount rate of 6%. GDP shares in parentheses represent the ratio between total investment (undiscounted) and total GDP (also undiscounted) for each respective period. NA indicates not available; - indicates same as ASP. The BAU+climate action column is calculated using the BAU GDP trajectory; the ASP+climate action, ASP vs BAU, and ASP+NDC vs BAU+NDC columns all use the ASP GDP trajectory. Δ BAU = the difference between BAU 2023-50 and BAU+climate action 2023-50; Δ ASP = the difference between ASP 2023-50 and ASP+climate action 2023-50; ASP vs BAU = the difference between BAU 2023-50 and ASP 2023-50; ASP NDC vs BAU+NDC = the difference between BAU+climate action 2023-50 and ASP+climate action 2023-50.

5.1. Current spending and financing

A preliminary estimation of government spending on climate action points to a shortfall compared to its NDC commitments. In 2020, estimated annual public domestic climate change-relevant expenditure was close to \$57 million, with an outturn expenditure of \$28.5 million (Republic of Uganda 2022). This falls short of the \$50.3 million per year of domestic resources for adaptation and mitigation estimated in the country's NDC. The updated NDC does not specify annual domestic public spending targets for climate adaptation and mitigation, making it difficult to estimate the current domestic funding gap.

GoU also remains exposed to a significant disaster relief funding gap. DRM is largely domestically funded and official development assistance for emergency response is highly variable. GoU has some ex-ante financing instruments to manage disaster risk, including a contingency fund, the National Disaster Preparedness and Management Fund, a central storage facility for emergency relief items, and risk transfer instruments.⁶² GoU also uses supplementary emergency releases from MOFPED, which can amount to up to 3 percent of the total approved budget for the financial year. These releases, authorized by the cabinet for mobilizing and allocating resources, are not necessarily risk-informed. At local level, districts are allowed to reallocate up to 50 percent of conditional Poverty Alleviation Fund grants to finance flood response, but these are usually insufficient to meet existing needs, and funds are not available for emergency preparedness and response (World Bank 2023a).

But Uganda is leveraging other sources of financing for climate action. From 2000 to 2021, the Ugandan Development Bank estimated that a total of 2,303 climate change-related projects has been initiated in Uganda, mobilizing around \$4.8 billion from international sources (UDB 2024). The contribution of bilateral and multilateral development partners' active projects to NDC actions amounted to €2.88 billion (Embassy of Denmark-Uganda 2025).⁶³ The number of initiatives tagged as climate-related and aligned with the NDC have nearly doubled, and between 2022 and 2024, the average contribution of each initiative increased by over 37 percent in nominal terms. In 2024, the relative share of development partners' support for adaptation was 66 percent, mitigation was 14 percent, and activities that comprised both adaptation and mitigation were 20 percent. Between 2022 and 2024, agriculture remained a key area of focus, but there was a shift from ecosystems and forests to crosscutting issues and energy.⁶⁴

5.2. Options for mobilizing climate finance

Uganda's large-scale financing needs for climate action are beyond what GoU can cover while maintaining fiscal sustainability as the anchor for macroeconomic stability. As such, it will need external climate finance and private sector investments to bridge the gap.

The NCFS has identified various avenues for mobilizing climate finance, which fall into three groups: domestic public climate finance, international climate finance, and domestic private sector climate finance. Increasing domestic public climate finance will require policies and frameworks that leverage innovative sources to complement public finance. Uganda will need to access international funding sources and implement innovative mobilization mechanisms to increase international climate finance, and use targeted incentives and strategies to promote private sector investment in climate initiatives.

62 The National Policy for Disaster Preparedness and Management urges MoFPED to work with OPM on a National Disaster Preparedness and Management Fund Bill. The central emergency relief storage facility faces challenges in maintaining adequate stock.

63 This is an increase of 92% across donors who reported their climate finance in 2022 and 2024 + financing from donors reporting for the first time in 2024.

64 This preliminary analysis does not include data from the World Bank. Since Uganda submitted its NDC in 2015, the World Bank portfolio has committed \$1.76 billion in climate co-benefits, and since FY20, climate co-benefits have been higher than previous years. Net adaptation co-benefits have been greater than mitigation co-benefits, with exception of FY22, when the Electricity Access Scale Up project was approved.

The global shifts in climate and development finance point to improving the way domestic public resources are used and increasing private sector engagement. Uganda is well positioned to take these steps. In the short-term, GoU can implement existing policies to improve domestic spending, develop a platform for strengthening climate finance coordination, and enable private sector climate action. In the medium to long term, it can use innovative financing instruments to leverage a more mature capital market to increase private sector financing.

5.2.1. Domestic public resources

Creating an enabling environment would stimulate better use of domestic public resources for climate action. As noted in Chapter 2, Uganda has built a system to tag public budget allocations and track international commitments and disbursements. GoU needs to accelerate the full roll-out of CCBT into its national program budget system. Integrating climate change into budget instruments such as the call circulars, strategies, and implementation circulars would help reinforce budget tagging. All budget submissions and NDP programs can be mandated to budget for relevant climate change adaptation and mitigation actions. But support is needed to build central MDAs and LG capacity to effectively program and track climate finance, including for climate change-responsive planning and budgeting. Stronger national and subnational climate finance tracking, reporting, and accountability will boost confidence in the effective and efficient deployment of public resources allocated for climate action, and their impact.

GoU should ensure compliance with climate disaster risk screening requirements in the Development Committee Guidelines and public investment appraisal and investment criteria. It can also increase domestic public resources for climate action by scaling up mechanisms for incentivizing subnational government to implement climate action, including via performance-based climate resilience grants.

A climate finance platform could strengthen coordination of public and private climate financing sources (including foreign direct investment or FDI), dedicated climate finance, official development assistance, and concessional loans. The aim would be to leverage available domestic resources for climate action to mobilize other financing sources and scale out effective performance-based climate financing. The platform would strengthen NCFS governance and coordination across the Ministry of Finance, Planning and Economic Development, BoU, Capital Markets Authority of Uganda, NPA, MWE-CCD, and Ministry of Local Governments. It should also be informed about the status of climate action and priority areas for effective climate interventions and help integrate financial sector considerations in the climate finance strategy. Finally, the platform could, jointly with MDAs, help mobilize climate finance from other sources for NDC 3.0 interventions.

