TECHNICAL ASSISTANCE REPORT

UGANDA

PFM Climate Assessment: Public Investment and Fiscal Risks Management

JANUARY 2024

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Abbreviations and Acronyms

AFOLU	Agriculture, forestry, and other land use
AGO	Accountant General Office
AMFG	Asset Management Framework and Guidelines
BAU	Business-as-Usual
CCA	Climate Change Act
C-PIMA	Climate Module of PIMA
DC	Development Committee
DRM	Disaster Risk Management
ESIA	Environmental and Social Impact Assessment
FAD	Fiscal Affairs Department
FRS	Fiscal Risk Statement
GAMIS	Government Asset Management Information System
GDP	Gross Domestic Product
GHG	Greenhouse Gas Emissions
IBP	Integrated Bank of Projects
IFMIS	Integrated Financial Information System
MDA	Ministries, Departments, and Agencies
MEPD	Macroeconomic Policy Department
MoFPED	Ministry of Finance, Planning and Economic Development
NDC	Nationally Determined Contributions
NDP	National Development Plan
NRVA	National Risk and Vulnerability Atlas of Uganda
OAG	Office of the Auditor General
PAP	Projects Analysis and Public Investment Department
PBS	Programme Budgeting System
PC	Public Corporations
PFM	Public Financial Management
PIM	Public Investment Management
PIMA	Public Investment Management Assessment
PIP	Public Investment Plan
PPP	Public-Private Partnerships
Q-Craft	Quantifying Macro-fiscal Impact of Climate Change tool
SOE	State-owned Enterprises
SSP	Shared Socioeconomic Pathways
UNMA	Uganda National Meteorology Authority
VfM	Value for Money

Preface

At the request of Mr. Ramathan Ggoobi, Permanent Secretary and Secretary of the Treasury (PS/ST) of the Minister of Finance, Planning, and Economic Development (MoFPED) of Uganda, a team from the IMF's Fiscal Affairs Department (FAD) undertook a mission to Uganda from September 6 to 19, 2023. The mission team was led by Arturo Navarro and comprised Tjeerd Tim, Natalia Salazar, and Eivind Tandberg (all FAD), Matthew Quillinan (AFE), and Jyoti Rahman (FAD expert).

The tasks of the mission were to: (i) discuss implementation of the 2022 PIMA recommendations; (ii) assess the sensitivity of Uganda's public investment practices to climate objectives using the C-PIMA analytical framework and propose a prioritized action plan for addressing them; (iii) introduce international approaches to assessing fiscal risks from climate change; (iv) work with the authorities to identify and begin applying practical approach(es) for climate change fiscal risk assessment and quantification for Uganda.; and (v) provide guidance on including climate change fiscal risk assessment in the Ugandan fiscal risk framework and its disclosure in an annual Fiscal Risk Statement.

The team met the MofPED PS/ST to discuss the key findings and recommendations of the assessment. The team also met with several staff of the MoFPED including Mr. Joseph Enyimu, Ag. Commissioner Economic Development Policy and Research Department, and Chair of the Development Committee; Dr. Albert, Musisi, Commissioner of the Macroeconomic Policy Department, and the representatives of his department that attended the climate-change fiscal risks workshop; Mr. Hannington Ashaba, Commissioner Project Analysis and Public Investment Department, and the members of his team that joined the meetings with stakeholders; Mr. Moses Zziwa, Commissioner for Debt Policy and Issuance Department; Ms. Margaret Kakande, Head of the Budget Monitoring and Accountability Unit; and Mr. Richard Tabaro, Commissioner, Asset Management Department in the Accountant General's Office. The team also met with officials from other government entities including: Dr. Geoffrey Okoboi, Director Economic Regulation; Electricity Regulatory Authority; Dr. Patrick Olowo, National Planning Authority; Mr. Orono Otweyo, Acting Executive Director, PPP Unit; Engineer Harrison E. Mutikanga, Chief Executive Officer, Uganda Electricity Generation Company Limited; Mr. Edison Masereka, Manager-Business Development, Kampala Capital City Authority; Mr. Richard Ndikuryayo, Commissioner Policy and Planning, Ministry of Works and Transportation; Mr. Collins Amanya, Commissioner Policy and Planning, Ministry of Water and Environment; Eng. Amayo Johnson, Deputy MD, Technical Services, National Water and Sewerage Corporation; and Mr. Edward Akol, Assistant Auditor General-Audit, Office of the Auditor General; Dr. Ayesiga Godwin, Manager, Training and Research, Uganda National Meteorological Authority (UNMA); Raymond Kirungi, Disaster Preparedness Officer, Office of the Prime Minister.

The mission is grateful for the efficient support provided in organizing and facilitating the discussions from the teams of the Project Analysis and Public Investment Department and the Macroeconomic Policy Department, with special thanks to Ms. Pheab Mukarwego and Ms. June Nyakahuma. In addition, the mission is grateful to the IMF Resident Representative Ms. Izabela Karpowicz and her staff, Ms. Pelga Origasha for the efficient support and coordination provided before and during the mission.

Executive Summary

Uganda is exposed to climate change and natural hazards that can weigh on economic growth and pose significant risks to public infrastructure. Between 1985 and 2021, floods and epidemics were the most frequent natural hazards, representing approximately 70 percent of total events, while droughts, though more sporadic, had the largest impact on the country's population.[1] These events have a particularly strong impact on the agriculture sector and on rural population, which represent about 24 percent of gross domestic product (GDP) and close to 73 percent of total population, respectively. The country's poverty level and the reliance on sectors sensitive to climate change, such as agriculture, increase its overall vulnerability to climate change. Moreover, there is a need to increase access to public infrastructure as the country lags its Sub-Sahara African (SSA) peers in the provision of key assets in the education, health, water, and electricity sectors, as underscored in the 2022 Public investment Management Assessment (PIMA).

Ugandan public finances are likely to deteriorate as the severity of climate change impacts increase. Although the impact of climate change appears to be milder than in many other SSA countries – it is relatively mild in two of the four climate scenarios analyzed – it is important in terms of economic growth and fiscal sustainability. A long-term fiscal analysis exercise undertaken together with officers from the Ministry of Finance, Planning, and Economic Development (MoFPED) estimated that by the end of the century the loss in GDP could surpass 4 percentage points, while debt could rise to 66 percent of GDP, versus 47.5 percent of GDP in the baseline scenario. This exercise also highlighted the importance of identifying the key specific fiscal risks linked to climate change to complement the longer-term macro-fiscal analysis. Decisive action and a strengthening of the budgetary framework will be required to prevent a worsening of public finances due to climate change.

In its 2022 updated Nationally Determined Contribution (NDC), Uganda committed to ambitious climate change objectives and targets, both in adaptation to climate change and mitigation of emissions. The country plans to implement policies and measures to reduce greenhouse gas (GHG) emissions by 24.7 percent compared to the business-as-usual (BAU) trajectory by 2030, mostly in the forestry and land use sectors. Uganda has also identified 48 adaptation actions across 13 sectors of the economy. To achieve these goals, the country relies on a comprehensive framework of laws, strategies, policy documents, and guidelines developed over more than 15 years, which allocate responsibilities for coordination, disaster management, budgeting and planning among institutions in the central government.

Uganda has introduced many important measures to strengthen its public investment management (PIM) framework, but additional efforts are needed to boost their effectiveness, offering an opportunity to include climate-related considerations. Some key reforms highlighted in the 2022 PIMA included the creation of a gatekeeper role for new investments proposals, the establishment of a PIM department within the MoFPED, and the development of manuals and guidelines for project preparation and appraisal. Despite the strong institutional framework, its effectiveness in practice is lagging. Actions have been taken to strengthen the effectiveness of the reform measures as

1 EM-DAT: The Emergency Events Database - Universite Catholique de Louvain (UCL) - CRED, D. Guha-Sapir, Brussels, Belgium. http://emdat.be/emdat_db/

suggested by the 2022 PIMA. These include the updated guidelines for the recording of multi-year commitments, the lack of which undermined the allocation of resources to projects, and the strengthening of information in asset registers. There are also plans to update the Development Committee (DC) guidelines and the Manual for Project Preparation and Appraisal, which provides an opportunity to include climate change considerations.

Uganda has built a framework to enhance climate change sensitivity across public financial and investment management, but specific gaps remain to be addressed and actions to strengthen implementation should be a priority. The steps taken by authorities have increased climate change awareness across government institutions by updating the regulatory framework, clearly allocating responsibilities, enhancing coordination across government, and developing mechanisms to identify these expenses in the budget. However, some of these initiatives are at early stages and require developing further expertise amongst government staff over time to achieve the expected results. Moreover, the lack of updated regulations in key areas enables an ad-hoc approach to incorporating climate change.

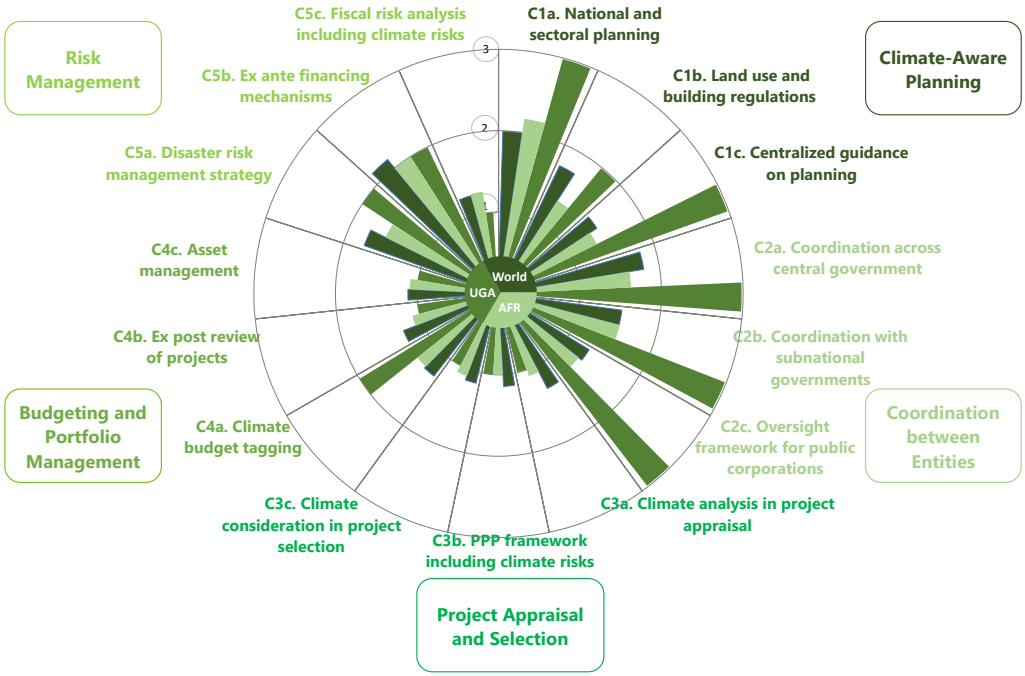
The C-PIMA identified good practices across several areas that should allow the country to effectively incorporate climate change-related aspects into public financial management (PFM). Two areas stand out as particularly strong: climate-aware planning and coordination between entities. Consistent with the 2022 PIMA findings, the country has developed a strong climate change planning framework, including for public investments, which has integrated NDC objectives and targets. Key infrastructure investments related to climate change can be traced through the different strategic documents, though the link becomes harder to follow at the budget and public investment plan stage. There is also a strong mechanism for coordination of climate sensitive investments across different government levels. A climate certification of annual workplans and the overall budget, including major investments by local governments (LG) and state-owned enterprises (SOE), is required before the budget's submission to parliament.

Some pressing reforms are needed to ensure that the climate-sensitive approach to public investment becomes operational and effective. The appraisal and selection of public investments should include of climate change-related impacts, and methodologies be developed to ensure that the project assessments do not follow an ad hoc and sector-specific approach. The climate change budget tagging framework introduced for FY23/24 needs to be strengthened and further training provided to line ministries', for it to provide reliable estimates of the government resources utilized for this purpose. IMF staff estimate that 3.6 percent of the total budget is related to climate change interventions, while the resources tagged in the budget codes is below 0.1 percent of the budget. The disaster risk management framework does address climate-change related risks, but it would benefit from a more forward-looking perspective on the risks to public infrastructure. This could be achieved by pooling together information available across institutions on assets, weather patterns, vulnerability analysis, and financial resources.

The C-PIMA results imply that Uganda's framework is strong relative to many other countries' results from an institutional design perspective. Uganda met the highest criteria of the questionnaire for most of the dimensions within the institutions of climate-aware planning and coordination between entities and was close to the world average for assessments to date across the rest (Figure 0.1). Tables 0.1 and 0.2 show the heat map assessment and the high-priority recommendations and short-term

actions, respectively. Annex I proposes an indicative action plan for the implementation of the recommendations.

Figure 0.1. Uganda C-PIMA: Institutional Design



Source: C-PIMA database

Table 0.1. Uganda C-PIMA Summary Assessment

Phase/Institution		Institutional Strength	Reform priority
C1	Climate-aware planning	**High.** Uganda has a comprehensive framework for strategic planning and NDC objectives and targets are effectively integrated in this framework, but there is no legal requirement that climate aspects be explicitly included in land use planning.	Low
C2	Coordination between entities	**High.** There are strong mechanisms for coordination of decision-making on climate-sensitive central government investments, including a climate certification process for annual work programs and the overall budget. All major projects in districts and public corporations are financed by the central government and subject to the same procedures as central government investments.	Low
C3	Project appraisal and selection	**Low.** Uganda has a strong project appraisal framework for projects and public-private partnerships (PPPs), but it does not reference or require consideration of climate change. Individual agencies are addressing this in an ad hoc manner, but an approach needs to be mandated and standardized. Standard criteria for project selection exist but do not specifically include climate change-related parameters.	High
C4	Budgeting and portfolio management	**Low.** Some climate change related projects can be identified in the budget documentation, but information can only be consolidated manually, as the tagging mechanism is yet to provide a reliable figure. Ex-post reviews or audits of major investment projects of climate change mitigation or adaptation outcomes are not conducted. Steps have been taken to improve the asset registers for General Government, but these are yet to have reliable information and do not include climate aspects.	High
C5	Risk management	**Medium.** Uganda's DRM framework does not systematically analyze climate change fiscal risks related to public infrastructure. Although there is a budget contingency to cover the impact of natural disasters, including on public infrastructure, there is no comprehensive disaster financing strategy. The FRS does not analyze climate change fiscal risks to public infrastructure assets.	Medium

Table 0.2. High-Priority Recommendations and Short-Term Actions[2]

Issue 1 *The project appraisal and selection framework, including for national government PPPs, does not incorporate climate change issues leading to an ad hoc approach by different entities.*	
Recommendation. Update the PIM framework to ensure that climate change impact assessment is included within the major project appraisal documentation and is part of the criteria used for project selection, including for PPPs at the national government level	June 2024
▪ Update Development Committee (DC) Guidelines and National Guidelines on PPP Appraisal to require consideration of climate change implications in the project appraisal and align with ESIA requirements.	PAP PPP Unit
▪ Incorporate climate change assessment in the specific DC project selection criteria.	DC
Issue. *The climate change budget tagging exercise for FY23/24 does not provide a realistic picture of this type of expense included in the budget.*	
Recommendation. Further develop the climate change budget tagging framework to ensure appropriate differentiation between recurrent and development expenditures and appropriate training for Ministries, Departments, and Agencies (MDA).	December 2024
▪ Review the existing coding structure and adjust this to differentiate between climate-related recurrent and investment expenditures.	Budget AGO PAP
▪ Develop detailed guidelines and training program that helps MDAs determine what recurrent and investment expenditures can be considered climate change related.	
Issue. *The existing information in the asset registers is incomplete, unreliable, and does not include considerations related to climate change.*	
Recommendation. As part of the ongoing process led by the Accountant General's Office (AGO) to strengthen the asset register information, compile information on the vulnerability of key assets to climate change-driven hazards.	June 2025
▪ Update the Asset Management Framework and Guidelines (AMFG) to include information on exposure and vulnerability to climate change risks in the list of requirements.	AGO
▪ Relevant ministries for public investment should work with the Uganda National Meteorology Authority (UNMA) to cross map their information on public assets location and hazards to inform project appraisals and improve maintenance plans.	Key MDA responsible for infrastructure

[2] Right-hand-side column includes a proposed target date and lead agency for each recommendation.

I. Introduction

1. This report analyzes the climate sensitivity of Uganda's Public Financial Management (PFM) framework, in particular with respect to public investment management (PIM) and climate change-related fiscal risks. The assessment builds upon the 2022 Public Investment Management Assessment (PIMA) and provides an update on the progress made in PIM reform since then. The report examines the weaker areas identified in the previous assessment and highlights the recommendations that have been acted upon. It complements the previous analysis with the Climate Module of the PIMA (C-PIMA). It also undertakes a qualitative and quantitative analysis of the impacts of climate change on Uganda's long-term fiscal sustainability.

2. The C-PIMA assesses five key PIM practices from a climate change perspective. These practices include climate-aware planning, coordination across the public sector, project appraisal and selection, budgeting and portfolio management, and risk management. The assessment aims to ensure that public investment aligns with climate objectives, facilitates effective decision-making and prioritization, incorporates climate-related analysis and criteria, identifies climate-related investment spending, and integrates fiscal risks associated with climate change and infrastructure into budgeting and risk management processes.

3. The FAD-developed Quantitative Climate Change Risk Assessment Fiscal Tool (Q-CRAFT) was employed to quantify fiscal risks arising from climate change under various scenarios. This tool was aligned with the Government's medium-term fiscal framework and the Debt Sustainability Analysis conducted under the IMF program. The underlying assumptions for the analysis were formulated during a 5-day workshop for government officials on applying Q-CRAFT to Uganda. This workshop also sought to build the government's capacity to integrate climate change-related fiscal risks into their medium and long-term fiscal planning framework.

4. The document is structured into five main sections. The first section examines the progress made in PIM reform since the 2022 assessment. The second section analyzes the impacts of and the long-term risks rising from climate change. The third, describes the climate change goals and strategies, including its Nationally Determined Contribution (NDC) and the 2019 National Environmental Act and 2021 Climate Change Act (CCA). The fourth section provides the detailed evaluation using the C-PIMA framework, and the fifth offers recommendations for strengthening Uganda's PIM and fiscal risk practices in the face of climate change.

A. 2022 Public Investment Management Assessment (PIMA)

5. The 2022 PIMA found that Uganda has achieved significant improvements in public investment management over the last few years. A number of important measures have been undertaken. These include giving the Development Committee (DC) a strong role as a gatekeeper for new investment proposals, the establishment of the Projects Analysis and Public Investment Department (PAP), and development of a draft public investment management policy, as well as guidelines and manuals to improve the quality of project preparation and appraisal. As a result of the reform process, Uganda is well ahead of its comparators in many aspects of public investment management, in particular

in institutional design – the formal framework for public investment management. Uganda received high scores on institutional design for eight institutions, being the only low-income developing country that scored high in four of the five institutions in planning, and one of the countries with highest average score across all PIMAs at the time the assessment was undertaken.

6. At the time of the 2022 PIMA, many of the reforms were fairly recent, many of them were still not fully institutionalized and the effectiveness of public investment management was therefore lower than the institutional design. The remaining weaknesses have negative impacts on public investment access and quality and project delays were still common, in particular for externally funded projects. The PIMA indicated that this is due to weak project planning and development practices, as well as the lack of a clear legal framework for resolving land use issues. Table 1 provides a heat map summarizing the 2022 PIMA results against each phase and institution assessed by the framework.

Table I.1. 2022 PIMA – Summary Heat Map Assessment

Phase/Institution			Institutional Design	Effectiveness	Reform priority
A. Planning	1	Fiscal targets and rules	HIGH	MEDIUM	MEDIUM
	2	National and sectoral planning	HIGH	MEDIUM	MEDIUM
	3	Coordination between entities	MEDIUM	MEDIUM	MEDIUM
	4	Project appraisal	HIGH	MEDIUM	LOW
	5	Alternative infrastructure financing	HIGH	MEDIUM	MEDIUM
B. Allocation	6	Multi-year budgeting	MEDIUM	LOW	HIGH
	7	Budget comprehensiveness and unity	HIGH	HIGH	LOW
	8	Budgeting for investment	MEDIUM	LOW	HIGH
	9	Maintenance funding	LOW	LOW	HIGH
	10	Project selection	HIGH	MEDIUM	LOW
C. Implementation	11	Procurement	HIGH	MEDIUM	LOW
	12	Availability of funding	MEDIUM	LOW	HIGH
	13	Portfolio management and oversight	HIGH	LOW	HIGH
	14	Management of project implementation	MEDIUM	MEDIUM	MEDIUM
	15	Monitoring of public assets	LOW	LOW	HIGH

Source: PIMA 2022

B. Recent Developments in Public Investment Management

7. Given that effectiveness was lagging significantly behind institutional design, the PIMA indicated a clear need to continue implementing the reforms and to further strengthen PIM. Uganda's high level of public investment and plans for a continued, rapid expansion of public infrastructure underscores the importance of effective and efficient investments There has been important progress in strengthening PIM institutions, but work is still underway in many of these.

