WESTERN AND
CENTRAL AFRICA

Gabon

World Bank Group

COUNTRY CLIMATE AND DEVELOPMENT REPORT

November 2025

1818 H Street NW, Washington, DC 20433
Telephone: 202-473-1000; Internet: www.worldbank.org

This work is a product of the staff of the International Bank for Reconstruction and Development (IBRD), the International Development Association (IDA), the International Finance Corporation (IFC), and the Multilateral Investment Guarantee Agency (MIGA), collectively known as The World Bank, with external contributors.

The World Bank does not guarantee the accuracy, reliability, or completeness of the content included in this work, or the conclusions or judgments described herein, and accepts no responsibility or liability for any omissions or errors (including, without limitation, typographical errors and technical errors) in the content whatsoever or for reliance thereon. The boundaries, colors, denominations, and other information shown on any map in this work do not imply any judgment on the part of any of the organizations of The World Bank concerning the legal status of any territory or the endorsement or acceptance of such boundaries. The findings, interpretations, and conclusions expressed in this volume do not necessarily reflect the views of IBRD/IDA, IFC, and MIGA, their respective Boards of Executive Directors, and the governments they represent.

The contents of this work are intended for general informational purposes only and are not intended to constitute legal, securities, or investment advice, an opinion regarding the appropriateness of any investment, or a solicitation of any type. Some of the organizations of The World Bank or their affiliates may have an investment in, provide other advice or services to, or otherwise have a financial interest in, certain of the companies and parties named herein.

Nothing herein shall constitute or be construed or considered to be a limitation upon or waiver of the privileges and immunities of any of IBRD/IDA, IFC, and MIGA, all of which are specifically reserved.
Rights and Permissions

Table of Contents

List of Figures, Tables, and Boxes

Abbreviations

AAL (Annual Average Loss)

AfDB (African Development Bank)

ANIF (National Agency for Financial Investigation)

ANPN (National Agency for National Parks)

ARSEE (Agence de Régulation du Secteur de l'Eau potable et de l'Energie électrique)

ARMP (Autorité de Régulation des Marchés Publics)

AWWA (American Water Works Association)

BEAC (Bank of Central African States)

BESS (Battery Energy Storage System)

BVMAC (Bourse des Valeurs Mobilières de l'Afrique Centrale)

CBD (Convention on Biological Diversity)

CAFI (Central African Forest Initiative)

CAADP (Comprehensive African Agricultural Development Program)

CEMAC (Economic and Monetary Community of Central Africa)

CGE (Computable General Equilibrium)

CIMA (Centro Internazionale in Monitoraggio Ambientale Research Foundation)

CMIP6 (Coupled Model Intercomparison Project 6)

CNAMGS (Caisse Nationale d'Assurance Maladie et de Garantie Sociale)

CNLCEI (National Commission for the Fight against Illicit Enrichment)

CNEE (Compagnie Nationale d'Eau et d'Electricité)

COBAC (Commission Bancaire de l'Afrique Centrale)

COMIFAC (Central African Forests Commission)

COSUMAF (Commission Régionale des Marchés Financiers de l'Afrique Centrale)

CSAIP (Climate Smart Agriculture Investment Plan)

CSAPs (Climate Smart Agriculture Practices)

CVTD (Centre de Valorisation et de Traitement des Déchets)

DAI (Digital Adoption Index)

DHS (Demographic and Health Survey)

DRM (Disaster Risk Management)

DRR (Disaster Risk Reduction)

ECCAS (Economic Community of Central African States)

EDGAR (Emissions Database for Global Atmospheric Research)

EGEP (Enquête Gabonaise pour l'Évaluation de la Pauvreté)

EIA (Environmental Investigation Agency)

EITI (Extractive Industries Transparency Initiative)

ESG (Environmental, Social, and Governance)

EU (European Union)

FCWC (Fisheries Committee for the West Central Gulf of Guinea)

FCFA (Central African CFA franc)

FDI (Foreign Direct Investment)

FGIS (Gabonese Fund for Strategic Investments)

FSTPs (Fecal Sludge Treatment Plants)

GEF (Global Environment Facility)

GFDRR (Global Facility for Disaster Reduction and Recovery)

GHI (Global Hunger Index)

GIEC (Groupe d'experts intergouvernemental sur l'évolution du climat)

GCMs (General Circulation Models)

GRAINE (GRAINE food program)

HFLD (High Forest Cover, Low Deforestation)

HFO (Heavy Fuel Oil)

HCI (Human Capital Index)

ICMA (International Capital Markets Association)

IFAD (International Fund for Agricultural Development)

ILO (International Labour Organization)

ILOSTAT (International Labour Organization database)

IPCC (Intergovernmental Panel on Climate Change)

IWRM (Integrated Water Resources Management)

ITTO (International Tropical Timber Organization)

JEE (Joint External Evaluation)

KPIs (Key Performance Indicators)

LKTS (Lesser-Known Timber Species)

LOLFEB (Organic Law on Finance Acts and Budget Execution)

LUCF (Land-Use Change and Forestry)

LUS (Lesser-used species)

M&E (Monitoring and Evaluation)

MERH (Ministère de l'Energie et des Ressources Hydrauliques)

MEFEPEPN (Ministère des Eaux et Forêts, de la Pêche et de la Protection de la Nature)

MoBudget (Ministry of Budget)

MoEnv (Ministry of Environment)

Acknowledgements

The Gabon Country Climate and Development Report (CCDR) was authored by a World Bank Group task team led by Madhavi M. Pillai, Erick Tjong and Yang Liu and including Sonia Barbara Ondo Ndong and Sabrina Sharmin Haque. The report has benefitted from invaluable inputs from the task team as well as teams from the energy and extractives, macro-economic and modeling, finance and competitiveness, poverty, governance, social protection, social inclusion, education, health, transport, water, agriculture, environment, digital, urban, treasury and IFC teams represented by:

Abel Bove, Alexandra Gordina, Amadou Makhtar Fall, Andre L. Carletto, Anne Marynczak, Ann-Sophie Jespersen, Anupurba Roy, Bernard Yungu Loleka, Besong Joseph Neiville Agbor, Bogachan Benli, Christina Paul, Clarence Tsimpo Nkengne, Daria Lavrentieva, Fabienne Mroczka, Gabriel Negedu David, George Henry Stirrett, Gildas Bopahbe Deudibe, Guy Olivier Ondo Assame, Guyslain Kayembe Ngeleza, Heriniaina Mikaela Andrianasy, Ioana Botea, Jean Philippe Garcon, Laurent Damblat, Lida Bteddini, Lisa Michelle Choux, Majd Olleik, Marguerite Clarke, Martin Aaroee Christensen, Martin Oswald, Mena Cammett, Mervy Ever Viboudoulou Vilpoux, Mei Mei Aileen Lam, Morten Larsen, Michael Thibert, Nathalie Andrea Wandel, Nicole Nguema Metogo, Papa Modou Ndiaye, Sabri Youcef Draia, Simon Rietbergen, Theophile Bougna, Tom Remy, Ulrike Lehr, Vsevolod Payevskiy, and Xavier Stephane Decoster.

Simon Rietbergen sadly passed away during the preparation of this report. We are deeply grateful for his invaluable contributions, and his memory continues to inspire our work.

The team would like to extend sincere thanks to the Industrial Economics (IEc) team of Brent Boehlert, Diego Castillo, and Kim Smet, who led the impact channel and adaptation modeling and to Felicien Meunier of University of Ghent, Belgium, for modeling the climate impacts on forests.

The team benefited immensely from the guidance of, and is grateful to, the peer reviewers: Tom Remy, Urvashi Narain and Raju Singh. The team is also thankful for the comments received from Carolina Monsalve, Kanta Kumari Rigaud, Sebastian-A Molineus, and Victor Bundi Mosoti.

Thanks are also extended to Management and their teams on their guidance, in particular, Ousmane Diagana, Chakib Jenane, Abebe Adugna, Cheick Fantamady Kante, Aissatou Diallo, Charlotte Ndaw, Lia Sieghart, Sandeep Mahajan, Ashish Khanna, Ani Balabanyan, Robert Johann Utz, Nabil Chaherli, Craig Meisner, Asha Johnson, Sidonie Jocktane, Aurore Simbananiye, Antoinette Kouna Kiki and Nejma Cheyi Koussou.

Finally, the team would like to extend our sincere gratitude to multiple ministries, agencies, and institutions of the Government of Gabon for their invaluable collaboration and support in the preparation of this report. This project would not have been possible without the dedication and expertise of the government officials who provided critical data, insights, and guidance throughout the process. In particular, the team is grateful for the guidance and commitment dedicated by the Ministries in charge of Economy, Environment and Climate, specifically by Mr. Eric Oyame Evouna, Advisor to the Minister in charge of Economy and government focal point for this CCDR.

Executive Summary

Gabon has a unique opportunity to drive inclusive growth, reduce poverty, and build a resilient post-oil economy. Climate action can accelerate progress toward these goals.

Gabon's main development challenge is achieving higher growth and poverty reduction. Stronger growth is needed regardless of projected climate shocks, to produce more jobs, raise living standards, and allow Gabon to transition to a viable post-oil economy. As it pursues growth-promoting economic reforms, climate action that puts people first must be central to its development pathway. Yet climate change could have the perverse effect of exacerbating poverty and regional inequalities, in a country that already faces long-term challenges to expand access to economic opportunities and to broaden the coverage of basic public services, especially in rural areas.

With net-zero emissions, robust climate commitments, and ambitious efforts to protect its vast forests and leverage their carbon absorption capacity, Gabon plays an important role in mitigating global climate change. Yet, by mid-century, temperatures across Gabon are projected to increase on average by 1.34°C, with southern regions feeling the hottest temperatures. Rainfall changes and extremes (including dry periods) would vary over the years, but precipitation levels are estimated to increase overall relative to historic levels, with increases to 30 percent in certain areas by 2050. In addition to long-term changes in climate, Gabon is at risk for increased intensity of extreme weather and natural hazards, such as flooding, droughts, heatwaves, and erosion. Sea levels are projected to rise significantly, by about 0.2 meters by 2050, impacting coastlines and the major cities of Libreville and Port-Gentil.

Climate shifts compound challenges for Gabon's people and economy. Stronger, private sector-led growth driven by economic reforms would increase resilience, resulting in a larger, more diversified economy, increasing productive jobs and reducing poverty. Yet, targeted investments in adaptation actions will still be needed to attenuate the impacts of climate shocks.

Using a whole-of-economy approach, the Gabon Country Climate Development Report (CCDR) estimates that the impacts from climate change considered in this report can result in GDP losses of 3.5 to 5.3 percent per year through 2050 compared to the baseline trajectory under a business-as-usual scenario (ES Table 1). While overall risks are higher, as other risks could not be included, these projected GDP losses stem mainly from labor productivity losses from increasing heat stress, followed by reduced agricultural yields and incomes, infrastructural damages, and climate-sensitive diseases (ES Figure 1).

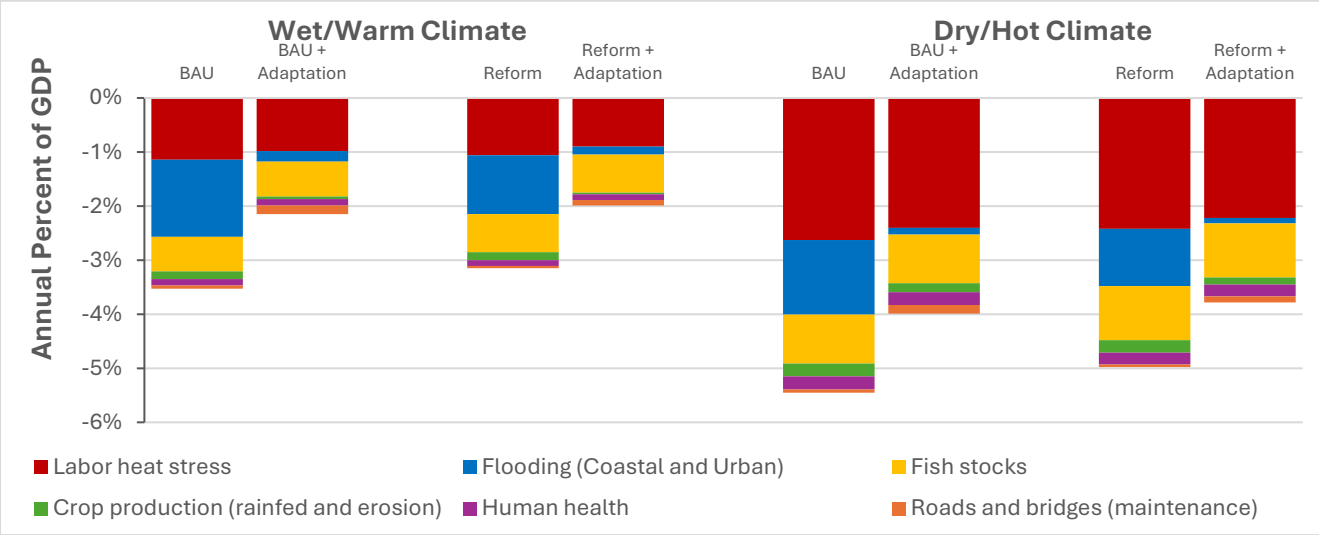
The CCDR finds that even under a "reform" scenario (ES Table 1) based on reforms to boost growth and job creation (e.g., stronger governance, improved business climate, access to credit, infrastructure and skills, diversification of commodities, industrial development, etc.), the projected annual losses from climate change would still be high, even if lower than the "business-as-usual" scenario. GDP losses would still range from 3.1 to 4.8 percent per year by 2050 under the reform scenario. While the reform scenario would produce higher growth that could strengthen state capacity to adapt in the future, it would still suffer from strong climate effects as diversification focuses on sectors highly sensitive to climate change, such as agriculture, wood, and fisheries. Sectors that are considered key areas for private sector investment and structural transformation, like timber, agrifood, and fisheries, would still remain exposed to climate shocks due to their reliance on outdoor workers and on the effects of a changing climate on crops, fish stocks, and

forests. This underscores the fact that growth alone, without targeted climate adaptation efforts enhancing resilience of the labor force, agriculture, and infrastructure, cannot shield Gabon from significant climate-related damages. At the same time, irrespective of climate change, structural reforms are an absolute priority to achieve the country's development goals. In the reform scenario, economic reforms would enable stronger, more inclusive growth, creating more jobs and generating considerably higher incomes and much lower poverty levels.

ES Table 1. Growth scenarios and projected losses due to climate shocks in Gabon, 2025-2050

Growth Scenario	Assumptions	Projected climate effects (under 'current policies')	Climate effects (attenuated by CCDR adaptation measures)
Business as usual (BAU)	Moderate growth and gradual poverty reduction, in continuation of historical trends. Growth is largely driven by commodities such as mining, wood, and agricultural goods. • GDP grows by ~2.4% from 2025 to 2050 (0.7% per capita). • Per capita GDP by 2050: USD 11,000. • Poverty rate by 2050: 10.2% (USD6.85/day in 2017 PPP). • Sector share of GDP by 2050: Primary sector: 11%; Secondary sector: 33%; Tertiary sector: 56%. • Gradual increase in non-oil revenues to 17% of GDP by 2050. • Expenditures increase to over 16% of GDP by 2050.	• Average annual losses of 3.5% to 5.3% of GDP by 2050.	• Average annual losses of 2.1% to 3.8% of GDP by 2050.
Reform	Strong reforms improve governance and business climate, generating higher growth and living standards, and much stronger poverty reduction. Reforms and investments promote sustainable mining, wood, and agricultural activities, industrial development, and services. Higher private investment, exports and private consumption create more jobs and demand. • GDP grows by ~4.7% from 2025 to 2050 (3.1% per capita). • Per capita GDP by 2050: USD 20,000. • Poverty rate by 2050: 1.8% (USD6.85/day in 2017 PPP). • Sector share of GDP by 2050: Primary sector: 10%; Secondary sector: 39%; Tertiary sector: 51%. • Stronger increase in non-oil revenues to nearly 19% of GDP by 2050 thanks to domestic revenue mobilization reforms. • Expenditures contained at 15% of GDP by 2050 thanks to increased spending efficiency and higher growth.	• Average annual losses of 3.1% to 4.8% of GDP by 2050.	• Average annual losses of 1.9% to 3.5% of GDP by 2050.

ES Figure 1. Annual percent of GDP loss between 2025-2050 by climate and growth scenario



Source: World Bank staff calculations and IEc. The CCDR considers two growth scenarios: the BAU (business-as-usual) and reform scenarios. The impacts of climate shocks under a wet/warm future and a dry/hot future are analyzed for both scenarios. Impacts are projected with and without specific adaptation measures. While BAU and reform scenarios may assume some inherent adaptation to climate change, the climate action scenario includes select interventions for cooling equipment in indoor spaces, heat-resistant crops, irrigation, rehabilitation of paved and unpaved roads, urban and costal zoning, floodproofing existing infrastructure in Libreville and coastal areas. Other critical adaptation measures (such as human health) were not considered due to data availability.

Gabon needs higher, more inclusive, private sector-led, and job-rich growth, that puts people first while addressing climate risks.

The CCDR estimates that the poverty rate could be nearly 2 percentage points higher by 2050 under a more severe climate scenario, increasing the number of people living in poverty by 52,000 people. While poverty is projected to decline more gradually under the business-as-usual scenario, and much more substantially under reforms, gains would be compromised without targeted adaptation to climate change. The livelihoods of people with lower education and vulnerable groups like informal workers could be more severely affected, due to lack of access to insurance mechanisms, social protection, and other attenuation mechanisms. Rural poverty could also be particularly impacted, due to strong impacts on agriculture and other outdoor-based sectors. Women could be highly impacted due to unequal access to resources, a higher reliance on climate-sensitive livelihoods, and a potential increase in gender-based violence. Indeed, women are more likely to work in sectors particularly affected by climate change, such as (rainfed) agriculture and (outdoor) petty trade. They also tend to have fewer resources and assets at their disposal, which limits their coping capacity in the event of an extreme weather event. Climate shocks could thus be worse for certain vulnerable groups than on the overall population. Climate change could exacerbate inequalities and have more severe effects in some regions and for women and certain education level and age groups, requiring an adaptation strategy that takes into account particular groups' needs and situation.

While the resilience gains from the reform scenario may seem small, reforms would produce a much larger economy, nearly doubling income levels. Even so, Gabon's diversification strategy should consider how future growth drivers and job markets will be impacted by climate change. Despite employment being a top government priority, climate shocks threaten to significantly undermine job creation efforts, with projected job losses of up to 5,100 a year by 2050, or about 0.3 percent of the working-age population, particularly in manufacturing and services, which are essential for economic transformation. Social dimensions are

also crucial, as growth is expected to rely greatly on sectors such as agriculture and fisheries, which are sectors vulnerable to climate shocks and employing many lower-income individuals.

Climate change disproportionately burdens the poorest, who often live in areas prone to hazards, concentrate in vulnerable sectors such as fishing, agriculture and in outdoor jobs, and have fewer resources to cope with shocks. According to the CCDR analysis, rising temperatures alone could lower labor productivity through heat stress by as much as 5 percent by 2050, especially in agriculture and outdoor workers — groups that often face higher poverty rates. While Gabon currently imports much of its food, the Government's plans to boost local food production and create more agricultural jobs for rural communities could also be compromised. Climatic shifts are projected to reduce crop yields from changing rainfall patterns and erosion to 8 percent and fish stocks to 30 percent, leading to income losses and exacerbating already high levels of food insecurity. As natural hazards like heatwaves and floods become more frequent and severe, disruptions to education, housing, and basic infrastructure would deepen disparities. The CCDR finds that heat-related illnesses and waterborne diseases are expected to surge by 2050, with increases of over 200 percent and 15 percent, respectively, under certain climate scenarios.

To address these challenges, a people-centric approach, prioritizing social fairness in resilience and climate adaptation is crucial. This involves implementing policies to protect and support the poor and vulnerable, such as introducing resilient social safety nets, reinforcing disaster risk management and climate preparedness, and improving access to affordable healthcare.

Climate and development needs are closely linked, with climate investments offering wider growth opportunities and social gains.