Complementing the climate finance platform, a project preparation facility can help develop the prioritized pipeline of climate action projects to operationalize NDC 3.0. To develop an effective pipeline, national and subnational MDAs must be aware of and work with the NDC Implementation and Resource Mobilization Plan. MDAs responsible for NDC interventions will need support to develop robust, feasible, and bankable projects, but as not all projects are suited for external climate financing, the pipeline should prioritize by alignment with the objectives of climate funding sources.

Increasing climate and disaster risk finance is vital for GoU to manage risks resulting from extreme weather and weather variability caused by climate change. Uganda must urgently complete and implement its financial protection/DRF strategy, strengthen existing risk finance instruments, and consider establishing new instruments to close the protection gap. For this, it will need to improve technical capacity and data on disaster-related losses and expenditure.

GoU should establish a contingent credit line specifically for disasters. In the event of a major shock, it currently addresses the funding gap through ex-post risk financing instruments, such as supplementary

budgets and donor assistance. Section 26 of the 2015 Public Finance Management Act mandates the contingency fund and sets annual funding at 0.5 percent of the previous year's total appropriated national budget. But since its inception in 2018, the fund has received less than 0.2 percent of the national budget (\$17 million) and has not been exclusively dedicated to natural disasters. In addition to ensuring adequate financing is included in the contingency fund, GoU should specify the events that are eligible for these funds and outline how the resources will be allocated.

Accelerating the establishment of public asset insurance will help GoU respond to natural disasters and provide a buffer against shocks. In 2019, it developed the Asset Management Framework and Guidelines, which specify the types of asset to be insured and the conditions for insuring them. While it has made efforts to improve public asset registers, these lack comprehensive and reliable information and do not account for climate-related factors (IMF 2024). Integrating requirements related to exposure and vulnerability to climate change would strengthen the framework and guidelines. GoU does not have public asset or sovereign insurance to finance responses to natural disasters. Incorporating information on the location of public assets and associated hazards would help improve maintenance budgeting and planning, and linking the climate finance platform to the asset register could improve coordination on climate spending (IMF 2024).

5.2.2. International financing for climate action, including from development partners

Uganda could engage in processes that advocate for larger volumes of adaptation financing as grants. It should continue to leverage its Green Climate Fund readiness to improve access to dedicated climate finance, while also developing tools and mechanisms that facilitate climate finance mobilization. It could use these to better track and monitor international climate finance, support the development of PPPs, promote climate-aligned FDI, provide incentives for green and blue investments, and operationalize blended financing tools.

5.2.3. Private sector financing for climate action

The private sector contributes 3.4 percent of Uganda's climate funding, or \$26.5 million annually (World Bank 2024), and invests in climate-smart practices, cleaner technologies, and technology-sharing platforms. In 2016/17, 70 percent of total financing for Uganda's renewable energy sector (approximately \$3.1 billion) was from the private sector (NORAD 2018). This figure has increased with the implementation of the Global Energy Transfer Feed-in Tariff program (2013 to present), which has promoted an enabling environment for private investment in renewable energy through improvements in the Renewable Energy Feed-In Tariff system and its application (UK - Department for Energy Security and Net Zero 2023). Private sector financing includes FDI, domestic private investment revenues, and funds raised locally through group, individual, and institutional savings, including pension funds (the National Social Security Fund). Commercial bank-managed funds, savings and credit cooperatives, capital markets, insurance companies, and corporate organizations also provide financing for climate action. Finally, some private financing is raised through development banks and similar organizations, which offer grants for public investment, innovations in sustainable development, and/or concessional grants (MoFPED 2023).

But private sector contributions to climate funding remain limited, and Uganda can incentivize private entities to do more. This is largely due to Uganda's small and illiquid capital markets, and the cost of capital. Its green finance markets are nascent, but GoU is making efforts to expand them.⁶⁵ Providing incentives such as tax breaks, subsidies, and grants for businesses that adopt green technologies and practices can also encourage private investment in climate action. Capacity-building programs for private

⁶⁵ Some of the policy efforts underway include developing a green taxonomy, establishing a climate finance facility in the Uganda Development Bank, which aims to encourage private sector investments in climate action, and the Bank of Uganda and Uganda Bankers Association ESG framework for Uganda's banking industry, launched in 2024.

sector actors would increase their understanding of climate risks and opportunities, and help businesses integrate climate considerations into their operations and decision-making.

In the short run, Uganda could focus on green loans or sustainability-linked loans to motivate private financing. Equity Bank and other banks are providing green loans, but these could be scaled up. The estimated market size for microenterprise green financing in the coffee and fisheries sector alone is approximately \$62 million. Micro and small enterprises represent a significant market for green finance in Uganda, with an estimated 1.5 million firms, of which 88 percent are micro and 12 percent are small. Microenterprises need financing for business expansion, asset acquisition, and adopting CSA practices (World Bank forthcoming). In the coffee and fisheries sectors, the market size for medium and large enterprises for green finance is approximately \$577.5 million, and there is an estimated supply gap of around \$503.3 million. Incentives could include direct foreign investors providing credit guarantees for loans tagged as “green”, and BoU continuing to raise banks’ awareness of, and build their capacity to handle, green finance.⁶⁶ There is also a need to identify how to ensure the short-term credit rates for these loans do not create cost barriers that impede access to climate finance, especially for microenterprises and SMEs. These companies will also need capacity support to fulfill reporting requirements as outlined in the IFRS guidelines, climate risk guidance, and the BoU’s ESG Framework.

Public-private collaborations can leverage private sector expertise, climate FDIs, technology, and financing to scale up climate-smart projects and enhance their sustainability. Institutional strengthening and building capacity on climate change are vital, and Uganda’s PPP Framework needs to integrate climate change concerns and climate risk analysis. Efforts to catalyze private investments could increase financing for climate action, while promoting an enabling environment for FDI through targeted and well-coordinated reforms could help unlock foreign investments that mitigate climate change and contribute to climate adaptation. Establishing collaborative platforms where government, private sector, and other stakeholders can come together to discuss and coordinate climate action initiatives can also facilitate knowledge sharing, networking, and joint project development.