8. The planning phase will be significantly strengthened when MoFPED issues an updated Manual for Project Preparation and Appraisal. The updated manual will reflect inputs from a study of different stakeholders and users of the manual, as well as the PIMA recommendations. The timetable for the updated Manual is not yet decided. An updated PIM policy has been forwarded to the Cabinet for approval, which is expected to be adopted by the end of 2023.

9. There have been important improvements in some institutions belonging to the resource allocation phase. The June 2023 Guidelines for compiling multi-year commitments aim to improve the effectiveness of medium-term budgeting, budgeting for investment, and availability of funding. By ensuring that all long-term commitments related to projects are accurately recorded in a Multi-Year Project Commitment Template, MoFPED expects to improve the reliability of medium-term budgeting and ensure that ongoing projects are prioritized during the budget process and when allocating funds during the year. The identification of multi-year commitments will also facilitate more realistic estimates of the fiscal space for new projects.

10. For the implementation phase, there has been progress in the compilation and consolidation of asset information. The Accountant General Office (AGO) is consolidating information about the current stock of assets in Ministries, Departments, Agencies (MDA), and local governments (LG) and will include this in FY22/23 financial statements. The asset information will be verified through surveys and should include information about asset location and condition. Going forward, assets will be registered through the Integrated Financial Information System (IFMIS) when they are procured. This is a new initiative, and it will probably take some time before the asset information is comprehensive, consistent, and accurate.

11. PAP has initiated work to strengthen forward-looking project monitoring by upgrading the Integrated Bank of Projects (IBP) to include a module on project monitoring and evaluation. The new monitoring module of the IBP is not yet being used for monitoring by the BMAU. Due to inconsistent coding structures and lack of interfaces with other information systems, in particular the Programme Budgeting System (PBS) and the IFMIS, data entry has proved to be challenging. It is not possible to upload project implementation data directly from the IFMIS, and line ministries have been reluctant to provide data directly in the new system. Further progress in this area will likely require that the coding structure in the Integrated Bank of Projects (IBP) is harmonized with the IFMIS, which is broadly consistent with and now has effective data interfaces with other key information systems in line with the program approach to planning and budgeting adopted in the Third National Development Plan (NDP III) 2020/21-2024/25.

12. The authorities have made significant progress in implementing the recommendations in the 2022 PIMA, but some areas are lagging. One important area where reforms are lacking is in maintenance, which also is important for climate resilience. Table I.2 describe recent developments in implementing the PIMA recommendations.

Table I.2. Implementation Status for 2022 PIMA Recommendations

Recommendation	Priority	Implementation status
A. Planning Sustainable Levels of Investment		
Ensure that the costs of the 18 overarching programs are reconciled with the total cost of projects included in each, within a realistic fiscal framework.	Medium	**In progress.** Following the Midterm review of NDP III, MoFPED and NPA reprioritized the interventions of the Program Implementation Action Plans (PIAPs) that are consistent with the fiscal framework. This should be done in the preparation of the NDP IV cycle to begin this year.
Update the Manual for Project Preparation and Appraisal to provide more detailed guidance and incorporate climate change issues, develop sector specific project preparation and appraisal manuals, and strengthen financing of pre-investment studies.	Medium	**Not implemented.** PAP is planning to update the manual, incorporating this recommendation as well as inputs from a survey of different stakeholders. Work has commenced on program specific manuals and financing for pre-investment studies will be undertaken through the Project Preparation Facility (PPF) under NPA. The development of the Governance framework for the PPF is in advanced stages
Allocate responsibility for review and analysis of PC annual financial statements and investment projects and publish an annual PC performance report.	Medium	**Not implemented.** No changes so far.
Identify and report information related to PPP-related contingent liabilities, particularly in the energy sector emanating from contracts signed before the 2015 law was enacted.	Medium	**Not implemented.** No changes so far.
B. Allocating Investments		
Publish complete project costs and multiyear projections, include cost revisions, in the budget annexes, and systemize this process through the IBP.	High	**In progress.** The June 2023 guidelines for multi-year commitments will facilitate more comprehensive disclosure of project costs.
Integrate the multi-year commitment process into the mainstream budget review process and expedite the interface of different IT systems to improve the accuracy and recording of multi-year commitments.	High	**In progress.** The June 2023 guidelines for multi-year commitments will strengthen the budget review process.
Strengthen methodologies for assessing routine and capital maintenance needs and give higher priority to require attention to enhance maintenance funding in the budget process.	High	**Not implemented.** No changes so far.

Recommendation	Priority	Implementation status
C. Implementing Investments		
Ensure predictable budget releases for investment projects, by enhancing the realism of the annual Budget and MTEF and instituting active cash management arrangements.	High	**In progress.** The June 2023 guidelines for multi-year commitments will help enhance the realism of annual budgets and in-year cash plans.
Strengthen investment portfolio monitoring to become more forward-looking and based on explicit project baselines, clearly identifying projects at risk and which actions will be required to resolve the risk. Focus this monitoring on major projects.	High	**In progress.** IBP is being upgraded to support more pro-active project monitoring, though limited interfaces with other IT systems will continue to undermine the effectiveness of this process.
Develop comprehensive assets register, including all types of assets, particularly infrastructure assets, starting with existing available databases.	High	**In progress.** MOFPED is consolidating asset information from MDAs and LG and will provide a full balance sheet in the FY22/23 financial statements.
D. Cross-Cutting Issues		
Strengthen the legal framework for effective public investment management, including amendment of the PFM Act to include a chapter on PIM (or a separate PIM law) and a legal reform to address land use and right-of-way challenges (expropriation law).	High	**In progress.** The current land policy review will provide a basis for updating land use legislation.
Integrate IT systems for monitoring and evaluation to avoid duplication of data requests and make better use of data (NPA M&E systems, the IBP, the IFMS, the PBS, the e-Procurement system, and the system of the OPM).	Medium	**In progress.** Integration of IT systems is being pursued but will require harmonization of coding structures in the different systems.

II. Climate Change and Risks in Uganda

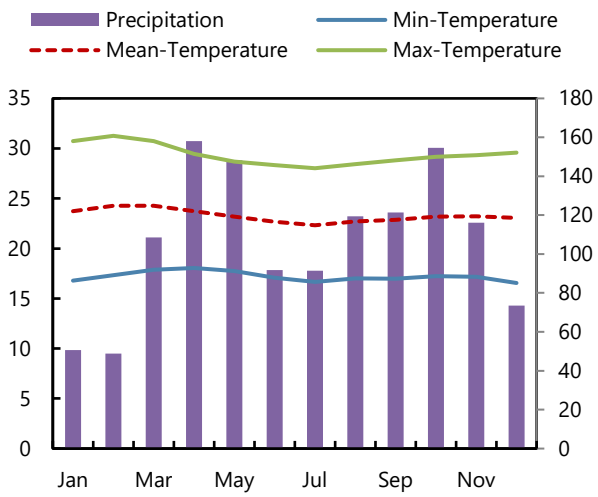
A. Climate Change Trends in Uganda

Recent Trends

13. Uganda has a largely tropical climate with moderate temperatures year-round and varying weather patterns reflecting the country's diverse topography. The country's average temperature is 23.3 degrees Celsius, with temperature fluctuations between a minimum of 17.2 degrees Celsius and a maximum of 29.4 degrees Celsius. While the northern region (making up a quarter of the country) has one rainy season from March to October, the remainder of Uganda has two rainy seasons (Figure II.1). Additionally, Uganda is susceptible to the El Niño phenomenon, a driver of both short-term and long-term rainfall variability, with its most pronounced impact occurring during the rainy season, increasing the likelihood of heavier rains and flooding.

Figure II.1. Temperature and Precipitation in Uganda

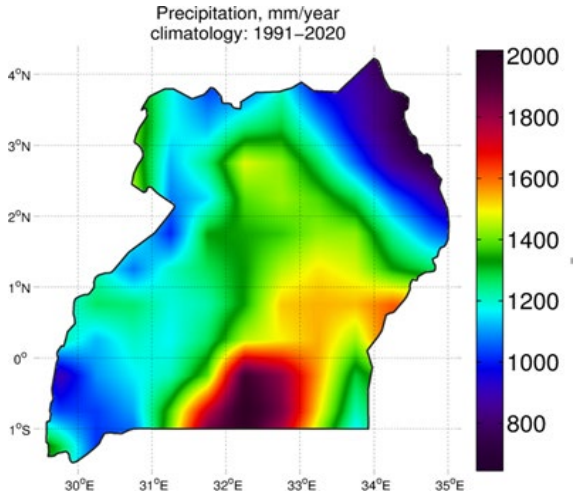
Temperature and Precipitation 1991–2020



Left Y-axis: temperature in degrees celcius
Right Y-axis: precipitation in mm.

Source: World Bank Climate Change Knowledge Portal

Precipitation 1991-20203



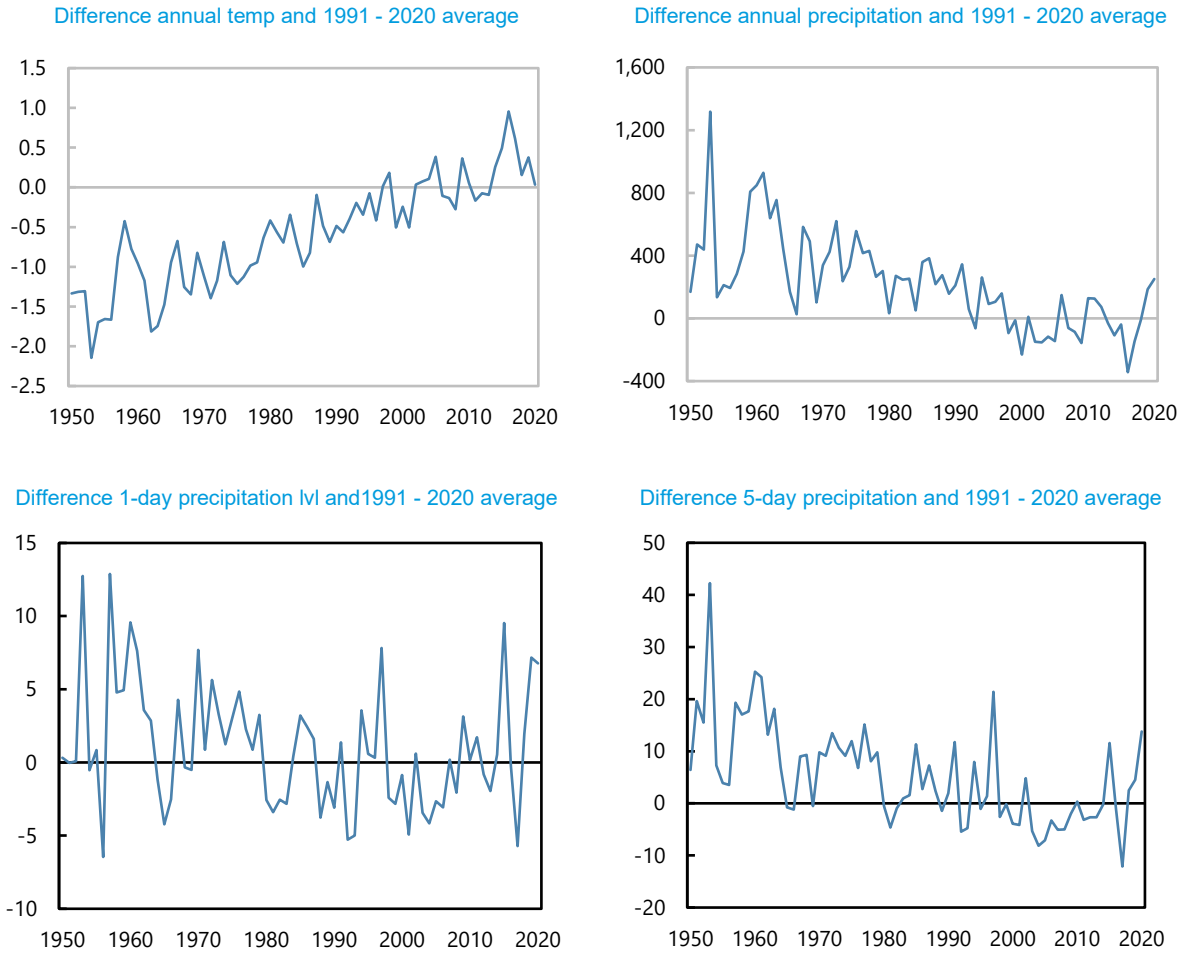
Source: IMF staff (Massetti, Tagklis, 2023).

14. Average temperatures in Uganda have increased by 1.3 degrees Celsius since the 1950s, and annual rainfall has lessened. According to Uganda's 2015 National Climate Change Policy, in line with an increasing average temperature, the frequency of hot days has increased, and the frequency of cold days has decreased. In its 2021 Uganda Climate Risk Country Profile, the World Bank concluded

[3] Source: *Massetti, Emanuele, and Filippos Tagklis, 2023. "Guidance Note on the FADCP Climate Dataset: Temperature and Precipitation." Unpublished manuscript, forthcoming, International Monetary Fund, Washington, DC.*

that annual rainfall has lessened (Figure II.2). Figure II.2 illustrates the variance between the yearly temperature and precipitation and the 1991-2020 average trends for these elements. The figures show no clear trend in the mean 1-day precipitation, but the annual number of consecutive days of rain has decreased significantly.

Figure II.2. Temperature and Different Precipitation Trends



Source: World Bank Climate Change Knowledge Portal

Future Climate Change Trends

15. Uganda's temperatures are projected to increase in climate change scenarios. Globally, temperatures may increase between 0.7 and 3.5 degrees Celsius by the end of the century, depending on the mitigation measures taken by countries to reduce their emissions. Table II.1 and Figure II.3 present the temperature increase estimate and long-term trends for Uganda and the average temperature increase for the Partner States of the East African Community[4], under each shared socioeconomic pathway (SSP) scenario, which are analyzed in this report.

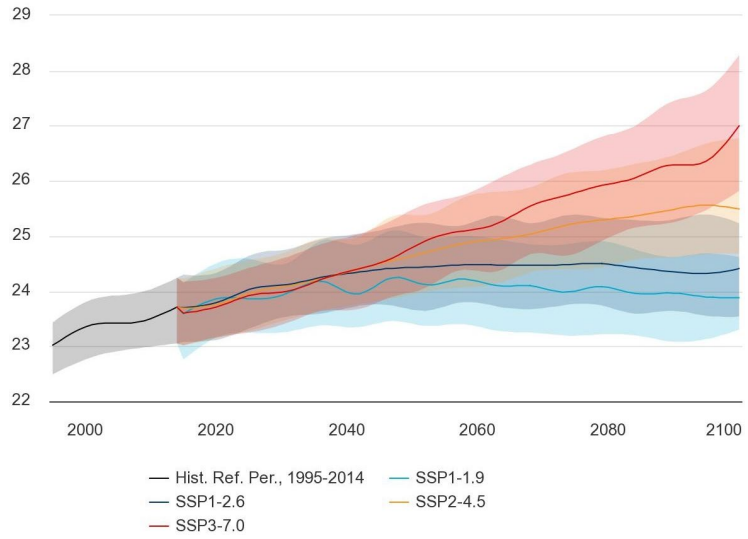
[4] The Partner States are: Democratic Republic of the Congo, Republic of Burundi, Republic of Kenya, Republic of Rwanda, Republic of South Sudan, Republic of Uganda, and the United Republic of Tanzania.

Table II.1. Climate Change Scenarios - Uganda

Scenario	Description	Temperature Change Degrees Celsius			
		2021-2050		2021-2100	
		Uganda	EAC	Uganda	EAC
Paris: SSP1-2.6	This scenario aims to limit the global temperature rise to below 2°C above pre-industrial levels by the end of the century.	0.6	0.8	0.6	0.7
Moderate: SSP2-4.5	In this scenario, emissions follow current trends, peaking and stabilizing by the end of the century. It assumes that countries will maintain their current climate mitigation policies but will not take additional actions to meet their Paris Agreement commitments.	0.9	0.9	1.7	1.8
High: SSP3-7.0	Countries reduce their current climate mitigation efforts, resulting in limited energy efficiency enhancements and continued reliance on fossil fuels.	1.0	1.1	3.3	3.3
Hot: SSP3-7.0, 90th percentile	This scenario follows the emissions path of the high scenario. However, it adopts the 90th percentile of temperature increase among all climate models for the SSP3-7.0 emissions, rather than the average temperature projection.	1.2	1.4	4.0	4.5

Source: World Bank Climate Change Knowledge Portal

Figure II.3. Mean Temperature Scenarios for Uganda

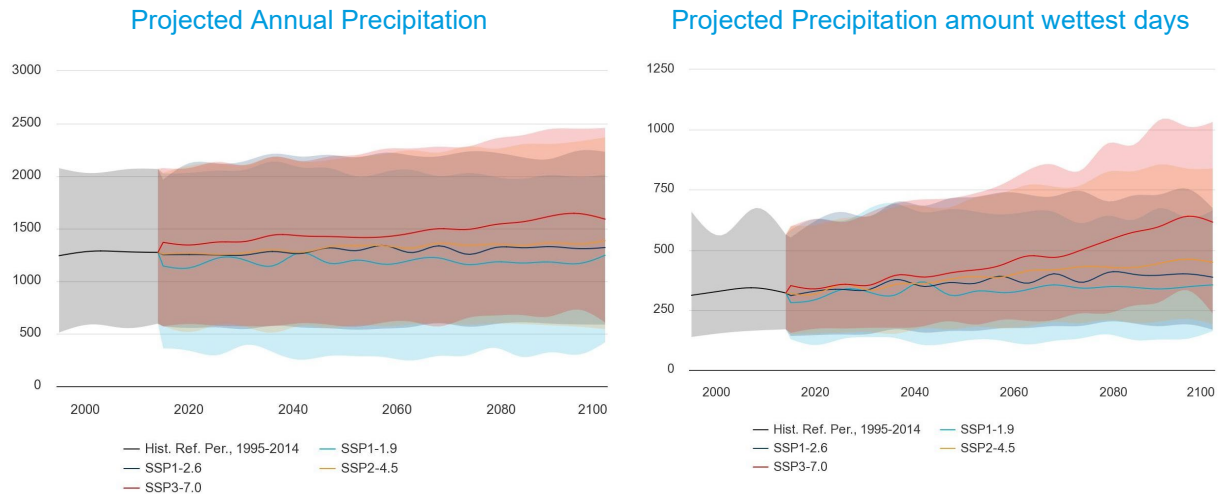


Source: World Bank Climate Change Knowledge Portal

Note: shaded area reflects that 10th-90th percentile range for each SSP and for the historical reference period 1995 - 2014.

16. In contrast to past declining trends for precipitation, rainfall is likely to increase in some areas of the country under more severe climate change scenarios. Precipitation trends under different climate change scenarios are highly uncertain, but there is an indication of a likely increase of the precipitation amount during the wettest days by the end of the century.

Figure II.4. Precipitation Scenarios



Source: World Bank Climate Change Knowledge Portal

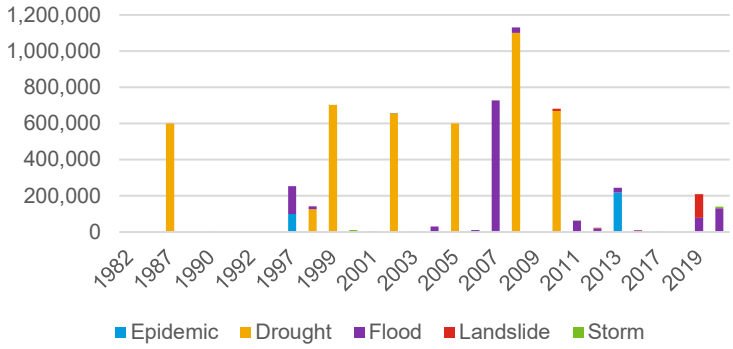
Note: shaded area reflects that 10th-90th percentile range for each SSP and for the historical reference period 1995 - 2014.