Based on projections on the macroeconomic and poverty effects of climate change, this CCDR prioritizes three areas for targeting adaptation efforts: **1) built environment and infrastructure; 2) natural capital management; and 3) human capital development.** Investing in targeted climate adaptation can help minimize the projected economic and social impacts of climate change, contributing to a more resilient economy. Advancing equitable, people-centered adaptation strategies across these priorities will be essential to ensuring that resilience efforts drive stronger and inclusive economic growth and provide meaningful support to Gabon's most vulnerable communities. The ES Table 2 provides a summary of high-level recommendations and priorities across themes.

For instance, strengthening infrastructure in urban areas where over 90 percent of the population lives, by investing in climate-resilient transport, housing, and drainage systems can significantly reduce flooding risks, particularly in informal settlements, which house over a third of the urban population. In rural areas, enhancing connectivity and expanding access to safe water and sanitation are urgent for reducing escalating public health risks. Building resilience in education systems, such as by ensuring that schools are better equipped to withstand climate shocks and integrating climate awareness into curricula, can protect learning outcomes and promote green skills. Similarly, strengthening healthcare systems to address climate-sensitive diseases and expanding social protection systems to shield households from economic and environmental shocks will be pivotal for protecting and developing human capital. The acceleration of ongoing efforts to protect Gabon's natural capital, including sustainable forestry practices, can also secure ecosystem services while supporting livelihoods in forest-dependent communities. Indeed, the vast natural assets held in Gabon's forests offer strong economic potential, through sustainable management of timber and other resources such as food, medicinal plants, ecotourism, and carbon and sediment retention services.

Moreover, climate change presents not only risks but also opportunities for Gabon's economy. These three areas offer strategic opportunities to advance mitigation efforts that align with its low-carbon growth commitments. On example is expanding renewable energy sources like hydropower and solar energy, which can reduce reliance on thermal energy while enhancing energy security and affordability. Eliminating gas flaring, a major contributor to GHG emissions in Gabon, by commercializing flared gas can help improve supply and cut production costs. Enhancing the power and water utility's performance would likewise generate economic and environmental gains, thanks to lower losses.

Further, proactive labor adaptation will be critical. Agriculture, forestry, and fisheries, which employ 19 percent of the working-age population, are particularly vulnerable to rising surface and ocean temperatures and changes in precipitation and will need targeted adaptation measures to protect livelihoods. Gabon's second Nationally Determined Contributions highlight the potential for climate policies to reshape the labor market, with opportunities for green job creation in sustainable forestry, renewable energy, and climate-smart agriculture. Investments in workforce reskilling and education will be important to ensuring that workers can transition to greener industries, sustain productivity, and contribute effectively to a low-carbon economy. These efforts, coupled with broader fiscal reforms to improve the management and sustainability of public finances, can build economic resilience while reducing poverty and inequality.

A combination of targeted and efficient public spending, sustainable public finances, and reforms promoting private sector-led growth and job creation is essential to finance climate action and unlock green growth opportunities.

Prioritizing investments with the highest economic and social returns is essential for effective planning. With climate-related damages projected to provoke annual GDP losses by up to 5.3 percent by mid-century in a dry/hot future, timely investments in resilience can significantly mitigate these losses and safeguard public finances. The CCDR estimates that adopting key measures — such as enhancing the resilience of roads and bridges, floodproofing critical urban infrastructure, improving temperature control for indoor workspaces, and expanding irrigation, erosion-reducing techniques, and heat-resistant crop varieties — could reduce GDP losses from 5.3 to 3.8 percent.

While these investments entail significant costs, estimated at 0.09 percent of GDP annually up to 2050, they would yield an annual net GDP gain of 1.5 percent by 2050. The alternative inaction scenario would result in far greater threats to the economy and population. These adaptation measures are not just economically prudent but also socially imperative, as more resilient infrastructure, crops, and urban systems can save lives, reduce vulnerabilities, and protect communities from shocks. The CCDR's adaptation analysis does not intend to provide a prescription of specific measures but rather an illustration of the potential benefits of adaptation efforts. Spending pressures to address development needs are high, and actions need to be considered within the fiscal space and the country's broader public policy strategy, based on a strong cost-benefit analysis. Exercises like this can support strategic decision-making and help the country prioritize investments.

Ensuring sustainable fiscal management and improving the environment for a vibrant private sector are critical for the country's future. Declining oil revenues, reliance on volatile commodity prices, and spending and debt pressures present significant challenges to public finances, requiring strong reforms to improve spending efficiency and mobilize more revenues. Current efforts, such as digitalizing tax and customs systems, have potential for boosting domestic revenue collection. However, broader reforms are needed, including rationalizing tax incentives, improving tax compliance, and adopting counter-cyclical measures to

create fiscal buffers for investments needed for growth and climate goals. Green fiscal policies can contribute to both fiscal and environmental goals, like reforms to reduce gas flaring and fuel subsidies. Reducing reliance on oil over the long term can also help attenuate the potential effects of a global decarbonization path on Gabon's economy and public finances. Meanwhile, public-private partnerships (PPPs) can play an important role in bridging financing gaps, especially in sectors like renewable energy, transport, and water infrastructure. Coupled with governance reforms and actions to create a more conducive business environment, these measures could help attract much-needed private investment and innovation.

Public resources alone will likely not suffice to meet the country's adaptation needs. Mobilizing private sector skills, expertise, and financing, strengthening fiscal policies, and leveraging climate financing opportunities such as global climate funds will be essential for Gabon to mobilize the private sector towards achieving its development and climate goals. Structural challenges such as high informality, limited access to credit, labor skills mismatches, trade barriers, and inefficiencies in infrastructure and public services hinder the private sector's ability to support green growth. Targeted reforms to streamline and digitize business procedures, improve access to finance, such as expanding credit guarantee schemes and encouraging banks to adopt green financing practices through a green taxonomy, can stimulate investment in high-potential sectors such as renewable energy, sustainable agriculture and agroforestry, and other climate-smart industries. Enhanced public-private dialogue can ensure that policies align with private sector needs, facilitating compliance with evolving global standards for sustainable products and markets. For example, sustainable forestry initiatives, such as land area fees that incentivize certified wood production, demonstrate the potential for fiscal tools to align environmental goals with economic and revenue-generation opportunities.

Notwithstanding its net-zero emissions, Gabon must prepare for the effects brought by climate change and look to its future development through a climate lens. To mobilize finance and coordinate climate actions, stronger, transparent institutions and governance are essential.

Gabon has demonstrated a strong commitment to ambitious climate targets through international agreements and a robust legal framework, including the 2021 Climate Change Ordinance. These efforts provide a foundation for sustainable land management, greenhouse gas (GHG) regulation, and carbon credit systems. However, governance challenges — including low inclusiveness, gaps in policy implementation, and transparency deficits — continue to limit the country's ability to achieve its climate and development goals. These challenges hinder effective coordination, constrain financing, and reduce the engagement of citizens and businesses in climate action.

The operationalization of Gabon's climate policies remains incomplete. For instance, the Climate Agency, envisioned as a central coordinating body under the 2021 Climate Change Ordinance, has yet to be established. Similarly, implementing regulations for essential measures such as GHG monitoring, carbon credit standards, and sustainable land-use planning are still pending. These gaps not only delay progress but also exacerbate existing issues such as unclear land tenure rights, which limit local communities' participation and the equitable distribution of benefits. Addressing these institutional weaknesses will be important for building confidence among international partners, private investors, and local stakeholders.

Other immediate priorities include integrating climate risks into urban and investment planning and operationalizing the Climate Fund. Expanding flood-proofing measures and ensuring that urban planning, public investment management and budgeting processes consider climate aspects is key, as flood

protections are among the actions that could contribute the most to minimizing GDP losses under adaptation scenarios. Also, incorporating environmental, social, and governance standards into state-owned enterprises, and improving their transparency and operational and financial performance, can help align national policies with international best practices. Finally, leveraging program-based budgeting and piloting climate-smart local development mechanisms will enhance the effectiveness of climate spending and ensure that actions are aligned with Gabon's broader development priorities.

Strong, transparent institutions are a prerequisite for increased private sector participation in the economy and in climate action. By addressing governance challenges, operationalizing its climate-related legal framework, and further aligning fiscal policies with its climate commitments, Gabon can strengthen its position as a leader in sustainable development while securing the institutional foundation needed to mobilize finance, foster climate and economic resilience, and deliver on its growth and climate ambitions.

ES Table 2. Summary of key recommendations and priorities by theme

Key Recommendation	Short-term priorities	Medum-to-long-term priorities
HUMAN CAPITAL DEVELOPMENT		
Prepare the health system to manage climate-sensitive diseases and health emergencies	• Training healthcare staff on climate-related disease prevention • Climate data systems, health monitoring, and workforce capacity for health risks	• Health security mechanisms for outbreak preparedness, surveillance, and lab capacity
Build climate-resilient education systems and green skills	• Climate change and green economy content and skills in curriculum • Resilient education infrastructure	• Improved access to education in vulnerable regions
Support adaptive social protection, address job gaps, and empower workers for a green economy	• Expanded social assistance to strengthen the coping capacity of the poor and vulnerable • Efficient and shock-responsive social protection delivery systems, such as a social registry • Cooling systems for indoor workers, and improved shading and more flexible work hours for outdoor workers	• Diversified social assistance to address climate-related risks and protect displaced workers • Locally-led climate action and inclusive, socially responsible carbon markets • Vocational training and reskilling to address labor skills mismatches and facilitate the green transition
BUILT ENVIRONMENT AND INFRASTRUCTURE		
Improve energy access, reliability, and affordability	• Turnaround plan for SEEG: governance, loss reduction, debt settlement • Update of the power sector master plan and engage with the private sector to accelerate renewable energy deployment • Hydrological data for hydropower planning • Penalties on gas flaring, venting, methane emissions	• National grid expansion and transmission lines • Climate-resilient energy infrastructure and renewable energy investments (hydropower, solar)
Strengthen water security through better resource management and expanded access to safe water and sanitation	• Turnaround plan for SEEG and strengthened regulatory (MEWR/ARSEE) roles • Expand rural water supply access • Sanitation improvements: fecal sludge treatment and waste regulation enforcement	• Water resource monitoring systems and integrated water resources management (IWRM)

Integrate climate risks into urban planning and advance resilient transport and digital connectivity	• Flood resilience in urban planning with nature-based solutions • Evidence-informed early warning systems and response actions • Action plans for heat, air pollution • Strengthened local authorities for community resilience • Resilient roads and energy-efficient vehicles	• Sustainable, accessible, and efficient public transport, with future electric/hybrid options
NATURAL CAPITAL MANAGEMENT		
Promote sustainable management and local value addition of forests	• Digital timber traceability and enforcement • Promote compliance with legal verification and sustainable forest management certifications	• Promotion of "Lesser-Known commercial Timber Species" • Initiatives on reducing human-wildlife conflicts
Increase agricultural production and productivity using a climate-smart approach	• Climate Smart Agriculture Investment Plan • Climate-smart and water-efficient agricultural practices • Improve governance in farmer producers' organizations	• Land tenure system improvements • Irrigation systems • Increased agricultural mechanization
GOVERNANCE AND FINANCING		
Improve governance and streamline climate targets into institutional frameworks	• Operationalization of '*Organisme de Gestion des Enjeux Climatiques'* and Climate Fund • Climate Long Term Strategy targets • Adoption of green dimension in public procurement and land use planning policies • Integration of climate dimension in program-budgeting process and climate risk in public investment management framework	• Climate-smart participatory local development pilot • Key state-owned enterprises implementing environmental, social, and governance standards
Strengthen public finances and mobilize public and private financing for climate action	• Rationalize tax expenditures and align environmental, growth, and fiscal goals in fiscal policies • Incentives and funding for small and medium firms and entrepreneurship in green/blue sectors • Disaster risk financing strategy • Climate-smart fiscal policies for sustainable forestry, agriculture, and fishing	• Rationalize fuel subsidies to reduce costs and environmental distortions • Foster public-private partnerships and private investment in green infrastructure (transport, energy, urban mobility, telecom tower) • Develop national green taxonomy and promote financing through green bonds, sustainability-linked loans/bonds, and climate insurance products, and mobilize support from donors and climate funds • Promote transparency in climate funds

1. Introduction – Gabon's development in a changing climate

Key Points

- Gabon, rich in natural resources and carbon sinks, has strong commitments to maintain net-zero emissions. Yet, the country faces challenges in transitioning from dependence on oil and other volatile commodities to a more sustainable and diversified economic model. Governance challenges have hampered meaningful progress in different areas, especially energy.
- While being one of the world's few net carbon absorbers thanks to its rich tropical forest ecosystems, Gabon is experiencing increased temperatures and threats from global warming. Climate changes and extreme weather events are expected to increase and intensify well into the future, impacting the overall economy and society.
- Widespread and persistent poverty, high unemployment, insufficient access to basic services, and human development outcomes below potential heighten vulnerability to climate impacts and underscore the need to build population-wide resilience through targeted adaptation actions, to minimize the impacts of changing temperatures and rainfall on its people and infrastructure. A combination of targeted spending, sustainable public finances, and reforms to promote private sector involvement will be needed to adequately fund the much-needed adaptation efforts.
- Gabon contributes just 0.04 percent of global greenhouse gas emissions, ranking 129th out of 193 countries, with 21 megatons of GHG emitted in 2021. While emissions intensity per GDP has declined, energy remains the largest emitting sector due to a high intensity of gas flaring, followed by land-use change and forestry, industry, waste, and agriculture.

This chapter frames Gabon's development within the context of climate change, introducing the ways in which these forces interact and shape the country's future. It (a) provides an overview of Gabon's economic and development trends and national vision, (b) outlines projected climate changes and their possible effects on various sectors, and (c) assesses Gabon's current emissions profile, identifying opportunities for sustainable, low-carbon development.

1.1 Development Context

With its ecosystems serving as some of the world's most crucial carbon sinks, Gabon is both a champion of climate stability and a nation striving for inclusive development. The country boasts a wealth of natural resources, including large petroleum and mineral reserves, a long coastline, and a significant portion of the Congo Basin forest. Yet, Gabon faces challenges in leveraging its natural resource advantage into sustained and inclusive growth. Gabon is among the few countries in Sub-Saharan Africa with upper-middle-income status, which it attained in the early 2000s, largely through its petroleum reserves and extractive industries. As oil fields mature, production is expected to decrease from 2025, shifting the focus to mining, timber, and agriculture as new engines of growth—sectors that will need to be fortified against climate impacts and shocks and may test Gabon's historical stewardship of its vast forests and biodiversity.

Despite high reliance on volatile commodities, Gabon's economic recovery is progressing; higher growth could be achieved with an acceleration of economic reforms. The economy remains undiversified and heavily dependent on a few commodities like oil, wood, and manganese. In 2022, the economy grew by 3

percent, reflective of a rebound from the COVID-19 crisis, driven by robust oil, manganese, and wood production, and an uptick in services as pandemic restrictions were lifted. Growth slowed to 2.4 percent in 2023 due to damages to its railway systems from severe weather events, higher fuel costs, and decreased demand for wood. A moderate recovery is expected to continue in the medium-term.

Over recent years, Gabon's resource-based growth and modest economic recovery have not effectively addressed high levels of unemployment and poverty, and lack of economic inclusion. Over a third (35.2 percent) of Gabonese citizens lived below the international poverty line at USD 6.85 per day in 2023, well exceeding the average for countries among Gabon's income group. Living conditions have not returned to levels pre-crisis due to the impact of COVID-19, the Russian invasion of Ukraine, and global supply disruptions, with vulnerability increasing due to food inflation, lack of jobs, and limited social protection.

The political transition process launched in August 2023 included efforts to strengthen governance, transparency, and improve living conditions. Several actions were initiated to simulate job creation and improve the management of public finances. Major political milestones including a national dialogue and a new constitution were adopted in 2024, and Presidential elections took place in April 2025, earlier than the original transition calendar. However, high public expectations following the regime change have intensified pressure on public spending, increasing fiscal and liquidity risks. Long-term challenges in governance and public financial management continued to lead to accumulating debt arrears, impacting financing costs in the current context of tight global financing conditions. Furthermore, rising fuel subsidies have strained public finances and could hinder the development of low-emission energy solutions.

Gabon faces an important challenge in funding sustainable development, requiring more efficient public action and enhancing private sector involvement in climate adaptation. To meet its strong fiscal pressures, the country needs to prioritize investments and adopt fiscal measures to mobilize more revenues, implement countercyclical policies and improve the quality and efficiency of public spending. Private sector mobilization is crucial for supporting climate adaptation. In Gabon, the financial sector is underdeveloped in supporting growth. Three banks hold nearly 78 percent of total assets, reflecting a highly concentrated banking sector. Despite this, the level of financial intermediation does not match the country's income level.

Development in Gabon is constrained by low participation of the private sector in the economy, due to a weak business environment and weak governance. Gabonese businesses could play a leading role in unlocking investment in climate action, despite facing obstacle for climate-enabling investments. To achieve long-term sustainable growth, the country needs to diversify its economy that has largely depended on the petroleum sector for revenue generation. Gabon's largest industries are petroleum, minerals, and timber. The country plans to develop the agricultural sector and improve infrastructure, a key enabler for the private sector. The investment climate is marked by regulatory hurdles. Reforms will be essential to facilitate businesses activity, access to services (energy, water, digital), and access to finance, especially for small and medium-sized enterprises (SMEs).

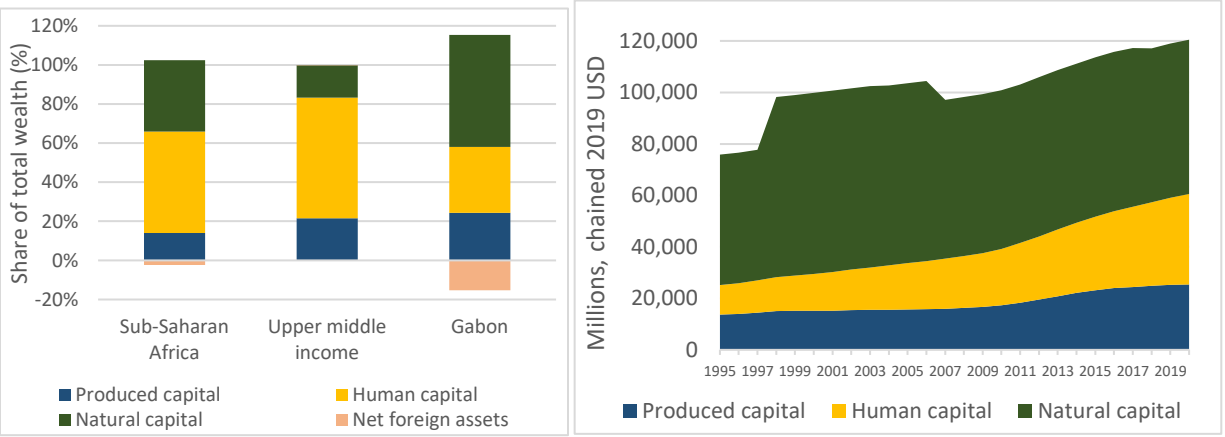
Gabon faces a significant rural-urban divide, with over 60 percent of the rural population living in poverty and with limited access to services. While capital-intensive industries like oil have dominated the economy, they have not generated sufficient jobs, and rural sectors such as agriculture and forestry struggle to attract workers. Despite nearly 90 percent of Gabon's land being forested, the country has one of the highest urbanization rates in Africa, with more than 80 percent of the population living in cities and expected to rise to 92 percent by 2030 and 95 percent by 2050. However, only 25 percent of rural residents have access to electricity, compared to 92 percent nationwide. Basic services such as water, sanitation, and healthcare similarly lag in rural areas, exacerbating inequalities between urban and rural populations. Libreville and Port Gentil, Gabon's two main cities, house 45 percent of the population, yet these urban

centers face significant challenges in resilience and livability. As a result, the potential for cities to further drive sustainable economic and social development remains constrained.

The country can do more to realize its full potential in human capital. Gabon's total wealth is dominated by natural capital, with limited shares in human capital compared to its upper-middle income counterparts and Sub-Saharan Africa. Total wealth has declined since the 2014 oil price shock due to its impacts to the oil sector (Figure 1.1). About a third of the youth do not participate in the workforce or education and training. Life expectancy from birth is 66 years, driven down by its higher-than-average infant and child mortality. Gabon has made significant progress in reducing childhood undernutrition, though about 17 percent of children under five are estimated to suffer from stunted growth (DHS 2024). According to the 2023 Global Education Policy Dashboard (GEPD), 73 percent of Grade 1 students are not ready to learn, and nearly 90 percent fail to acquire basic literacy and numeracy skills. These health and educational shortfalls severely undermine Gabon's ability to build a skilled and productive workforce.