Growing the use of insurance to respond to climate shocks and deploying a national insurance policy and microinsurance regulation can strengthen risk transfer and mobilize private capital for responding to climate-related disasters. Established in 2016 as a PPP between GoU and the private sector, the Uganda Agriculture Insurance Scheme is the country’s primary risk transfer mechanism, providing insurance coverage to more than 650,000 farmers, 90 percent of whom are smallholders.⁶⁷ But despite its successes, several challenges persist, including limited awareness and understanding among farmers, a lack of data for accurate risk assessment and pricing, and average premiums that are unaffordable for many smallholder farmers.

The private sector can also contribute to flows through the regulated and voluntary carbon markets. Uganda is the fourth-largest developer of voluntary carbon credits in Africa (after the Democratic Republic of Congo, Kenya, and Zambia), primarily for household and community projects. Uganda’s Clean Development Mechanism (CDM) portfolio consists of 189 registered activities in 19 standalone projects and 9 programs, and the country has 101 active initiatives within the voluntary carbon market, which generates most of its carbon credits. These are primarily focused on energy efficiency, particularly through improved cookstove initiatives, alongside biogas and forestry projects, which were not covered under the CDM framework (Eastern Africa Alliance on Carbon Markets and Climate Finance 2022). In Uganda, both the regulated market, which operated under the CDM, and the voluntary market, which functions independently, are set to transition under Article 6 of the Paris Agreement (MoFPED 2023). To unlock further carbon finance, GoU needs to implement the national carbon market regulations and an associated fiscal framework.

⁶⁶ This includes through the rollout of the National Green Finance Curriculum developed in coordination with the Uganda Institute of Banking and Financial Services and aBi Trust.

⁶⁷ DRF Strategy Workshop May 14 to 17, 2024, Entebbe, Uganda.

To leverage innovative climate finance sources to supplement domestic climate financing, Uganda needs to grow its capital market for the medium to long term. To date, it has issued a limited number of green, sustainable, or sustainability-linked bonds, such as the InvestHER Climate Resilient Bond.⁶⁸ Patient capital, such as equity, is also limited. But several regional funds cover Uganda and could be explored further, including the Acumen Resilient Agriculture Fund.⁶⁹ In the long term, Uganda could develop a green bonds framework for sovereign issuances to facilitate green bond issuance from public and private sector players.⁷⁰ Another option is to explore sovereign sustainability-linked bonds,⁷¹ which may provide more flexibility because the use of proceeds is not ringfenced, and they incentivize change by attaching interest payments to predefined key performance indicators and sustainable performance targets. To increase private sector climate finance and strengthen its efforts to build a green finance market, Uganda could:

- Strengthen governance and strategies by setting up, as part of its existing interministerial, interagency taskforce, an internal governance structure that links to private sector groups and brings together financial sector authorities and finance providers.
- Enhance climate risk management by issuing and supporting implementation of climate risk supervisory guidelines for banks that are aligned with global guidelines, such as Basel Committee on Banking Supervision's principles, conducting a comprehensive climate risk analysis for the financial sector, and integrating climate risk in the supervisory framework, including on-/off-site supervision.
- Increase market transparency by finalizing the green taxonomy and introducing climate/ESG disclosures starting with large, listed companies,⁷² strengthening the ESG disclosure guidelines for listed companies over time. This could be done by the capital market regulator, with support from the stock exchange, which could provide voluntary guidelines as a starting point. GoU could complement these efforts by harmonizing definitions and classification systems and developing incentives for green products, such as loans, to accelerate the roll-out of green finance instruments and access to appropriate sovereign sustainable finance instruments, such as green or sustainability-linked bonds or debt swaps.
- Deepen capacity building and training of financial institutions and firms and build financial literacy. GoU needs to increase financial sector considerations in the NCFS, build institutional capacity to implement green finance instruments, and prepare a comprehensive framework and guidelines for issuing sovereign green or sovereign sustainability-linked bonds and convening investors for these.

68 The InvestHER Climate Resilience Bond promotes CSA practices and gender mainstreaming by improving access to credit for women-led or owned agri-SMEs and providing technical assistance to enhance their impact on women farmers. This bond strengthens women's climate resilience in agrifood systems by enhancing their access to tailored formal credit and building their knowledge and capacity in CSA practices (<https://www.climatefinancelab.org/ideas/investher-climate-resilience-bond/>).

69 The world's first equity fund designed to build the climate resilience of smallholder farmers, this \$58 million impact fund supports smallholder farmers in Africa by investing in early and early-growth stage agribusinesses that enable them to anticipate, weather, and bounce back from climate events through increased yields and incomes. These businesses are backed by passionate founders committed to building profitable and scalable enterprises that prioritize the needs of smallholder farmers (<https://arafund.com/>).

70 The rationale for this being a long-term proposal is that the capital market is relatively small, and a green bond would be more appropriate once Uganda's capital market develops. But GoU could lead by example. It is also important to note that the feasibility of using green bonds to service Uganda's relatively high public debt (as suggested in the NCFS) warrants careful analysis around the appropriateness or costs and benefits of using the proceeds in this way. Uganda may want to examine Côte d'Ivoire's sustainability linked loan, which was used to buy more expensive debt. This could be a potential attractive innovation.

71 Although relatively new in the sovereign space, sovereign sustainability-linked bonds are quite common in the corporate world. Some countries (e.g., Uruguay, Thailand and Chile) are exploring or have already issued these bonds at sovereign level. They may be appropriate for Uganda if it is struggling to identify project pipelines or ringfence public spending.

72 22 financial institutions report offering "ESG" financial products, but these need to be clearly defined to ensure comprehensive tracking of market trends and avoid the risk of greenwashing.



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6

Priority Climate Action and Conclusion

6. Priority Climate Action and Conclusion

Due to its long-term growth aspirations, high vulnerability to climate events, and limited fiscal space, Uganda needs to prioritize and sequence intervention measures. This CCDD recommends four multisectoral intervention packages and whole-of-economy measures that address Uganda's main climate risks and contribute to its development and climate objectives. All the recommended packages and measures include short- and medium- to long-term measures. Implementation of the short-term measures should be initiated—and where possible, completed—in the next 1–2 years. Implementation of medium- and long-term measures should be initiated within the next 3–5 years and 5–10 years, respectively.