B. Climate-Related Hazards and Vulnerability

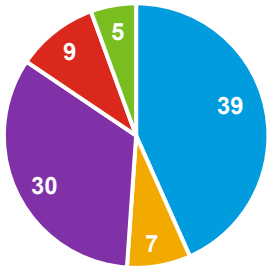
17. Uganda is prone to various types of climate-related natural disasters. According to the World Bank Climate Risk Country Profile (2021), during the period 1985 to 2021, floodings and epidemics in Uganda were the most frequent natural disasters, accounting for approximately 75 percent of the recorded events, with four other, climate-related natural disasters accounting for the remaining 25 percent. Although droughts represented only 7 percent of total disasters, this type of disaster brought the most significant economic, social, and humanitarian effects. Figure II.5 shows that the number of affected people by drought is significantly higher than for other disasters. Uganda, with a rapidly growing population that increased from 22.5 million people in 2002 to 48.9 million people in 2021, has seen significant impacts from droughts in the past. Between 2002 and 2010, droughts impacted over 3 million Ugandans, and the drought in 2016/17 impacted more than 1 million people in the country and, according to the authorities, GDP growth declined with 3.1 percent.

Figure II.5. Natural Hazards in Uganda 1980 - 2015

People affected by natural hazard



Event count per natural hazard



Source: World Bank Climate Change Knowledge Portal; Note: the number of people impacted by the 2016/17 drought was not available and therefore not included in the graph.

18. Uganda's vulnerability makes it imperative for the country to take steps to adapt to climate change. Uganda's future challenges relate not only to its exposure to climate-related risks, its high level of poverty and dependency on weather-sensitive sectors like agriculture and fisheries increases the country's vulnerability. Additionally, non-climate factors such as challenges in building the infrastructure needed to handle the quickly increasing population and rapid urbanization further heighten this urgency. The ND GAIN index[5] assesses the resilience of 183 countries to climate change. Of these, Uganda is ranked as the 171st, making it one of the most vulnerable countries to climate change. Relative to other SSA countries, Uganda is ranked as relatively vulnerable (37th out of 44).

C. Analyzing Climate Change Fiscal Risks in Uganda

19. Climate change poses long-term risks to Uganda's economic growth and public finances through gradual transformation of the environment and more frequent and more severe natural disasters. For Uganda, the slow but persistent increase in temperature, shifts in precipitation patterns, and more volatile weather events can have long term macroeconomic effects. These climate-related changes can slow down productivity growth by reducing the availability and effectiveness of important resources like capital and labor, including in climate-sensitive sectors in Uganda like agriculture. These macroeconomic effects of climate change will compound fiscal pressures, demanding timely government responses. Moreover, natural disaster events —whether sudden impact events such as floods, or slow-onset events such as droughts — can directly strain fiscal resources through direct fiscal effects such as tax revenue loss and unexpected expenditure on relief, recovery, and reconstruction as well as triggering various contingent liabilities e.g., public private partnerships, and guarantees.

20. Long-term fiscal analysis helps the government design climate adaptation policies and development strategies to enhance fiscal sustainability. The economic effects of climate change build slowly but can be significant over the longer term, and the associated fiscal risks may not be visibly discernible over the budget cycle or even over the horizon of the medium-term fiscal framework.

[5] https://gain.nd.edu/

Analyzing these risks quantitatively under different climate change scenarios can inform policymaking, especially when balancing long-term commitments with other fiscal pressures like demographic shifts or development needs. Further, a high-level quantification exercise helps identify areas for more in-depth analysis, from expenditures and revenues, to financing needs and debt dynamics, as well as fiscal risks from natural disasters.

Box II.1 Long-Term Fiscal Sustainability Analysis in Uganda

Long-term fiscal sustainability analysis is important for informing long-term policymaking, including for decision-making about competing priorities; identifying and quantifying long-term fiscal pressures such as demographics and climate change; informing areas for deeper analysis; and in developing economy context, assessing the feasibility of long-term development goals in developing economies.

Long-term fiscal projections should account for public investment supporting long-term development goals. Uganda, like many developing economies, is in its demographic transition's early phase, with a rising working-age population projected for the coming decades. To capitalize on this potential demographic dividend, investment in human capital is essential, but comes with fiscal ramifications. Structural economic transformation might also necessitate public spending. Assumptions about interest rates significantly influence long-term fiscal projections, and cross-country comparisons can be helpful.

Source: IMF Mission team

21. A technical, hands-on workshop on quantitative and qualitative climate change fiscal risk analysis was conducted for MoFPED officials, covering both macroeconomic and specific risks. At the request of the authorities, the mission team conducted a five-day workshop. This training session was designed to equip the authorities with the skills needed to analyze climate change risks, understand long-term fiscal sustainability, and evaluate the long-term fiscal implications of climate change risks under different climate change scenarios. During the workshop, the mission team supported the authorities with choosing the right assumptions to generate long-term estimates for key fiscal aggregates. Subsequently, using Q-CRAFT, the macroeconomic fiscal risks Uganda might be facing over the long term from climate change were quantified. The output of this part of the workshop is discussed in Section II.D and in Annex II. In addition, and together with the authorities, the mission developed the Specific Climate Assessment Risk Framework to systematically identify and qualitatively assess specific fiscal risks from climate-related hazards, such as floods, droughts, and landslides, across the public sector. More information on this assessment framework is provided in Section II.E and Annex III.

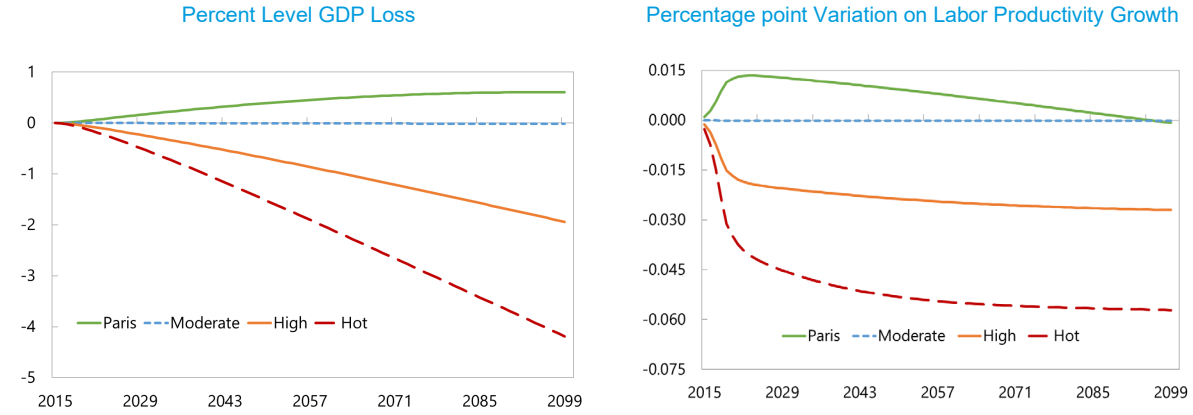
D. Quantifying Fiscal Risks from Climate Change

22. Under a pessimistic-yet-plausible 'hot' climate scenario, climate change negatively impacts Uganda's economy, with a 4 percent reduction of nominal GDP by the end of the century (Figure II.7). These estimates, using the latest empirical techniques[6], reflect the impact of temperature variations on GDP in countries across the world over the past 70 years. As can be seen in the figures and data presented below, the Paris (agreement consistent) scenario and the moderate climate scenario

[6] Centorrino, S., E. Massetti, and F. Tagklis (2023). Guidance Note on Projecting GDP Impacts of Warming Using Kahn et al (2022). Unpublished manuscript, forthcoming, International Monetary Fund, Washington, DC.

present a benign outlook with limited deviations from the baseline for Uganda and therefore they are not discussed as extensively in this report. In contrast, the hot scenario presents a pessimistic outlook that is essential for the government to consider. Analyzing such a severe scenario is important for fiscal risk analysis, as it helps to define the boundary of worst-case yet plausible outcomes.

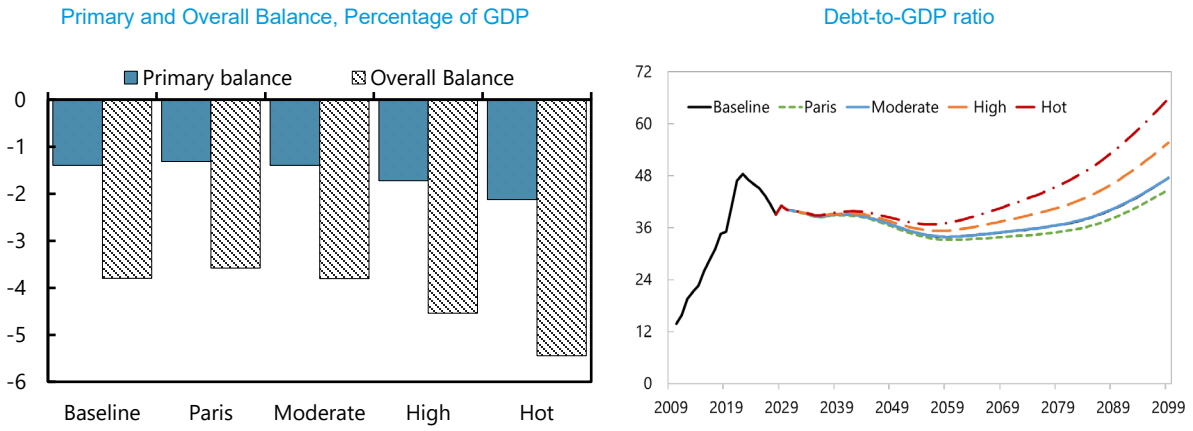
Figure II.7. Macroeconomic Effects of Climate Change in Uganda (2015-2099)
Deviations from the baseline



Source: Q-CRAFT

23. Uganda's public finances deteriorate as the severity of climate change increases (Figure II.8 and Table II.2). The fiscal effects of climate change become increasingly visible by the end of the century, raising public debt by over 18 percent of GDP in the hot scenario compared to the baseline. In both high and hot scenarios (which are explained in Table II.1), public debt surpasses the 50 percent of GDP fiscal rule ceiling, taking on an unsustainable upward trajectory. By the end of the century, the primary deficit in the hot scenario is projected to be 0.7 percent of GDP worse than the baseline. Figure II.8 depicts the impact of different climate change scenarios on the primary and overall financial balances. The difference between the primary balance and overall balance can be attributed to the rising interest costs, which, in turn, stem from deficits incurred due to the effects of climate change. Box II.1 summarizes the baseline generated for the Q-CRAFT analysis.

Figure II.8. Fiscal Effects of Climate Change Scenarios in Uganda



Source: Q-CRAFT

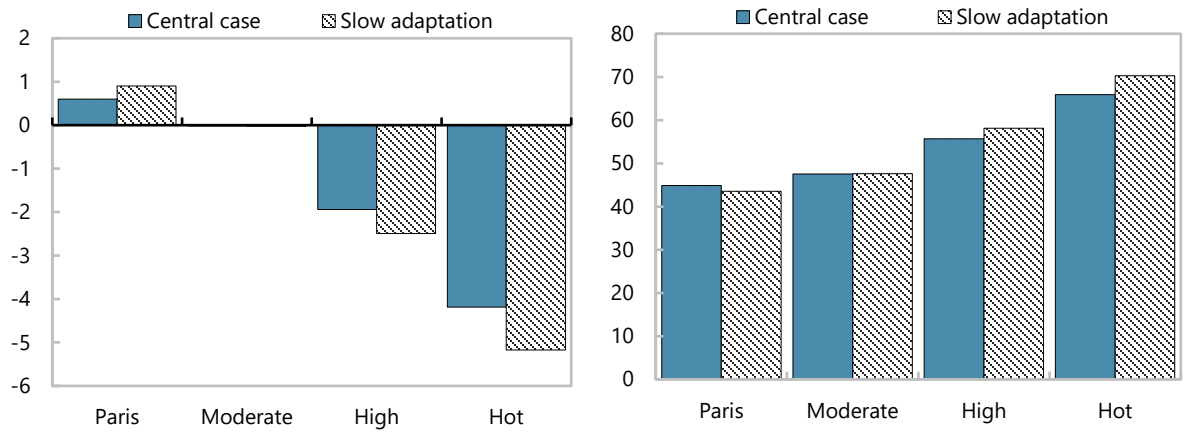
Table II.2. Debt-to-GDP Ratio (percent) Under Different Climate Scenarios

	2023	2050	2075	2099
Baseline	47.1	36.2	35.8	47.5
Paris		35.8	34.4	44.9
Moderate		36.2	35.9	47.6
High		37.0	39.2	55.7
Hot		37.9	43.5	65.9

Source: QCRAFT

24. Uganda's vulnerability to climate change implies that slow adaptation can further undermine the sustainability of public finances. Climate change adaptation can reduce, but not eliminate, the impact of climate change on the economy. Conversely, slow adaptation is likely to exacerbate the macroeconomic, and consequently the fiscal, effects of climate change (Figure II.9). Currently, there is no econometric analysis and country-specific data available that links adaptation investments with certain macroeconomic and fiscal outcomes. However, implementation of the C-PIMA recommendations, such as the inclusion of climate change considerations in public investment project appraisal and selection decisions can reduce GDP losses and fiscal losses triggered by climate change related disasters[7].

Figure II.9. Macroeconomic and Fiscal Effects of Slower Adaptation in Uganda (2099)



Source: IMF Staff calculations based on Q-CRAFT

25. Early action and a robust budgetary framework are essential to prevent a worsening of public finances because of climate change. This framework should allow the government to adjust spending in response to reduced government revenues resources caused by climate change. The projections above assume that spending under the climate scenarios remains at the same level as in the baseline. Essentially, this means that policymakers do not adjust fiscal policy even if climate change

[7] In the "Uganda Selected Issues" paper published by the IMF in 2022, an analysis was conducted using the Debt-Investment-Growth-Natural-Disasters (DIGNAD) model. The simulations using the DIGNAD model indicate that the construction of adaptation infrastructure can lead to a reduction in GDP losses by approximately two-thirds and nearly cut in half the resulting fiscal gap.

slows growth. While this assumption could exaggerate the modelled fiscal impacts (since policymakers may adjust primary expenditure in light of reduced growth and revenues) it emphasizes the importance of early fiscal adjustments to prevent debt accumulating because of climate change effects. For example, in the hot scenario, if primary expenditure is reduced annually in line with half of the lost revenue, the debt-to-GDP ratio rises by less than 10 percentage points relative to the baseline in 2099. However, it is important to note that this approach carries the risk of government reducing development spending, which could negatively affect the GDP trajectory. Therefore, enhancing resilience against climate change risks can reduce the likelihood of authorities reducing spending on vital development priorities such as education and healthcare.

26. The methodology underlying the fiscal projections simulated by Q-CRAFT can be used to inform long term fiscal planning. For example, with climate change raising both the debt-to-GDP ratio as well as its growth rate in the severe climate change scenarios, stabilizing debt will become increasingly challenging.

Table II.3. Debt-Stabilizing Primary Balance, 2099

	Primary Balance	Debt-stabilizing primary balance*	Primary balance gap**
Baseline	-1.4	-0.6	0.8
High	-1.6	-0.6	1.0
Hot	-1.8	-0.6	1.2
Hot with slow adaptation	-2.3	-0.8	1.5
Hot with slow adaptation and expenditure adjustment***	-1.8	-0.7	1.1

Source: Q-CRAFT. All in percent of GDP. *Debt-stabilizing primary balance: this is the total fiscal adjustment required to maintain the debt-GDP ratio at the year's debt-to-GDP level. A negative value indicates fiscal space available before debt starts rising). **Primacy balance gap: Represents the fiscal adjustment needed to achieve the debt-stabilizing primary balance compared to the primary balance ***Expenditure adjustment means reducing primary expenditure by half of the revenue loss.

E. Specific Climate Change Fiscal Risks

27. Through identifying, analyzing, and addressing specific fiscal risks from climate change the government can reduce its exposure to climate change risks. Climate change is likely to heighten specific fiscal risks including through more frequent and severe natural disasters that could trigger contingencies involving state-owned enterprises (SOEs), sub-national governments finances, and threaten the viability of public private partnerships (PPPs). Realization of these specific fiscal risks can result in either loss of government revenue or increase in primary expenditure.

28. During the workshop, the mission team and authorities developed a framework to systematically identify and analyze specific climate change fiscal risks, providing results that could be published in the Fiscal Risk Statement (FRS). In the workshop, participants used the SCARF framework, see paragraph 20, to identify and analyze specific fiscal risks from climate-related hazards, such as floods, droughts and landslides in the water, energy, transport, agriculture, and education sectors. Using the framework, the government can identify, analyze, and class these specific climate change fiscal risk in a manner that is consistent with international good practices for the classification of fiscal risks (see Box II.2). While significant further refinement of the analysis —such as

stylized quantification and more robust ranking of likelihood — is possible, one key conclusion of the workshop was that specific fiscal risks in several sectors would likely be correlated and exacerbated with climate change. Annex III provides the Excel template that can be used by the authorities to identify and analyze specific climate change fiscal risks.

Box II.2. Key Characteristics of Specific Climate Change Fiscal Risks

Potential future expenditures, which the government is expected to or legally obliged to make in response to a climate change risk can cause fiscal risks. A **contingent liability** refers to a government obligation that is triggered when a potential but uncertain future event occurs. In the context of climate change, this **trigger event** could be a **climate-change related natural hazard**. The following climate change-related hazards that could trigger a contingent liability were identified: drought, diseases epidemics, fire, flood, landslide, precipitation, storm, and temperature.

Contingent liabilities may be **explicit** or **implicit**:

- Explicit contingent liabilities arise from specific commitments, such as a contract, law, or a defined policy, that become due when a particular event occurs. For example, a government might have to buy electricity if a hydroelectric dam under-produces due to reasons other than mechanical failure, like low water levels.
- Implicit contingent liabilities are expenditure that might arise due to a moral obligation with any prior commitments, or due to public expectations or political pressure on the government. For instance, after a severe flood damages properties of small farmers, the government might assist in rebuilding without any prior contractual obligation.

Fiscal risks can have a **direct** impact, such as when a natural disaster disrupts economic productivity, leading to lost government revenue. Alternatively, they can have an **indirect** impact, like when there is a default on an agricultural guarantee (an explicit liability) or a SOE default (an implicit liability).

Source: OECD (2019): Fiscal Resilience to Natural Disasters, Lessons from Country Experiences

III. Climate Change Objectives and Strategies

29. Uganda has ambitious climate objectives and targets, covering adaptation to mitigate the impacts of climate change as well as greenhouse gas emission reduction, as specified in the updated Nationally Determined Contribution (NDC) 2022. On the adaptation side, the NDC covers 13 sectors highlighting 48 priority adaptation actions and 82 indicators with targets for 2025 and 2030. For greenhouse gas (GHG) emission reductions, Uganda plans to implement policies and measures that will result in 24.7 percent reduction of national GHG emissions below the BAU trajectory in 2030, to 112.1 MtCO2e. The unconditional target is 5.9 percent reduction compared to BAU whereas the remaining 18.8 percent is dependent on external support being available. Figure III.1 summarizes Uganda's BAU emission scenario and shows that forestry and other land use is by far the dominating sector for GHG emissions. Figure III.2 illustrates the NDC emission reduction targets and shows that an equally dominating share of GHG mitigation will be in agriculture, forestry, and other land use (AFOLU).

Figure III.1. Uganda GHG Emission Paths and targets

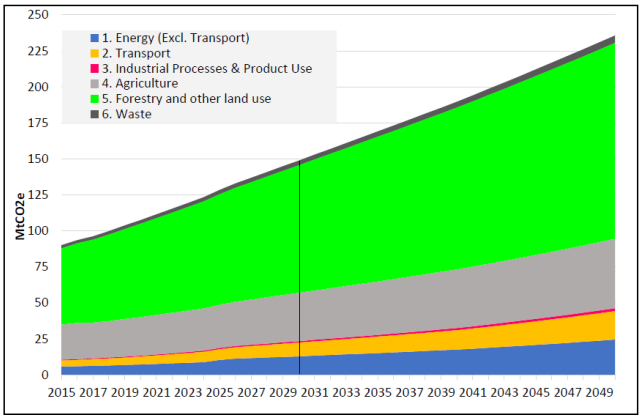
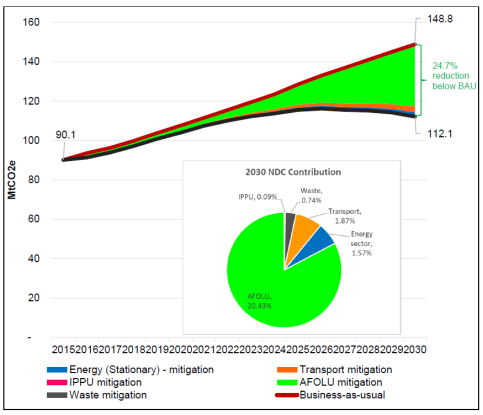


Figure III.2. Uganda NDC Emission Reduction Targets



Source: Uganda NDC 2022

30. The climate objectives are specified in and supported by a comprehensive framework of laws, strategies, and policy documents, as well as several technical guidelines. These instruments have been developed over several years, starting with the National Adaptation Programme of Action in 2007, the framework is effectively communicated, and different stakeholders are aware of the objectives and the specific requirements on their activities. Table III.1 summarizes key strategies, and institutions for climate sensitive public investment. Important laws are listed in Table IV.1 in Section IV.