The Government's vision, outlined in the National Development Plan for the Transition (PNDT), is centered on building a stronger, more participatory and inclusive economy. Major investments in infrastructure, institutions, and human capital are foreseen to foster investment, job creation, and SME activity in different sectors, from agriculture, mining, and fisheries to wood processing and digital services. The authorities aim at promoting higher-value, job-creating, sustainable use of its natural resources, aligning development and social goals with a continuation of a strong environmental conservation record.

Figure 1.1 Shares and evolution of total wealth (percent), 2020



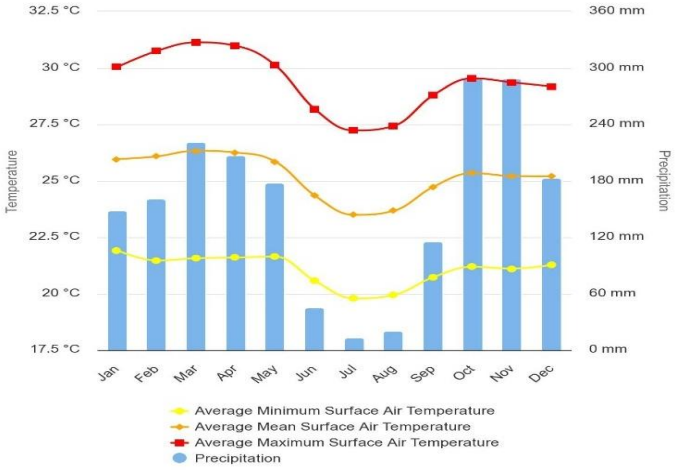
Source: CWON 2024 country tool (https://www.worldbank.org/en/publication/changing-wealth-of-nations/data). Note: The trends in total wealth and asset categories are based on the Törnqvist index, where the change in physical volumes of individual assets is weighted by their value shares. "Volume" here refers to the physical quantity of each asset, or a proxy for that quantity. The Törnqvist volume index is 'chained' to make a time series by selecting a base year (2019) and then expressing other years in terms relative to the base year.

1.2 Climatology and risks from climate change and natural hazards

With tropical forests covering most of the territory and mangrove ecosystems in the northwest near Libreville, Gabon's diverse and largely intact ecosystems play an integral role in absorbing greenhouse gases and supporting Gabon's humid tropical climate and extensive biodiversity. The country receives precipitation throughout the year, ranging from 1,500 mm to 3,500 mm annually, and experiences a wet season from October through May. Precipitation is generally uniform throughout the country, though areas in the northeast, near the country's capital, can experience wetter conditions. Temperatures vary across the country and are generally higher in central and western areas, with average annual values peaking at

about 27˚C. Between 1990-2020, monthly average temperatures ranged between 26˚C in March and 23˚C in July, while average precipitation varied from 13 mm in July to 290 mm in October (figure 1.2).

Figure 1.2 Monthly mean temperature and precipitation, 1991-2020



Source: IEc. 2024.

Gabon has not been immune to the effects of global warming, which are already felt in the country. The Earth's average global surface temperatures, encompassing both land and oceans and closely linked to overall climate conditions and weather events, were approximately 1.1°C higher in 2011–2020 compared to pre-industrial levels (1850–1900). In West and Central Africa, average annual and seasonal temperatures have increased by 1°C–3°C since the mid-1970s. This warming has led to more frequent and prolonged heatwaves, shifting rainfall patterns, rising sea levels, and increased flooding in recent decades (IPCC 2022; 2023). While historical data is limited in Gabon, data estimates reveal mean annual temperatures rising by 0.60°C since 1960. Temperature increases are observed across the country but are especially higher in the winter and drier months. The number of days of extreme heat also increased substantially over this period. Indeed, the impacts of global warming are already being felt. Heatwaves occurring since early 2024 have led to increased energy demand, and lower river levels affected hydropower generation, causing frequent outages over the year.

Climate changes in Gabon and globally are expected to continue well into the future, with each increment of warming presenting more severe hazards worldwide. Future climate is inherently uncertain, due to variability in the earth's physical responses, uncertainty in future greenhouse gas emissions trajectories, as well as uncertainty across different climate model projections for the coming decades. This CCDR leverages projections from the World Bank's Climate Change Knowledge Portal for 29 General Circulation Models (GCMs) included in the Coupled Model Intercomparison Project 6 (CMIP6) suite of model outputs at 1X1 degree spatial resolution. These models reflect up to 5 possible emissions trajectories through combinations of Shared Socioeconomic Pathways (SSPs) and Representative Concentration Pathways (RCPs) emission scenario runs[1]. The large ensemble of models and scenarios helps account for uncertainties and provides a robust range of possible climate futures.

[1] World Bank. 2021.

This CCDR presents projections for average rainfall and temperature by 2050 for two possible climatic scenarios in Gabon: Wet/Warm[2], (wetter conditions and warmer temperatures) and Dry/Hot[3] (drier conditions and hotter temperatures). These scenarios are based on a selection of climate models representing outer ranges of precipitation and temperature changes under moderate to high emissions pathways. Changes are expressed up to 2050 relative to average historic rainfall and temperature data observed between 1995-2020. The scenarios exclude both aggressive mitigation pathways (very low-emissions) and worst-case high-emissions pathways. By focusing on these two scenarios, we enable scenario planning that considers a broad spectrum of potential climate changes to inform a comprehensive vulnerability and adaptation assessment. These scenarios are referenced to estimate climate effects on various sectors (Chapter 3) and on the overall economy and poverty (Chapter 4)[4].

Over the next decades, temperatures and rainfall are both anticipated to rise (table 1.1). Temperatures are projected to 2050, increasing from an average change of 0.25°C in 2021-2030 to 0.72°C in 2041-2050 under the Wet/Warm scenario. These changes are estimated to be mostly uniform across the country (figure 1.3). In the Dry/Hot scenario, temperatures increase from an average of change of 0.59°C in 2021-2030 to 1.34°C in 2041-2050. However, the Dry/Hot scenario forecasts variable increases, with the southern regions expected to observe hotter temperatures (figure 1.3). Regarding rainfall, under the Wet/Warm scenarios, general wetter conditions are expected throughout the country, with increases of up to 30 percent in certain areas. Under the selected Dry/Hot scenarios, varied trends are expected, with precipitation generally decreasing across most regions and increasing in the east (figure 1.3). However, it should be noted that these projections are expressed in averages, and both temperature and precipitation patterns may exhibit significant variability over time. Rainfall, in particular, is more challenging to project because it depends on complex atmospheric processes that are difficult to model precisely. As a result, even under scenarios where overall rainfall is anticipated to increase, longer periods of consecutive dry days are likely in certain regions or seasons. This underscores the importance of considering localized variations in climate projections, especially for water-resource planning and management.

Table 1.1. Change in Average National Temperature and Precipitation by Decade Relative to Baseline

Scenario	2021-2030		2031-2040		2041-2050	
	Temp.	Precip.	Temp.	Precip.	Temp.	Precip.
Dry/Hot average	+0.59 °C	+2.8%	+0.87 °C	+1.5%	+1.34 °C	+1.0%
Wet/warm average	+0.25 °C	+3.4%	+0.50 °C	+9.0%	+0.72 °C	+12.5%

[2] **Wet/Warm Scenario:** This scenario considers three model outputs that represent the 90th percentile of mean precipitation changes (i.e., wet) and the 10th percentile of mean temperature changes (i.e., warm) to 2050 across SSP2-4.5 and SSP3-7.0 GCMs. This focus led to the selection of the following models: SSP3-7.0 INM-CM5-0, SSP3-7.0 MPI-ESM1-2-LR, and SSP2-4.5 INM-CM6-0. It also considers the mean across the selected models. Changes in rainfall and temperature are expressed as a period from 2031-2050 relative to 1995-2020. The scenario assumes moderate to high emissions pathways, with SSP2-4.5 representing moderate emissions with some mitigation efforts, and SSP3-7.0 reflecting limited global cooperation and high emissions. Aggressive mitigation pathways (e.g., SSP1-1.9) and the most extreme high-emissions pathways (e.g., SSP5-8.5) are excluded, focusing on plausible outcomes where moderate warming and wet conditions prevail.

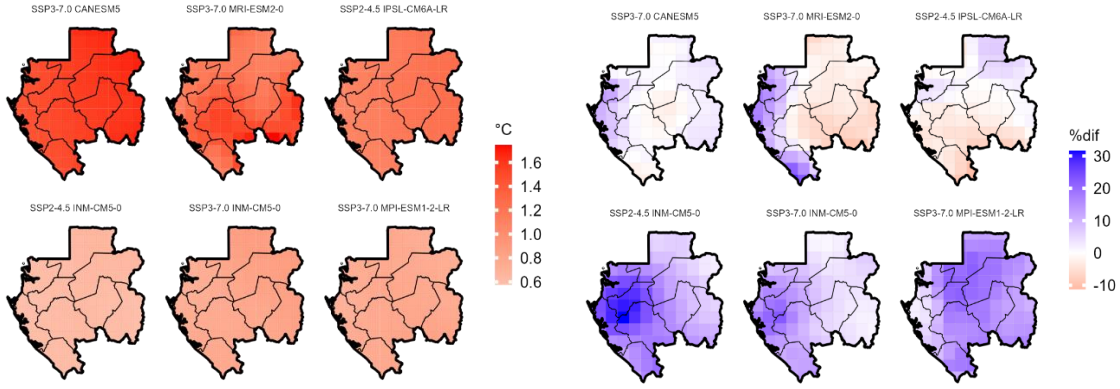
3 **Dry/hot scenario:** This scenario considers three model outputs that represent the 10th percentile of mean precipitation changes (i.e., dry) and the 90th percentile of mean temperature changes (i.e., hot) to 2050 across SSP2-4.5 and SSP3-7.0 GCMs. This focus led to the selection of the following models: SSP3-7.0 CANESM2, SSP3-7.0 MRI-ESM2-0, SSP2-4.5 IPSL-CM6-LR. The scenario also considers the mean across the selected models. Changes in rainfall and temperature are expressed as a period from 2031-2050 relative to 1995-2020. The scenario assumes moderate to high emissions pathways, with SSP2-4.5 representing moderate emissions with some mitigation efforts, and SSP3-7.0 reflecting limited global cooperation and high emissions. Notably, this scenario excludes both aggressive mitigation pathways (e.g., SSP1-1.9) and the most extreme high-emissions pathways (e.g., SSP5-8.5), focusing on plausible outcomes where moderate dry and hot conditions prevail.

[4] Further details on the construction of climate scenarios are provided in Annex 2.

Source: IEc. 2024.

Figure 1.3 Change from 2031-2050 relative to 1995-2020 by Climate Scenario

a) Mean Temperature b) Mean Precipitation



Note: The top row of panels shows projections of models selected in the Dry/Hot scenario, while the bottom row of panels shows projections of models selected in the Wet/Warm scenario. Please refer to the scenario definitions in the Annex. Source: IEc 2024.

In addition to long-term changes in climate, Gabon is at risk for increased intensity of natural hazards and extreme weather events, such as flooding, heatwaves, sea-level rise, and soil erosion. By 2050, the mean sea level is projected to rise by about 0.2 meters, with a much larger rise expected by the end of the century. Flooding, particularly in coastal and low-lying areas, is likely to become more frequent and damaging. The western coastal areas of Gabon are highly vulnerable to coastal flooding, with the city of Port-Gentil and provinces like Nyanga, Ogooue-Maritime, and Estuaire at high risk. These events have the potential to impact many Gabonese, as over 70 percent of the population resides in coastal areas. Further, economic development is concentrated along the coast. Gabon has taken steps to address these challenges, including constructing embankments, dikes, and sea walls, but further efforts would be needed to improve resilience. Flood-affected areas currently already contribute to about 0.22 percent of the GDP, equivalent to around US$30 million per year[5]. At the same time, in certain regions drought affects 21,000 people annually, resulting in a loss of up to US$185 million[6].

Gabon encounters significant development challenges that will be exacerbated by climate change. Gabon ranks 76 out of 185 countries in vulnerability to climate risks and is considered one of the least prepared to face climate shocks, being ranked at 152[7]. Climate change is expected to affect vulnerable groups more severely. They often reside in low-cost, substandard housing located in areas susceptible to natural hazards, making them more vulnerable to associated risks. Additionally, their reliance on climate-sensitive economic activities, such as farming and fishing, coupled with limited resources and insufficient social protection, leaves them ill-prepared to cope with climate challenges.

Climate change is significantly impacting Gabon's urban infrastructure. The country faces increased urban flooding risks due to high urbanization and loss of mangrove ecosystems, which are crucial as a buffer during floods. Weak infrastructure in the capital Libreville has led to substantial monetary losses. By 2050, climate change is expected to result in annual urban infrastructure damages of $64 million. The projected average increases in urban flooding damages could mask even more significant damages associated with individual flood return periods. Road infrastructure in Gabon is also facing increasing risks due to higher

[5] CIMA, UNISDR (2018). Gabon Disaster Risk Profile. United Nations Office for Disaster Risk Reduction. CIMA Research Foundation: Via Armando Magliotto, 2 - 17100 Savona – Italy.
[6] CIMA, UNISDR (2018)..
[7] Notre Dame GAIN Index. https://gain.nd.edu/our-work/country-index/rankings/.

precipitation and more intense flooding events. Without adaptation measures, it is estimated that damages to roads could result in significant annual costs ranging from US$14.4 million to $15.9 million by the 2040s. It is thus crucial to consider these impacts in future assessments, development plans, and attenuation measures[8].

Agriculture and fishery, which are key pillars of the Government's strategy to reduce its heavy reliance on food imports, create more jobs and enhance food security, are projected to be severely impacted by the heat stress and warming oceans. Agriculture, which employed 16 percent of the working population as of 2021, faces projected challenges such as reduced water resources, lower soil fertility due to erosion, and the effects of heat stress on labor and outdoor temperature exposure. The fisheries sector in Gabon is also expected to be significantly affected by changing temperatures and ocean conditions in the coming years, which can compromise its expected contribution to both food production and livelihoods. Despite heavy reliance on imported food, Gabon has approximately 1.0 million hectares of arable land, presenting an opportunity to enhance food security and crop production. Addressing issues such as soil erosion, flood damage, and increasing pest incidence can help Gabon capitalize on development opportunities while mitigating the adverse effects of climate change.

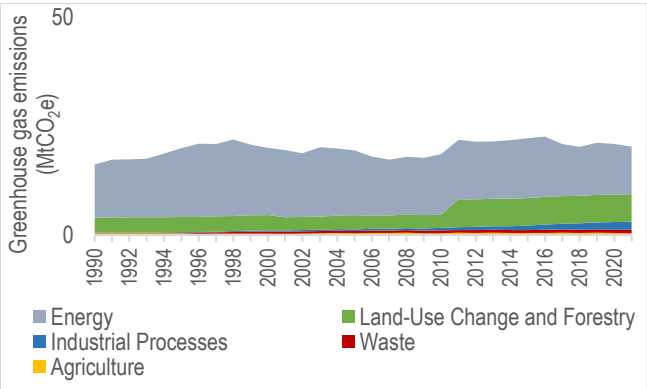
Climate change impacts human capital by contributing to the spread of certain diseases, disrupting access to education, worsening job insecurity, and deepening social disparities, particularly among vulnerable populations. These combined impacts reduce opportunities for individuals to develop skills, find stable employment, and contribute to long-term economic growth. For example, malaria prevalence has led to significant labor supply shocks under average climate conditions. Analysis conducted by this CCDR identified that the incidence and mortality of waterborne and heat-related diseases is expected to increase due to climate change[9]. This could limit labor supply and more generally, human health and income generation capacity, both for affected workers and their families.

1.3 Opportunities and risks for low-carbon development

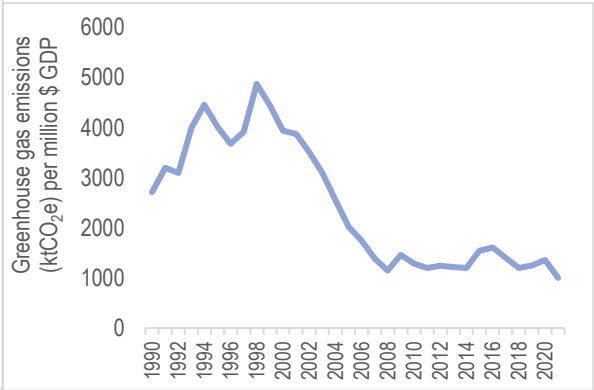
Gabon emits about 0.04 percent of the world's share of global greenhouse gas (GHG) emissions, making it the world's 129th largest emitter out of 193 countries (Climate Watch 2024). In 2021, Gabon emitted about 21 megatons of GHG. Emissions intensity per GDP has mostly declined in Gabon, with stabilizing trends in the last decade. Energy is the leading sector responsible for emissions, followed by changes in land-use change and forestry (LUCF), industry, waste, and agriculture (figure 1.4).

Figure 1.4 Sources of Gabon's greenhouse gas emissions, 1990–2021

Emissions by sector



Emissions intensity as share of GDP



[8] IEc "The Economic Damages of Climate Change in Gabon", 2024.
[9] IEc "The Economic Damages of Climate Change in Gabon", 2024.

Source: World Bank staff, based on data from Climate Watch (2024). Note: MtCO2e = million metric tons of carbon dioxide equivalent. Climate Watch estimations differ from Gabon's national greenhouse accounting reported to the United Nations Framework Convention on Climate Change (UNFCCC) because of differences in methodology and sources of data.

The energy sector is Gabon's largest source of emissions, but it also presents significant opportunities for low-carbon development, as its strong renewable potential offers synergies across growth and climate goals. Gabon's abundant renewable energy potential, particularly hydropower, offers a pathway to decarbonizing the energy sector while at the same time expanding access to reliable and affordable energy, a crucial element in improving the business climate and living conditions. Currently, hydropower accounts for nearly half of electricity generation, but there is still a vast potential for further development[10]. Gas flaring, venting and fugitive emissions are also a major contributor to the energy sector's emissions, with Gabon ranked in the top 10 globally for flaring intensity. Expanding renewable energy, modernizing aging infrastructure, and expanding rural electrification through solar and grid interconnection will be key to reducing emissions, ensuring energy reliability, and meeting growing demand. The private sector can play a pivotal role in accelerating Gabon's energy transition, from developing large-scale renewable energy projects to providing decentralized solutions and energy-efficient technologies. At the same time, Gabon must better manage its petroleum resources to maximize revenues to fund productive investments and support new growth opportunities while reducing its carbon footprint. A major transition risk for Gabon is its continued dependence on petroleum, which constituted about 70 percent of exports and 25 percent of GDP in 2023. Potential global decarbonization lowering oil demand trends could have important economic impacts for Gabon, along with an expected depletion of oil reserves due to maturing oilfields.

Accounting for 18 percent of the Congo Basin Forest, Gabonese forests are vital for meeting the world's climate ambitions, for which it needs to be adequately compensated. They absorb around 140 million tons of CO2 annually, effectively compensating for the country's emissions. Gabon's success in maintaining its rainforests in a mostly intact state has garnered international acclaim. Gabon was a pioneer in obtaining compensation for reducing emissions, through a $150 million REDD+ agreement with the Central African Forest Initiative (CAFI). It also recently concluded a debt-for-nature swap in August 2023, through a blue bond operation. However, international funding mechanisms for standing forests are still at an embryonic stage, and the quest for fair compensatory mechanisms continues.

Globally recognized for its role in carbon absorption, Gabon has committed to sustaining a net-zero status through 2050 and is focused on meeting short-term development goals. Gabon has proactively addressed climate change risks by establishing a National Climate Council in 2010 and enacting national climate plans and laws, as discussed in detail in Chapter 2. The country's second Nationally Determined Contribution (NDC) commits to maintaining a net annual carbon absorption of at least 100 million tons beyond 2050 with global climate financing support. Transitioning sectors like forestry, agriculture, urban planning, health, and energy will be crucial for climate change adaptation, presenting opportunities for new revenue generation and job creation through the adoption of innovative technologies and financial instruments[11]. At the same time, a shift to a low-carbon economy could disproportionately affect the poor, leading to increased consumer prices and job losses in high carbon-emitting sectors. Ensuring a socially just transition with adequate protection and support for the most vulnerable will be key, especially given the country's situation as a net carbon absorber and a provider of essential climate services to the world.