The priority climate actions associated with the four multisectoral intervention packages and whole-of-economy measures are outlined in Table 6.1. These actions contribute to better development, targeted adaptation, and help maintain a low-carbon footprint or lower future GHG emissions. Several align with actions identified in Uganda's NDP IV programs, including natural resources, environment, climate change, land and water management; human capital; agro-industrialization; energy development; and integrated transport and infrastructure services. But Uganda's technical and political readiness to implement the priority actions varies, and GoU will need technical support and political willingness for some of them.

6.1. Priority whole-of-economy actions

Three groups of whole-of-economy actions need to be implemented. First, Uganda must strengthen the governance framework for climate action (Chapter 2) by enhancing coordination, improving oversight over climate action, and improving the resilience of public investments. Second, it needs to establish a comprehensive disaster risk system, support sectors to use and work with early warning data, expand its early warning system, and develop tailored services for key sectors. These first two actions could leverage digital innovations, including artificial intelligence and machine learning, to improve accuracy, speed and timeliness of forecasts, and digital platforms and devices to accelerate information dissemination, interactive communication, and citizen engagement. Third, it needs to mobilize climate finance (Chapter 5), by improving the use of domestic resources available for climate action, leveraging additional climate finance, and incentivizing greater private sector engagement. The focus should be improving SME access to loans, increasing green loans and sustainability linked loans, strengthening the PPP Framework to integrate climate change concerns, strengthening risk finance instruments, including climate risk insurance, and operationalizing a robust carbon markets regulatory framework. It will be important to follow up these short-term measures with the other medium- to long-term policy recommendations related to mobilizing finance to fill the financing gap for climate action.

6.2. Priority actions in the multisectoral intervention packages

The four multisectoral intervention packages (Chapter 3) outline several measures that can help Uganda achieve its development goals in a climate-resilient and low-carbon manner. Each package has short-, medium- and long-term measures.

Intervention Package A: Boost resilience through jobs for youth and services for the poor

Short-term measures focus on building vulnerable people's resilience while helping them benefit from climate-positive opportunities. These measures target Uganda's growing youth population, the poor, and persons engaged in climate-vulnerable occupations that have low productivity. Priority measures focus on adaptive social protection, skills support, labor market information, and sustained access to health, education, and WASH services.

Intervention Package B: Promote resilient and productive agriculture and natural resources with lower GHG emissions

Agriculture, livestock, and natural resources are highly vulnerable to climate change and major sources of GHG emissions. To enhance these sectors' contribution to growth and lower GHG emissions, priority actions center on on-farm and landscape measures that improve productivity and resilience and promoting private sector engagement. Actions include developing regulations, policies, and fiscal measures, meeting data needs, and building capacity to improve agricultural and livestock productivity, manage natural assets for goods and ecosystem services, and reduce the degradation of wetlands and forests. These actions also support lowering GHG emissions from agriculture, forests, and land use.

Intervention Package C: Develop climate-responsive energy, transport, and digital infrastructure

More power, reliable all-weather roads, and improved connectivity are essential for Uganda to realize the opportunities of regional trade and boost productivity. Uganda is at a crossroads and can choose to pursue rapid growth in a manner that ignores its carbon footprint or implement financially sensible, low-carbon solutions. The country's relatively low carbon footprint and resilient hydropower sector justifies selecting the low-carbon growth path. But it must ensure its roads, bridges, ports, and transmission and distribution lines are resilient to climate shocks. Priority measures focus on institutional capacity, policies, and planning to support low-carbon and climate resilient energy, transport, and digital investments.

Intervention Package D: Foster planned and climate-positive urbanization

Uganda's growth ambitions will involve populations and economic activities transitioning to its urban spaces. Existing and future cities and built-up areas require planning to reduce the likelihood of climate disruptions and minimize congestion and pollution, which lower quality of life. Given current levels of urbanization, Uganda can consider climate risks and support financially viable, low-carbon actions. Priority actions focus on institutional and policy frameworks for climate-resilient urbanization and promoting low-carbon transport and housing with private sector.

Table 6.1: Priority policy actions

Objective	Recommended policy actions S = short term; M = medium term; L = long term, ▼ = low-carbon; ⓘ = adaptation	MDAs	T	P
Intervention Package A: Boost resilience through jobs for youth and services for the poor				
Adaptive social protection program	S: Develop a costed framework for the Adaptive Social Protection program ⓘ ▼ M: Operationalize and scale up the Adaptive Social Protection program ⓘ	MGLSD		
Skills and knowledge to address climate change	S: Establish short-term upskilling and work-based skilling programs ⓘ ▼ M: Prepare and adopt climate-smart/resilient building standards for education facilities ⓘ L: Prepare modular skilling and work-based skilling curricula for priority skills areas ⓘ ▼	MoES <i>MGLSD</i>		
Climate-responsive health services	S: Adopt climate-smart standards for planning, programming, budgeting, financing, health technologies, infrastructure ⓘ M: Build capacity to handle climate health emergencies and climate shocks ⓘ L: Invest in climate and health research including GHG in health baseline, climate vulnerability, capacity, and adaptation assessments at national and local levels ⓘ ▼	MoH, MWE <i>MoES</i>		
Climate-responsive WASH services	S: Develop and adopt a national climate-resilient water investment framework ⓘ ▼ M: Review and operationalize WASH tariff policy and guidelines ⓘ	MWE		
Intervention Package B: Promote resilient and productive agriculture and natural resources with lower GHG emissions				
Scale up climate-compatible irrigation	S: Develop and implement a national irrigation master plan ⓘ M: Develop and implement a strategy to scale up micro-scale irrigation ⓘ	MAAIF, MWE		
Increase productivity via CSA	S: Promote soil management and strengthen market-based incentives to use climate-compatible seeds and feed for crops and livestock ⓘ ▼ M: Adopt and operationalize the National Accreditation System Bill and support livestock breed improvement ⓘ ▼ L: Modernize agricultural extension, leverage private extension, augment access to finance and mechanization, and support formation of more farmer cooperatives ⓘ ▼	MAAIF		
Restore ecosystem services	S: Support financing of upfront restoration costs (e.g., tree nurseries, community mobilization) ⓘ ▼ M: Strengthen capacity and local government-community partnerships for wetland and forest management ⓘ ▼ L: Scale out PES schemes to reward effective restoration efforts promote tourism opportunities ⓘ ▼	MWE, NEMA <i>MoLG</i>		
Curb the degradation of natural assets	S: Enforce forest laws and wetland boundaries; simplify governance of fuelwood and charcoal use; and increase incentives to transition to clean cooking ⓘ ▼ M: Develop and implement land use plans for viable wildlife corridors; expand technical and financial support for commercial tree-growing ⓘ ▼ L: Monitor climate change impacts on species and habitats to inform conservation strategies; ensure industries use responsibly sourced biofuel ⓘ ▼	MWE, NEMA <i>MEMD, NFA</i>		
Intervention Package C: Develop climate-responsive energy, transport, and digital infrastructure				
Least-cost and competitive power generation	S: Build capacity and institutionalize regular use of least-cost generation and transmission expansion planning ▼ M: Establish a competitive framework for procurement of new generation and transmission capacity ▼ L: Consider climate adaptation in investments across the electricity value chain to increase resilience, enhance security of supply ⓘ	MEMD		
Transition to clean cooking	S: Fully finance clean cooking goals and use social safety nets to promote uptake ▼ M: Develop labeling scheme for clean cooking technology to enhance quality assurance ▼ L: Enforce monitoring to track clean cooking technology use at household, industry, and service levels ▼	MEMD		