Table III.1. Climate Change Strategies and Institutions

Key Strategies and Plans	Coverage
Vision 2040 (2013)	The overarching development vision document identifies climate change as a key challenge and includes objectives to further investigate the potential impacts on Uganda and to develop appropriate climate adaptation and mitigation measures.
National Development Plan III (2020)	The National Development Plan III (NDP) includes the objective: *Promote inclusive climate resilient and low emissions development at all levels*. Key measures include capacity building, natural resource accounting, mainstreaming climate change resilience in programs and budgets, developing bankable carbon projects, and introducing climate and green bonds. NDP III identifies 69 core projects, several with climate impacts.
Nationally Determined Contribution (2022)	The adaptation component of the updated NDC covers actions and indicators for agriculture, forestry, energy, health, ecosystems, water and sanitation, fisheries, transport, manufacturing, mining, cities, disaster risk reduction, tourism, and education. Uganda plans to implement policies and measures in the AFOLU, energy, waste, transport, and IPPU sectors that will result in a 24.7% reduction of national GHG emissions below the BAU trajectory in 2030. The estimated cost of the NDC is 28.1 billion USD (26 percent of 2022 GDP).
Guidelines on integrating climate change in sector plans and budgets (2014)	The guidelines provide detailed guidance on how to integrate climate change in sector plans and budgets. They outline specific steps and procedures that ministries and agencies should follow.
Climate Change Policy (2015)	The Climate Change policy identifies the roles and responsibilities of different institutions and the processes for pursuing climate change objectives.
Disaster risk management strategy (2022)	The DRM provides a comprehensive national Disaster Risk Management plan and Standard Operating for handling disasters, with a clear link to achievement of the NDP.
Sector strategies and masterplans	Climate change is explicitly covered in many sector strategies and masterplans, including for agriculture, transport, water and environment, electricity, in the Green Growth Development Strategy, and in the National Risk and Vulnerability Atlas.
District strategies and masterplans	Kampala Climate Change Action Strategy and Kampala Capital City Multi-Hazard Risk Book are examples of LG climate strategies and plans.
Institutions	**Climate Related Responsibility**
Climate Change Department, MOWE (CCD)	CCD is the main coordinating department for climate change issues, as defined in the 2021 National Climate Change Act. CCD reviews Budget Framework Papers from all ministries and agencies to certify that they are consistent with the CCA, relevant policies and strategies.
Ministry of Finance, Planning and Economic Development (MOFPED)	MOFPED provides guidance on inclusion of climate change analysis in budget submissions in their budget circulars. MOFPED also provides the overarching climate certification of the budget to the Parliament.
National Planning Authority	NPA is responsible for national plans and strategies and assesses whether project proposals and budget submissions are consistent with NDP III. NPA advises MOFPED on the climate certification of the budget.
DRDPM, Prime Minister's Office	The Department of Relief, Disaster Preparedness and Management is the lead agency in coordinating stakeholders engaged in disaster risk management.
National Environment Management Authority	Is responsible for providing guidance on Environmental and Social Impact Assessment (ESIA) of major projects, including their climate change impacts and vulnerability and for approving ESIAs for proposed projects.
Sector ministries	According to the CCA, "lead agencies shall establish mitigation, adaptation and compatibility standards, measures, and performance levels for responding to the climate change matters which relate to the mandate of the respective lead agencies".

Source: Mission

31. Climate policies, national and sector strategies identify several public investments that will be important for climate change adaptation or mitigation. Most projects in the sectors Natural Resources, Transport, and Energy have direct or indirect linkages to climate change. For some projects, such as roads, climate-resilient design and construction is imperative. Others serve to enhance broader regional or sectoral climate resilience, through strengthening irrigation systems or land use changes. Some projects impact greenhouse gas emissions, including in the energy sector. While most of these investments currently are funded by the national budget, the scaling-up envisaged in NDP III is dependent on external funding. Table III.2 provides an overview of climate relevant NDP III core projects in different sectors and their status at the time of NDP approval and indicates whether they also are included in the NDC. Many of these are identified separately in the NDC, while some are covered by NDC quantitative targets, for instance for roads and transmission lines.

Table III.2. Examples of Climate-Relevant Investment Projects in NDP III

Sector and project	Status	In NDC?
Natural Resources, Environment, Climate Change, Land and Water Management		
National Community Tree Planting Project	Project idea	**Yes**
Support to rural water supply and sanitation project.	Feasibility	**Yes**
Building Resilient Communities, Wetland Ecosystems and Catchments	Ongoing	**Yes**
Comprehensive inventory of Land	Project idea	**No**
Integrated Transport Infrastructure and Services		
Regional Trade Roads	Project idea	**No**
Community Roads Improvement Project (Total 7,905 Kms)	Feasibility	**Yes**
Rehabilitation of the Meter Gauge Railway (Relief of Road Transport)	Feasibility	**Yes**
Kampala-Jinja Express Highway	Procurement	**Yes**
Kibuye – Busega Express Highway	Procurement	**Yes**
Busega – Mpigi Expressway	Ongoing	**Yes**
Kampala Flyover Construction and Road Upgrading Project	Ongoing	**Yes**
Iganga-Bulopa/Buwenge-Kaliro/Bugembe-Kakira-Bulongo	Feasibility and design	**Yes**
Rwenkunye-Apac-Lira	Procurement	**Yes**
Bukasa Inland Port (Connect to Kisumu and Mwanza ports through Victoria)	Feasibility and design	**No**
Bridge Project (including Karuma, Laropi, Mpondwe, and Semliki Bridges)	Feasibility and design	**No**
Improvement of Ferry Services Project	Ongoing	**No**

Sector and project	Status	In NDC?
Energy development		
LPG Infrastructure Development Project	Feasibility	**Yes**
Ayago (840MW), Oriang HPP (392MW), Kiba HPP (330MW)	Feasibility	**Yes**
Industrial Substations Upgrade	Ongoing	**Yes**
Masaka – Mwanza 220kV;	Concept	**Yes**
Nkenda – Mpondwe – Beni 220kV	Concept	**Yes**
Olwiyo – Nimule – Juba 400kV	Ongoing	**Yes**
Grid Extension in Northeast, Lira and Buvuma	Concept	**Yes**
Kabaale-Mirama Transmission Line	Ongoing	**Yes**
Masaka -Mbarara Grid Expansion Line (400kv);	Ongoing	**Yes**
Opuyo-Moroto 220Kv	Project idea	**Yes**

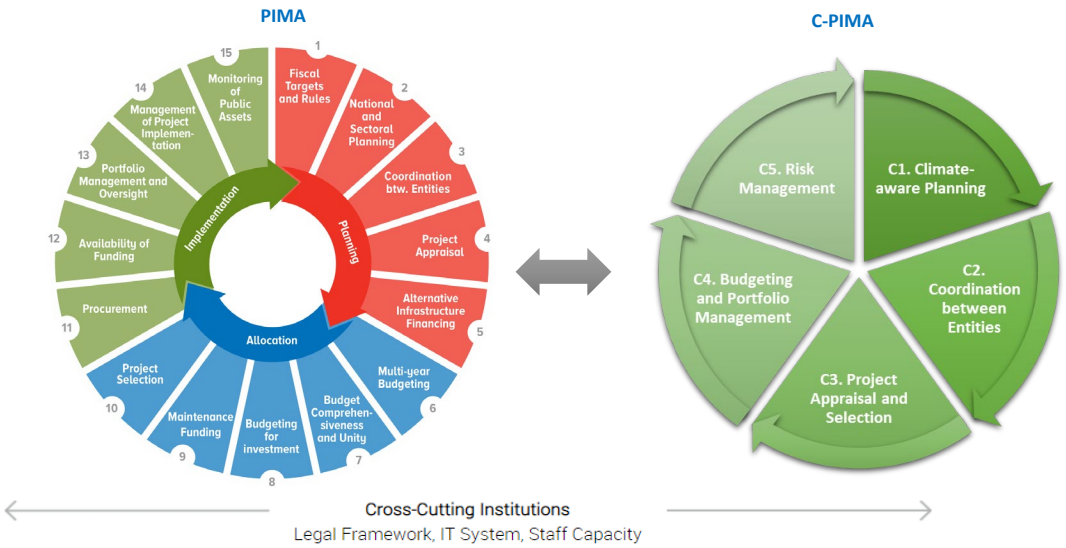
Sources: NDP III, NDC 2022

IV. Uganda: Climate PIMA

A. Climate PIMA Framework

32. The Climate PIMA assesses five key public investment management practices from the climate change perspective and is an extension of the existing PIMA framework. Figure IV.1. describes the main elements.

Figure IV.1. Climate Public Investment Management Assessment Framework



Source: IMF

33. The Climate PIMA covers the following specific issues (see Annex IV for the C-PIMA Questionnaire and Annex V for the detailed C-PIMA scores):

- ***C1. Climate-aware planning****:* Is public investment planned from a climate change perspective? This is necessary to ensure that long- and medium-term plans contribute to meeting climate objectives and facilitate effective prioritization and decision making.
- ***C2. Coordination across public sector****:* Is there effective coordination of decision making on climate change-related public investment across the public sector? In addition to the central government, subnational governments (SNGs), public corporations (PCs) and private sector entities play key roles in realizing climate-related public investment.
- ***C3. Project appraisal and selection***: Do project appraisal and selection include climate-related analysis and criteria? This is necessary to ensure that the most effective and efficient investments are prioritized and serves to maximize the climate impacts of public investments with available resources.
- ***C.4 Budgeting and portfolio management****:* Is climate-related investment spending clearly identified in the budget and subject to active management and oversight? Because the climate benefits may be

less tangible and more difficult to quantify than other project benefits, systematic and consistent management, and oversight of benefits over the project lifecycle is critical.

- ***C5. Risk management**:* Are fiscal risks relating to climate change and infrastructure incorporated in budgets and fiscal risk analysis and managed according to a plan? The likelihood of climate related disasters is expected to increase over time. The impacts of these risks on public infrastructure must be systematically assessed and monitored, to facilitate adequate and effective risk mitigation.

B. Detailed Assessment – Uganda

C1. Climate-Aware Planning (Strength—High; Reform Priority—Low)

34. Uganda has a comprehensive framework for strategic planning and NDC objectives and targets are effectively integrated in this framework. The 2022 PIMA found that the institutional design for national and sectoral planning was highly developed. As described in Table III.1, climate change is well reflected in national development strategies and there are a number of specific strategies and guidelines that define how climate change should be addressed in sector strategies, plans and budgets. Key sector strategies give explicit consideration to climate change issues. Box IV.1 gives an overview of the sector strategies for the four NDC key sectors Forestry, Water and Environment, Transport, and Energy.

Box IV.1. Climate Considerations in Key Sector Investment Strategies

The **National Adaptation Plan for Agriculture 2018** discusses Uganda's development context highlighting the agriculture and development nexus. It presents vulnerability analyses of Uganda's economy in relationship to the impacts of climate change; and in particular of agriculture related sub-sectors. This plan presents proposed climate change adaptation actions in the different sub-sectors, as well as coordination arrangements and resource mobilization strategies.

The **Water and Environment strategic sector investment plan 2018** estimates the funding needed to achieve sector targets, including climate change-related, over the next 10 years. This will require significant funding increases, which seem unrealistic. The SSIP also outlines how to optimize the investment portfolio under more realistic funding scenarios, including a scenario that extends current funding levels. The analysis shows that the outcome targets for the climate change subsector are unlikely to be met under realistic funding levels.

The **Grid Development Plan 2018 – 2040** identifies and justifies new grid investments to meet the country's future energy needs. Increased electricity use is a key measure to reduce GHG emissions from fossil fuels and biomass. The Grid Development Plan considers three increasingly ambitious scenarios for future power demand: the base case (extension of historic trends), the NDP III scenario, and the Vision 2040 scenario. The plan outlines how the grid should be extended to meet the demand in each of these scenarios and the related investment costs.

The **Green Growth Development Strategy 2018 – 2030** aims to ensure that the goals of the Uganda Vision 2040 and the NDPs are attained in a sustainable manner. Green growth is defined as an inclusive low emissions economic growth process that emphasizes effective and efficient use of the

Box IV.1. Climate Considerations in Key Sector Investment Strategies

country's natural, human, and physical capital while ensuring that natural assets continue to provide for present and future generations. The strategy indicates that full implementation of the "green growth" scenario will enhance GDP by on average 1 percent beyond the BAU target each year, deliver an additional 3.4 million green jobs, about 60 percent of them permanent, and reduce greenhouse gas emissions by 28 percent relative to the conventional growth pathway.

Sources: National Adaptation Plan for Agriculture, Water and Environment Strategic Sector Investment Plan, Grid Development Plan, Green Growth Development Strategy

35. Building codes include guidelines on energy efficiency and climate resilience requirements; and land use planning, though not explicitly required in the law, is based on detailed mapping of climate vulnerabilities.

- Section V of the National Building Code covers environmental protection and energy efficiency. Box IV.2 summarizes the objectives of this part of the Code. The Code defines four climactic zones, and the building regulations are tailored to reflect the physical conditions in each of the zones. It includes advice on how to promote energy-efficient solutions in buildings, how to use green solutions for stormwater management, and requires that certain types of buildings install photovoltaic systems.

- The 2019 National Risk and Vulnerability Atlas of Uganda (NRVA) provides a detailed overview and analysis of the risks related to different geographical areas. This analysis forms a useful basis for national and local land use planning. The NRVA allows the planners to determine the need to enhance the resilience of existing infrastructure and the design and location of new infrastructure. For instance, there are maps showing the exposure of power facilities to the hazards of earthquake, windstorm, lightning, and landslides. However, the NRVA does not describe future changes in risks and vulnerabilities related to climate change, and there is no legal requirement that climate aspects be explicitly included in land use planning.

Box IV.2 National Building Code Environmental Objectives

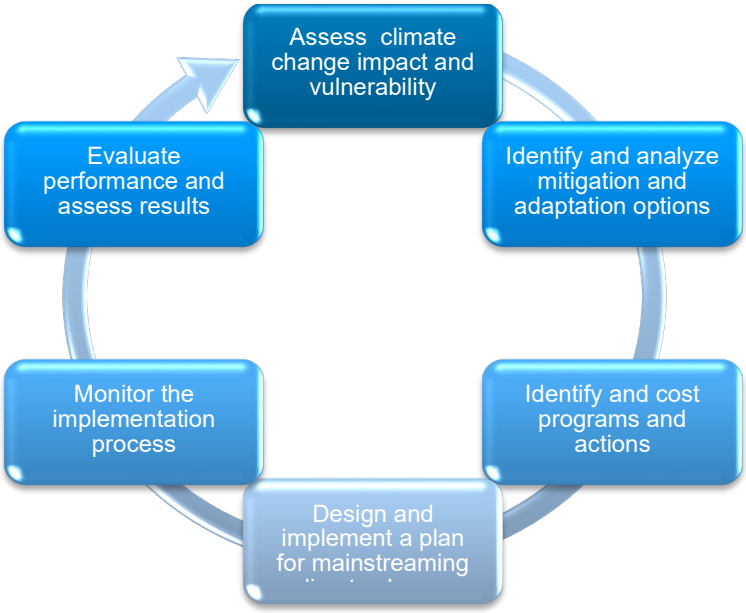
Paragraph 138 of the National Building Code specifies that the objective of Section V on Environment and energy efficiency is:

a) To achieve a rational use of the energy and natural resources required for the construction, operation, and demolition of buildings …..
b) To guarantee the right to sustainable cities and safeguard a healthy and comfortable urban environment ….
c) To offer orientation to built environment professionals in Uganda a standard with which to deliver energy and resource efficient solutions ….
d) To provide technical tools that take account of the various climatic conditions in Uganda ….
e) To promote quality of the built environment through parameters and requirements …
f) To incorporate criteria to reduce energy consumption and promotion of energy and resource efficiency in building ….

Source: National Building Code 2019

36. The 2014 Guidelines on the integration of climate change in sector plans and budgets provide extensive strategic guidance to ministries and agencies on the development of climate strategies and public investment projects. The guidelines emphasize the importance of costing but do not provide a specific costing methodology. Some sectors, including agriculture, have developed more detailed sector guidelines on mainstreaming climate change adaptation and mitigation in strategies and plans. Figure IV.2 describes the six steps that should be followed by all agencies according to the 2014 Guidelines.

Figure IV.2. Steps for Developing Climate Change Mitigation and Adaptation Sector Strategies



Source: 2014 Guidelines on integration of climate change in sector plans and budgets.

37. There is a strong framework for ensuring that public investment is planned from a climate change perspective, but some additional steps could be taken over time to enhance the effectiveness. This framework has been gradually developed and strengthened over several years and is well known and understood at different levels of government. In the 2022 PIMA, the effectiveness of the planning institutions was assessed as lower than the institutional design. Many of the projects that are defined in national and sectoral plans are at early stages of development and implementation is often dependent on external or private financing. This means that a limited share of the projects is realized during the planning period, and many are carried forward to subsequent plans. A more targeted approach to including projects in national and sector plans could help ensure that scarce development resources are focused on the projects that are likely to be realized. The 2022 PIMA also indicated that there are weaknesses in land use legislation. When updating this legislation, it should be considered whether there is a need for more explicit requirements to base land use planning and decisions on natural hazards risk assessments of the type mentioned above. The NRVA could also be updated to reflect changes in risks and vulnerabilities due to future climate change.

38. However, future institutional reforms in this area are a low priority compared to other important reform areas. The robust planning institutions are to some extent undermined by the lack of systematic approaches to climate analysis in project appraisal and selection. As discussed under institution C3, many MDAs include some elements of climate analysis in their project appraisal, but it is not based on standard methodologies and approaches. The lack of systematic identification of climate-related spending in the budgets also makes it difficult to gauge the effectiveness of the planning institution on climate investments. However, as indicated in the 2022 PIMA, there has been a tendency for the NDPs to be unrealistic and it is important to strengthen the realism and thereby the effectiveness of the plans.

C2. Coordination Between Entities (Strength—High; Reform Priority—Low)

39. There are strong mechanisms for coordination of decision-making on climate-sensitive central government investments, including a requirement for climate certification of annual work programs and for the overall budget. Article 30 of the CCA amends the Public Finance Act to require that the Minister of Finance in consultation with the Chairperson of the National Planning Authority, shall certify that the Budget Framework Paper is climate change responsive and contains adequate allocation for funding climate change measures and actions. This certification shall be based on evaluation of all votes of the Budget Framework Paper. Extrabudgetary entities and externally financed projects are reflected in the budget and covered by this provision. There are currently no PPP investment activities, but the climate provisions in the PPP framework are being updated (see institution C3). The 2nd Budget Call Circular for FY23/24 specifies that MDAs should submit their Budget Policy Papers (budget submissions) to the Ministry of Water and Environment (MoWE) to facilitate this certification. The Budget Call Circular also specifies that the Policy Statements should include clear interventions for environmental conservation and mitigation of and adaptation to climate change effects, define workplans with clear outputs and outcome to facilitate the monitoring of these interventions and allocate sufficient resources to these purposes.

40. The CCA includes several additional measures to ensure that climate change policies are effectively implemented, and these measures are largely covered in the updated NDC. According to Article 5 of the Act, the Climate Change Department in MoWE shall develop a Framework Strategy on Climate Change within one year after approval of the Act, which shall guide the Government in planning and budgeting for financing and monitoring of climate change programs and activities. According to article 6, the Climate Change Department shall also develop a National Climate Change Action Plan within the same timeframe. The NDC outlines a strategy for meeting the national climate objectives and specific measures to implement this strategy. Article 7 stipulates that lead agencies should develop their own action plans based on the Framework Strategy and the National Action Plan but does not set a specific timeframe for the lead agency action plans. The action plans are expected to include public investments.