[10] IEA. 2024. Gabon. Energy Mix (https://www.iea.org/countries/gabon/energy-mix).
[11] Gabon Nationally Determined Contributions (NDCs) (https://unfccc.int/documents/497489).

2. Gabon's Institutional Readiness for Climate Change

Key Points

- Gabon has ambitious climate targets, and a strong legal framework underpinned by international commitments. However, persistent governance challenges—ranging from low inclusiveness and satisfaction with government services to gaps in policy implementation—reduce the country's ability to fully realize its climate and development goals. These issues limit effective coordination, financing, and climate engagement of citizens and businesses.
- Gabon's legal framework for climate policy, including landmark laws like the 2021 Climate Change Law, provides the foundation for sustainable land management, GHG regulation, and carbon credit systems. However, its partial operationalization, including the absence of a formally established Climate Agency, incomplete implementing regulations, and unresolved land tenure issues, constrains progress.
- Improving the integration of climate considerations into Gabon's budgeting processes is essential for aligning fiscal policies with national climate goals. While reforms like program-based budgeting provide a strong foundation, weaknesses in budget execution, financial controls, and reporting inhibit effective implementation of climate and development policies.
- Transparency and public financial management challenges pose significant risks to its institutional readiness for climate action and its access to the carbon credit market. Readmission to the Extractive Industries Transparency Initiative (EITI) and the outcomes of the 2024 Inclusive National Dialogue offer a pivotal opportunity to bolster transparency, enhance investor confidence, and facilitate access to international climate finance.

This chapter discusses Gabon's climate commitments and its institutional readiness to take climate action. It (a) provides context to Gabon's climate policy framework and governance structure; (b) assesses key barriers to effective climate policy implementation, such as in areas of legislation, coordination, planning and budgeting, and transparency; and (c) concludes with recommendations on "no-regret" measures feasible in the short-term, and selected "transformative" measures that require significant reform effort, but would have a positive long-term impact on climate and development policy implementation.

2.1 Setting the context: high governance challenges, high potential for benefits from climate change policy

Gabon's governance challenges pose obstacles to effective climate policy implementation. Performance in worldwide governance indicators[12] and perceptions of inclusiveness and satisfaction of government services and welfare policies have been historically lower in Gabon compared to the rest of the region[13]. Ultimately, these challenges affect the state's capacity to define and implement standards and regulations and coordinate cross-sectoral and territorial governance essential for addressing complex climate and development issues. They also limit the country's ability to attract financing, effectively leverage public spending and tax incentives, and fully monetize the environmental services of its protected ecosystems.

[12] Worldwide governance outcomes include indicators of Voice and Accountability, Government Effectiveness, Regulatory Quality, Rule of Law, and Control and Corruption. In 2020, Gabon scored lower in all measures compared to the averages for Sub-Saharan Africa.
[13] World Bank 2020.

Moreover, governance and transparency issues can make it difficult to foster consensus and behavioral changes among citizens and businesses to advance development and climate goals.

Gabon's governance challenges, while significant, have not diminished its ambition to lead on climate and sustainable development. In 2024, Gabon introduced the National Development Plan for the Transition (PNDT), building on its medium-term development plan, the *Plan Stratégique Gabon Emergent* (PSGE), adopted in 2012. Together with its commitments to several international climate conventions,[14] these policies have laid the groundwork for economic transformation toward a green and diversified economy, targeting the maintenance of carbon neutrality by 2050, and integrating climate and sustainability.

This vision has been operationalized through key national strategies and plans including the Gabon Vert Plan, the National Climate Plan, and the NDCs. As a central pillar of the PSGE, the Gabon Vert Operational Plan (2012-2025), charts a green economy development trajectory around seven sectors (agriculture, livestock, fisheries, aquaculture, timber, non-timber forest products). The National Climate Plan (2012) contains a series of medium-term actions[15] to combat climate risks by 2020 and longer-term goals to 2050, This Plan focuses primarily on the forest/wood, agricultural, energy/mining, and electricity sectors. Gabon's NDCs submitted in 2016 and 2022 incorporate the main elements of the *Gabon Vert* et National Climate Plan. A key element of its NDC is the Reducing Emissions from Deforestation and Forest Degradation (REDD+) strategy, which aims to avoid unplanned deforestation and forest degradation, and foster carbon sequestration and carbon stocks. While Gabon has demonstrated strong ownership of its climate policies in its economic development planning, there are sectoral gaps in its climate plans, where priority areas within agriculture, such as livestock, fisheries, aquaculture, and bushmeat have limited coverage. Climate actions in the transport sector are also not taken into account from mitigation or adaptation perspectives.

Gabon also strengthens its commitments to climate action through legal provisions, including the adoption of a specific climate law. Law No. 18/2022, following Ordinance No. 19/PR/2021, applies to all climate-related actions, activities, measures and initiatives and outlines the fundamental principles of GHG emission thresholds, quota, and offset system. It provides an institutional framework for climate governance, regulation (inspections, controls, infractions, and sanctions), and mechanisms for climate financing. This law complements the existing legal framework on climate policy:

a) **Forest code** (Law No. 016/01 and Ordinance No. 006/PR2002): Establishes that the State is the owner of all forests and divides them into permanent forest estate and rural estate. It endorses sustainable forest management as a governance strategy, allowing exploitation only under approved plans, and recognizes the rights of local communities within forest governance;
b) **Land Tenure Legislation** (e.g., Law No. 14/63, Law No. 3/2012, Ordinance No. 5/2012, Law No. 1/2012): Establishes that the State is the owner and manager of land in the public domain[16]; access to land ownership is granted to private persons but remains circumscribed;
c) **National Parks Law** (2007): Secures 11 percent of territory for conservation;
d) **Law on Sustainable Development** (Law 002/2014): Defines principles and objectives for sustainable development, requiring all policies of public authorities, economic operators, and civil society to align with Gabon's sustainable development strategy, prioritizing the well-being of current and future generations.

[14] Please consult Annex 4 for more details.
[15] The time horizon of the 2012 national climate plan was not specified, except for certain sectors, for example 2016 for agriculture, 2020 for electricity, 2050 for flaring (based on the PSGE).
[16] Law No. 14/63 of May 8, 1963 establishing the composition of the State's Domains and the rules that determine its management and disposal methods.

e) **Environmental Protection Law** (Law 007/2014): Establishes inter alia, the principles to be respected when carrying out activities that may endanger the environment. The law mandates the creation a national inventory of GHG emissions, the principle of the carbon footprint of economic operators, the integration of energy efficiency in public procurement and high environmental standards in construction, low carbon public transport, and calls for an Energy Efficiency & Adaptation Plan and a National GHG Emissions Reduction Plan
f) **Climate Change Ordinance Law** (Law 018/2022): Establishes institutional arrangements and the integration of GHG system, a national system of quotas and offsets for GHG emissions.

Nevertheless, Gabon's legal framework for climate policy remains partially operational: several key implementing regulations and legislative revisions are outstanding, including:

a) **Land-use Planning Act**: Currently under development, this Act is necessary for guiding sustainable land management and harmonizing competing land-use priorities. The absence of a national land-use plan has contributed to overlaps among oil, mining, forestry, and conservation concessions, complicating resource management and environmental conservation. While the Forest Atlas offers progress by improving transparency, a legal framework for land-use planning is needed to sustainably arbitrate competing uses, such as extractive activities, conservation, and agricultural development. Additionally, the lack of recognition of customary land rights further restricts access for local communities, who depend on land for cultural, religious, and subsistence purposes. Land law currently grants ownership to the State by default, excluding local communities from ownership rights over traditional lands. This is compounded by limitations on community forests, capped at 5,000 hectares, without ownership transfer.
b) **GHG and Carbon Credit regulations:** These include procedures for declaring the carbon footprint of economic operators, setting GHG emissions thresholds, regulating carbon credit exchanges, and establishing national standards and authorization processes for private carbon credit initiatives. However, Gabon lacks national standards for registering or implementing emission reduction projects, as mandated by Article 9 of the Climate Change Ordinance, which prohibits adherence to international standards. The State's ownership of land and forests extends to carbon rights, excluding customary rights even though customary law prevails in many rural areas. This exclusion often disqualifies local communities from participating in and benefiting from emission reduction projects and the resulting carbon credits. Furthermore, the State's monopoly over the international marketing of carbon credits ensures national consistency but limits private-sector participation and potential innovation in mitigation initiatives, which could generate tax revenue and broader economic benefits.
c) **Construction standards:** Regulations on standards for sustainable construction are not finalized.
d) **Forestry Sector Implementing Legislation**: Key gaps include regulations on the rural forest estate (Art. 12 of the Forestry Code), special regime for forests managed by the State and subject to unusual physical, ecological or social constraints (in accordance with the requirements of Art. 144 of the Forest Code), and modalities for extending customary use rights to economic use rights to support poverty alleviation (Art. 252 of the Forest Code);
e) **Forest and Buffer Zone Clarifications:** Discrepancies between the legal frameworks governing forestry, mining, aquaculture, hunting, agriculture, and tourism activities in buffer zones (e.g., Order No. 118-PR-MEFEPEPN) and the principles outlined in the Law No. 003/2007 on national parks require resolution.

The Climate Agency outlined by the climate law has not been created. The Climate Agency (*Organisme de Gestion des Enjeux Climatiques*) and its seven technical committees have not yet been created.[17] This Agency would be attached to the Presidency and lead coordination of Gabon's climate policy across ministries and departments. De facto, the National Council on Climate Change has so far played the role of coordinating climate policy. The Council supports Ministries in defining and monitoring strategies and participates in climate-related international negotiations, but its limited powers and resources can hinder its effectiveness. In contrast, the Climate Agency would have legal powers of control and sanctions (with sworn officers).

Operational efficiency and transparency in climate coordination could be enhanced. Beyond the creation of the climate agency, clarifying the functional responsibilities between the Climate Council (or later the Agency) and respective ministries in charge of climate would be required. Further, establishing periodic and thematic technical coordination — potentially in the form of technical committees within the Climate Agency — could strengthen collaboration, such as by involving departments responsible for financing climate policies (e.g., Budget, Treasury, and aid coordination). Bi-annual reporting on NDC implementation is part of the new international commitments, with a first report expected by December 2024.[18] This could be harnessed to ensure periodic reporting to citizens and legislatures on the implementation of climate policy and improve accountability.

2.2 Climate integration into planning and budgeting and public financial management

The integration of climate considerations into Gabon's planning and budgeting processes remain limited (table 2.2). While disaster-related shocks are included in fiscal risk assessments as an annex to the budget law,[19] comprehensive assessment of fiscal risks including the impact of climate change on the economy, revenues mobilization, and expenditures are not addressed. Improved integration could entail assessing climate risks in local development planning; incorporating a climate dimension in budgeting; budget monitoring on expenditures financing climate policies; evaluating public investment projects that include a climate dimension (e.g., in terms of risks, potential GHG emissions, alignment with climate policy) and the greening of public procurement. However, there are reforms under way that could have a positive impact (e.g., ongoing revision of the texts on public procurement and PPPs, draft text on the public investment management framework), and other reforms that can be carried out in the short term because of the prerequisites already in place (e.g., improvement of oversight for the mobilization of international climate financing, climate budget tagging, climate consideration in budget trade-offs, ESG criteria for performing SOEs with high potential for climate adaptation and mitigation actions).

[17] The law provides, for example, that the body has seven technical committees (energy, industry, agriculture, forestry/fisheries, transport, waste, awareness, research, telecoms), and powers of control and sanctions that the climate council does not have.
[18] Under the Enhanced Transparency Framework, Parties to the Paris Agreement are required to submit biennial transparency reports every two years, including information on national inventory reports, progress towards NDCs, policies and measures, climate change impacts and adaptation, levels of financial, technology development and transfer and capacity-building support, capacity-building needs and areas of improvement. https://unfccc.int/documents/193408
[19] Fiscal risks of climate change are partially taken into account in an annex to the budget law, with estimates of impact of natural hazards (floods, landslide, fire) on public finances. This assessment could be broadened to (i) other potential climate-related events (droughts not mentioned, disease due to change of temp. or rain seasons patterns, and the impact on forest and agriculture, heatwaves on health and/or electricity grid for air conditioning, etc.), (ii) longer-term horizons, and (iii) analysis of cost-benefits of investment spending on climate transition or adaptation.

Table 2.2. Summary of Climate-related Public Finance Management in Gabon

Climate PFM	Gabon
Climate-Informed Local Level Risk Assessment	No
Climate-Informed Fiscal Risk Assessments	Partial
Climate-Informed Budget Guidelines	No
Climate Expenditures in Budget or Tracked	No
Climate-Informed Project Screening	No but draft public investment law includes climate dimensions for pre-selection and appraisal
Green Public Procurement Practices in Law	No but green public procurement foreseen in 2014 Law on Environmental Protection, and public procurement law being revised

Weaknesses in public finance management also affect Gabon's capacity to implement climate policies. The recent Public Expenditure and Financial Accountability (PEFA 2017) assessment showed progress in policy-based budgeting and timely fiscal reporting, but various indicators fell short of PEFA standards. Persistent challenges include managing arrears, executing expenditures, and ensuring effective internal and external control, among others. The credibility of budget documents remains an ongoing issue, with alignment problems between plans and actual budgets. Transparency issues exist regarding transfers to subnational units, and performance audits are lacking, contributing to transparency challenges. Frequent budget adjustments throughout the fiscal year further complicate predictability and oversight, with special waivers and simplified encumbrance processes adding layers of complexity.

Challenges in budget execution, internal and external controls, and financial reporting can constrain access to global climate financing. Accessing international climate financing, such as the Green Climate Fund (GCF) and the Adaptation Fund requires strong and credible fiduciary management and reporting. For example, GCF accreditation[20] requires on the fiduciary side to have credible financial reporting in place as well as internal and external controls.

Full implementation of performance-based budgeting offers significant potential to enhance spending efficiency in general, including spending on climate-related programs. Gabon made progress in strengthening its public financial management (PFM) legal framework, including the enactment of the Organic Law on Finance Acts and Budget Execution (LOLFEB) in 2010, and the program-based budgeting reform adopted in 2015. Resource allocations are based on each line ministry's core mandate and programs, which are underpinned by clearly defined objectives and performance indicators. They have also redefined stakeholder roles in the PFM process and reorganized the services of the Ministry of Public Accounts, contributing to greater credibility in the budget process and clearer links between public policies, objectives, and resource envelopes. However, challenges remain in fully realizing the benefits of these reforms. Key implementing regulations for LOLFEB are still pending, including provisions for program managers to autonomously manage program and sub-program budgets (management charter and Commitment Authorization/Payment Credit [AE/CP] processes). Additionally, the use of performance data to enhance accountability and improve program design and implementation remains limited.

Program-based budgeting also presents an opportunity to strengthen the integration of climate considerations into the budget. This approach could facilitate the inclusion of the climate dimension in several complementary ways:

[20] https://www.greenclimate.fund/accreditation.

a) **Climate Integration in Budget Preparation Circulars**: Incorporating climate commitments in the guidelines provided to ministerial departments during budget preparation would ensure that proposed programs align with national climate goals.
b) **Climate-Related Performance Indicators**: Requiring at least one performance indicator focused on climate change mitigation or adaptation for each program could enable consolidated monitoring across ministries and better track progress on shared climate objectives. A few standard indicators could be proposed and would also allow for a consolidated monitoring of action by several ministries on the same topic.
c) **Budget and Expenditure Estimates for Climate Policy**: Estimating the financial allocations and public expenditures related to climate policies would support informed budget trade-offs, improve evaluation of climate efforts, and strengthen the case for mobilizing additional climate financing (see Box 2.1).

Box 2.1. Budget Climate Labeling: International Experience

Since the first budget climate tagging was introduced in 2012, around 20 governments have developed budget climate tagging methodologies (e.g., Nepal, Chile, Indonesia, Philippines, Colombia, Ireland, Ghana, Kenya, France, Australia, etc.). Methodologies for climate tagging of the budget have three essential components: defining climate-related expenditure, defining appropriate coverage, and estimating climate-related expenditure

The Philippines has since 2015 institutionalized climate expenditure tagging in a systematic manner. The "Climate Change Expenditure Tagging" allows for the identification and tracking of climate-responsive expenditure in the budget and facilitates a discussion on its performance. The process also generates statistics to assess trends, monitor budget execution and performance. The finalized data facilitates the establishment of a baseline of climate change expenditures by result area and the National CC Action Plan to support policy dialogue within and outside of government. The tagging of climate change related expenditures implies that each department evaluate each Program, Activity and Project in the budget along three dimensions: (i) whether the Program, Activity and Project are climate responsive and aligned to the National CC Action Plan; (ii) if this is the case, whether the entire program or only specific components are climate sensitive and to what proportion; and (iii) classify and label using a climate expenditure typology code, and declare as climate expenditure the relevant budget or identified specific components. Colombia is also publishing climate finance data through its Climate Finance MRV platform, enabling a tracking of financing of climate policies from private and public sector, since 2011, by provinces and sectors.

2.3 Building confidence for international financing: Leveraging Extractive Industries Transparency Initiative membership and strengthening anti-corruption policies

Transparency and integrity remain critical areas requiring attention to ensure Gabon's institutional readiness to take climate action. For example, the country's governance profile and limited implementation of the National Strategy to Fight Corruption and Money Laundering could affect carbon credits' credibility and foreign direct investment (FDI). Like other sectors of the Gabonese economy, the development of a carbon credit-based economy could suffer from the governance and transparency challenges in Gabon.

Gabon's key integrity indicators place it among countries that still need to make efforts. In 2020, the Mo Ibrahim Index of African Governance gave the country a score of 47.7/100 and ranked it 29th out of 54

countries assessed.[21] Afrobarometer data indicate that the majority of Gabonese believe that corruption is persistent among law enforcement services (69 percent of respondents).[22] In 2023, Transparency International ranked Gabon 136th out of 180 countries in terms of corruption with a score of 28/100.[23]

Weaknesses in governance and compliance frameworks present challenges in climate-related sectors. For example, in Gabon's forestry sector, non-compliance with sustainable logging rules and illegal logging remain challenges, despite ongoing initiatives to improve wood traceability and controls. Similar to other Central Africa Forests Commission (COMIFAC) countries, governance gaps in Gabon also impact efforts to address pollution and environmental degradation. Access to land also remains a challenge, influenced in part by hurdles in the land acquisition process and the recognition of land rights, particularly for vulnerable communities. Additionally, in view of weaknesses in transparency of resources generated from carbon credit sales, there is a risk of reputational concerns among buyers, especially in voluntary markets.

Gabon has validated its Extractive Industries Transparency Initiative (EITI) membership, which is a major step to promote transparency and send a positive signal to citizens and foreign investors. Gabon's journey with EITI, which began in 2004, encountered challenges, including a suspension in 2013 due to delays in reporting, incomplete data, irregular committee meetings, and limited civil society participation. In 2021, Gabon was readmitted following the publication of its extractive sector revenue report for 2021, with the validation process completed in March 2025. A moderate score of 73.5 points was achieved in the implementation of EITI standards[24]. Also, EITI membership in Gabon does not currently include the forestry sector, as is the case in most EITI countries. In the future, it would be important to pursue EITI recommendations, and standards could be expanded to forestry. The EITI engagement offers an important opportunity to further enhance transparency and governance across all sectors.

Access to climate finance could be facilitated if anti-corruption efforts are accelerated and Gabon's credibility strengthened. On the legal front, Gabon has ratified most of the international and regional provisions25 that have been translated into Gabonese law on illicit enrichment26 and asset declaration27 and their enforcement by the National Commission for the Fight against Illicit Enrichment (CNLCEI)28 and the National Agency for Financial Investigation (ANIF)29. However, the National Strategy for Fighting Corruption and Money Laundering has neither been independently evaluated nor updated since 2014, while indicators have deteriorated in the meantime. The April 2024 Inclusive National Dialogue has highlighted the fight against corruption as central to the ongoing transition and provides an opportunity for Gabon to accelerate reforms.