Objective	Recommended policy actions S = short term; M = medium term; L = long term, ▼ = low-carbon; ⓘ = adaptation	MDAs	T	P
Low-carbon and climate-resilient transport	S: Establish collaborative frameworks that promote multimodal, low-carbon transport solutions ▼ M: Promote integrated transport, land use planning and urban mobility plans that promote greener modes of public transport and non-motorized transport ▼ L: Build technical and institutional capacity in climate-resilient transport planning ⓘ	MoWT		
Green IT environment	S: Use cloud setups based on virtualized servers that reduces energy consumption GHG emissions; use Internet of Things (IoT) remote sensing technology to predict disasters and improve proactive response as well as early warning in communities prone to mudslides and flooding ⓘ M: Leverage digital innovations in strengthening disaster risk management; manage water resources using a fusion of IoT sensors, cloud-based water management system; increase outreach to promote green IT environments ⓘ L: Dispose of e-waste in compliance with the National e-waste Policy; manage e-waste and promote e-recycling and refurbishing of handsets ▼	MoICT & NG, NITA-U		
Intervention Package D: Foster planned and climate-positive urbanization				
Climate-resilient cities, municipalities, and town councils	S: Integrate climate resilience in urban plans and policies; develop prioritization framework for climate-smart urban solutions ⓘ M: Prepare local climate-resilient action plans; introduce incentives for green materials; update building codes with sustainability standards and prioritize certified green building materials in public procurement ⓘ L: Strengthen and empower urban authorities to coordinate and implement climate action; promote research to inform green housing guidelines ⓘ ▼	NPA, MoLHUD MoLG, MoWT, LGs, BoU, NHCCCL		
Promote low-carbon urban mobility	S: Develop and operationalize a national multimodal public transport framework which promotes mass transit ▼ M: Promote boda-boda and minibus electrification; introduce BRT and the commuter rail in Greater Kampala and NMT infrastructure in urban areas ▼ L: Prepare green urban mobility masterplans for cities and municipalities ▼	MoWT, MoLHUD, KCCA, NEMA MoFPED, URA		
Whole-of-economy measures to strengthen governance frameworks for climate action				
Coordination and stakeholder engagement	S: Strengthen the Policy Committee on Environment's capacity to direct and oversee national climate action ⓘ ▼ M: Issue regulations to fully operationalize the NCCA ⓘ ▼ L: Strengthen local government capacity to engage in climate action ⓘ ▼	MWE-CCD		
Mainstream climate considerations	S: Develop and institutionalize climate screening criteria in the PIM framework ⓘ ▼ M: Integrate climate risk screening into national and sector development plans and budgeting ⓘ ▼	NPA, MoFPED		
Disaster risk management	S: Upgrade meteorological real-time services for key sectors ⓘ ▼ M: Expand meteorological networks ⓘ ▼ L: Establish centralized, real-time urban meteorological data ⓘ ▼	MWE		
Whole-of-economy measures to improve access to domestic climate finance				
Improve domestic spending on climate action	S: Complete and implement the national financial protection/DRF strategy ⓘ ▼ M: Strengthen governance around the climate finance strategy ⓘ ▼ L: Design and operationalize a climate finance platform ⓘ ▼	MoFPED		
Whole-of-economy measures to increase private sector engagement in climate action				
Increase SME engagement in climate action	S: Establish climate finance facility or window within the Agricultural Credit Facility to support CSA ⓘ ▼ M: Expand access to affordable insurance in climate-sensitive sectors ⓘ ▼ L: Incorporate blended finance tools (e.g., credit guarantees, results-based financing) to enhance bankability and reach smallholder farmers ⓘ ▼	BoU, MAAIF, MoFPED, banks		