41. The coordination mechanisms mentioned above also apply to LG climate-sensitive investment. Local governments participate in the program workshops early in the budget process and all major investments at the regional level are funded by the central government and are subject to the standard PIM process. According to the 2022 PIMA, LG funded only 3 percent of public investment in FY22/23. While the LGs own budgets are not yet subject to the climate certification process by MoWE that is required for central government, most of the investment in this sector is funded from the center and will be subject to this certification**.** Article 8 of the CCA requires that districts prepare their own climate

change action plans, and that these plans are prepared within one year after the National Action Plan. Some LGs, such as the Kampala Capital City Authority, have prepared comprehensive climate risk analyses and action plans.[8]

42. Public corporations' (PC) investments are largely financed from the budget and subject to the same appraisal mechanism and the same coordination framework as central government investments. The PCs also participate in the program workshops during the budget process and coordinate very closely with their parent ministries. Some PCs are in sectors with significant climate relevance, in particular water/wastewater and electricity. According to the 2022 PIMA, only 3 percent of public investment was funded directly by PCs in FY22/23.

43. The institutional design for coordination of climate change-related public investment is very strong, particularly within the central government, but the effectiveness of this framework remains to be tested. Some of the instruments, for instance the climate certification of budget submissions, are potentially very forceful, but will have to be developed and fine-tuned over the coming years. Since climate investments are not systematically identified in the budget, the basis for the certification is somewhat unclear. It will be important to strengthen the identification of climate-related investments, as discussed under institution C4. It could also be useful to issue precise guidelines on which factors the climate certification should cover. The effectiveness of the NDC, which serves as the National Climate Change Action Plan, will depend critically on external financing. This will also have impacts on the coordination at the sector and district levels.

44. The established coordination mechanisms will need some time to take full effect and there is no urgent need for additional institutional reform measures in this area. It is important that the defined coordination institutions are effectively implemented. However, the robust coordination institutions are somewhat undermined by the lack of systematic approaches to climate analysis in project appraisal and selection, as discussed in institution C3. Even if the decision-making procedures for climate-related investments are well defined, it is difficult to take optimal decisions if there is limited or inconsistent information about the climate implications of different projects.

C3. Project Appraisal and Selection (Strength—Low; Reform Priority—High)

45. Assessment of climate change impacts for major investment projects, using a standardized methodology, is not required under the current framework. Since 2016 a strong framework for project appraisal has been established, requiring all major capital projects, regardless of financing source, to be subject to rigorous technical, economic, and financial analysis and review by the Development Committee (DC) but there is no specific inclusion of climate change in the assessment criteria (2022 PIMA Report).[9] The environment appraisal requirement in the DC Guidelines focus on the

[8] See Kampala Multi-Hazard Risk Book and Kampala Climate Change Action Strategy.

[9] The Development Committee Guidelines for the Approval and Review of the Public Investment Plan Projects" provide the framework for project appraisal in the public sector; the Public Investment Manual for Project Preparation and Appraisal was developed to guide MDAs through the appraisal and approval process; the Estimation of Economic Value of Natural and Environmental Resources Report provides advice and parameters in considering the cost of environmental impacts of a project and the cost-effectiveness of any remedial measures.

economic effects of environmental norms and possible compensations for ecological damages but not the potential impact of the environment on the feasibility of the project.

46. The PPP assessment framework does not consistently include explicit consideration of climate change for risk allocation or contract management. There is a robust framework for assessing PPPs from inception through the implementation phases, but climate change considerations are only considered by regulation for local government-led projects.[10] The PPP Guidelines for LGs provide a baseline for a future update of the guidelines for the National Government, which the PPP Unit advised are being followed for national-level projects in the project appraisal stage (Box IV.3). Climate change-related risks in legacy PPPs signed prior to the 2015 PPP Act stress the need to strengthen this type of assessment in PPP appraisal. For example, take or pay arrangements under PPA contracts allocate the risk of natural events to the government; and the government is required to pay for generation capacity even if low water levels mean the generator cannot operate.[11] A more detailed discussion of these risks should be part of an analysis on specific risks related to climate change.

47. There are no explicit climate change criteria used by the government for the selection of projects. The existing DC guidelines include parameters such as strategic fit, project readiness, or social and environmental impact, but there is no reference to climate change impacts on the project (2022 PIMA). Other government measures could influence the inclusion of climate change-related expenditures in the budget, but are not part of the selection criteria, nor focused on public investments. For example, the Budget Circulars for FY23/24 and FY24/25 require MDAs to consider climate change when preparing their budgets and the Budget Guidelines require a minimum of 3 per cent of the budget to be spent on climate related activities. Moreover, the Climate Change Department (CCD) in MoWE reviews budgets for compliance and is required to certify that the relevant spending and projects are climate responsive and received certification. However, the MoWE can only provide recommendations to decision makers but does not have authority to reject proposals.

48. Assessment of climate change impacts could be enhanced and better understood through the required Environmental and Social Impact Assessment (ESIA), but in practice climate change assessment is not well understood. This type of assessments should include the impact of the project on climate change (e.g., emissions) and the climate change-related impacts on the project (e.g., design requirements); however, the 2019 National Environment Act make limited mention of climate change. Although, related regulation and guidelines require an assessment of climate change-related impacts associated with the project, including the potential vulnerability to climate change and the proposed adaptation and mitigation measures, this exists outside of the DC Guidelines and stakeholders are unaware of the requirements.

49. Climate change analysis is slowly, and in an ad hoc manner, being introduced into project appraisal and frameworks. MDAs, especially in the energy sector, have included climate change issues in their strategic documents or when planning specific projects. Also, in response to the impact of natural

[10] The 2015 PPP Act, 2019 PPP Regulations, and the National PPP Guidelines define the framework for assessing PPPs, but do not require a climate change impact assessment. The 2023 PPP Guidelines for Local Governments include climate change considerations.

[11] Some examples of this type of contracts include Bujagali Hydropower Generation project, Eskom Generation Concession, and Umeme Power Distribution Concession.

disasters on infrastructure, the roads sector is considering climate change impacts in the design of replacement of key assets. Box IV.3 provides examples on how climate change considerations are incorporated in project design.

Box IV.3. Climate Considerations in Project Design

Existing assets resilience: Climate change impacts were among the parameters used to determine the design and location of the Katonga Bridge affected by a flooding in 2023, including the use of materials to ensure increased resilience to natural disasters. A special DC meeting was conducted to review the new project, including projections of likely water volumes.

Project planning: Climate change impacts are considered in the design of energy projects. For example, the oil refinery site was selected as one with the least climate change impact and hydropower plants consider climate change to ensure sufficient water.

Updating regulation: Part 5 of the Building Code requires consideration of climate change aspects (e.g., sun shading, renewable energy) and schedules 4 and 5 specify the related assessment needs. **Information availability:** The Meteorological Department provides information for MDAs to include environment and climate change in their work: rainfall forecasts to the MoWE for hydropower assessments; wind for the MoWT for updating building standards.

Coordination with private partners: CCA 2021 requires that private partners implementing public investments comply with Uganda's climate change obligations. LG PPP Guidelines require the submission of a climate change mitigation and adaptation plan to ensure project's resilience to extreme climate events and in compliance with adaptation/mitigation performance targets.

Climate and PPPs: Climate change is to be taken into account at the different stages of the project cycle: at inception, the impact of the project on the climate and vice-versa should be assessed; feasibility studies should identify climate-related risks and adaptation and resilience strategies; during implementation, GHG emission and compliance with adaptation/mitigation performance standards must be monitored and reported.

Source: IMF based on stakeholder meetings with relevant MDAs.

50. Formalizing the requirement to consider both the effect of climate change on projects and the climate change impacts of the projects themselves, and providing guidance on how to do this, would strengthen the appraisal process. It will be important to ensure harmonization with the ESIA process and requirements, and to sensitize stakeholders to ensure compliance. An update of the 2017 DC Guidelines is planned to be completed by June 2024 and builds on a review undertaken by The Makerere School of Economics. [12] Although the review does not explicitly mention climate change or the environment, the review of the guidelines provides an opportunity to introduce climate change in project appraisal and to the review process led by the DC. Finally, the DC should routinely review the ESIA of significant projects. Annex VI provides guidance on climate change and project appraisal.

51. Despite the generally robust project appraisal and selection framework the reform priority is high to ensure climate change considerations are incorporated. Project planning and selection

[12] The 2022 Review of the Usage and Performance of the DC Guidelines completed by the Makerere School of Economics was accompanied by a training course on incorporating Environment and Climate in PIM.

follows a cascading system that begins with the identification of projects in high-level strategic documents – e.g., NDC and NDP III –, multiple gateways to ensure project are well appraised, and a clear decision criterion to determine whether an initiative should enter the budget. However, the assessment of climate change implications is not supported in the regulation supporting this system and when present, it is fragmented. Coordination in the review and approval process of the DC Guidelines and National PPP guidelines is crucial to ensure that climate change aspects are included across the whole process, as selection criteria will not be actionable if the climate change is missing in the appraisal process.

C4. Budgeting and Portfolio Management (Strength— Low; Reform Priority— High)

52. Some climate-related investment projects can be identified in the budget documentation, including those receiving external financial support. The NDP III, Public Investment Action Plan, Public Investment Plan (PIP) and annual budget cross-reference information on programs and subprograms, investment projects, funding and outputs that allows the identification of some investment projects with climate-change content. However, none of these documents provide a consolidated view, nor is there a report that summarizes the climate change-related projects. Relying on the information available in these documents it was possible to estimate that Uganda allocates 3.6 percent of its budget to major climate-related investment projects, figure similar to estimates by other development partners though higher than the figures from an initial budget tagging exercise undertaken by MoFPED for FY23/24 (Figures IV.3). Figure IV.4 shows the sectors with most climate-related investments.

Figure IV.3. Climate-Related Development Expenditures FY23/24 (percent of total budget)

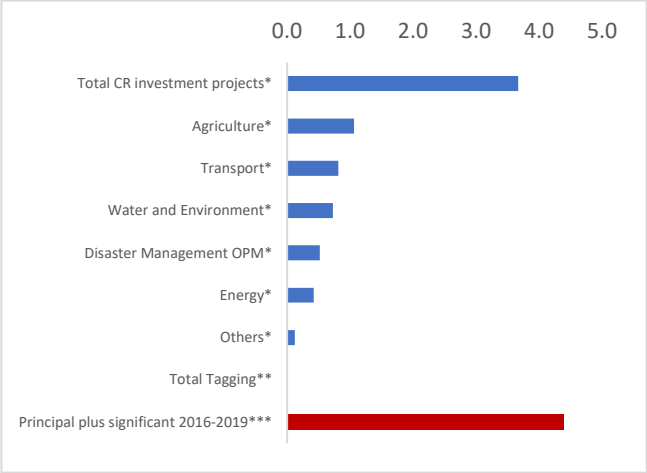
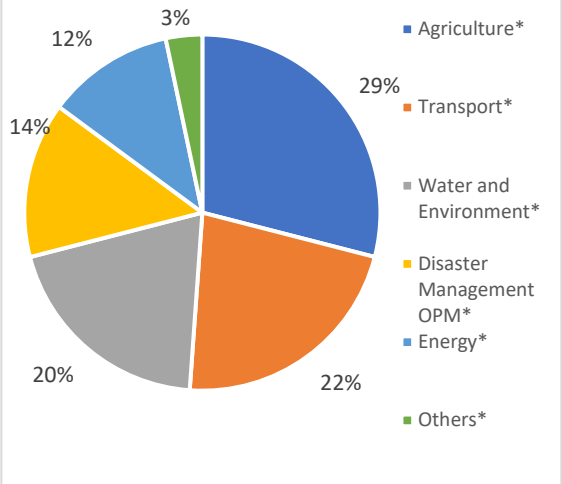


Figure IV.4. Climate-Related Development Expenditures by Sector FY23/24 (percent of total)



Source: Mission team estimates based on FY23/24 PIP and Budget.

* Corresponds to approved project budget for FY23/24. Since projects are defined activities that primarily involve capital purchases, figures may content expenditures different from investment. ** Correspond to total budget reported in codes for climate change mitigation and adaptation interventions (output codes in PBS are 000089 and 000090, respectively). *** Uganda DDR Budget Tracking Report (Development Initiatives, 2019), estimates public investment in natural disasters management using the OECD-DAC-DDR marker. Principal investments correspond to public interventions that target disaster risk as their primary or principal objective. Significant investments correspond to interventions that are relevant to vulnerability reduction, preparation for disaster response or resilience improvement.

53. The 2008 National Audit Law requires environmental audits of project involving public funds, but these are not undertaken systematically, are focused on compliance with regulation but do not identify climate-related impacts.[13] The OAG has prepared sporadic reports on environmental issues, policies, institutions, and investment projects, but the focus continues to be on analyzing compliance with regulations; mainly the need to undertake environmental impact assessments or adopting environmental management plans, but not the assessment of climate change-related impacts on the infrastructure. Only until the FY21-25 Strategic Plan did the OAG commit to undertake at least one environment value-for-money audit annually. Moreover, the well- coordinated follow-up mechanism adopted to monitor the implementation of the OAG recommendations has not covered environmental audits.[14] However, there are examples of findings during these audits that led in some cases to important decisions from the climate change perspective.[15]

54. There have been improvements in asset management practices, but these improvements do not cover climate change impacts. All public agencies maintain asset registers; however, they do not include information on the exposure and vulnerability of public assets to climate change, and the cost of the assets is unreliable. The AGO has made some progress in consolidating financial information in the decentralized asset registers and some basic assessment of their condition. A public asset census is planned with the objective of complementing and validating the information received, while annual surveys required in the PFM Act should support the upkeep and update of the asset registers. However, none of these actions address climate change aspects that could allow an assessment of the vulnerability of existing or new assets.

55. The authorities have taken steps to introduce climate change-related issues in public financial management processes, particularly planning and budgeting, , but further fine-tunning is needed. The MoFPED introduced climate budget tagging for the FY23/24 Budget that identifies spending on climate change mitigation and adaptation interventions. However, the output codes created for this fail to differentiate between current and investment spending, and limited guidance led to a low uptake by MDAs. Only thirteen entities provided information under these codes, and key sectors, such as energy, transport, and water, did not complete the exercise.[16] In the energy sector, the Ministry of Energy and Minerals (MEM) cross-referenced the location of its assets with georeferenced data on climate change and natural disaster events of the Uganda National Meteorology Authority (UNMA). This analysis is used to locate new projects in low-risk areas and to develop a maintenance and upgrade plan for assets

13 Article 13 of the 2008 National Audit Law.

14 Audits undertaken by the OAG cover 95% of the budget and 20% of the government entities (central Government, LGs and SOEs). The OAG performs three types of audits: i) financial audits, ii) value-for-money reports (VFM), and iii) special reports. VFM, or performance audits, are independent examinations on a non-recurring basis that may deal with many different types of problems within a specified legal mandate. The OAG is free to select the topics for VFM audits (scope, focus, audit objects, and methods). A follow-up mechanism is in place to monitor the implementation of audit recommendations: i) audit findings and recommendations are submitted to the Accountability Committee of Parliament, ii) in turn, Parliament prepares documents for the Government for them to take corrective actions, and iii) A Treasury Memoranda is submitted to by MoFPED to Parliament which includes metrics and comments on the measures adopted or to be adopted in response to the committee report.

15 An example are the decisions taken after OAG's audit on the Kampala-Entebbe Expressway project, whose primary purpose was to reduce congestion on the old road. Due to elevated cost concerns, an audit of the project was undertaken in 2016 by the OAG, with the support of external experts. The audit determined that costs could be reduced by changing the design of the road, mainly by eliminating some of the bridges in the original design. However, the redesign was careful to leave the roadway elevated in some sections, including the Nabigirwa Swamp, to protect the wetlands and the road from damages caused by future floods.

16 The MWE argues that 100 percent of its expenditures are climate responsive, and the MoT indicates that it is impossible to identify the climate component in their programs, mainly because the information system does not allow to do this differentiation.

vulnerable to natural disasters and climate change risks. In transport, the recent UNRA's strategic report sets climate change as a cross-cutting pillar that impacts not only construction but maintenance of the infrastructure. In coordination with UNMA and using the NRVA other MDAs could: (i) have an overview of key hazards; (ii) identify key assets vulnerable to natural events, (iii) use this information for project appraisals; and (iv) develop maintenance and resilience strengthening plan.

56. The importance of building information on climate change-related risks to public infrastructure makes reforms a high priority. Improving asset registers to include the exposure to climate risks, and updating the Asset Management Framework and Guidelines to include information on vulnerability to climate events in the registers, would enhance the government's adaptation and mitigation capacity and reduce related fiscal risks. Maintenance methodologies and guidelines would benefit from the enhanced information and could consider climate change impacts. As defined in its strategic documents, the AOU should annually audit one investment project from a climate change perspective to evaluate its achievements and/or trigger corrective actions, as with the Kampala-Entebbe Expressway audit. Through increased guidance for MDAs on the tagging process, scrutiny by MoFPED of the information provided, and adjustments of IT systems, Uganda could report on the budgeting and execution of climate-related current and development expenditures.

C5. Risk Management (Strength—Medium; Reform Priority—Medium)

57. Uganda's Disaster Risk Management (DRM) framework addresses climate-related risks, but there is need for a DRM Bill and a forward-looking perspective on risks to public infrastructure. Stemming from the NDP II, which recognized disaster risk management as pivotal for sustainable development, the authorities introduced the 2021 DRM Policy, the NRVA and the 2022 DRM Plan. The documents have enhanced Uganda's DRM framework significantly. However, a DRM Bill is necessary to establish the legal foundation for defining DRM definitions, roles, and responsibilities, including for MoFPED, which is needed to pave the way for developing disaster risk financing instruments. The NRVA of Uganda is a valuable tool as it provides information about the current exposure to natural hazards, including the exposure of the public sector assets like the road network, and education, energy health, police and water and environment sectors. In future updates, the NRVA could evolve to include more information with a forward-looking perspective on how climate change might alter risks to public infrastructure across key sectors and districts.

58. Uganda primarily finances its DRM through the government budget, and there are limited prearranged DRM financing instruments available. While article 157 of the Constitution and section 26 of the PFMA 2015 (as amended) mandate a Contingency Fund (CF) to finance responses to natural disasters – constituting 0.5 percent of the previous fiscal year's appropriated government budget – additional financing needs often drive the government to resort to supplementary budgets. The challenge was underscored by the 2022 World Bank Disaster Risk Finance Diagnostic: annual disaster relief costs are estimated at USD 30.7 million, which is almost twice the median relief allocation of USD 18.5 million. The domestic insurance market is underdeveloped and the lack of insurance for government assets or public infrastructure creates a contingent liability. Currently, the government does not have a comprehensive database in place with the costs of damages and losses of natural disasters, including costs related to damaged public infrastructure. Such data would be helpful for shaping future DRM financing instruments, including the design of a national disaster risk financing strategy, and optimizing the size of the CF based on the expected losses from natural disasters.

59. Whilst the FRS discusses climate fiscal risks, it does not analyze climate change risks to public infrastructure assets. The FRS explores the relationship between macroeconomic factors and climate change, noting potential GDP losses due to climate effects. However, it does not analyze the fiscal risks of climate change concerning public investment spending or major investment programs and projects. Notably, much of the necessary data for such analysis exists within various government entities. However, MoFPED could collaborate with government stakeholders to collect and analyze information, aiming to identify and analyze climate change fiscal risks; following the example of the MEM mentioned in the previous section. This collaborative effort could facilitate a more fluent flow of information across the government. A comprehensive information database would enable a more thorough assessment of climate change fiscal risk, which should be included in future FRS's.

60. To enhance its resilience against climate-related risks, Uganda should develop a comprehensive disaster risk financing strategy and disclose the exposure of the government budget to climate change fiscal risks. Uganda has made commendable progress to strengthen its DRM framework. This process could be solidified with the adoption of a DRM Bill that clearly establishes roles, responsibilities, and disaster risk financing mechanisms. The NRVA, an already helpful tool, can evolve to include a forward-looking perspective on long-term climate-related risks to public infrastructure. By compiling data on the damages and losses to public infrastructure and other fiscal costs from climate-related disasters, the government can create a more comprehensive understanding of its vulnerabilities and fiscal risks. This understanding could then be incorporated into the FRS and be used a basis to develop for a disaster risk financing strategy.

C. Cross-Cutting Issues

Capacity Building

61. The capacity for climate-sensitive public investment is quite high in many parts of government as a result of conscious efforts. The importance of adequate capacity as a key prerequisite for effective implementation of climate change policies and projects is well recognized in Uganda, and the country has a strong tradition of proactive policies to enhance capacity and create the necessary skill sets in government and among the population. This is demonstrated in two important strategic documents: the Climate Change Learning Strategy and the Climate Change Communication Strategy.

62. The goal of the Uganda National Climate Change Learning Strategy is to strengthen Human Resources and Skills to advance low-emission and climate-resilient development in Uganda. To pursue this, analysis was conducted to identify the specific needs to strengthen human resource capacities through a strategic approach for climate change learning and skills development. The strategy comprises an action plan with seven main activities:

- Activity 1: Enhance the capacity of the national UNFCCC and IPCC focal institutions.
- Activity 2: Integrate climate change learning in the education curricula (primary, secondary, and tertiary education).
- Activity 3: Support university and research institutions as leaders of excellence in climate change education.