---

[21] https://www.gabonreview.com/indice-ibrahim-de-la-gouvernance-africaine-le-gabon-toujours-pas-au-point/
[22] https://www.afrobarometer.org/countries/gabon/
[23] https://www.transparency.org/en/countries/gabon
[24] Extractive Industries Transparency Initiative. 2025. Gabon 2024 Validation Report. https://eiti.org/documents/gabon-2024-validation-report
[25] Including the African Union Convention on Preventing and Combating Corruption (2003); the United Nations Convention against Corruption (2007); and CEMAC Regulations on the prevention and suppression of money laundering and financing of terrorism in Central Africa (Regulation No. 1 CEMAC/UMAC/CM of April 4, 2003, Regulation No. 02/10 of October 2, 2010, Regulation No. 1/CEMAC/UMAC/CM of April 11, 2016).
[26] Law No. 002/2003 of May 7, 2003, establishing a regime for the prevention and punishment of illicit enrichment, revised by Law No. 041/2020 of 2021.
[27] Decree No. 00324/PR/MCEILPLC of 7 April 7, 2004 setting the procedures for declaring assets, amended by Decree No. 000717/PR/MCEILPLC of September 6, 2004.
[28] Created by Law No. 0003/2003 of May 7, 2003 on the creation, organization and functioning of the National Commission for the Fight against Illicit Enrichment with the mission of preventing and recording acts of illicit enrichment.
[29] Created by Decree No. 739/PR/MEFBP of September 22, 2005 specifying the organization, operation and financing of the Financial Investigation Agency.

2.4 Strengthening institutions to scale up climate action

The challenge in terms of public management is to improve the implementation and effectiveness of public policies – including policies relevant to adaptation and mitigation. This requires a transformational shift in public financial management and climate governance from strategies that have been partially implemented to operational planning that is sequenced over time, budgeted and executed effectively (at least on time and for the intended purpose). At the same time, this would require policy reforms capable of improving integrity and transparency on the functioning of the State in general, and in particular on the implementation of the NDC and the Climate Law, in order to ensure accountability for implementation and nourish the confidence of partners, investors and citizens.

Proposed recommendations in this CCDR are prioritized according to feasibility and impact on climate action (table 2.3). The short-term "no-regret" recommendations are assessed as the most feasible politically and mature technically, with significant impact on the climate action. The medium-term "transformative" recommendations appear to be crucial to climate policy of Gabon but might be challenging to implement and would require strong coordination, and possibly technical assistance and support to be implemented.

Table 2.3 Matrix of proposed institutional policies to enhance climate action in Gabon

No.	Institutional policy	Timeframe
1	Create the *Organisme de Gestion des Enjeux Climatiques*, including the technical thematic coordination mechanism, ministries in charge of economy and budget, and monitoring and evaluation system.	Short term
2	Update, adopt & disseminate Climate Long Term Strategy (covering adaptation and mitigation) with clear targets, an operational 5-year plan and a M&E mechanism. Alternatively, integrate climate commitments (Loi 2022, CDN) in updated Development Vision and Sectoral Plans.	Short term
3	Harness program-budgeting to insert climate dimension in PFM: (i) request climate contribution in budget preparation circular; and/or (ii) request line ministries to include at least one climate performance indicator into their programs; and possibly (iii) pilot climate budget tagging.	Short term
4	Include a green dimension in the Public Procurement law revision.	Short term
5	Pilot a climate-smart participatory local development mechanism.	Short term
6	Adopt a public investment management framework including climate risk and climate strategy in projects' selection and appraisal. In the short term, enforce the legal framework on systematic environmental impact studies to integrate climate GHG emissions, climate-related risk and climate change adaptation dimension.	Medium term
7	Finalize and adopt the pending land use planning law.	Medium term
8	Operationalize the Climate Fund.	Medium term
9	Identify key performing SOEs to implement (i) environmental, social, and governance (ESG) standards in line with international standards and/or (ii) good fiduciary and environmental/social safeguards to global climate financing.	Medium term

3. Strengthening climate resilience through infrastructure, natural capital, and human development

Key Points

- Gabon's path to decarbonization by 2050 requires a comprehensive approach that prioritizes renewable energy development, particularly hydropower, alongside critical power infrastructure investments and private sector participation. Strengthening and interconnecting electricity networks will be critical to expanding affordable electricity access, enhancing reliability, and reducing costs. Leveraging gas-based power offers a transitional solution, enabling grid stability, cost reductions and emission cuts by curbing gas flaring and moving away from fuel-based energy generation. Meanwhile, targeted investments are also needed to expand water access in rural areas, reduce losses, and improve sanitation infrastructure. Improving governance and utility performance in both the electricity and water sectors is crucial. This involves making utilities more efficient, accountable, and transparent, while ensuring effective regulation.

- Gabon's cities and roads face strong climate risks from flooding, sea level rise, heat stress, and air pollution. Informal settlements are especially at risk and often lack access to basic services. Investments in urban planning, resilient infrastructure, and climate-proofing are thus essential to build resilience. In this sense, early warning systems, integrated water management, and nature-based solutions can be part of key adaptation strategies.

- Initiatives taken by the country created a local timber industry with low deforestation rates, but challenges remain to utilize lesser-known wood species, non-timber products, and move up in value chains. Diversifying and boosting the wood sector will be key in view of potential climatic impacts on forests. In agriculture, Gabon faces challenges to increase productivity, and climate change can impact several key crops. Investments in resilient crop varieties, irrigation, and land tenure reform are needed to boost production.

- Despite its abundant natural wealth, Gabon faces challenges in human capital development, with low human capital index scores and high unemployment. Climate change poses risks to health, education, and social protection, particularly for vulnerable groups. Investments in health infrastructure, education and training, and social protection systems responsive to shocks are crucial to build resilience. Skills development and green jobs offer opportunities to build a more inclusive economy going forward.

This chapter presents sectoral pathways for a green, resilient and inclusive development. It discusses the main development challenges faced in each sector, as well as the impacts of climate change and opportunities for government action and private sector involvement. The key sectors assessed in this chapter are related to Gabon's physical capital – energy, water, urban, transport and digital infrastructure, natural capital – agriculture, fisheries, and forestry, and human capital – health, education, social protection, inclusion, and jobs. For some sectors, original modeling was done to understand unique risks and options under various growth and climate scenarios. In each area, policy options are proposed to advance development and climate goals, to build a resilient development path in Gabon.

3.1 Built environment and infrastructure

Improving energy access, affordability, and reliability with a low-carbon approach

The power sector is crucial to Gabon's sustainable development, requiring expanded renewable energy and modernized infrastructure to reduce emissions and meet energy demands. To achieve a sustainable energy future, Gabon must reduce its reliance on thermal power and make better use of its abundant renewable resources. Despite having a substantial hydroelectric potential of more than 10 GW, the country's energy mix in 2023 was still heavily dominated by thermal sources (> 50% of total generation). Out of a total installed capacity of 704 MW in 2024, 54 percent consists of gas and diesel (380 MW) and only 46 percent is from hydroelectric power (324 MW). The existing transmission and distribution networks are outdated and insufficient, struggling with maintenance issues and a lack of interconnection, hindering the effective distribution of surplus electricity, and deterring investment in large-scale hydro projects. This limits the utilization of renewable resources and hampers efforts to reduce emissions, highlighting the need for improved power infrastructure and expanded hydroelectric power.

Improving access to an affordable and reliable energy supply will also be central to achieving development aspirations. The lack of electricity is among the top concerns for firms in the country, especially for those operating in rural areas, such as mining and wood industries. The recent load shedding occurring in August 2024 resulted from insufficient, unexpected historically low water levels affecting hydropower generation. The shortages have had a significant negative impact on firms and households, in Libreville as well as in rural and industrial areas, further highlighting the need to diversify Gabon's energy mix, for investments in renewables to meet demands, and to ensure resilience in the face of climate change.

Given Gabon's planned investments in renewable energy and its abundant water resources, the country is well-positioned to achieve a decarbonized energy sector. An exploratory analysis was conducted to identify the policies and investments necessary to develop strategies for Gabon's clean energy transition, with the goal of achieving net-zero emissions in the power sector by 2050. Using the World Bank's Electricity Planning Model, the analysis evaluated the impact of a net-zero emissions pathway on the country's energy capacity and generation mix, considering projected demand growth and available technologies.

Three scenarios were explored to identify the most effective strategies for maximizing renewable resources and reducing reliance on fossil fuels. These scenarios are: (a) conservative baseline scenario with no further hydro deployment before 2032 in the Libreville regional grid (Réseau Interconnecté, RIC[30]) and before 2035 in other regional grids of Gabon, and no interconnection between the different regional grids (internal zones) of Gabon [Base]; (b) net zero emissions target for the power sector without interconnection between internal zones of Gabon and timely development of hydropower resources[31][NZP]; and (c) net zero emissions target for the power sector with interconnection between internal zones starting in 2035 and timely development of hydropower resources [NZPI]. In addition, a sensitivity analysis in terms of the timing of hydropower deployment has been performed: timely realization of planned hydro investments in the baseline and delayed hydropower deployment as per the conservative baseline in the net zero scenarios.

In the conservative baseline scenario, emissions from Gabon's power sector are projected to remain over 1 MtonCO2 up to 2030[32]. Delayed hydropower development will result in increased gas capacity and generation in the short term in all scenarios, and an associated increase in GHG emissions. For the base

[30] Gabon has 5 different RICs: Libreville, Francheville, Point-Gentil, Louetsi, and the Northern region.
[31] As per the latest Government Master Plan (Plan de développement du système production - transport et de distribution d'énergie électrique à l'horizon 2040, 2020).
[32] The latest historic recorded power sector emission level was 1.6 MtonCO2e in 2022.

case, the expected gas capacity by 2030 is 330 MW (Figure 3.5). A sensitivity with timely deployment of hydro decreases the necessary gas capacity to 222 MW by 2030, a 30 percent decrease versus the conservative base scenario (Figure 3.6). Under an average 5 percent annual GDP growth over the modelling horizon from 2025-2050 in NZP, timely deployment of hydro could decrease the required gas capacity from around 400 MW to 280 MW, representing a 30 percent decrease, and reduce expected GHG emissions by 2030 down to 220 kton CO2e per year. The continued reliance on gas due to delayed hydropower investment together with the expected deployment of heavy-fuel oil power ships will impede progress toward emission reductions in the short term. However, with timely deployment of hydro in the NZP scenario, emission intensity is projected to drop sharply from 335 gCO2e/kWh today to around 50 gCO2e/kWh already by 2030 (Figure 3.6).[33]

Figure 3.5. Projected generation and capacity mix for Base, NZP, and NZPI (2024[34], 2030, 2050).

a) Capacity mix (MW) b) Generation mix (GWh)

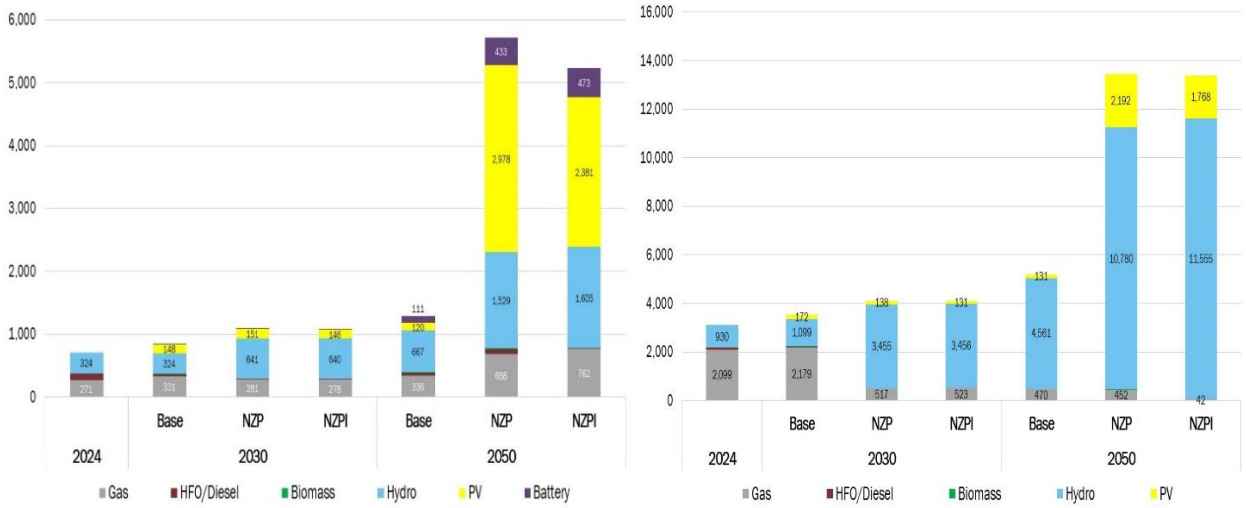
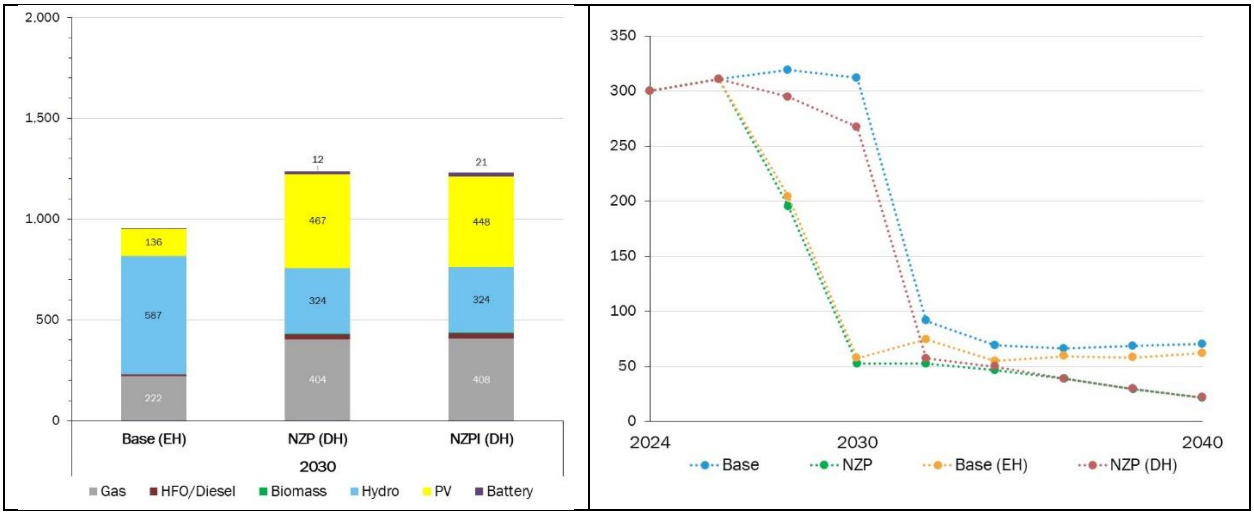


Figure 3.6 Capacity Mix for sensitivity scenarios and Emission Intensity Across Energy Scenarios by 2030.

a) 2030 Capacity mix for sensitivity scenarios b) Emission intensity across scenarios (gCO2 per MWh)



[33] The energy modelling annex contains additional figures showing results in terms of emissions for all scenarios and sensitivities.

[34] The expected capacity in 2024 was estimated based on the latest Government Master Plan and installed capacity data received from the Ministry of energy and hydraulic resources (Ministère de l'Energie et des Ressources Hydrauliques) in March 2024.

Note: Base (EH): Base scenario with early hydropower deployment; NZP (DH): NZP scenario with delayed hydropower deployment. The deployment of HFO fueled power ships causes the initial increase in emission intensity in all scenarios.

Gabon's hydropower is generally resilient to climate change, though river runoff variations and rainfall variability could affect generation. Hydro power also comes with certain potential environmental risks such as biodiversity and water security impacts that need to be carefully managed or avoided. A Rapid Climate Risk Assessment of the Ogooué River Basin, which drains nearly 80 percent of Gabon, shows that hydro-energy generation in terms of annual output (GWh/year) is only moderately sensitive to future climate changes, with a potential increase in output by 2050. While dry-season firm power (defined as the mean power output during the two months with the lowest river flows) is more sensitive due to limited storage, most climate models forecast a wetter future for Gabon. Thus, climate change is unlikely to significantly harm Gabon's hydro-energy potential and may even offer opportunities for increases, with projections of a 10 percent rise in annual output and a 20 percent increase in dry-season firm power. Given these projections and the need for resilient hydropower to support country's clean energy and climate goals, Gabon should continue to develop its hydro-energy potential with strong support from development partners and private investors, while also improving its hydrological forecasting capacity.

If hydropower development faces delays, using gas as a transition fuel instead of oil-based fuels could be a practical alternative to maintain grid stability, ensure energy supply, and meet emission reduction goals. Diesel and heavy-fuel oil power plants are considered a last-resort option and are not cost-effective under normal circumstances. They leave the power sector exposed to volatile global fuel prices. However, significant investments in gas infrastructure could risk becoming stranded assets if a rapid shift to renewables occurs in Gabon, making it crucial to carefully balance short-term energy needs with long-term sustainability goals. Indeed, gas-based power is expected to provide the necessary firmness in NZP and contribute to flexibility within Gabon's power system by 2030 and beyond (even with timely deployment of hydro), although average capacity factors could decrease from 71 percent in 2024 to as low as 20 percent by 2035 in NZP. Future gas-based power purchase agreements with independent power producers will need to include provisions to ensure the required flexibility and firmness.

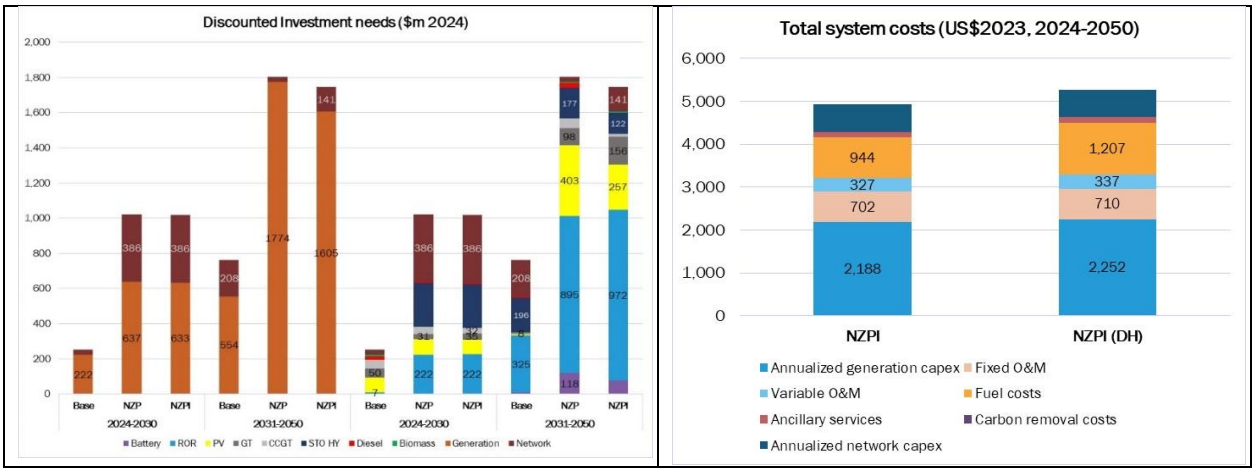
Interconnecting all regional power networks (Réseau Interconnecté, RIC) can unlock Gabon's hydropower potential and reduce the cost of the energy transition, enabling a transition to a 100 percent renewable electricity system primarily driven by hydropower by 2050. In the net zero with interconnection scenario (NZPI), the share of hydropower is projected to rise from around 30 percent in 2024 to 86 percent of the generation mix by 2050 (Figure 3.5). In this scenario, by 2040, stored hydro would contribute 15 percent of hydropower generation, providing crucial flexibility. Solar photovoltaic (PV) combined with a battery energy storage system (BESS) is expected to become increasingly important towards the end of the planning horizon, driven by net zero targets, increasingly more favorable cost parity, and the need for reliable reserve capacity. To achieve net zero target, BESS will be critical to maintain grid stability and flexibility, especially due to fast response requirements due to solar intermittency and fluctuations in hydropower generation from seasonal variations. PV and BESS would need to grow from nearly zero today to 2.4 GW and 470 MW respectively by 2050 to achieve the net zero target (Figure 3.5).