Objective	Recommended policy actions S = short term; M = medium term; L = long term, ▼ = low-carbon; ☞ = adaptation	MDAs	T	P
Engage private sector in climate-compatible trade	S: Review and reduce tariff peaks on climate-friendly goods and reduce tariffs on environmental goods to zero ☞ ▼ M: Establish a trade and climate strategy to inform national plans; streamline nontariff measures for environmental goods, services, etc. ☞ ▼ L: Enhance the monitoring, reporting, and verification system; provide GHG emissions certification and deforestation-free supply chains for SMEs ☞ ▼	MTIC, MWE <i>MSTI, MEMD</i>		
Increase climate financial sector resilience	S: Set up an interministerial taskforce for financial sector authorities ☞ ▼ M: Deepen capacity building on climate change risks for financial institutions and firms; consider financial sector in climate finance strategy ☞ ▼ L: Consider introducing climate/environmental, social, and governance disclosures, starting with large, listed companies ☞ ▼	MoFPED <i>BoU, CMA</i>		
Leverage PPPs	S: Strengthen the PPP framework to include climate-sensitive sectors ☞ ▼ M: Ensure PPP pipeline contributes to low-carbon and climate-resilient capital investments ☞ ▼	MoFPED		
Engage the private sector via carbon markets	S: Approve and operationalize a robust carbon market regulatory framework ☞ ▼ M: Facilitate land tenure formalization, clear rights over assets, and secure land leasing arrangements ☞ ▼ L: Define carbon rights in the land laws; develop protocols for carbon credit eligibility under customary, leasehold, and freehold regimes ☞ ▼	MWE, MoLHUD, ULC, ULA, NEMA, MoJCA		
Increase the use of green finance instruments	S: Approve and issue the Green Taxonomy ☞ ▼ M: Identify sovereign sustainable finance instruments ☞ ▼ L: Build capacity to implement green finance instruments ☞ ▼	MoFPED, BoU <i>CMA</i>		
Whole-of-economy measures to improve access to dedicated climate finance				
Sectoral climate finance mobilization	Build capacity of and support sectors (e.g., agriculture, health, education, transport, energy, forests, tourism) to leverage dedicated climate finance to mobilize additional climate financing for implementing the NDC 3.0 (under development) ☞ ▼	MoFPED <i>All MDAs</i>		

Notes: In the MDA column, those in **bold are lead MDAs**, those in *italic* are supporting MDAs. In the final column, T = technical readiness; P = political readiness; *red* = low readiness, *yellow* = medium readiness; *green* = high readiness. BoU = Bank of Uganda; CCD = Climate Change Department; CMA = Capital Markets Authority Uganda; KCCA = Kampala Capital City Authority; LG = local government; MAAIF = Ministry of Agriculture, Animal Industry and Fisheries; MEMD = Ministry of Energy and Mineral Development; MGLSA = Ministry of Gender, Labor and Social Development; MoES = Ministry of Education and Sports; MoFPED = Ministry of Finance, Planning and Economic Development; MoH = Ministry of Education and Sports; MoICT&NG = Ministry of ICT and National Guidance; MoJCA = Ministry of Justice and Constitutional Affairs; MoLG = Ministry of Local Government; MoLHUD = Ministry of Lands, Housing and Urban Development; MoWT = Ministry of Works and Transport; MSTI = Ministry of Science, Technology and Innovation; MTIC = Ministry of Trade, Industry and Cooperatives; MWE = Ministry of Water and Environment; NEMA = National Environment Management Authority; NFA = National Forestry Authority; NHCCL = National Housing and Construction Company Limited; NITA-U = National Information Technology Authority Uganda; NPA = National Planning Authority of Uganda; ULA = Uganda Land Alliance; ULC = Uganda Land Commission; URA = Uganda Revenue Authority.



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References

7. References

- Barbic, F, Minonzio, M, Cairo, B, Shiffer, D, Cerina, L, Verzeletti, P, Badilini, F, Vaglio, M, Porta, A, Satambrogio, M, Gatti, R, Rigo, S, Bisoglio, A and Furlan, R. 2022. "Effects of a Cool Classroom Microclimate on Cardiac Autonomic Control and Cognitive Performances in Undergraduate Students." *Science of the Total Environment* 808: 152005.
- Dicko, T F, Ndlovu, Q and Mahony, C B. 2022. *Uganda: Disaster Risk Finance Diagnostic*. Washington DC: World Bank Group. <http://documents.worldbank.org/curated/en/099752511072337998>.
- Directorate of Water Resources Management. 2013. *National Water Resources Assessment Report*. Ministry of Water and Environment, Uganda.
- Eastern Africa Alliance on Carbon Markets and Climate Finance. 2022. Carbon Market Profile (Uganda). https://climatefinanceinnovators.com/wp-content/uploads/2023/06/Carbon-Report_Uganda_2023_Rev03_single.pdf.
- Embassy of Denmark-Uganda. 2025. "Mapping of Donor Financing for Climate Change" (unpublished). Kampala: Embassy of Denmark.
- GoU. 2016. *Uganda Wetlands Atlas*. Volume II, popular version. <https://www.mwe.go.ug/library/uganda-wetlands-atlas>.
- GoU. 2023. "Uganda's NDC Implementation and Resource Mobilization Plan."
- IEA. 2023a. *Uganda Energy Policy Review*. International Energy Agency. <https://iea.blob.core.windows.net/assets/e329674b-f51f-4eb0-b0fd-402ddc016d90/Uganda2023.pdf>.
- IEA. 2023b. *Uganda Energy Transition Plan*. International Energy Agency.
- IFC. 2022. *Country Private Sector Diagnostic*.
- IFC. 2025. *Opportunities and Challenges for Private Sector Investment in Climate Change in Uganda*.
- IMF 2024. *Uganda: PFM Climate Assessment: Public Investment and Fiscal Risks Management*. <https://www.imf.org/en/Publications/high-level-summary-technical-assistance-reports/Issues/2024/02/28/Uganda-PFM-Climate-Assessment-Public-Investment-and-Fiscal-Risks-Management-545468>.
- IPCC. 2022. "Africa." [Trisos, C H, I O Adelekan, E Totin, A Ayanlade, J Efitre, A Gameda, K Kalaba, C Lennard, C Masao, Y Mgaya, G Ngaruiya, D Olago, N P Simpson and S Zakieldeen]. In: IPCC. 2022. *Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [H-O Pörtner, D C Roberts, M Tignor, E S Poloczanska, K Mintenbeck, A Alegría, M Craig, S Langsdorf, S Löschke, V Möller, A Okem, B Rama (eds.)]. Intergovernmental Panel on Climate Change. Cambridge, UK and New York, NY, USA: Cambridge University Press https://report.ipcc.ch/ar6/wg2/IPCC_AR6_WGII_FullReport.pdf.
- Isunju, J B, Bukenya, J N, Masembe, V, Ssekamatte, T, Namanya, D B, Nyenje, P, Doreen, N, Tamale and Nalugya, A. 2023. "Climate Change Health Vulnerability and Adaptation Assessment (VAA) for Sound Management of Climate Change-related Health Risks in Uganda."
- Jassogne, L, Laderach, P and van Asten, P. 2013. *The Impact of Climate Change on Coffee in Uganda: Lessons from a case study in the Rwenzori Mountains*. Oxfam. <https://policy-practice.oxfam.org/resources/the-impact-of-climate-change-on-coffee-in-uganda-lessons-from-a-case-study-in-t-277813/>.
- Kalra, N, Molina-Pérez, E, Syme, J, Esteves, F, Cortés, H, Rodríguez-Cervantes, M T, Espinoza-Juárez, V M, Jaramillo, M, Baron, R, Alatorre, C, Buttazzoni, M and Vogt-Schilb, A. 2023. *The Benefits and Costs of Reaching Net Zero Emissions in Latin America and the Caribbean*.
- Kasese district local government. 2020. *Kasese District 1-Year Post Disaster Recovery Plan and Budget 2020/2021*. Compiled by the District Disaster Management Committee.
- Kumala Dewi, L P R and Dartanto, T. 2019. "Natural Disasters and Girls Vulnerability: Is Child Marriage a Coping Strategy of Economic Shocks in Indonesia?" *Vulnerable Children and Youth Studies* 14: 24–35.
- MEMD. 2021. *National Electrification Strategy*. Ministry of Energy and Mineral Development. <https://nrep.ug/document/national-electrification-strategy-for-uganda-national-electrification-strategy-study-report-nessr-vol1/>.