- Activity 4: Design and deliver short-term, medium-term, and long-term training programs in climate change.
- Activity 5: Undertake regular assessment of climate change impacts including economic and non-economic aspects in different ecosystems.
- Activity 6: Provide fellowships, scholarships, and undergraduate / graduate assistantships to support undergraduate, graduate, diploma. and postgraduate education including existing staff in leading institutions, to improve in climate change adaptation and mitigation in Uganda.
- Activity 7: Promote education, research, and outreach programs.

63. The National Climate Change Communication Strategy 2017 – 2022 has also been an important element in raising awareness and strengthening capacity to address climate change. The main objective of the strategy is to effectively increase and improve the level of awareness, interest, positive attitudes, behaviors and practices towards climate change adaptation and mitigation among the public, vulnerable communities, and stakeholders in Uganda. The strategy comprises six specific objectives:

- Provide adequate information, education, and communication services for effective management of climate change vulnerabilities and risks among the public, vulnerable communities, and stakeholders.
- Increase access and utilization of climate change information, knowledge, and learning.
- Establish two-way communication mechanisms that are appropriate in terms of mode, channels, and language that is locally friendly.
- Provide appropriate, relevant, and accurate information, content, and materials for diverse audiences on climate.
- Enhance the capacity, competences, and skills of stakeholders in Uganda in climate change communication.
- Build collaborations, partnerships, and coordination mechanisms for informing, educating, and communicating about climate change adaptation and mitigation issues.

64. The awareness of climate change issues and the capacity to address these issues are quite high, but continued training is important to mitigate high staff turnover and to fill skills gaps. The capacity building strategy and the communication strategy mentioned above seem to have been effective in building capacity both within the government and in the population more generally, and the knowledge about climate change issues is impressive in many government institutions. Officials indicated that training institutions, including the Makerere University, play an important role in this regard. It is important to ensure that this is a continuous effort over time.

Legal and Regulatory Framework

65. There is an extensive legal framework for climate change and for public investment. The legal framework is generally well developed. Table IV.1 provides an overview of key legislation related to climate change and public investment.

Table IV.1. Main Laws and Regulations for Climate Investment Management

Law	Coverage
The Constitution of the Republic of Uganda, 1995	Stipulates that the state shall promote sustainable development and public awareness of the need to manage land, air, water resources in a balanced and sustainable manner for the present and future generations.
The National Forestry and Tree Planting Act, 2003	The Act aims to create an integrated forest sector that will facilitate the achievement of sustainable increases in economic, social, and environmental benefits from forests and trees by all the people of Uganda.
National Audit Act, 2008	The Act mandates the OAG to undertake environmental audits of any project or activity utilizing public funds.
The Land Act, 2012	Sets out provisions and procedures for ownership, control, and management of land in Uganda, including procedures for resolution of land disputes.
PPP Act, 2015	The PPP Act and related regulations provide a comprehensive framework for PPPs, but do not require climate analysis.
Development Committee Guidelines, 2017	The DC guidelines define the framework for appraisal and selection of public investment projects but does not require climate analysis.
National Environment Act, 2019	Establishes the framework for environmental management, impact assessment, reporting and compliance.
ESIA regulation, 2020.	The regulation and related guidelines require an assessment of climate change-related impacts associated with a project, including potential climate benefits and carbon footprints, the potential vulnerability to climate change, and the proposed adaptation and mitigation measures.
Climate Change Act, 2021	Defines the legal framework for climate change response, including strategies, actional plans and lead agencies. Defines the department responsible for climate change, the role of the Environment Policy Committee and establishes a National Advisory Committee on Climate Change.
Public Finance Management Act, 2015, amended 2021	Requires that the Minister of Finance in Consultation with the Chairperson of the National Planning Authority certifies that the budget submitted to Parliament is climate change responsive and includes adequate allocations for climate change measures and actions.

Source: Mission

66. While the legislation covering climate change and public investment generally is adequate, there is a need to update land use legislation. According to the Ministry of Lands, Housing and urban Development, here is an ongoing review of the current land use policy and related legislation[17]. This is partly driven by the need to ensure that there are clear legal requirements to consider climate change impacts, in particular for adaptation, in land use planning and management. The review should also look at how the legislation can be strengthened to ensure that land use and right-of-way conflicts do not impede the implementation of public investments, for instance roads and electricity lines. The 2022 PIMA indicated that the lack of strong legislation in this area was a significant obstacle to effective implementation of investment projects. The policy review should provide clear proposals for amendments to the land use legislation and relevant regulations.

IT Systems and Data Management

67. Key functions for climate-sensitive public investment are generally well covered by IT systems, but systems are not integrated or effectively interfaced, and data exchange mechanisms are inadequate. There have been a number of projects to develop key information systems over several years, and most of these systems are now operational. However, the IT systems have often been

[17] "Government moves to review land laws", New Vision, August 2023.

freestanding, without effective integration or interfaces with other systems in the same sector. Table IV.2 provides an overview of the main systems that are important for climate change and public investment.

Table IV.2. Main IT Systems for Climate Change and Public Investment Management

System	Coverage
Integrated Financial Management System (IFMS)	Supports bank reconciliation, payments, accounting and reporting by MDAs and LGs (web based except for remote locations).
Performance Budgeting System (PBS)	Supports budget preparation and performance reporting by MDAs and LGs.
Integrated Bank of Projects (IBP)	Registers all project information throughout the PIMS cycle (pre-investment, investment, and ex post evaluation)
Government Asset Management Information System (GAMIS)	Asset Management (currently being rolled out to MDAs)
NDP Monitoring and Evaluation System	Monitoring and Evaluation of NDP III indicators and core projects.
e-GP	Automated procurement system, being gradually rolled out to all MDAs.

Source: Mission

68. It will be important to continue to strengthen integration and interfaces between key IT systems, in particular between the IBP and the other systems. In recent years, there has been important progress in establishing interfaces between some of the systems, in particular the IFMIS, the PBS and the NDP monitoring systems. GAMIS will also be integrated with the IFMIS. The main remaining gap is between IBP and the other systems. As discussed in section I, to ensure effective integration or interfaces, it will likely be necessary to update the coding structure in IBP, so it is consistent with the other systems.

V. Recommendations

69. The recommendations below are the priority areas identified by the CD team that should support improving the climate sensitivity of the PIM and fiscal risk management frameworks in Uganda. Annex I provides a draft action plan, including a suggested timeline and key entities involved.

Issue 1. *The IBP system is not effectively integrated with the IFMIS and other key information systems, undermining the efficacy of project budgeting and monitoring.*

Recommendation 1. Harmonize the coding structure in the IBP with the IFMIS and other key systems and establish procedures for effective data sharing. (PAP, AGO, Budget – FY26/27)

Issue 2. *The project appraisal and selection framework, including for national government PPPs, does not incorporate climate change issues leading to an ad hoc approach by different entities.*

Recommendation 2. Update the PIM framework to ensure that climate change impact assessment is included within the major project appraisal documentation and is part of the criteria used for project selection, including for PPPs at the national government level. To achieve this the authorities should:

- Update DC Guidelines to require consideration of climate change implications in the project appraisal and align with ESIA requirements. (PAP, DC – Q3 FY23/24)
- Revise National Guidelines for PPP Appraisal to include climate change (consistent with Local Government PPP Guidelines 2023) and update the project risk matrix to include detailed climate change risks and preferred risk holder. (PPP Unit – end of FY25/26)
- Incorporate climate change assessment in the specific DC project selection criteria. (DC – Q1FY25/26)

Issue 3. *The climate change budget tagging exercise for FY23/24 does not provide a realistic picture of this type of expense included in the budget.*

Recommendation 3. Further develop the climate change budget tagging framework to ensure appropriate differentiation between current and development expenditures and appropriate training for MDAs. To achieve this the authorities can (Budget, AGO – end of Q2FY24/25):

- Review the existing coding structure and adjust this to differentiate between climate-related current and investment expenditures.
- Develop detailed guidelines that help MDAs determine what recurrent and investment expenditures can be considered climate change related.

Issue 4. *The existing information in the asset registers is incomplete, unreliable, and does not include considerations related to climate change.*

Recommendation 4. As part of the ongoing process led by the AGO to strengthen the asset register information, compile information on the vulnerability of key assets to climate change-driven hazards (AGO).

- Update the AFMG to include information on exposure and vulnerability to climate change risks in the list of requirements. (End of FY24/25)

- Relevant ministries for public investment should work with UNMA to cross map their information on public assets location and hazards to inform project appraisals and define maintenance plan. (End of FY25/26)
- Include climate change considerations in methodologies for costing asset maintenance. (End of 26/27)

Issue 5. *The OAG does not undertake the audit of climate change adaptation or mitigation outcomes of major investment projects.*

Recommendation 5. Expand the scope of OAG audits to include in its workplan the audit of the climate change adaptation or mitigation outcomes of major investment projects (OAG) .

- Define a methodology and criteria for audits from the climate-change perspective (Q1-FY24/25).
- Identify major public investment projects that should be subject to an audit of climate change outcomes based on an assets' strategic value and climate vulnerability parameters (FY following the definition of a methodology, i.e., Q2-FY24/25).

Issue 6. *The current DRM framework is not properly consolidating and cross-referencing information on climate change risks on public sector assets.*

Recommendation 6. Enhance the DRM framework to consolidate existing sources of information on climate change that would better inform the climate change risks to public infrastructure.

- Create a database documenting historical budgetary effects (relief, recovery, and reconstruction) from natural disasters (OPM – Q1-FY24/25).
- Revise the NRVA incorporate emerging climate change risks to public infrastructure (OPM – Q2-FY24/25).
- Align the DRM framework and fiscal risk analysis with these changes (OPM, MEPD – FY25/26).
- Use the updated NRVA to inform the development of the NDP IV (OPM – end of FY24/25).

Issue 7. *Resource allocation to the contingency fund is insufficient to cover the estimated impacts of climate change-related hazards on public infrastructure, requiring frequent supplementary budgets.*

Recommendation 7. Strengthen DRM financing by ensuring appropriate funding of the CF to cover expected impacts of natural hazards on public infrastructure and the development of a disaster risk financing strategy (MoFPED – by end of FY25/26).

- Develop an estimate of the resources needed in the CF to finance expected government expenditure on public infrastructure impacted by natural disasters.
- Based on historical data and forecast impact of natural disasters, develop an assessment of the appropriate mechanisms for Uganda to finance its DRM.

Issue 8. *The fiscal risk statement does not disclose climate change fiscal risks, including risks related to public sector assets and long-term macroeconomic risks.*

Recommendation 8. Expand the scope of the FRS to include a qualitative and quantitative assessment of climate change fiscal risks, including for public sector assets and the macroeconomic risks.

- Discuss in the FRS the impacts of the long-term fiscal risks of climate change using Q-CRAFT or similar tools. (MEPD – Q3-FY23/24)
- Discuss qualitatively the specific climate change-related fiscal risks to which public assets are exposed in Uganda. (MEPD – Q3-FY24/25)

Issue 9. *There is limited technical capacity at the MoFPED and MDAs to assess climate change-related issues in PFM (PIM, budgeting, audit) that undermines the implementation of proposed regulation.*

Recommendation 9. Develop a capacity building plan for MoFPED and MDAs on assessing climate change-related issues to implement associated regulation.

- Develop a capacity building program to enhance the climate change-related expenditure tagging exercise (Budget, AGO – Q1-FY24/25).
- Provide further training on budget tagging for climate change, including identifying climate change-related recurrent and investment expenditure (Budget, AGO – every FY from FY23/24).
- Develop a training on managing climate change-related risks and how these should be reported in the FRS (MEDP – Q2-FY24/25).

Annex I. Draft Action Plan

Recommendations /Actions	FY23/24		FY24/25				FY25/26	FY26/27	FY27/28	Responsible Agency
	Q3	Q4	Q1	Q2	Q3	Q4	End of FY			
Recommendation 1. Harmonize the coding structure in the IBP with the IFMIS and other key systems and establish procedures for effective data sharing.										
▪ Complete a review the structure of the outcome codes in the IBP, PBS and IFMIS to identify differences.		✓								PAP, AGO, Budget
▪ Finalize an action plan to address the inconsistencies in the codes.			✓							PAP, AGO, Budget
▪ Update the IBP with the updated coding structure.						✓				PAP
▪ Develop an interface to achieve a better integration of the three systems.							✓			PAP
▪ Complete the integration of the three systems that support management of capital expenditures.								✓		PAP, AGO, Budget
Recommendation 2. Update the PIM framework to ensure that climate change impact assessment is included within the major project appraisal documentation and is part of the criteria used for project selection, including for PPPs at the national government level.										
▪ Update DC Guidelines to require consideration of climate change implications in the project appraisal and align with ESIA requirements.	✓									PAP, DC
▪ Revise National Guidelines of PPP Appraisal to include climate change.			✓							PPP Unit
▪ Update the PPP project risk matrix to include detailed climate change risks and preferred risk holder.							✓			PPP Unit
▪ Incorporate climate change assessment in DC project selection criteria.							✓			DC

Recommendations /Actions	FY23/24		FY24/25				FY25/26	FY26/27	FY27/28	Responsible Agency
	Q3	Q4	Q1	Q2	Q3	Q4	End of FY			
Recommendation 3. Further develop the climate change budget tagging framework to ensure appropriate differentiation between current and development expenditures and appropriate training for MDAs.										
▪ Review the existing coding structure to address the limitations for tagging climate change-related expenditures.		✓								Budget, AGO
▪ Adjust coding structure in the BPS and IFMIS to better differentiate between climate-related current and investment expenditures.				✓						Budget, AGO
▪ Develop detailed guidelines that help MDAs determine what recurrent and investment expenditures can be considered climate change related.				✓						Budget, AGO
▪ Develop a training program on identifying climate-related recurrent and investment expenditure.	✓									Budget / Makerere
▪ Annual training for MDAs on the guidelines for climate-related budget tagging			✓	✓			✓	✓		Budget
▪ Develop and publish reports on climate-related expenditures to accompany the budget documentation						✓	✓	✓	✓	Budget
Recommendation 4. As part of the ongoing process led by the AGO to strengthen the asset register information, compile information on the vulnerability of key assets to climate change-driven hazards.										
▪ Update the AFMG to include information on exposure and vulnerability to climate change risks in the list of requirements.						✓				AGO
▪ Relevant ministries for public investment should work with UNMA to cross map their information on public assets location and hazards to inform project appraisals and define maintenance plan.							✓			AGO
▪ Prepare a report identifying the key public assets exposed to climate change risks.								✓		AGO
▪ Include climate change considerations in methodologies for costing asset maintenance.								✓		AGO

Recommendations /Actions	FY23/24		FY24/25				FY25/26	FY26/27	FY27/28	Responsible Agency
	Q3	Q4	Q1	Q2	Q3	Q4	End of FY			
Recommendation 5. Expand the scope of OAG audits to include in its workplan the audit of the climate change adaptation or mitigation outcomes of major investment projects.										
▪ Define a methodology and criteria for audits from the climate-change perspective.			✓							OAG
▪ Identify at least one major public investment project that should be subject to an audit of climate change outcomes based on an assets' strategic value and climate vulnerability parameters.				✓						OAG
▪ At least biannually, complete a performance audit of the climate change adaptation or mitigation outcomes of major investment projects.							✓		✓	OAG
Recommendation 6. Enhance the DRM framework to consolidate the multiple sources of information on climate change that would provide a better assessment of the climate change risks to public infrastructure.										
▪ Create a database documenting historical budgetary effects (relief, recovery, and reconstruction) from natural disasters.			✓							OPM
▪ Revise the NRVA to incorporate emerging climate change risks to public infrastructure.				✓						OPM
▪ Aling the DRM framework and fiscal risk analysis with these changes.							✓			OPM/MEPD
▪ Use the updated NRVA to inform the development of the NDP IV.					✓					OPM
Recommendation 7. Strengthen DRM financing by ensuring appropriate funding of the CF to cover expected impacts of natural hazards on public infrastructure and the development of a disaster risk financing strategy.										
▪ Develop an estimate of the resources needed in the CF to finance expected government expenditure on public infrastructure impacted by natural disasters.			✓							MoFPED
▪ Based on historical data and forecast impact of natural disasters, develop an assessment of the appropriate mechanisms for Uganda to finance its DRM.							✓			MoFPED

Recommendations /Actions	FY23/24		FY24/25				FY25/26	FY26/27	FY27/28	Responsible Agency
	Q3	Q4	Q1	Q2	Q3	Q4	End of FY			
Recommendation 8. Expand the scope of the published FRS to include a qualitative and quantitative assessment of climate change fiscal risks, including for public sector assets and the macroeconomic risks.										
▪ Discuss in the FRS the impacts of the long-term fiscal risks of climate change using Q-CRAFT or similar tools.	✓									MEPD
▪ Discuss qualitatively the specific climate change-related fiscal risks to which public assets are exposed in Uganda in the FRS.					✓					MEPD
▪ Develop quantitative methodologies to estimate the impact of climate change-related risks on public assets.							✓			MEPD
▪ Discuss in the FRS the climate change-related impacts on public infrastructure.								✓		MEPD
Recommendation 9. Develop a capacity building plan for MoFPED and MDAs on assessing climate change-related issues to implement associated regulation.										
▪ Develop training program for the tagging of climate change-related expenditures and investments in the budget documentation.			✓							Budget, AGO
▪ Develop a training on managing climate change-related risks and how these should be reported in the FRS.				✓						MEPD
▪ Provide annual training on these topics to government officers.							✓			MEPD, Budget, AGO

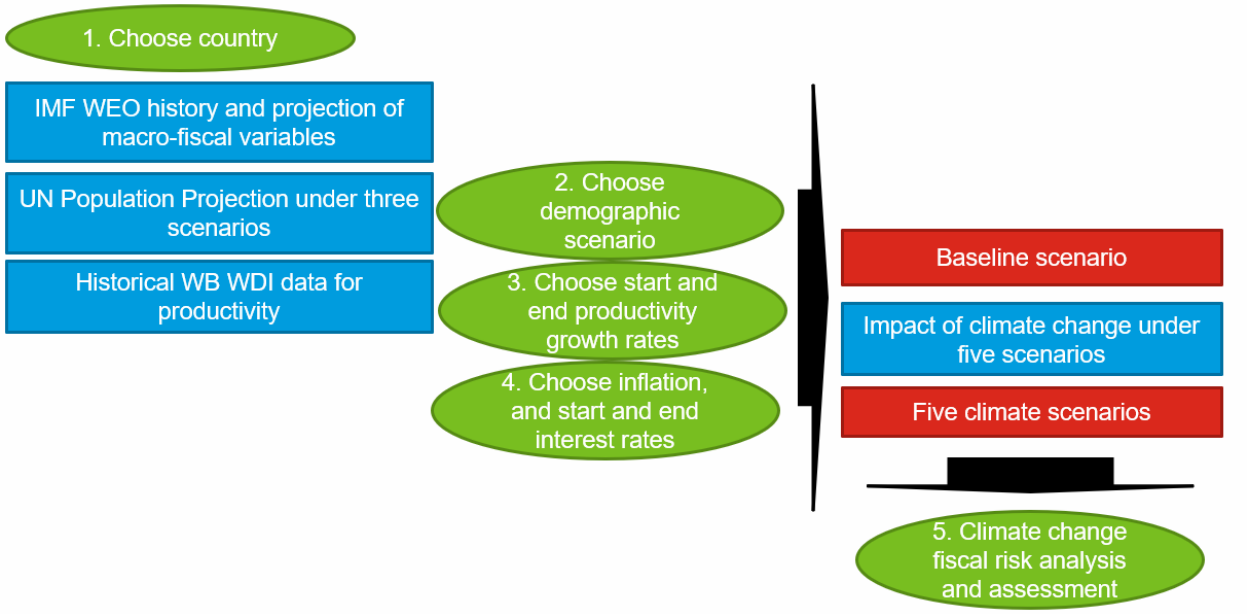
Annex II. Setting Up Q-CRAFT

70. This Annex explains how to set up, use and interpret the results of the Q-CRAFT that was customized with the authorities during a workshop. The following are covered: Q-CRAFT's functional overview including various features of the spreadsheet such as its set up and color conventions; data and assumptions needed to set up the baseline; the baseline scenario for Uganda; the climate scenarios and the empirical framework underpinning Q-CRAFT; and Uganda's macro-fiscal outlook under different climate scenarios.