Achieving net zero in Gabon's power sector by 2050 with increased economic growth will require significant additional discounted investment costs of $1.75 billion in NZPI vs. Base, even when the Government's planned hydro deployment and interconnections between the internal networks are realized. In the NZPI scenario with timely hydro deployment, total discounted investment needs[35] amount to up to $2.2 billion in

[35] Investment needs refer to discounted capital expenditures (CAPEX) for generation and networks, using a 6 percent discount rate.

power generation and $530 million in networks[36] by 2050 (Figure 3.7). The majority of these investments are needed to meet increased demand resulting from higher economic growth in NZPI vs. Base. Delayed hydropower deployment will increase total system costs[37] by $342 million by 2050 compared to the timely hydro NZPI scenario. While capital investment needs will be lower in the coming decade due to the lower upfront cost of gas or HFO-fired power generation capacity compared to hydro, this reduction will be offset by higher fuel expenses over the modelling horizon (Figure 3.7). Decarbonizing the power sector has minimal impact on average generation costs up to 2040 in Gabon. Afterward, average generation costs in the net zero scenario without interconnection scenario can be 25 - 30 percent higher than in the base scenario due to increased investments in PV and BESS. To manage affordability of energy services, it will be crucial to implement strategies that leverage cost-effective energy resources, integrate blended concessional financing, and optimize grid integration. An integrated national grid in NZPI can help reduce average generation costs by around 10 percent vs. NZP by mutualizing cost-effective energy resources. Leveraging the private sector to introduce energy-efficient technologies, battery storage, and alternative fuels would also help bolster Gabon's energy systems and get to net zero.

Figure 3.7 Discounted investment needs for NZPI (left) and total system costs for NZPI/NZPI (DH)



Note: (RoR = run of river hydro; STO HY = stored hydro; GT = gas turbine; CCGT = combined cycle gas turbine). NZPI (DH): NZPI scenario with delayed hydropower deployment.

Transitioning to a net-zero scenario will require substantial efforts in developing both renewable off-grid and central grid infrastructure, because there is a significant disparity in access to basic services between urban and rural areas in Gabon. While nationwide access to electricity stands at 92 percent, only 25 percent of people in rural areas have access to power grids. About 14 percent of the population lives in isolated areas served by off-grid systems, and 7 percent resides in non-electrified, remote localities distant from the medium voltage network. In this context, expanding solar power generation through mini-grid or off-grid systems is essential, especially in remote areas with good solar irradiance or where large hydro projects are not feasible.

Achieving a sustainable energy system in Gabon depends on the financial viability of the national utility. The electricity sector is currently hindered by underinvestment from the State and the national utility,

[36] The investment needs in network refer to the capital costs to a) strengthen existing transmission lines; b) allow for interconnection between the (currently) isolated internal zones (only in NZPI; and c) increase access through grid connections and are based on the latest Government Master Plan.
[37] Total system costs are the discounted sum of a) capital annuities for generation and network; b) fixed and variable operation and maintenance costs; c) fuel costs; d) cost for spinning reserve; e) any carbon removal costs to meet emission targets.

Société d'Eau et d'Électricité du Gabon (SEEG), as well as a lack of private sector and PPP financed-investments driven by high off-taker risks related to SEEG. SEEG manages both water and electricity services and was granted a 20-year renewal of its concession for generation, transmission, and distribution in 2022. However, SEEG's turnover has been stagnant over the past six years, and the company reported a net loss of $21.6 million in 2022. This loss is attributed to high transmission and distribution losses of 29 percent, a low electricity bill collection rate of 84 percent, high generation costs due to reliance on liquid fuels, and a tariff freeze that has remained in place since 2018. Efforts to rationalize tariffs, ensure cost-reflective pricing, reduce technical losses, and increase operational efficiency need to be accelerated to de-risk energy projects and attract more private sector investments.

Gabon needs to better manage its petroleum resources to maximize revenues for new growth opportunities while reducing its carbon footprint. A major transition risk for Gabon is moving away from its dependence on petroleum extraction. Oil constitutes 74 percent of Gabon's exports and 45 percent of its GDP (source: EIA, 2020 - EIA Gabon). As global decarbonization trends accelerate, oil demand is expected to decrease, influencing investment decisions. Global oil companies are diversifying into renewables, affecting Gabon where oil extraction costs are relatively high. With reduced investment in exploration, oil production has declined from 230,000 barrels per day in 2012 to 196,000 barrels per day in 2022 (source: EIA, 2022). This, coupled with volatile oil prices, introduces significant uncertainty for public finances. Furthermore, oil output is expected to decline gradually from 2025, due to the natural maturity of existing oilfields.

Despite progress, flaring and fugitive emissions remain significant challenges in Gabon. The country is among the top 20 globally for absolute gas flaring volumes and ranks within the top 10 for flaring intensity (m^3 of gas flared per barrel of oil produced) due to its high flare gas volumes relative to its modest oil production. With current flaring at 1.4 billion cubic meters per year, Gabon emits approximately 3 million tons of CO2 annually, with flaring activity evenly distributed between onshore and offshore fields. Despite lower oil production (0.2 million barrels per day) compared to Angola (1.1 million barrels per day), Gabon's flaring levels are higher. The country aims to implement a zero-flaring policy to address these issues, which will require stronger institutions and financially sustainable utilities to attract the necessary capital.

Recommendations (see Annex VII for more details)

To improve Gabon's electricity sector and ensure its sustainability, several key actions are recommended:

- **Develop and implement a turnaround plan for SEEG to enhance governance, reduce losses, and settle debts.** Settling arrears and reducing technical and commercial losses are essential to attract investment. The government should update generation and electrification plans, revise tariffs, and work with the private sector to expand renewable energy access. Prioritizing grid integration and key transmission lines, especially between Haut-Ogooué and Libreville, will support large hydropower projects like Booué and stabilize electricity supply.

- **Improve hydrological data.** Adequate hydrological data needed for project design are lacking at most potential hydropower sites. This is a significant concern for assessing design and safety check flows, environmental flow requirements, and power system operations. It is recommended to urgently establish a hydro-meteorological monitoring system in the Ogooué River basin, with key gauging stations on the main river and major tributaries with hydropower potential.

- **Develop a transition strategy with strict measures to address gas flaring and venting to move toward a low-carbon future and provide more certainty for investors.** Immediate actions should strengthen

regulations and enforcement to penalize flaring, venting, and methane emissions. Oil development plans must mandate utilization or capture of associated gas and methane.

Strengthening water security

Water resources are largely abundant in Gabon. In 2022, total renewable water resources reached 190 billion cubic meters per year, against a water withdrawal of 0.14 billion cubic meters per year. Over the long term, total water availability in the country is projected to remain relatively stable above 150 km^3/year. Estimates of total water availability in Gabon were assessed for four climate scenarios (RCPs), based on the runoff generated from the water basins covering the country, plus renewable groundwater resources. Projections under the RCP4.5 scenario indicate an increasing trend to levels above 200 km^3/year by 2050. However, under the RCP6.0 scenario, the total renewable water availability in Gabon is projected to decline by up to 40 percent below the baseline in most of the central and eastern areas. Although climate change is expected to affect the future renewable water supply as well as water demands, projections show that the country should remain a 'no water scarce' country through 2050.

According to analysis using the Global Change Assessment Model (GCAM),[38] total water demand in the country is projected to double. Projected growth by sector in 2050 relative to 2010 levels are: Livestock: 108 percent; Municipal: 84 percent; Electricity: 94 percent; Industry: 108 percent; Irrigation: 220 percent. The municipality is a major contributor to total water demand, accounting for over 50 percent of total demand in many areas. However, the fraction of municipal water in total demand is projected to decrease, particularly in the north-central areas of the country due to increased competition with the livestock sector.

Water supply and sanitation services are not meeting the needs of the population. Improvements in access and sustainability of services are limited due to unclear roles and responsibilities of sector institutions, particularly for sanitation and rural water supply. About 90 percent of people in cities—home to 91 percent of Gabon's population—have access to basic water services, compared to 55 percent in rural areas (2022) [39]. However, urban water services managed by SEEG (Société d'Energie et d'Eau du Gabon) are plagued by mismanagement and insufficient maintenance – evidenced by a non-revenue water (NRW) rate of over 50 percent.[40] The resulting chronic water shortages in large areas of the urban distribution network may force people to cope through unsafe water sources. SEEG's operational performance has deteriorated since the abrupt end in 2018 of the affermage contract with Veolia, as the electricity and water operator. Low consumer billing and collections is accompanied by large arrears of unpaid bills accumulated by the state towards SEEG. As a result, SEEG has recorded increasing financial losses since 2018 which prevents it from honoring its financial commitments, hampering its ability to invest in maintenance and climate-resilient infrastructure to provide universal water services that are robust to rainfall variability and seasonal variations in surface water flows.

In rural areas, many communities remain unserved by basic water services and require investments in new water points and mini-grid systems. Meanwhile, the Water and Electricity Regulator (Agence de Régulation du Secteur de l'Eau potable et de l'Energie électrique, ARSEE) is largely unable to perform its role in sector

[38] The Global Change Assessment Model (GCAM) is a state-of-the-art integrated assessment model (IAM) designed to explore interactions among critical sectors of the economy, the human and physical systems, and to support policy-relevant decisions (Edmonds and Reilly 1985, Wise et al. 2009, Clarke et al. 2014). As a leading IAM, GCAM has contributed significantly to advance the scientific understanding of climate change as the IAM selected by the Intergovernmental Panel on Climate Change (IPCC) to model the representative concentration pathway (RCP) 4.5 (Thomson et al. 2011). GCAM is freely available as a community model and can be obtained through a widely used software repository (https://github.com/JGCRI/gcam-core).

[39] UNICEF / WHO.

[40] NRW is defined by the American Water Works Association (AWWA) as the sum of water loss and unbilled consumption in a water distribution system.

oversight. There is a need to reinforce both institutions through policy reform and capacity building to support the effective management and sustainability of water services.

With respect to sanitation, Gabon lacks adequate sanitation infrastructure at the household level, and has yet to develop a holistic sanitation value chain to address wastewater collection, emptying, transport, treatment, and reuse. In 2022, 50 percent of Gabonese lacked access to basic sanitation services. Safely managed sanitation and the management of fecal sludge are nearly nonexistent, with fecal sludge currently being dumped directly into the environment due to the lack of any fecal sludge treatment facilities. The resulting discharge of fecal sludge into the environment, exacerbated by increased flooding due to climate change, causes significant damage to the environment and biodiversity and leads to the spread of water-borne diseases. Gabon will need to undertake key reforms of the sector, build the capacity of the actors involved, enforce environmental regulations, and develop the infrastructure necessary for the collection and treatment of fecal sludge.

Flooding, including coastal, urban, and riverine floods, is a particular high hazard for Gabon. Floods cause significant physical damage, economic losses, displacement of affected persons, spread of waterborne diseases, and are often life-threatening. 70 percent of the country's population lives in coastal areas at risk of flooding due to sea-level rise[41]. Flooding in urban areas is aggravated by poor stormwater management.

Institutions and service providers in the water, sanitation, and water resources management sectors are poorly equipped and adapted to deliver sustainable services that are resilient in the face of climate change. Integrated water resources management (IWRM) is yet to be operationalized to safeguard the availability and quality of water resources for competing uses. A lack of operational data and monitoring systems prevents the Government from effective decision-making, particularly in the face of rainfall variability. electricity and water operator. Low consumer billing and collections is accompanied by large arrears of unpaid bills accumulated by the state towards SEEG. As a result, SEEG has recorded increasing financial losses since 2018 which prevents it from honoring its financial commitments, hampering its ability to invest in maintenance and climate-resilient infrastructure to provide universal water services that are robust to rainfall variability and seasonal variations in surface water flows.

Ensuring safely managed and climate-resilient water supply and sanitation services for all Gabonese by 2030 requires substantial annual financing. Given fiscal constraints, mobilizing diverse funding sources will be essential to supplement budget allocations. Expanding safely-managed access to unserved populations is roughly estimated at US$1.24 billion and US$85 million total in urban and rural areas respectively based on methodology developed by Hutton and Varughese (2016).[42] An additional approximately US$62 million would be required for NRW reduction in the Libreville urban area.[43] Finally, it is important to consider the expenses required to implement SEEG's turnaround plan (likely to be in the order of US$50 million). In total, about US$1.43 billion would be required, not including the recurrent operational and maintenance costs of existing infrastructure and any additional water production facilities that a water audit may deem necessary to compliment NRW reduction. The government needs proactive

[41] Climate Risk Country Profile: Gabon, World Bank Group, 2021

[42] Team's calculation using World Bank population, population growth, and urbanization data and estimated unit costs for basic and safely-managed water and sanitation services in Gabon from Hutton, Guy; Varughese, Mili. 2016. The Costs of Meeting the 2030 Sustainable Development Goal Targets on Drinking Water, Sanitation, and Hygiene. © World Bank, Washington, DC. http://hdl.handle.net/10986/23681 License: CC BY 3.0 IGO..

[43] Assumes reducing NRW losses by 103,633m^3/d. That is, reducing losses from 170,794m^3/day, or 51 percent, to an assumed economically-efficient 67,162m^3/day, or 20 percent (figures from SEEG's most recent annual report of 2021). An average unit cost for physical leak reduction globally of US$600 per cubic meter per day was assumed based upon Liemberger R. & Wyatt A. 2019 Quantifying the global non-revenue water problem. Water Supply 19 (3), 831–837. https://doi.org/10.2166/ws.2018.129.

policies and a conducive regulatory environment to attract private investment and PPPs to improve water management and access. Private sector participation could be leveraged to expand water access to secondary cities, develop targeted initiatives, concession models, and blended rates that expand water access in under-served communities.

Recommendations (see Annex VII for more details)

- **Implement a turnaround plan for SEEG to improve performance and optimize the use of water resources.** SEEG should adopt a Turnaround Plan with clear actions on efficiency, resilience, and service quality. The plan should prioritize reducing water losses in Grand Libreville and explore PPPs to boost performance. A diagnostic should assess future production needs, followed by technical studies. Once service improves, tariffs, unchanged since 2018, should be gradually adjusted to ensure financial viability, balancing affordability and sustainability. **Additionally, there is a need to strengthen institutional capacity and governance by improving the regulatory environment, supporting the Ministry of Energy and Water Resources in leveraging public and private financing, and enhancing ARSEE's capacity to effectively regulate the sector**. Clarifying roles, building institutional capacity, and improving the policy framework are key to enabling sustainable water management and attracting public-private partnerships.

- **Expand access to water supply in rural areas while ensuring effective operations and maintenance (O&M).** In rural areas, access should be expanded through new mini-grid water systems, water points, and SEEG network extensions where feasible. Outside SEEG's perimeter, the GoG should ensure sustainability by clarifying O&M responsibilities, improving financial viability, and strengthening institutional capacity and regulation for CNEE, SEEG, and municipalities.

- **Improve sanitation by investing in fecal sludge treatment plants and related services and by enforcing environmental regulations to prevent the dumping of untreated waste.** Three fecal sludge treatment plants (FSTPs) are planned with World Bank and AfDB support and must be complemented by structuring the sanitation value chain. Regulation and enforcement should prevent the dumping of untreated sludge once the plants are operational.

- **Operationalize integrated water resources management (IWRM) and take a multi-faceted approach towards improving water security.** The Government should implement regional water policy of the Economic Community of Central African States (ECCAS), focusing on transboundary water management, resource monitoring, and investment planning. Strengthening data systems, promoting nature-based flood protection, and recognizing groundwater ecosystems are key to climate resilience.

Managing climate risks in urban centers

Gabon's urban population is distributed in sparsely populated and poorly connected urban areas. Apart from Libreville (703,940 inhabitants), Port-Gentil (136,462 inhabitants), and Franceville (110,568 inhabitants), all other cities in the country are small or very small, with 14 cities with populations of between 10,000 and 80,000[44]. They are scattered over a relatively large territory of 267,667 km^2. The average population density is 8.1 people per km^2. In the absence of substantial investment in transport

[44] Source: citypopulation.de. Population figures are based on last census 2013. 2020 projections for Libreville (834,000), Port-Gentil (163,000), Franceville (132,000).

infrastructure, connectivity between and within cities represents a major challenge for Gabon's urbanization and the country's economic development.

Lack of budgeting and public spending in the urban sector resulted in substantial deficits in basic infrastructure and services in most cities. In recent decades, investments have not been able to keep pace with the rapid and uncontrolled urbanization of the country. This resulted in the proliferation of informal settlements in cities, characterized by poor access to basic services, poverty, poor connectivity, lack of drainage systems, insecure tenure, and exposure to risks. Lack of planning and enforcement and underinvestment in infrastructure have resulted in development often taking place in flood-prone areas, swampy lowlands, or hillsides unsuitable for construction. These informal settlements, mostly occupied by poor households, account for 36.6 percent of urban population nationwide[45].

The national urban strategy lacks coordination to manage spatial development, and municipalities lack financial and technical capabilities to effectively implement plans and invest in infrastructure. There is no recent urban development policy in Gabon, and urban development has been unfolding without coherent development plans[46] , leading to sprawl. This poses significant difficulties for municipalities who need to equip and manage their territory with limited resources. Consequently, urban management suffers from chronic issues such as inefficient land use and dysfunctional land markets, lack of maintenance of exiting assets, proper prioritization, and enforcement of regulation[47].

Secondary cities exhibit low population density and extensive urban sprawl with a lack of clear structure or centrality. Commercial hubs are organized along key roads, but the businesses are often housed in fragile and informal structures lacking essential services (e.g. waste, parking, equipment, etc.). While the main roads are often of good quality, secondary roads are often not paved and impassable in rainy weather, limiting access and economic activity. Pedestrian infrastructure is inadequate, and erosion of water bodies' banks poses additional risks. Public and green spaces are underdeveloped, and public facilities are poorly connected and often affected by flooding. Informal housing is prevalent, and water and waste management issues lead to significant health problems.

The country's urban centres are also prone to pluvial, fluvial, and coastal flooding resulting in damage to assets and disruption of human activities. Direct economic losses from fluvial and pluvial flooding account to an annual average (AAL) of USD 270 million (0.23 percent of total stock value) and affected areas produced about 0.22 percent of the national GDP (2016 reference year)[48]. These values are expected to increase significantly by 2050 under future climate scenarios (i.e., AAL of USD 450 million, 0.37 percent of total stocks and 0.3 percent of GDP). These figures do not yet account for the impact of coastal flooding and as coastal areas significantly add to the GPD, annual GDP losses would be much higher. Although floods currently affect, on average, only 0.21 percent of the total population, this number is likely to increase given prediction of more extreme events in the near to medium term.