Ministry of ICT. 2023. “Vote 126: National Information Technologies Authority.”

MoFPED. 2023. *Market Readiness Assessments of Innovative Financing Instruments for Advancing Uganda’s Adaptation and Mitigation Measures*. As cited in GoU. 2024. “Draft National Climate Finance Strategy” (November 2024 version).

MoFPED. 2024. *National Climate Finance Strategy 2023/24–2029/30*. Third Draft.

MoTWA/UBOS. 2023. *Uganda Tourism Satellite Account Report. Measuring the contribution of tourism to the economy of Uganda*. Ministry of Wildlife, Tourism and Antiquities and Uganda Bureau of Statistics, Kampala.

MTWA. 2019. *Tourism Expenditure and Motivation Survey 2019*. Ministry of Wildlife, Tourism and Antiquities, Kampala.

MWE. 2019. *Uganda Woodfuels Overview*. Ministry of Water and Environment, Kampala.

MWE. 2022. *Updated Nationally Determined Contribution*. Ministry of Water and Environment.

NCDC. 2019. “*The Lower Secondary Curriculum Framework*.” Kampala: National Curriculum Development Centre.

NORAD. 2018. *Unlocking Financing and Investments for Clean and Renewable Energy Access in Uganda: A Case of the Albertine Region, July 2018*.

NPA. 2013. *Uganda Vision 2040*. Kampala: National Planning Authority. <https://www.npa.go.ug/vision2040/>.

NPA. 2020. *Third National Development Plan (NDP III) 2020/21 – 2024/25*. Kampala: National Planning Authority

Nyboer, E A, Musinguzi, L, Ogutu-Ohwayo, R and Natugonza, V. 2022. “Climate Change Adaptation and Adaptive Efficacy in the Inland Fisheries of the Lake Victoria Basin.” *People and Nature* 4 (5): 1319–38.

Pain, D J, Fishpool, L, Byaruhanga, A, Arinaitwe, J and Balmford, A. 2005. “Biodiversity representation in Uganda’s forest IBAs.” *Biological Conservation* 125(1): 133–138. <https://doi.org/10.1016/j.biocon.2005.02.017>.

Plumptre, A J, Nangendo, G, Ayebare, S, Kirunda, B, Mugabe, H and Nampindo, S. 2017. *Impacts of Climate Change and Industrial Development on the Long-term Changes in Wildlife Behavior in the Greater Virunga Landscape*. https://igcp.org/content/uploads/2020/09/GVTC-WCS-report-on-behaviour-changes-to-development-and-climate-changes-final-draft_2017.11.30.pdf.

Republic of Uganda. 2022. “Uganda’s NDC Implementation & Resource Mobilization Plan.” As cited in GoU. 2024. “Draft National Climate Finance Strategy” (November 2024 version).

Rigaud, Kanta Kumari; de Sherbinin, Alex; Jones, Bryan; Adamo, Susana; Maleki, David; Arora, Anmol; Casals Fernandez, Anna Taeko; Chai-Onn, Tricia; Mills, Briar. 2021. *Groundswell Africa: Internal Climate Migration in the Lake Victoria Basin Countries*. World Bank. <http://hdl.handle.net/10986/36403> License: CC BY 3.0 IGO.

Rozenburg, J and Fay, M. 2019. *Beyond the Gap: How Countries Can Afford the Infrastructure They Need while Protecting the Planet*. Sustainable Infrastructure. Washinton DC: World Bank. <http://hdl.handle.net/10986/31291>.

Tsimpo, C and Wodon, Q (eds). 2019. *Water and Sanitation in Uganda*. Washington DC: World Bank Group. <http://documents.worldbank.org/curated/en/772821545386728074>.

Turpie, J K, Wilson, L, Brühl, J, Letley G and Gardner, K. 2023. *Making the Case for Investing in Indigenous Forest Restoration and Protection in Western Uganda: A Scenario Analysis*. Report prepared by Anchor Environmental Consultants for the World Bank, on behalf of the Government of Uganda.

UBOS. 2020. *Uganda Wood Asset and Forest Resource Accounts report*. Kampala: Uganda Bureau of Statistics.

UBOS. 2021a. *The National Labour Force Survey 2021 – Main Report*. Kampala: Uganda Bureau of Statistics. https://www.ubos.org/wp-content/uploads/publications/11_2022NLFS_2021_main_report.pdf.

UBOS. 2021b. *Uganda National Household Survey 2019/2020*. https://www.ubos.org/wp-content/uploads/publications/09_2021Uganda-National-Survey-Report-2019-2020.pdf.