Functional Overview

71. Q-CRAFT is a tool designed to generate long-term fiscal projections under different climate change scenarios, utilizing existing data and a systematic approach. This section provides a functional overview of the tool, covering various features of the spreadsheet including its set up and color conventions, the data sources, and the steps needed to set it up. Q-CRAFT requires the user to select the country (Uganda) and key assumptions for demography, productivity, inflation, and interest rates. After that, long-term projections for key fiscal aggregates under the baseline and alternative climate change scenarios are automatically generated. All these steps are explained in more detail after Figure 1, which illustrates Q-CRAFT's operative structure.

Figure 1. Visual representation of Q-CRAFT's operations



A. Q-CRAFT Structure Description

72. To make it easy to understand and use, Q-CRAFT has been developed in accordance with strict formatting rules. Q-CRAFT has the following worksheets:

- The blank "Read me" worksheet provides information for the user to operate Q-CRAFT.

- The green "Dashboard" worksheet has the dashboard in which users can select the parameters needed for Q-CRAFT to generate the baseline and climate change scenarios.

- The blue worksheets (that is, MTFF, DSA, Productivity, Demography, Interest rate, Climate) contain the data needed to generate the scenarios. This version of Q-CRAFT comes pre-loaded with data from Uganda's latest MTFF, the latest published DSA, the United Nations, the World Bank, and the econometric results linking climate change with GDP.

- The red worksheets (that is, Baseline, Paris, Moderate, High, Hot, Vulnerable) are used by Q-CRAFT to calculate the baseline and the different climate scenarios. These worksheets should not be changed by the user.

- The yellow "Output" worksheets provide the user with output tables and charts.

Subsequently, the following formatting and coloring conventions are used:

- Cells with blue digits are hard-coded data from an external source
- Cells with green digits link data between different worksheets
- Cells with black digits contain the calculations.

B. Data and Assumptions for the Baseline

73. The Dashboard allows the user to choose the parameters needed to set up the baseline scenario. The first step in using Q-CRAFT is to choose the country in the dashboard —Uganda in this case. The next step is to choose the demography scenario —the UN medium variety scenario in this case. The third step is to choose the assumptions for productivity growth. The next step is the assumption on inflation. The final step is to choose the assumptions on interest rates. Figure 2 shows the Dashboard assumptions used at the workshop.

Figure 2. The Dashboard

Select Country	Uganda
	BASELINE SCENARIO
Demography	Medium
Productivity	
Start	3.4
End	1.8
Inflation	4.8
Interest rate	
Start	3.8
End	5.5
	CLIMATE SCENARIOS
Expenditure Rigidity	1.0

Macro-fiscal data

74. All the required economic and fiscal data and projections from the authorities' MTFF and the latest published IMF DSA for Uganda are loaded in the MTFF and DSA worksheets. The following variables are loaded for the period 2012-41: real GDP; nominal GDP; the GDP deflator; revenue; expenditure; overall balance; primary balance; and gross debt.[18] The MTFF is used for the period till 2028, and the DSA for the period 2029-41. A set of summary charts are also produced in the DSA worksheet to help with macroeconomic diagnostics, which is important for setting productivity, inflation, and interest rates assumptions and interpreting the long-term fiscal projections.

Population data

75. The UN's medium variety demographic scenario is chosen as it accords with the Uganda Bureau of Statistics (UBoS) demographic projections. The UBoS projects population by age groups to 2050. These are identical to the UN medium scenario in growth rates, composition, and underlying fertility, morbidity, and migration assumptions, but the historical population levels are different with the UBoS projections reflecting the latest national census. The UN also produces high and low fertility scenarios for population projections. These are included in the Demography worksheet, but not used for analysis.

Employment and productivity

76. In Q-CRAFT, employment is assumed to grow in the long run with working age (15-64) population, and productivity is defined as real GDP per employed person. This is the broadest definition of labor productivity and is the one used in the World Bank World Development Indicator —the source of the historical productivity data for 1991-2021.

77. In the workshop, long-run productivity growth was assumed to be 1.8 percent. With real GDP growing at 6.2 percent at the end of DSA period and working age population (and therefore employment) growing by 2.8 percent, the implied productivity growth at the beginning of the long-term projection is 3.4 percent. The users need to form a view about the structural productivity growth rate for the Ugandan economy in the long run (the end period, 2090 to 2100). The rationale and implication of the assumed long-run productivity growth are described in the next section.

Inflation and interest rates

78. The long-run inflation rate of 4.8 percent was assumed in the workshop, reflecting the rate at the end of the DSA period. This is broadly in line with what the central bank considers to be consistent with macroeconomic stability.

79. In the workshop, the long-run interest rate was assumed to be 5.5 percent. At the end of the DSA horizon in 2041, the weighted average nominal interest rate on Uganda's public debt is 3.8 percent. The users need to form a view about the long-term nominal interest rate. Country expertise is important to develop credible assumptions for interest rate developments in a country, particularly with respect to the availability of concessional loans, risk premia, and the maturity of domestic financial sectors. While a

[18] The MTFF was provided by the authorities. The DSA was published in June 2023.

constant interest assumption (that is, the same 'start' and 'end' period interest rates) is possible, Q-CRAFT does provide the authorities with an option to vary interest rates over the long term by choosing a different end rate. The rationale and implication of the assumed long-run interest rate are described in the next section.

C. The Baseline Scenario

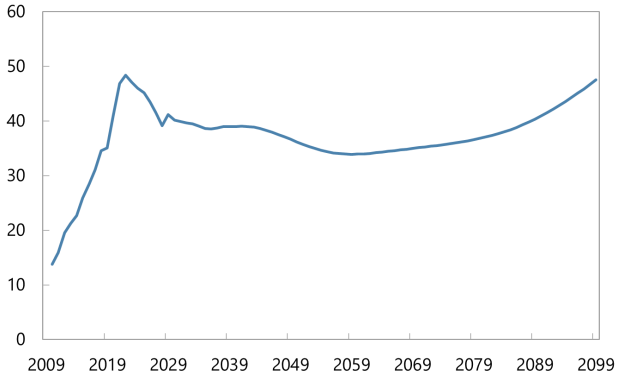
80. The baseline scenario is generated automatically once the relevant choices are made in the Dashboard and reflects certain methodological assumptions. The baseline scenarios are summarized in a set of charts in the Output Baseline worksheet. The macro-fiscal projections in the baseline scenario reflect the following methodological relationships and assumptions.

- *Nominal GDP*: Nominal GDP projections are calculated using employment growth together productivity growth and inflation that reflect the Dashboard choices. Specifically, the Nominal GDP growth is approximately the sum of employment growth, productivity growth, and inflation.[19]
- *Revenue*: Revenue is assumed to remain constant as a share of nominal GDP (that is, grow by productivity, inflation, and working age population) after the end of the DSA horizon.
- *Primary expenditure*: Primary expenditure is assumed to grow by productivity, inflation, and *total* population after the end of the DSA horizon.

[19] Let *N* represent nominal GDP. $N = Y * P$ where *Y* is real GDP and *P* is the GDP deflator. For *Y*, we assume a production function of the form $Y = A * L$, where *L* represents employment and *A* represents all factors that affect labor productivity over time, including land productivity; physical and human capital; innovation and technological progress; sectoral composition of the economy and its resource endowment; and history and institutions. Since $N = Y * P = A * L * P$, growth in nominal GDP (*Y*) is approximately the sum of growth in productivity, employment, and GDP deflator.

81. Q-CRAFT projects debt-to-GDP ratio to 2099 using the debt dynamics equation (Figure 3). The debt dynamics equation is a formula used by the IMF to assess how a country's debt level changes over time, taking into account an initial debt level in a country, the interest rate at which a country borrows money to finance its debt, the primary balance of a government and nominal GDP growth.[20]

Figure 3. Debt-to-GDP ratio in Uganda, Baseline Scenario



82. In the baseline scenario, Uganda's debt-to-GDP ratio remains below the 50 percent fiscal rule ceiling till the end of the century. Public debt is projected to stand at 39.1 percent in 2041 according to the DSA. Debt is set to decline relative to GDP for the following couple of decades as Uganda benefits from strong employment growth (reflecting the demographic projections) and productivity growth, while the interest rates are assumed to remain low. After the 2060s, debt rises relative to GDP as productivity growth slows, interest rates start rising, and eventually employment growth slows because of the ageing of the population.

83. The implications of Q-CRAFT's methodological assumptions as well as the parameter assumptions made above for the baseline projection of debt-to-GDP ratio is described below. These issues were discussed in detail during the workshop.

Productivity

84. While the MTFF and DSA imply strong productivity growth into the early 2040s, extending this to the end of the century might not be realistic. Economic theory and historical experience in many countries suggest that poorer countries can experience faster productivity growth as they adopt production processes and techniques from more advanced economies, but productivity growth slows down as an economy becomes more developed and relatively 'low hanging fruits' of the so-called catch-up growth are plucked.

85. Assumptions needed for long-term labor productivity growth projections require detailed country expertise. According to the WB WDI, Uganda's annual productivity growth was 3 percent during 1991-2021 (the full period for which the WB WDI data is available); 1.8 percent during 2007-19 (covering

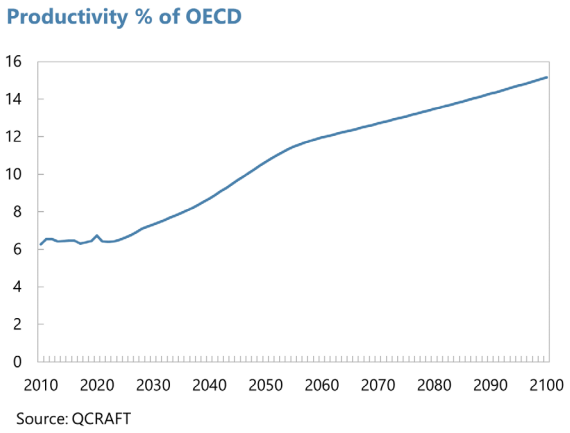
[20] Given nominal GDP growth of *g*, nominal interest rate of *i*, and primary balance (as percentage of nominal GDP) of *pb*, the debt-to-GDP ratio (*D*) evolves according to:

$$D_{t+1} = D_t * [(1+ i) / (1+g)] - pb_t$$

the global business cycle between the Global Financial Crisis and the COVID-19 pandemic); and 0.8 percent during 2014-19 (the most recent five years before the pandemic). These rates were discussed in detail during the Workshop, along with comparisons to other East African, Sub-Saharan African, and low-income developing countries. Considerable further analysis —covering prospects for structural transformation, investment needs and prospects, and the enabling policy and institutional frameworks—could improve the robustness of the 1.8 percent long-term productivity growth assumption made in the Workshop.

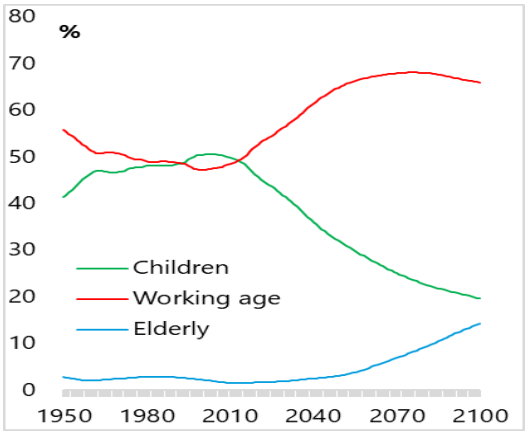
86. Productivity level relative to the OECD is an important realism check for productivity growth projections in Q-CRAFT. Given the period productivity growth assumptions, Q-CRAFT calculates a productivity growth path and the implied productivity level relative to the OECD (assuming that OECD productivity continues to grow at the historical average rate of 1.2 percent). Average productivity level in Uganda is set rise from 6 percent of the OECD currently to about 9 percent over the DSA horizon. Even though productivity growth is assumed to slow thereafter, Uganda's productivity still increases to around 15 percent of OECD by the end of the century (Figure 4). In contrast, with the long-term productivity growth rate of 3 percent, Uganda's relative productivity level would reach 25 percent of OECD by the end of the century. By way of comparison, over the period 1991-2021, relative productivity level in Lower-Middle Income Countries (as classified by the World Bank) increased from below 14 percent to over 21 percent.

Figure 3. Productivity relative to OECD, percent



Source: QCRAFT

Figure 4. Population Structure (2002-2100), percent of total population



Demography

87. Uganda is on the cusp of a potential demographic dividend, with the working age population share increasing in the coming decades (Figure 4). In Q-CRAFT, demography affects both macroeconomic and fiscal projections. With employment assumed to grow in line with working age (15-64) population, Uganda's GDP growth is boosted by the rise in the share of working-age people. Further, real primary expenditure per capita is assumed to grow in line with productivity, implying that nominal primary expenditure grows by inflation, productivity, and *total* population. Since nominal GDP grows by inflation, productivity, and *working age* population, when the share of working age population rises, nominal GDP grows faster than primary expenditure (that is, primary expenditure declines as

percentage of GDP). With revenue-to-GDP ratio assumed to remain constant in the long run, primary balance improves when the share of working age population rises.

88. The demographic dividend is, however, not automatic, and sustained investments in human capital is needed development for its actualization, which may bear significant fiscal implications. Along with the productivity assumption above, Q-CRAFT's methodological assumptions on the benefits of demographic dividend presupposes significant investment in human capital, ongoing commitment to prudent macroeconomic and fiscal management and microeconomic policies that support innovation and entrepreneurship, and favorable international conditions.

Interest rates

89. Long-term fiscal projections are highly sensitive to the interest rate assumptions, and there are considerable uncertainties around them. Conceptually, the weighted average nominal interest rate on a country's debt reflects its debt profile. Calculating it from a granular analysis would require a detailed knowledge of the length, yield, and the currency of each instrument as well as an assumption on the expected trajectory of the exchange rate. A much simpler approach is taken in Q-CRAFT whereby: the initial interest rate is calculated from the DSA data on interest expenditure and gross debt at the end of DSA horizon; and an interest rate is assumed for 2100 reflecting the discussion at the Workshop. Given the calculated initial and the assumed end-period interest rates, the tool derives an interest trajectory to the end of the century.

90. Nominal interest rate is set to rise in the long run. The MTFF projects a weighted average nominal interest rate of 6-8 percent on Uganda's public debt, which is consistent with recent history. According to the DSA projections, inflation is set to be 4.8 percent and nominal interest rate stands at 3.8 percent. This implies a real interest rate of -1 percent, which is not a credible long-term assumption either theoretically or empirically. The 4.8 percent inflation assumption was considered realistic at the Workshop, implying that nominal interest rate should rise over the long-term. As Uganda's economy develops, its ability to avail concessional lending might be reduced, also exerting an upward pressure on interest rates. While a more developed economy will have the ability to borrow from the market, there may be significant risk premia on any foreign currency denominated debt. Somewhat offsetting these factors may be a more developed financial market, which could increase domestic savings and thus lower domestic interest rates. Further, in the long run, the real interest rate tends to track productivity growth, and as productivity growth slows, so might the interest rate.

D. The climate scenarios

91. Fiscal consequences are simulated for five different climate scenarios (Box 1).

- **Paris**: based on the SSP1-2.6 IPCC scenario where international commitments from the 2015 Paris summit are met, keeping global temperature increase above its pre-industrial level below 2°C at the end of the century.
- **Moderate**: based on the SSP2-4.5 IPCC scenario. Emissions continue increasing in line with the continuation of present trends and stabilize at the end of the century. This scenario assumes that climate mitigation policies continue along the observed trend, but countries do not take more aggressive actions to fulfill their Paris commitments.

- **High**: based on the SSP3-7.0 IPCC scenario. Rather than intensifying climate mitigation efforts, countries start scaling back their implemented policies in a world with limited energy efficiency improvements and continued use of fossil fuels.

- **Hot**: emissions are as in the high scenario, but it uses the 90th percentile of temperature increase among all climate models that used SSP3-7.0 emissions, instead of the average temperature projection that is used for the high scenario.

- **Vulnerable**: using the same emission as the hot (SSP4-7.0 90th percentile) scenario, but with slower adaptation and therefore more damaging macroeconomic impacts.

Box 1 Climate Scenarios

Climate scientists develop scenarios of future warming using representative emission scenarios from integrated assessment models. In the most recent Intergovernmental Panel on Climate Change assessment report (IPCC 2021), each emission scenario is based on a storyline chosen among five standardized socioeconomic, technological, and policy developments, called Shared Socio-Economic Pathway (SSP). The emission scenario is indicated with its level of radiative forcing (RF) in 2100. RF is the excess energy trapped by Greenhouse Gases (GHGs) in the atmosphere above the pre-industrial level and is measured in watts per square meter (W/m^2). For example, the lowest warming scenario is SSP1-1.9, which indicates that SSP1 was used and the level of RF in 2100 is equal to 1.9 W/m^2.

Although it is impossible to attach exact probabilities to these scenarios, most economy-energy models indicate that with no mitigation, RF would be between 6.0 and 7.0 w/m^2 in 2100. With national climate pledges and mitigation measures, global temperature is expected to rise by 2.7°C by the end of the century, in line with the SSP2–4.5 scenario (UN Environment Programme 2021).

The SSP5-8.5 scenario has often been used as a Business-as-Usual trajectory of emissions, but it is increasingly seen as highly implausible and is not used for Q-CRAFT. The SSP5-8.5 scenario was developed for scientific reasons, to study the climate response to extremely high emissions. It was not conceived as a Business-as-Usual scenario because it relies on implausibly fast economic growth and extremely high use of fossil fuels. The SSP-8.5 is increasingly considered not useful in analysis of socio-economic impacts of climate change (Hausfather and Peters 2020; Pielke and Ritchie 2021).

The effect of increasing levels of emissions on climate is uncertain and this uncertainty cannot be easily quantified. The range of projections obtained from different models for the same emission scenario is used to quantify this scientific uncertainty and is called "model uncertainty". As model projections are not independent random observations, the distribution of model scenarios cannot be used to estimate objective probabilities, but it provides useful *best estimates* (averages across all models) and *confidence ranges* (for example the interval from the 10th and the 90th percentiles of all models). Table 1 provides best estimates and ranges of global mean surface temperature increase for all the scenarios considered in Q-CRAFT.

To consider a worst-yet-plausible case level of warming the *hot* scenario uses the 90th percentile of the range of temperature for the *high* emission scenario. This allows the analysis of a pessimistic climate response to a high, but plausible, level of emissions. This is the most credible way to build a worst-case scenario of climate change impacts.

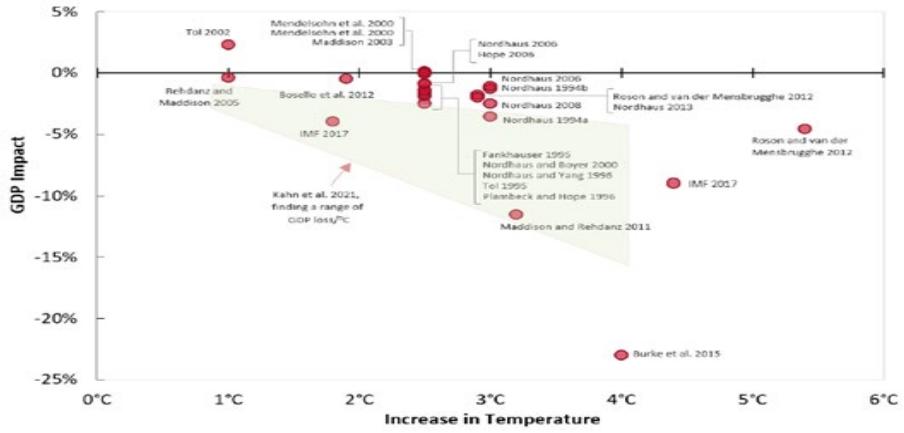
92. Q-CRAFT uses estimated impact of climate change on the GDP levels and growth rates to 2099 under different climate scenarios. Q-CRAFT calculates the macroeconomic impacts of climate change under different scenarios by using updated estimates[21] of Kahn et al (2021) —see Box 2. The more severe climate scenarios result in worse GDP losses.

Box 2 Summary of Kahn et al (2021)

The authors estimate the long-term effects of weather patterns transformed by climate change on economic activity across countries. They begin with a theoretical growth model that links "deviations" of temperature and precipitation (that is, weather) from their long-term moving-average historical norms (that is, climate) to growth in real GDP per capita. This theoretical model is then estimated by using data from 174 countries over 1960-2014. Their econometric technique allows for dynamics, nonlinearity, an implicit model for adaptation to climate change, and accounts for the effects on economic activities of changes in the distribution of weather patterns — that is, both averages and variability of temperature and precipitation. They further explore the efficacy of adaptation by tracking the elasticity of per capita GDP to climate variables over time. The key findings include the following.