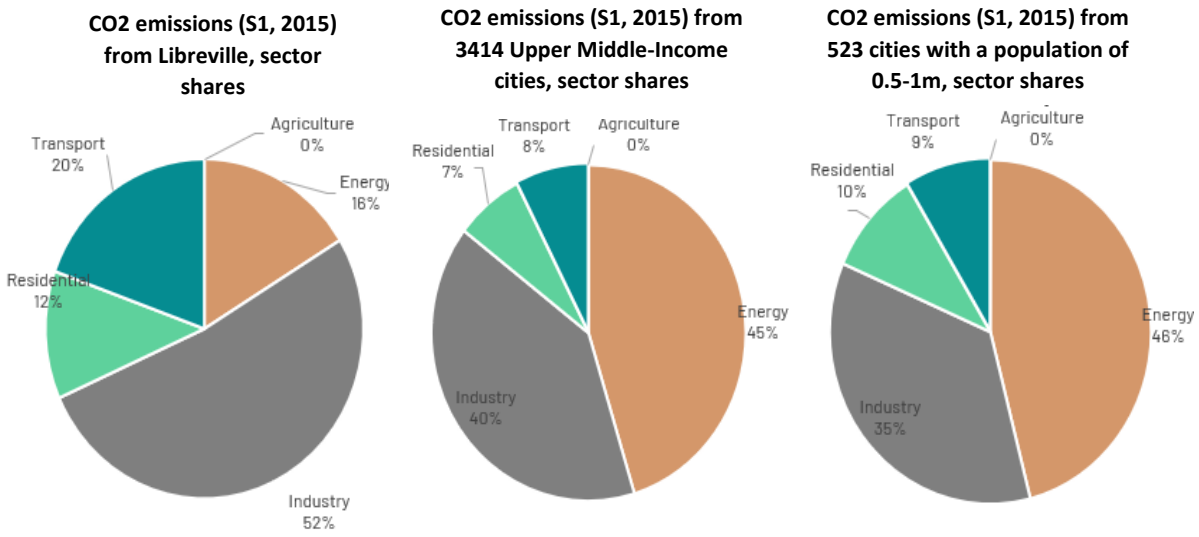
Underdeveloped or inadequately maintained drainage, sanitation and solid waste management systems exacerbate flood risk and contribute to environmental degradation. Gabon generates 0.56 kg of municipal

[45] Compared to the average of 65 percent of urban population in slums for Sub-Saharan Africa (2018 data, source: UN-Habitat)
46 While the national Urban Development and transports strategy was defined through the PAPSUT (with World Bank support in 1996–2001), its implementation was very weak, mainly because of the poor mobilization of resources and the complicated implementation of neighborhood upgrading operations in under-served areas. The Master Plans (Schéma Directeur d'Aménagement et d'Urbanisme - SDAU) for the nine provincial capitals have been updated and approval but most are not operationalized.
47 A decentralization law was passed in 2015, and its practical implementation is expected to improve cities' capacities to achieve their functional potential, especially if it is coupled with better resource allocation and more effective management by local governments.
[48] CIMA Research Foundation et al. (2018). *Disaster Risk Profiles Gabon.* https://reliefweb.int/report/gabon/disaster-risk-profile-gabon-building-disaster-resilience-natural-hazards-sub-saharan

solid waste (MSW) per capita per day, amounting to an overall daily MSW generation of 652,000 kg[49]. About 34 percent of MSW generated in Gabon is inadequately managed. In comparison, the average daily waste generation per capita of Sub-Saharan Africa is 0.46 kg and less than 44 percent of this waste is collected.[50] In Gabon, plastic waste accounts for 12 percent of MSW arisings with a daily generation rate of about 118,000 kg[51]. Waste recovery and disposal are underdeveloped in most cities and landfill site are often problematic from an environmental and safety point of view. For example, in Libreville the Mindoubé landfill is crossed by the Lowé River, and during heavy rains the river carries large quantities of waste to the sea[52]. Although the collection system works quite well, drains clogged by waste, litter and plastic pollution of surface waters are still a major challenge. Furthermore, most plots are not connected to a grey water disposal system and discharge into storm water drainage or rivers. Urban drainage systems are generally underdeveloped and/or poorly maintained, and flow is impeded either by the built environment or waste.

Although in line with other Sub-Saharan African cities, Gabon's cities have a relatively higher share of CO_2 emissions from transport and residential areas compared to cities of similar size or wealth-level. As its largest city, Libreville is responsible for most of Gabon's urban CO2 emissions. Transport accounts for 20 percent and residential for 12 percent of Libreville's total direct emissions. Industry and energy production are close to urban areas in many Gabonese cities (e.g. manganese and uranium mining industry in Franceville, oil and gas industry in Port-Gentil).

Figure 3.8 Sector shares of urban emission in Libreville and cities of similar income level or size



Source: World Bank based EDGAR Urban Centre Emission data 1975-2015.

Cities across Gabon face a multitude of climate risks, which can undermine gains from urban development in absence of climate action. Gabon is vulnerable to climate change impacts, particularly changing precipitation patterns leading to flooding and landslides, sea level rise, increasing temperatures, and drought events. These risks will put significant pressure on the country's economy, urban infrastructure, and vulnerable groups. The convergence of risk factors is especially pronounced in the major coastal cities

[49] Source: WACA, 2019 (https://www.wacaprogram.org/sites/waca/files/knowdoc/6. percent20Gabon.pdf).
[50] UNEP, 2020 (https://www.switchtogreen.eu/wp-content/uploads/2021/02/Integrated-Waste-Management-in-Africa-Focus-on-Circularity-.pdf).
[51] Source: https://www.wacaprogram.org/sites/waca/files/knowdoc/6. percent20Gabon.pdf
[52] https://copip.eu/news/integrated-solid-waste-management-project-cvtd-libreville/

of Gabon, Libreville and Port Gentil, where a significant portion of the population resides. Hazards are likely to intensify in the future and impact more residents due to climate change, rapid and unmanaged urbanization, and continued environmental degradation. Without proper adaptation measures, climate shocks can thus negatively affect the livability and resilience of Gabon's cities and undermine development gains that urban investments may bring.

The rapid urban growth over the past decades resulted in new built-up area in flood zones, exacerbating the already high flood exposure of some cities, particularly those situated along rivers. For example, an estimated 37 percent of the population in Libreville is directly threatened by floods[53]. Libreville and Port Gentil are projected to experience increased annual rainfall as well as extreme rainfall, in addition to longer dry spells. Thus, strategic, integrated spatial planning and urban management, including the enforcement of zoning laws or building codes, will become even more important under future climate change scenarios.

Enhanced spatial planning and urban management as well as climate-proofing of existing and future assets and services will be key for Gabonese cities. Both climate change and urban growth can further strain the capacity and performance of Gabon's urban infrastructure and services. For example, waste generation is expected to more than double in the next 25 years[54] and without proper investments into the waste management and the drainage system as well as the right regulatory framework, the impacts of urban flooding will be far worse than under a climate-change only scenario. Among the urban sectors, the housing and the service sectors are expected to suffer the most from increased flooding associated with climate change[55]. Direct flood losses in the housing sector are expected to increase 1.7 times from an annual average of ca. USD 135 million to ca. USD 230 million, while service sector losses rise from ca. USD 60 million to ca. USD 95 million[56]. Transport systems and critical infrastructure will also experience significant increase of losses. Therefore, investments in climate proofing of urban infrastructure and services are a must, alongside exercising of adequate spatial planning and urban management.

Drought conditions vary substantially across Gabonese cities; some are expected to experience more severe drought conditions while for others, drought risk may decrease in the mid-term. Several Gabonese cities may experience prolonged warm and dry spells, rising temperatures, and increased rainfall variability. Annually, approximately 21,000 people are affected by drought and potential losses account up to USD 185 million each year. These figures are expected to rise to 50,000 people affected and USD 214 million in potential losses[57]. Lambaréné, which has experienced historical drought conditions, is particularly vulnerable. This will affect water provision in cities, with significant and more frequent water shortages expected for cities such as Libreville. Extended dry spells in all cities will have cascading impacts on not just drinking water, but also livelihoods, food supply and potentially electricity supply. This will be a major challenge for Gabon's fragmented and complex water sectors, as coordinated action will be needed.

Urban heat will pose health risks to residents and negatively affect labor productivity and infrastructure. Surface temperature in Gabonese cities during the hottest months can currently exceed 45 degrees Celsius. With continued increase in built-up and sealed/concrete surfaces as cities expand and densify, summer urban temperatures are projected to rise further by 2050, even without accounting for climate change. In Franceville, a mean temperature increase of 1.6 degrees Celsius is expected for the period of 2040-2059. Significant increases in efforts to mitigate the carbon footprint of urban areas (e.g. green

[53] GFDRR, 2024. Urban Climate Risk Analysis.
[54] More Growth, Less Garbage, World Bank, 2021
[55] E.g. increase in precipitation 10-14 percent (by 2074 resp. 2095) and temperature increases to 2-4 degrees Celsius (by 2074, 2095)
[56] CIMA 2018
[57] CIMA 2018

buildings, transport, etc.) are required along with adaptation measures (e.g. neighbourhood greening, improved airflows and ventilation, cooling) to control health and impacts of heat on labor productivity. The impacts to labor productivity from heat stress are relatively high in Gabon due to its hot climate. The mostly affect sector is agricultural while moderate effects are projected for the industry and service sector.

Air quality is concerning in Gabonese cities, with most cities exceeding the WHO threshold for PM2.5, a measure of particulate matter present in the air[58]. The primary sources of air pollution in urban areas are vehicle emissions, refining industries, and waste burning. Additionally, domestic activities such as the burning of wood and biomass for cooking purposes also release harmful pollutants into the air, even if access to clean cooking is high in urban areas, reaching 96 percent of the population in 2022[59]. With the rise in urban energy demand, oil/gas power plants have emerged as significant contributors to PM2.5, exacerbating the already deteriorating air quality. Surprisingly high air pollution levels are even found in rural hinterlands such as Oyem. The absence of air quality monitoring data and related management capabilities has only compounded this issue. Improving air quality will require both enforcement of environmental regulations (e.g. related to oil/gas, waste, air etc.), implementation of a cohesive framework for air pollution mitigation as well as ultimately efforts towards a more low-carbon economy.

The disaster risk management (DRM) system in Gabon is not comprehensive and remains mainly focused on civil protection and some risk reduction efforts. These activities are carried out by several government agencies in collaboration with a variety of non-government stakeholders, including development partners. The legal framework derives from various pieces of legislation instead of a single law[60], and mainstreaming of DRM in the national budget is limited. Although there are planned budgets for disaster prevention and mitigation under the Ministry of the Interior, direct budget allocated to DRM is relatively small (i.e. for the years 2014-2017[61], the marked DRR budget was 7.5 percent of the national budget with of 0.1 percent of the budget directly linked to the principal DRR policy objectives)[62]. Most of this principal DRR budget is targeted at social interventions rather than economic and infrastructural investments. For post-disaster management, Gabon heavily relies on donor funds. Thus, working towards a comprehensive system including strengthening of capacities in preparedness (e.g. early warning systems) as well as response is crucial for Gabon to deal with future climate impacts. Areas for DRM capacity improvement include risk information, analytics and mapping for informed planning and decision making, as well as strengthening of risk prevention (e.g. infrastructure maintenance and upgrading), and response and post-disaster recovery capacities (e.g. disaster risk financing/financial protection). This may help to prevent or recover better from loss and damage life, health, livelihoods, and assets in urban areas.

Recommendations (see Annex VII for more details)

Seven priority recommendations aim to strengthen resilience in Gabonese cities by addressing risk levels, impact, and feasibility. They promote policy coherence, climate risk awareness, and stronger community resilience through public, private, and civil society partnerships.

[58] The six main cities have average PM2.5 exceeding 5 µg/m3, a threshold which, according to the WHO, is associated with a 6–13 percent increase in long-term mortality. Transportation, mining and forestry contribute heavily to air pollution in Gabon. Source: GFDRR (2024). Urban Climate Risk Analysis (based on data from SEDAC & WHO)

[59] World Bank. World Development Indicators database. In rural areas, less than half (49 percent) of residents have access to clean fuels and cooking technologies.

[60] UNDRR risk sensitive budget review, 2020.

[61] Calculations are based on 2014–2017 Finance Law Budgets, Ministry of Budget and Public Accounts, Gov. of Gabon

[62] UNDRR risk sensitive budget review, 2020.

- **Create evidence-informed Early Warning Systems and improve planning and response actions** Strengthening multi-hazard early warning systems is vital for disaster resilience, giving communities time to act and take ownership. Efforts should focus on building local capacity, raising awareness of vulnerabilities, translating warnings into action, and addressing training gaps in preparedness and response.

- **Strengthening flood monitoring and forecasting is critical to ensure more accurate and reliable information.** Capacity building should help communities interpret climate information and understand local risk factors. Adapting warning messages to local contexts and platforms enhances response, while integrating traditional knowledge supports effective Disaster Risk Management (DRM), Strengthening local governments' ability to disseminate information and coordinate efforts is also essential.

- **Integrate flood resilience into urban planning and develop and adopt integrated water and flood risk management approaches with a focus on Nature-based Solutions.** Beyond upgrading materials and flood-proof designs, the Government should guide city growth and land-use planning to prioritize flood resilience and protect growing populations from natural disasters.

- **This should include establishing floodplain management regulations, zoning codes and updates to existing building and construction codes to regulate or guide development in flood-prone areas, based on comprehensive flood risk assessments.** This is not only vital for residents and developers to comprehend the risks associated with living or building in specific areas but also has ripple effects on other sectors. For instance, flooding has impaired sanitation infrastructure in Gabon, resulting in the spread of fecal waste through floodwaters, negatively impacting human and environmental health.

  The promotion of Nature-Based Solutions (NBS) or green infrastructure where feasible will support flood management. Solutions should adopt a watershed approach, including stormwater use, flood control, aquifer recharge, and water reuse to manage floods and droughts. The private sector should assess water risks and engage in stewardship to improve watershed health.

  NBS also has the potential to significantly enhance drought resilience in Gabon and are currently being tested for their effectiveness in bolstering flood resilience across the country. For example, wetlands can replace costly stormwater and greywater treatment, while supporting livelihoods like fishing and farming. To tackle water challenges and climate risks, local governments should adopt a bottom-up approach that integrates nature-based solutions and green infrastructure with resilient grey infrastructure.

- **Systematize resilient urban action plans to mitigate extreme heat and air pollution and implement innovative solutions in urban developments.** To address extreme heat, pollution, and emissions, local governments should coordinate stakeholders for better planning and long-term reduction programs. Informal settlements, growing with population demand, often face higher heat risks and need targeted attention.

  Passive cooling solutions can immediately and cost-effectively mitigate heat stress in informal or low-income neighborhoods (e.g., cool and green roofs, promoting neighborhood greening, and creating urban ventilation channels as part of settlement upgrading efforts). To reduce transport emissions, cities should enhance urban mobility planning, promote decarbonized transport, and expand green public

spaces and nature-based solutions. Engaging residents and repurposing vacant spaces as cooling centers can also help reduce heat stress.

Establishing urban climate action plans at the city and sub administrative levels is critical for enhancing citizens' overall understanding and promoting the necessary actions to remedy the effects of heatwaves and pollution in Gabon. This should be reinforced by institutional reforms to support efficient coordination and the effective allocation of resources. The government should provide strong financial and policy support to work toward the goal of alleviating urban heat and creating livable public spaces.

- **Strengthen the role and capacities of local authorities to expand the resilience of their communities.** Municipalities are frontline defenders against climate impacts. The Government should strengthen laws and institutions to support local adaptation, improve coordination, and equip local authorities with the technical and financial capacity to build resilience.

  Community-based resilience planning could play a crucial role in buttressing residents' adaptive capacity by leveraging grassroots resources. Furthermore, improving the resilience of the poorest and most vulnerable will be critical for community resilience. With 42 percent social resilience in Gabon is lower than the global average (62 percent) – meaning that well-being losses outnumber asset losses, making recovering from and coping with disasters more difficult. High asset vulnerability, limited financial inclusion, and poor early warning access contribute to this. Scaling up local initiatives can support communities, speed recovery, and strengthen critical resources like schools and hospitals as resilience hubs.

Developing resilient transport and digital connectivity

Physical and digital connectivity issues are both constraints and solutions to a greener economy in Gabon. Gabon's transportation sector, such as rail, road, river, and air transport, relies heavily on petroleum products for nearly 91 percent of its final energy. The urban transport sector is a major contributor to GHG emissions in Gabon, estimated to contribute 20 percent of total energy sector emissions. Motorized transport, particularly road, sea, and air transport, remains dependent on oil and combustion engines. The share of biofuels consumed by vehicles has steadily increased over the years, but the implications for GHG emissions vary considerably depending on the feedstock and conversion technologies used. Within the transport sector, road transport generates the highest proportion of GHG emissions, followed by sea and air transport. Road is the major means of transporting people, goods and services in Gabon. The country has a total road network of 9,170 km (2018) of which only 1,097 km is paved.

Rail transport in Gabon, mainly managed by SETRAG, plays a major role in the economy by facilitating the transport of goods and people. Better planning could help reduce the sector's carbon footprint, for example by adopting cleaner technologies, including on transport, and improving energy efficiency. Higher energy efficiency could also help cut transportation and operational costs, which would greatly benefit the economy, including key sectors that depend on railway transportation, such as wood and mining. In addition, measures need to be taken to make rail infrastructures more resilient to extreme weather events, thus contributing to a greener, more sustainable economy.

Gabon is sensitive to the impact of climate change by its exposure to a wide range of natural hazards which includes extreme winds, seasonal flooding, and landslides. These hazards are detrimental to the country's transport sector. The urban flood hazard risk is classified as high, meaning potentially damaging and life-threatening urban floods are expected to occur at least once in the next 10 years. The country is strongly

committed to improving its environment and the efficiency of the national transport system should play a major role in achieving these objectives. Environmental commitments include a 50 percent reduction in greenhouse gas emissions by 2025 and the preservation of 98 percent of Gabon's tropical forests.

Factors contributing to transport emissions include (i) Fuel consumption. Today, 70 percent of Gabon's vehicle fleet runs on diesel; (ii) the country's ageing vehicle fleet; (iii) the lack of efficient public transport infrastructure. The lack of reliable and accessible public transport systems forces people to resort to individual vehicles, aggravating congestion, and emissions. (iv) The growth in air traffic, particularly in large cities such as Libreville and Port-Gentil, also contributes to GHG emissions. To speed up the transition to addressing climate change and build a more resilient and connected society, Gabon's advanced digital infrastructure could be used to unlock new pathways for rapid economic growth unlike other sectors. Gabon is one of the most advanced digital markets in Central Africa and has a strong foundation to build on. It has one of the most liberalized digital sectors in the region, with affordable services. Gabon has both the highest percentage of internet users and the most affordable mobile broadband data in West and Central Africa, with internet access covering 74 percent of the population as of 2022 and the mobile broadband data at a cost of 1.6 percent of the monthly GNI per capita in 2022[63]. However, while Gabon has grown its broadband connectivity, exceeding the regional average, disparities remain when it comes to access and digital literacy. Gaps remain in data infrastructure and last mile connectivity of schools, hospitals, and other public institutions. Also, the existing national backbone infrastructure would benefit from upgrades. Overall, the country has not yet been able to fully capitalize on its digital infrastructure investments to improve public administration and service delivery and build a vibrant local entrepreneurship ecosystem, capable of creating more jobs and bringing more businesses and individuals online. In 2020, Gabon's Digital Adoption Index was at 28 out of 100 points, lower than the West and Central Africa average of 47.43 points[64].

The impacts analysis for the transport sector focuses on roads and bridges subsectors, and the total impacts are estimated under a 'current policies' Baseline and an Adaptation scenario. The adaptation scenario assumes proactive climate resilience measures are implemented across the entire road network. The analysis examines the impacts of climate change in the form of increased repair and maintenance costs incurred as a result of climate damages. It also performs a disruption cost analysis to estimate the delay costs of damaged roads and bridge requiring repair and maintenance, which in turn result in labor productivity effects. The main drivers of damage across all climate futures evaluated are flooding and precipitation, which account for approximately 84 and 16 percent of damages, respectively. On average, annual costs in the 2040s increase by approximately USD 14.4 to 15.9 million for roads and approximately USD 2.2 million for bridges. The impacts are concentrated in the western provinces of Estuaire, Moyen-Ogooué, and Ogooué-Maritime, with more moderate and uniform damages in the rest of the country.

Figure 3.9 : Annual Incremental Costs and Delays under the Baseline scenario with 'current policies' for 2041-2050

[63] WDI.
[64] The DAI is a worldwide index that measures countries' digital adoption across three dimensions of the economy: people, government, and business. The index covers 180 countries on a 0–1 scale.

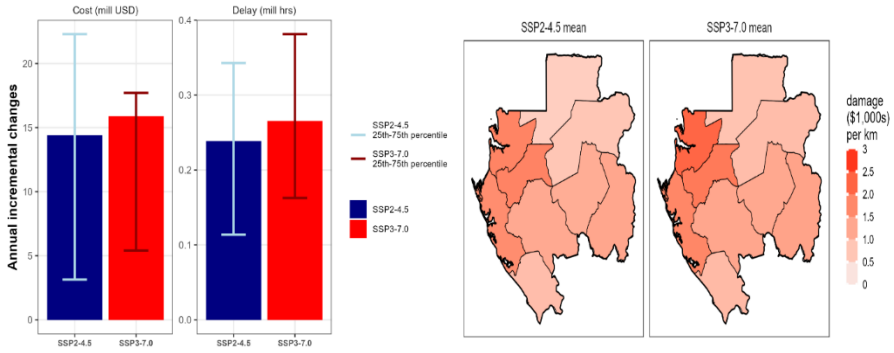
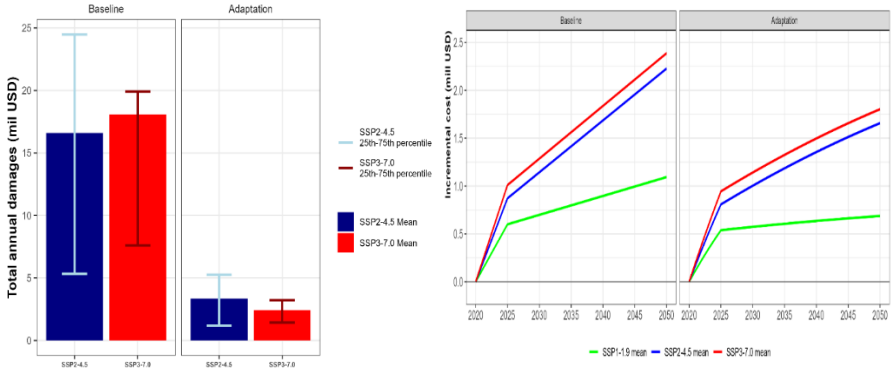


Figure 3.10 Projected Annual Road Costs and Average Annual Bridge Damage



Source: Estimating the Economic Damages of Climate Change in Gabon, IEc, 2024.