UBOS. 2023. *Physical and Monetary Ecosystem Services and Asset Accounts for Uganda 1990-2015*. Kampala: Uganda Bureau of Statistics.

UBOS. 2024a. *National Livestock Census 2021 Main Report*. Kampala: Uganda Bureau of Statistics. <https://www.ubos.org/wp-content/uploads/publications/National-Livestock-Census-Report-2021.pdf>

UBOS. 2024b. Press Release Revised Annual GDP for FY2023/24-October 2024. Uganda Bureau of Statistics. https://www.ubos.org/wp-content/uploads/publications/Revised-Annual-GDP-2023_24-October-Release.pdf.

UDB. 2024. "The Climate Finance Landscape: Barriers and Opportunities to Uganda's Access and Utilization of Climate Finance." Policy Brief 1, February 2024. https://www.udbl.co.ug/wp-content/uploads/2024/05/UDB-PB3_Barriers-and-Opportunities-NO.3.pdf.

UK - Department for Energy Security and Net Zero. 2023. "Global Energy Transfer for Feed-in Tariff (GET FiT) Annual Review." <https://devtracker.fcdo.gov.uk/programme/GB-GOV-13-ICF-0009-GETFiT/documents>.

UNCDF. 2024. *Uganda Climate Risk and Vulnerability Assessment for Subnational Adaptation*. Volume 1. <https://www.uncdf.org/article/8332/uganda-climate-risk-and-vulnerability-assessment-for-subnational-adaptation>.

UNICEF. 2021. *Progress on Drinking Water, Sanitation and Hygiene in Schools: Special Focus on COVID-19*. New York: United Nations International Children Education Fund.

UNICEF. 2022. *Uganda Annual Report 2022*. New York: United Nations International Children Education Fund.

United Nations. 2020. *Uganda: Progress on Achieving SDG6: 2020 Voluntary National Review*. <https://sdgs.un.org/basic-page/uganda-24784>.

USAID. 2014. *An Overview of Climate Change and Biodiversity in Uganda*. <https://www.climatelinks.org/resources/overview-climate-change-and-biodiversity-uganda#:~:text=USAID's%20African%20and%20Latin%20American,expected%20during%20the%20dry%20season>.

USAID. 2021. *Uganda Water Resources Profile Overview*. Water Resources Profile Series. https://winrock.org/wp-content/uploads/2021/08/Uganda_Country_Profile_

Vu, T M. 2022. "Effects of Heat on Mathematics Test Performance in Vietnam." *Asian Economic Journal* 36: 72–94.

World Bank. n.d. World Development Indicators. <https://databank.worldbank.org/source/world-development-indicators>.

World Bank. 2019. "Special Theme: Jobs and Economic Transformation." IDA19 paper. <https://documents1.worldbank.org/curated/en/381791564075012778/pdf/Special-Theme-Jobs-and-Economic-Transformation.pdf>

World Bank. 2020. *Uganda Economic Update: Strengthening Social Protection to Reduce Vulnerability and Promote Inclusive Economic Growth*. 14th ed.

World Bank. 2021. "Uganda Skills Development in Refugee and Host Communities (P176263). Project Information Document." <https://documents1.worldbank.org/curated/en/336661632309532618/txt/Concept-Project-Information-Documents-PID-Uganda-Skills-Development-in-Refugee-and-Host-Communities-P176263.txt>.

World Bank. 2021. *Climate Risk Profile: Uganda*. https://climateknowledgeportal.worldbank.org/sites/default/files/2021-05/15464-WB_Uganda%20Country%20Profile-WEB%20%281%29.pdf

World Bank. 2022. *Uganda Poverty Assessment: Strengthening Resilience to Accelerate Poverty Reduction*. Washington DC: World Bank Group.

World Bank. 2023a. "Draft Report Review of Gaps and Proposals for Revision of the Development Committee (DC) Guidelines and the Public Investment Management (PIM) Manual of the Government of Uganda."

World Bank. 2023b. *Uganda Country Economic Memorandum*.

World Bank. 2023c. *Uganda Crisis Preparedness Gap Analysis (CPGA)*.

World Bank. 2024a. *Strengthening Urban Resilience Capacity for the GKMA*.

World Bank. 2024b. *Rising to the Challenge*.

World Bank. 2025a. "Agriculture Background Note: Improving Crop Productivity and Resilience." Background note prepared for the Uganda CDDR.

World Bank. 2025b. "Agriculture Background Note: Improving Livestock Productivity and Resilience." Background note prepared for the Uganda CDDR.

World Bank. 2025c. “Climate Change Institutional Assessment.” Background note prepared for the Uganda CCDR.

World Bank. 2025d. “Climate Impact Channel Analysis.” Background note prepared for the Uganda CCDR.

World Bank. 2025e. “The Impacts of Climate Change on Education Outcomes.” Background note prepared for the Uganda CCDR.

World Bank. 2025f. “Low Emissions Pathways Analysis.” Background note prepared for the Uganda CCDR.

World Bank. 2025g. Macro Poverty Outlook (MPO). <https://thedocs.worldbank.org/en/doc/bae48ff2fefc5a869546775b3f010735-0500062021/related/mpo-ssa.pdf>.

World Bank. 2025h. Mapping Land Use Scenarios. Background note prepared for the Uganda CCDR.

World Bank. 2025i. “Natural Capital Background Note.” Prepared for the Uganda CCDR.

World Bank. 2025j. “Trade and Climate Background Note.” Prepared for the Uganda CCDR.

World Bank. 2025k. “Transport Background Note.” Prepared for the Uganda CCDR.

World Bank. 2025l. “Uganda: Adaptation and Resilience Readiness Assessment Background Note.” Prepared for the Uganda CCDR.

World Bank. 2025m. “Uganda Human Capital Development and Growth Review: Key Finding and Recommendations - Presentation to MoES Senior Management.” <https://documents.worldbank.org/pt/publication/documents-reports/documentdetail/099061825100040568>.

World Bank. Forthcoming. “Investing in Green Value Chains in Uganda.”

World Bank Group, GFDRR, and ACP-EU. 2019. *Disaster Risk Profile: Uganda. Africa Disaster Financing Initiative*. https://www.gfdr.org/sites/default/files/publication/uganda_low.pdf.



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