- Per-capita real output growth is adversely affected by persistent changes in the temperature above or below its historical norm.
- A persistent increase in average global temperature by 0.04 degrees Celsius per year, in the absence of mitigation policies, reduces world real GDP per capita by around 7 percent by 2100.
- The estimated losses would increase to 13 percent globally if country-specific variability of climate conditions were to rise commensurate with annual temperature increases of 0.04 degrees Celsius.
- Abiding by the Paris Agreement goals, thereby limiting the temperature increase to 0.01 degrees Celsius per year, reduces the loss substantially to about 1 percent.
- While adaptation to climate change can reduce these negative long-run growth effects, it is highly unlikely to offset them entirely.

Figure A. Estimates of GDP Impact from Increases in Temperature



Source: Kahn M.E., Mohaddes K., Ng R.N.C., Pesaran M.H., Raissi M., and Yang J-C, 2019, *Long-Term Macroeconomic Effects of Climate Change: A Cross-country Analysis*, Energy Economics, 104, pp. 105624/1–13.

[21] Centorrino, S., E. Massetti, and F. Tagklis (2023). Guidance Note on Projecting GDP Impacts of Warming Using Kahn et al (2022). Unpublished manuscript, forthcoming, International Monetary Fund, Washington, DC.

E. Fiscal Effects of Climate Change on Uganda

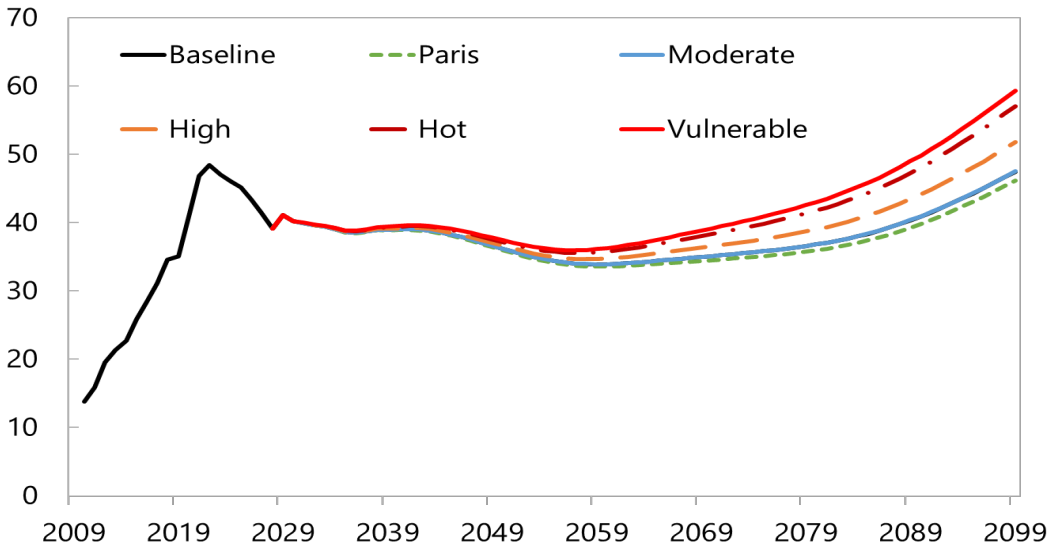
93. Q-CRAFT assumes that fiscal projections will be affected by climate change starting in 2030. This assumption is used to distinguish the long-term impacts of climate change, on which Q-CRAFT analysis focusses, from other macroeconomic shocks that buffet an economy in the near and medium term.

94. The climate scenarios are generated automatically reflecting certain methodological assumptions. The climate scenarios are summarized in a set of tables and charts in the Output Scenarios worksheet. The macro-fiscal projections in these scenarios reflect the following methodological assumptions.

- In each scenario, the revenue-to-GDP ratio remains same as the baseline, and revenue is therefore lower than the baseline.
- In contrast, in each scenario, primary expenditure is initially assumed to remain rigid at the baseline level in local currency terms. As GDP declines with climate change, the primary expenditure-to-GDP ratio rises.

95. With reduced revenue but unchanged primary expenditure, primary balance worsens with climate change. This raises debt and worsens the overall deficit. Over time, the debt-to-GDP ratio can therefore become much higher in the climate scenarios than that in the baseline, taking on a potentially unsustainable upward trajectory. For example, even though the debt-to-GDP ratio remains below the 50 percent fiscal rule ceiling, this is breached in the high, hot, and vulnerable scenarios with debt appearing to rise inexorably by end-century (Figure 5).

Figure 5. Debt-to-GDP ratio in Uganda, Climate Scenarios



96. Users can adjust the expenditure rigidity parameter in the dashboard. As noted above, primary expenditure is assumed to remain unchanged in the face of smaller GDP under climate change. This reflects a parameter value of 1 for the Expenditure Rigidity parameter in the dashboard. At the other

extreme, a value of 0 for the parameter means that government reprioritizes expenditure to maintain the same primary expenditure to GDP ratio as that in the baseline. Users can choose any value between 0 and 1 in the dashboard.

97. Users can register materialization of specific fiscal risks or fiscal impact of natural disasters as one-off rises in primary expenditure or losses of revenue. In addition to macro-fiscal risks, climate change is likely to heighten specific fiscal risks including more frequent and severe natural disasters as well as risks to SOEs, sub-national governments and public private partnerships (PPPs). Realization of specific fiscal risks can result in either loss of government revenue or increase in primary expenditure. Q-CRAFT allows users to manually enter, as percentage of GDP in the Discrete Risks worksheet, fiscal impacts of the materialization of these risks under different climate change scenarios.

98. Using the debt dynamics equation, Q-CRAFT calculates the debt-stabilizing primary balance, which is the necessary primary balance to maintain stable debt levels, for every year to 2099 in every scenario. With climate change raising both the debt-to-GDP ratio as well as increasing its slope (that is, putting it on a potentially unsustainable upward trajectory) in the more extreme scenarios, it will become more difficult to stabilize debt. For example, a fiscal consolidation of 0.8 percent of GDP is required to stabilize debt in the baseline scenario, which rises to 1.5 percent in the vulnerable scenario.

Annex III. Specific Climate Change Fiscal Risks

Event	Sector	Direct/ Contingent	Explicit/ Implicit	Instrument	Name of Risk	Detailed Analysis	Past Events	Risk Owner	Likelihood (1-5)	Impact (1-5)	Climate Risk Reduction Measures	Fiscal Risk Reduction Measures
						Describe key climate change impacts on identified risk area	*Describe relevant events that have occurred in the last 10 years*	*Which gov. entity is responsible for managing the risk?*	*Assign probability that risk will realize*	*Assign impact of the risk being realized*	Describe measures to reduce the impact of climate change risk	Measures to reduce the fiscal exposure to risk
Precipitation	Electricity, gas water	Contingent	Explicit	Exp. (Curr.)	Bujigali Dam	PPA with [entity] requires the purchase of [X] MW per year, regardless of whether the energy is used or generated. Reduced rainfall increases the risk of low power generation and the need for alternative and more expensive energy sources. The PPA will run to [YEAR].	[Generator] did not produce power for [X] months in [YEAR] at a cost of [X] for no power delivered.	Ministry of Energy	3	2	Optimize water levels by addressing water flow to dams; reducing evaporation loss. This is expected to cost [X] and be completed by [X].	Renegotiate PPA contract.
Flood	Electricity, gas, and water	Contingent	Explicit	Exp. (Curr.)	Nile Flooding	Unexpectedly high levels of waterflow in the Nile River (from Lake Victoria) require the shutdown of up to 7 hydro dams to protect infrastructure. This threatens the production of 250MW of power which is [X] percent of Uganda's electricity production and requires the use of Heavy Fuel Oil as an alternative. This adds [X] to generation costs.	In 2019 1.7 additional meters of water in Lake Victoria (highest since 1965) required shutting down all hydro dams for [X] months. The additional cost for HFO fuel generation was [X].	Ministry of Energy	1	1	Planned strengthening of dams and increasing height to address increased flood events. This is expected to cost [X] and be completed by [X].	

Annex IV. C-PIMA Questionnaire

Indicator		Scoring		
		1 = To no or a lesser extent	2 = To some extent	3 = To a greater extent
C1. Climate-aware planning: Is public investment planned from a climate change perspective?				
C.1.a	Are national and sectoral public investment strategies and plans consistent with NDC or other overarching climate change strategy on mitigation and adaptation?	National and sectoral public investment strategies and plans are not consistent with NDC or other overarching climate change strategy.	National public investment strategies and plans are consistent with NDC or other overarching climate change strategy for ***some*** sectors.	National and sectoral public investment strategies and plans are consistent with NDC or other overarching climate change strategy for ***most*** sectors.
C.1.b	Do central government and/or sub-national government regulations on spatial and urban planning, and construction address climate-related risks and impacts on public investment?	Central government and/or sub-national government regulations on spatial and urban planning, and construction do not address climate-related risks and impacts on public investment.	Central government and/or sub-national government regulations on spatial and urban planning, ***or*** construction (through building codes) addresses climate-related risks and impacts on public investment.	Central government and/or sub-national government regulations on spatial and urban planning, ***and*** construction (through building codes) address climate-related risks and impacts on public investment.
C.1.c	Is there centralized guidance/support for government agencies on the preparation and costing of climate-aware public investment strategies?	There is no centralized guidance/support for government agencies on the preparation and costing of climate-aware public investment strategies.	There is centralized guidance/support for government agencies on the ***preparation*** of climate-aware public investment strategies.	There is centralized guidance/support for government agencies on the ***preparation and costing*** of climate-aware public investment strategies.
C2. Coordination between entities: Is there effective coordination of decision making on climate change-related public investment across the public sector?				
C.2.a	Is decision making on public investment coordinated across central government from a climate-change perspective?	Decision making on public investment is not coordinated across central government from a climate-change perspective.	Decision making on public investment is coordinated across budgetary central government from a climate-change perspective.	Decision making on public investment is coordinated across all central government, including externally financed projects, PPPs, and extra-budgetary entities, from a climate-change perspective.

Indicator		Scoring		
		1 = To no or a lesser extent	2 = To some extent	3 = To a greater extent
C.2.b	Is the planning and implementation of capital spending of SNGs coordinated with the central government from a climate-change perspective?	The planning and implementation of capital spending of SNGs is not coordinated with the central government from a climate-change perspective.	The central government issues guidance on the planning and implementation of capital spending from a climate-change perspective and information on major climate-related projects of SNGs is shared with the central government and is published alongside data on central government projects.	The central government issues guidance on the planning and implementation of capital spending from a climate-change perspective, information on major climate-related projects of SNGs is shared with the central government and is published alongside data on central government projects, and there are formal discussions between central government and SNGs on the planning and implementation of climate-related investments.
C.2.c	Does the regulatory and oversight framework for public corporations ensure that their climate-related investments are consistent with national climate policies and guidelines?	The regulatory and oversight framework for public corporations does not promote consistency between their climate-related investments and national climate policies and guidelines.	The regulatory and oversight framework for public corporations promotes consistency between their climate-related investments and national climate policies and guidelines.	The regulatory and oversight framework for public corporations requires that their climate-related investments be consistent with national climate policies and guidelines.
C3. Do project appraisal and selection include climate-related analysis and criteria?				
C.3.a	Does the appraisal of major infrastructure projects require climate-related analysis to be conducted according to a standard methodology with central support?	The appraisal of major infrastructure projects does not require climate-related analysis to be conducted according to a standard methodology.	The appraisal of major infrastructure projects requires climate-related analysis to be conducted according to a standard methodology.	The appraisal of major infrastructure projects requires climate-related analysis to be conducted according to a standard methodology, and a summary of appraisals is published or subject to independent external review.
C3b	Does the framework for managing longer-term public investment contracts, such as PPPs, explicitly address climate-related challenges?	The referred framework does not include explicit consideration of climate change for risk allocation or contract management.	The referred framework includes explicit consideration of climate change with respect to how risks are allocated between the parties in infrastructure contracts.	The referred framework includes explicit consideration of climate change with respect to how risks are allocated between the parties in infrastructure contracts, and contract managers in government departments and agencies

Indicator		Scoring		
		1 = To no or a lesser extent	2 = To some extent	3 = To a greater extent
				are mandated to address climate-related challenges.
C.3.c	Are climate-related elements included among the criteria used by the government for the selection of infrastructure projects?	Either there are no explicit selection criteria or climate-related elements are not included among the criteria used by the government for the selection of projects for financing.	Climate-related elements are included among the criteria used by the government for the selection of all major budget-funded projects, and the criteria are published.	Climate-related elements are included among the criteria used by the government for the selection of all major projects, including externally financed projects, projects financed by extra-budgetary entities, and PPPs, and the criteria are published.
C.4 Budgeting and portfolio management: Is climate-related investment spending subject to active management and oversight?				
C.4.a.	Are planned climate-related public investment expenditure, sources of financing, outputs and outcomes identified in the budget and related documents, monitored, and reported?	Planned climate-related public investment expenditure are not identified in the budget and related documents.	Some planned climate-related public investment expenditures are identified in the budget and related documents, including investment expenditure funded externally, by extra-budgetary entities, and PPPs.	Most planned climate-related public investment expenditure, sources of financing, and outputs and outcomes are identified in the budget and related documents, including investment expenditure funded externally, by extra-budgetary entities, and PPPs, and expenditure on these projects is monitored and reported.
C4.b.	Are ex-post reviews or audits conducted of the climate change mitigation and adaptation outcomes of public investments?	No ex-post reviews or audits are conducted of the climate change mitigation and adaptation outcomes of public investments.	Ex-post reviews or audits are conducted for selected major public investments of either the climate change mitigation or adaptation outcomes.	Ex-post reviews or audits are conducted and published for selected major public investments of both the climate change mitigation and adaptation outcomes.
C4.c.	Do the government's asset management policies and practices, including the maintenance of assets, address climate-related risks?	Neither the government's asset management policies and practices nor methodologies for estimating the maintenance needs of climate change-	Methodologies prepared by the government for estimating the maintenance needs of some climate change-exposed infrastructure assets address climate-related risks.	Methodologies prepared by the government for estimating the maintenance needs and associated costs of most climate change-exposed infrastructure assets address climate-related risks, and government asset

Indicator		Scoring		
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		exposed infrastructure assets address climate-related risks.		registers include climate-related information of these assets.
C5. Risk management: Are fiscal risks relating to climate change and infrastructure incorporated in budgets and fiscal risk analysis and managed according to a plan?				
C5.a.	Does the government publish a national disaster risk management strategy that incorporates the potential impact of climate change on public infrastructure assets and networks?	Either there is no published national disaster risk management strategy, or the strategy does not identify the key climate-related risks to public infrastructure assets and networks.	The government publishes a national disaster risk management strategy that identifies the key climate-related risks to public infrastructure assets and networks in terms of hazards, exposure, and vulnerability.	The government publishes a national disaster risk management strategy that identifies and analyses the key climate-related risks to public infrastructure assets and networks in terms of hazards, exposure, and vulnerability, and includes the government's plans to mitigate and respond to these risks.
C5.b.	Has the government put in place ex ante financing mechanisms to manage the exposure of the stock of public infrastructure to climate-related risks?	The government has not put in place any ex-ante financing mechanisms to manage the exposure of the stock of public infrastructure to climate-related risks.	There is an annual contingency appropriation in the budget or other financing mechanisms that is available to meet the costs of climate-related damages to public infrastructure.	There is an annual contingency appropriation in the budget and other financing mechanisms that are available to meet the costs of climate-related damages to public infrastructure.
C5.c.	Does the government conduct and publish a fiscal risk analysis that incorporates climate-related risks to public infrastructure assets?	The government does not conduct a fiscal risk analysis that incorporates climate-related risks to public infrastructure assets.	The government conducts and publishes a fiscal risk analysis that incorporates a qualitative assessment of climate-related risks to public infrastructure assets over the medium term.	The government conducts and publishes a fiscal risk analysis that incorporates a quantitative assessment of climate-related risks to public infrastructure assets over the medium term and policies to mitigate these risks, and a qualitative assessment of the risks that may arise over the long-term.
Cross-cutting issues				
A	**IT support**. Is there a comprehensive computerized information system for public investment projects to support decision making and monitoring?			
B	**Legal Framework**. Is there a legal and regulatory framework that supports institutional arrangements, mandates, coverage, standards, and accountability for effective			
C	**Staff capacity.** Does staff capacity (number of staff and/or their knowledge, skills, and experience) and clarity of roles and responsibilities support effective			

Annex V. Detailed C-PIMA Scores

C1. Climate-aware planning	
C1.A.	National and sectoral planning
C1.B.	Land use and building regulations
C1.C.	Centralized guidance on planning
C2. Coordination between entities	
C2.A.	Coordination across central government
C2.B.	Coordination with subnational governments
C2.C.	Oversight framework for public corporations
C3. Projection appraisal and selection	
C3.A.	Climate analysis in project appraisal
C3.B.	PPP framework including climate risks
C3.C.	Climate consideration in project selection
C4. Budgeting and portfolio management	
C4.A.	Climate budget tagging
C4.B.	Ex post review of projects
C4.C.	Asset management
C5. Risk management	
C5.A.	Disaster risk management strategy
C5.B.	Ex ante financing mechanisms
C5.C.	Fiscal risk analysis including climate risks

Score	1	2	3
Color			

Annex VI. Climate Considerations in PPP Project Design

At a high level, the CCA 2021 requires those responsible for executing PPP projects to ensure the project complies with Uganda's climate change obligations. Under the PPP guidelines for LGs, climate change is to be taken into account at key stages, and key forms and templates specifically require its inclusion. This includes:

- **Inception stage:** Assess the impact of the project on the climate and vice-versa in accordance with the CCA 2021.
- **Feasibility Study:** Identify climate related risks and adaptation and resilience strategies, including environmental, climate and disaster risk concerns.
- **Procurement:** Assessment of whether the bidder's climate change action and mitigation plan is capable of meeting performance targets.
- **Implementation:** monitor and report GHG emissions and compliance with adaptation/mitigation performance standards.

Climate Change Mitigation and Adaptation Plan: Bidders are required to submit this document, including a note on climate change risk vulnerability for the project and a plan for mitigation and adaptation measures to increase resilience to extreme climate events applicable to the project, including structural and non-structural measures.

Source: CCA 2021

Annex VII. Climate Change and Project Appraisal

Climate change creates new challenges for public investment in infrastructure with respect to mitigation and adaptation because:

- Public infrastructure can contribute to GHG emissions and therefore to climate change.
- Infrastructure is also increasingly exposed to the risk of damage from weather-related disasters.
- And in case of failure the cost will exceed the cost of rebuilding or repair alone.

The challenge is how to design, select and implement infrastructure prepared to face disasters. This requires changes in infrastructure design and construction standards, but it also requires better processes for project preparation, evaluation, selection, monitoring and maintenance. To address these issues the IMF has developed the C-PIMA framework to help governments identify potential improvements in public investment institutions and processes to build low-carbon and climate-resilient infrastructure.

More resilient infrastructure is usually costlier and traditional appraisal seeks to select the option with the highest NPV or the lowest Cost/Beneficiary. The following five step approach can be used.

- **First step:** Identify relevant risks for a project for example: Earthquake, Volcanism, Hurricane, Tsunami, Landslide, Flood, Wind, Tornado, Erosion, Drought.
- **Second step:** Estimate the recurrence period (number of occurrences in a certain number of years). This is a challenging step because recurrence periods of many disasters have changed in the last decades due to climate change and therefore historical series are not reliable.
- **Third step:** Assess cost in case of disaster. The cost will depend on the damage that the event causes to the project and the consequences that the failure of the project generates, which may include cost of repairs, cost due to lost benefits, cost in human lives, injuries, and environmental costs.
- **Fourth step:** Identify actions to increase resilience and estimate their cost. Cost increase may be due to change of project location, larger project size, use of a different technology and additional works.
- **Fifth step:** Appraise the project using one of the following options:
  - **Business as Usual.** Evaluate the project as usual and calculate the NPV. Then reevaluate the project for a more resilient alternative and considering the event and its probability of occurrence. Consider the additional investment cost required for the project to be resilient to the disaster and incorporate to the cash flow each year as a benefit the probable cost savings that would be generated by the project resisting the occurrence of the event. Then calculate the NPV for the most resilient project and see if the extra investment is justified.
  - **Stress test.** Identify indicators to use and minimum acceptable values (for example NPV>0). Appraise considering different probabilities of occurrence of the disaster and determine the probability that leads to the minimum value of the indicators. Then compare that probability with the historical series and decide if the minimum value will ever be reached.
  - **Monte-Carlo.** Use Monte-Carlo simulation considering the estimated probability distribution for the occurrence of the disaster.

- None of the above-mentioned appraisal alternatives is perfect, but they are better than forgetting about climate related and other disasters.

Source: IMF staff