Investing in adaptation reduces total damages in the roads by about USD 13.3 to 15.6 million per year with incremental annual delay increases of between 240,000 and 270,000 hours by 2041-2050. Likewise, expected annual labor supply shock is projected to reach approximately -0.03 percent by 2041-2050. The reductions in total road and bridge costs are driven by investments in more resilient road infrastructure and of improving bridge design standards, making them more resistant to the significant flooding and precipitation impacts.

Recommendations (see Annex VII for more details)

To achieve its economic, social and climate goals, the Government, through various ministries including the Ministry of Energy and Hydraulic Resources, the Ministry of Water and Forests, and the Ministry of Public Works, must collaborate to develop and implement effective action plans for the transport sector.

- **Adopt a reform plan to improve the resilience of transport infrastructure, involving investments in public transport, urban and national roads, and railway, air, and maritime transport.** It would be important to consider resilience aspects, for example to minimize the expected impacts of climate change to its roads and bridges[65]. The adaptation strategies will include the reduction of the likelihood of inundation and increase stability (construct/Improve cross-drainage systems, elevate the road surface above the altitude of likely floodwater height, strengthen pavements and repair damages including cracks and potholes to increase their ability to resist water flow etc.), increase bridges hydraulic capacities (scour

[65] The modeling results of expected impacts of climate change to Gabon's roads and bridges, as well as adaptation costs, are discussed in chapter 4 and annex 1.

and erosion countermeasures at bridge sites). Prioritize road links and bridges in need for adaptation, especially in the Estuaire, Moyen- Ogooué, and Ogooué-Maritime.

- **Build on ongoing investments to expand digital connectivity and bring in sustainability aspects.** The Government's digital transformation program offers opportunities to boost the digital economy and promote sustainability. Expanding digital infrastructure can support underserved areas, improve sector efficiency, enhance digital financial services, build a skilled workforce, and modernize public services. Reforms should embed sustainability through a framework promoting energy efficiency, renewable energy use, e-waste management, circularity, and governance for green digital investments.

  Additionally, further expanding access, developing digital skills, scaling infrastructure through 4/5G towers and metro fiber, and driving more advanced use cases like data centers, cloud and AI solutions, can help unlock the full potential of the digital economy. Other recommendations include: (1) reactivate the universal access fund to further expand broadband coverage; (2) promote investment in rural areas through tax incentives and subsidies; and (3) Update laws and regulations governing the TMT sector and allow new data service providers to enter the market and the private sector to expand digital infrastructure.

- **For maritime transport, integrate alternative technological solutions and analyze the national production capacity for green fuels.** It also important to support players in the transport logistics chain by giving them the means to effectively assess and mitigate their carbon footprint. Specific actions include. (i) Carry out a feasibility study for the gradual renewal of the national vehicle fleet; (ii) Set up a GHG inventory for the transport sector according to the GIEC Tier 2 Bottom-up methodology; and (iii) Promote environmentally-friendly options by reducing the associated utilization rates.

3.2 Natural capital management

Increasing productivity and production (agriculture, fisheries, and food security)

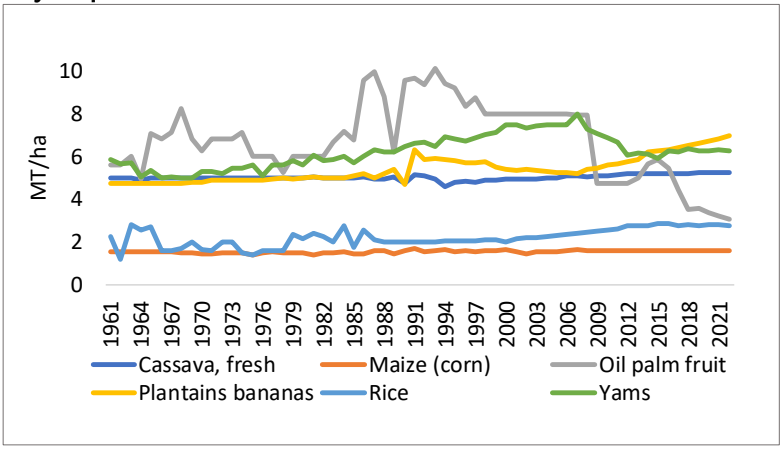
Agriculture productivity and production in Gabon have stalled despite the country's significant potential and government programs to boost local food production. Despite its 3 million hectares of agricultural land, a rich hydrographic network, and abundant annual rainfall, ranging from 1,450 to 4,000 mm, agriculture in Gabon remains in a low productivity and low production equilibrium. Local crop production has stagnated in the last 10 years and is estimated at around 800,000 tons, of which more than 90 percent is made up of bananas, roots, and tubers. Yields have not improved since the 1960s[66], keeping the supply of major crops below the national demand. Production of cassava and plantains, for example, have stagnated at 230,000 and 175,000 tons/year leaving Gabon with supply gaps of 130,000 and 85,000 tons/year, respectively. The livestock sector is comprised primarily of smallholders, with a semi-nomadic system and with a few industrial units in poultry and beef cattle. Similarly, fishing remains largely artisanal, with a few larger shipowners of foreign origin, despite a large coastline of 800 km. As a result, Gabon remains highly dependent on food imports, which represent about 60 percent of nutritional needs[67] A staggering 450

[66] Yield decline in palm oil production in Gabon stem from mainly the El Niño weather phenomenon. For example, in 2017, high rainfall in Gabon's Awala plantation resulted in crop losses of 1,093 kg/hectare. Other factor contributing to productivity decline include the plantation aging caused by farmers failure to replant.

[67] US Trade Department. 2024. Gabon: Country Commercial Guide. Market Opportunities (https://www.trade.gov/country-commercial-guides/gabon-market-opportunities).

billion FCFA was spent in 2022 alone[68]. This overreliance on food imports makes the country vulnerable to external market fluctuations, such as rising global food prices and international transportation costs, exerting inflationary pressure in the country, and affecting food security.

Figure 3.11 Yield of key crops 1960 - 2022.



Source: FAO.

Agricultural production systems in the country include: (i) family systems in forest and savannah areas; (ii) peri-urban systems (market gardening); and (iii) agro-industrial systems. The family systems are the backbone of the agriculture sector in the country and are made up of 70,000 farms, encompassing a population of approximately 150,000 people. These farms are between 1 and 2 hectares in size, and they primarily cultivate plantain, cassava, taro, yam, and various other vegetables. Peri-urban systems are practiced in less rural areas where private individuals – namely active and retired civil servants – cultivate fruits and vegetables on medium-sized private farms. The agro-industrial production systems are dominated by a few industrial producers, including the Investment Company for Tropical Agriculture (*Société d'Investissement pour l'Agriculture Tropicale* – SIAT), and Olam International, a multinational company focusing on rubber and palm oil production. As of 2024, IFC is investing in Olam Palm Gabon to support 63,000 hectares of palm oil plantation and milling operations.

Gabon's agricultural sector, excluding forestry, plays a marginal role in the country's economic and social life. Over the recent decades, its contribution to the GDP has declined and is now about 3 percent compared to 16 percent in 1970. The downward trend in the sector's contribution is mainly due to the dominance of the oil sector in the economy. Nevertheless, agriculture, stockbreeding, and fisheries have declined by almost 80 percent in terms of annual food production[69]. This has created chronic food deficits and insecurity, which are threatening a high proportion of Gabon's population.

Having recognized its heavy dependency on the oil sector and food imports, Gabon has embedded agricultural production as a key pillar of successive development plans. Launched in 2016, the Plan Stratégique Gabon Emergent (PSGE) was designed to be a roadmap that guides the transformation from a rent-based economy to a high value-added and diversified economy while protecting the country's vast natural wealth. Under the 'Green Growth' pillar, the focus was to transform the agricultural sector and make it the main driver of the economic diversification and inclusive growth. Increasing local production is seen

[68] US Trade Department. 2024. Gabon: Country Commercial Guide. Market Opportunities (https://www.trade.gov/country-commercial-guides/gabon-market-opportunities).
[69] Technical Support for the Agriculture Transformation Strategy and Promotion of You Entrepreneurship in Agricultural sector and Agribusiness, *African Development Bank*, 2017.

as a mean to reduce Gabon's dependence on food imports, improve food security, and alleviate high living costs. Over the years, several policies, plan, and programs were put in place, including: (i) the GRAINE program implemented at the end of 2014 with the aim of developing the Gabonese agricultural sector and improving its food and nutritional security (sécurité alimentaire et nutritionnelle – SAN); and (ii) The Agricultural Development and Investment Program (Le Programme de Développement et d'Investissement Agricole au Gabon – PRODIAG), the Plan to Accelerate the Transformation of the Gabonese Economy (Plan d'Accélération de la Transformation de l'économie gabonaise – PAT) that placed agriculture as a driver of economic growth. The PAT aimed at developing local agricultural sectors by increasing cultivated areas. To achieve this, five sectors were favored: cassava, plantain, sugar, poultry, and fishing. A more recent program, the National Development Plan for Transition (PNDT) 2024-2026, is intended to be the framework for reference to lead priority actions of the Government of Transition. It also places a central role for agriculture and fisheries.

Despite these strategies and successive government programs, the sector has limited public support. About 51 percent of agriculture land in Gabon is under sustainable land management practices. However, agriculture's share of public expenditure is only 0.7 percent, well below of the Comprehensive African Agricultural Development Program (CAADP) Malabo target of 10 percent. Funding for agricultural research to enhance agricultural productivity is also limited (0.16 percent of the GDP). Consequently, only 10 percent of farmers have access to good agriculture advisory services. In addition, only a small number of farmers have access to financial services, using an average of 8.79kg/ha of fertilizer per hectare of arable land which is much lower than the recommended 50 kg/ha.

Rural exodus is reducing availability of agriculture labor while increasing urban demand of food. Although agriculture employs 40 percent of the rural population[70] and the combined agricultural, forestry, and fishing sectors represent 72 percent of rural employment[71]., the rural population continues to decline, now constituting only 9 percent of Gabon's total population. The rural exodus creates a dual challenge: rising demand for food in urban areas and a labor shortage in the rural areas responsible for food production.

Weak land tenure systems are hampering agriculture production and productivity. Land ownership is generally unregulated and insecure, making access to land difficult for residents and producers. The land title ownership rate is low in the country. Only around 14.8 percent of women and 14.2 percent of man possess titles for their land[72]. This uncertainty discourages investment in land improvements, undermining productivity. Additionally, the absence of comprehensive land-use planning has led to conflicts, including overlaps between agricultural activities and protected areas. Currently, Gabon is preparing a National Land Allocation Plan (*Plan national d'affectation des terres* – PNAT), which aims to identify the different land uses, secure and make agricultural land available to farmers and cooperatives, economic operators, investors, and developers. However, this plan has not yet been completed and people without land titles remain vulnerable.

Human-wildlife conflicts discourage farming. Human-wildlife conflicts are notably caused by elephants often pushed to go to villages and plantations in search of food. Poaching in protected forests and even national parks pushes these elephants to find refuge in areas where hunting pressure is lower, including agricultural areas. Conflicts also arise from habitat disruptions through deforestation, mining, forestry, and infrastructure development, which fails to provide secure forest corridors for elephant migration. Elephants

[70] International Fund for Agricultural Development (IFAD), 2018
[71] World Bank 2020.
[72]Projet de développement agricole et rural, 2ème phase (PDAR2) Rapport de conception détaillée, IFAD 2018.

damage crops, destroy plantations, and pose safety risks to rural populations. A World Bank project demonstrated that constructing electric fences can effectively mitigate these conflicts, increasing farmers' monthly revenues by 40 percent through crop protection[73].

Low investment in irrigation in the face of climate change also hampers agricultural intensification. Irrigation systems are relatively underdeveloped, with most of agriculture still reliant on rainwater. The government has launched several initiatives aimed at increasing agricultural productivity and enhancing food security, including the construction of new irrigation systems. One such project is the Lambaréné Irrigation Project, which aims to develop irrigated agricultural areas along the Ogooué River. Despite these efforts, investments in irrigation remain limited. Currently, Gabon's irrigation potential remains untaped. Only 4,450 hectares are equipped for irrigation out of the estimated at around 440-thousand-hectare country potential. The lack of agricultural diversification and the dependency on traditional rain-fed agriculture leave the country vulnerable to climate-related shocks, including droughts and floods.

The lack of road infrastructure to support production and marketing is another severe constraint, among several other challenges faced in the agriculture sector. These include[74] the absence of technical and financial support, limited investments in modern agriculture, the insufficient qualification of human resources, rudimentary agricultural practices, the absence of seeds and improved inputs, the lack of breeding of large livestock, as small ruminants and poultry are favored, and the lack of awareness of the contribution of NTFP to SAN. Limited value addition through export of raw commodities has made lower returns for growers and exporters. More domestic processing, building on existing transformation investment initiative, is needed to increase profitability and economic security for farmers and businesses.

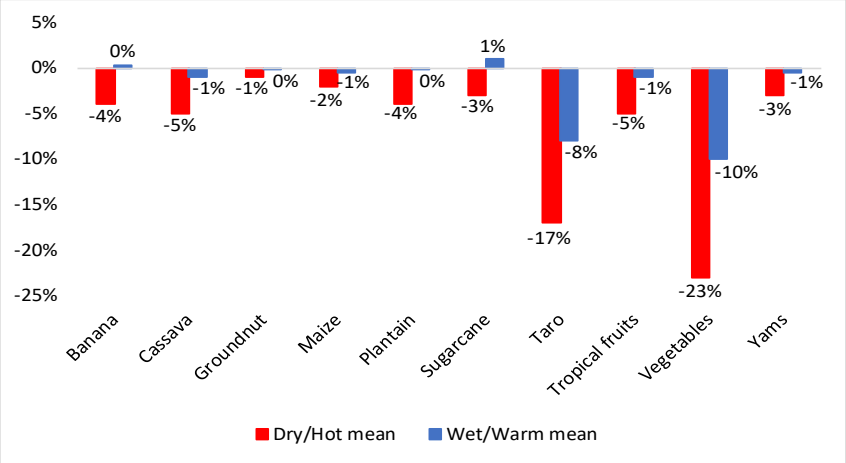
Gabon's agriculture sector is increasingly exposed to a range of natural hazards exacerbated by climate change, such as extreme winds, heat, flooding, and landslides. Agricultural losses are more pronounced in the Haut Ogooué, Nyanga, Ngounie, and Ogooué-Lolo provinces due primarily to droughts. Climate change is anticipated to have a variety of impacts on crop, livestock, and fisheries production. Temperature increases are likely to reduce the suitability and productivity of crops and pastures. Changes in precipitation patterns is expected to reduce water resources available for agricultural users, as well as impacting erosion levels which in turn will affect soil fertility. Further, changes in sea surface temperature are likely to impact aquatic environments and fish catch.

In terms of crop production, increasing temperature and decline in water availability caused by change in precipitation patterns are anticipated to have negative production shocks on the majority of rainfed crops under a "current policies" baseline scenario (Figure 3.9). Vegetables, taro, cassava, and tropical fruits are some of the most vulnerable rainfed crops. These crops are expected to experience production decline to 23 percent under the dry/hot[75] scenario and 10 percent under the wet/warm scenario[76]. The remaining crops show more minor or varied responses to climate change. Groundnuts, maize, plantains, and yams are all projected to experience negative shocks under both wet/warm and dry/hot conditions, while bananas and sugarcane are likely to see small gains in production under a wet/warm climate future in

[73] World Bank. *Gabon - Wildlife and Human-Elephant Conflicts Management in the South of Gabon Project (English).* Washington, D.C.: World Bank Group. http://documents.worldbank.org/curated/en/099080323104036065/B0SIB0225e353a0a80b2f5043ddc439090e
[74] Enjeux de l'agriculture vivrière et de la sécurité alimentaire et nutritionnelle durable au Gabon, Centr Universitaire de Formation en Environnement Durable 2022
[75] See Chapter 1, page 18 for description of the projected temperature and rainfall changes under the dry/hot and wet/warm scenarios
[76] Climate scenarios were presented in the IEc report and were based on the General Circulation Models (GCMs) from the Coupled Model. *dry-hot* mean scenario considered the compound effects of drought and heat. Under this scenario, drought condition is assumed to be amplified when accompanied by heat. *wet-warm* mean scenario considered the compound of precipitation and high solar flux or intense greenhouse warming. Under this scenario, season rain fall variation is assumed to be amplified when accompanied by high solar flux.

contrast to negative shocks under dry/hot conditions[77]. Discussions on the aggregate agricultural damages of reduced crop production and labor productivity losses are quantified and discussed in Chapter 4.

Figure 3.12 Rainfed Crop Production Shock under Baseline Scenario, 2041-2050



Source: IEc, 2024.

Gabon imports almost all the beef, sheep, pork and poultry meat for its consumption. Local livestock production is confined to cattle breeding. Pig and poultry farming is experiencing several difficulties, including difficulty accessing animal feed, leaving the country with limited livestock production. Under current climate conditions, approximately 1.6 percent of the small country's livestock production is affected by drought, while under future climate conditions, it is projected to increase up to 4.8 percent[78]. Currently, most of the livestock affected by droughts is situated in Ngounié, while in the future, large numbers of livestock will also be affected in the Nyanga, Haut-Ogooué and Ogooué-Ivindo provinces (UNDRR, 2019)

Gabon's fishing industry is greatly below the country's potential. The annual production of 30,000 tons is well below the potential for sustainable fish catch, estimated at 230,000 tons[79]. The Gabonese fishing sector is dominated by industrial fishing, artisanal fishing, and inland fishing. Aquaculture is also practiced, but accounts for a small portion of total catch. Industrial fishing is comprised of offshore fishing activities, and is dominated by foreign fishing fleets, which focus on tuna fishing for processing abroad. A revival of the local tuna processing industry is among the goals of the latest development plan, the PNDT. Artisanal fishing, which occurs mainly in estuaries and lagoons, is responsible for the majority of the country's catch, representing roughly 66 percent[80]. Fishing contributes significantly to Gabonese diets, with annual fish consumption estimated at 35 kilograms per person[81]. The main species include tuna, sardines, and bonitos. In the future, climate change may have important implications on the country's fisheries stock as increases in sea surface temperature and ocean acidification may potentially decrease species abundance[82]. Climate impacts are projected to grow incrementally towards mid-century and vary depending on the climate scenario considered. Between 2041 and 2050, mean shocks to fish stocks range from around -23.1 percent under the lowest radiative representative concentration pathways climate scenario (RCP 2.6) to about -30.4 percent under the worst radiative representative concentration pathways scenario (RCP 8.5).

[77] IEc report : *Estimating the Economic Damages of Climate Change in Gabon,* May 2024.
[78] UNDRR, Gabon Disaster risk profile, 2019
[79] World Bank. 2022. Pathways for Blue and Green Economic Diversification in Gabon. Washington, DC.: World Bank.
[80] Fisheries Committee for the West Central Gulf of Guinea (FCWC) 2018
[81] FAO 2022b
[82] World Bank 2021a

The 2023 Global Hunger Index (GHI) ranked Gabon as 80th out of 125 countries, reflecting important food security issues. With a score of 17.4 in 2024, which increased from 16.7 in 2016, the situation is still classified as moderate by GHI, but it is deteriorating.[83] Climate change can exacerbate food insecurity in the future, by hampering agricultural production and food distribution. Due to its largely adverse effects on Gabon's agriculture and food distribution, rising frequency and intensity of floods, droughts, and higher temperatures and sea levels are expected to have a negative impact on food security.

Food availability is the channel through which climate changes directly affects food security, and climate change is expected to reduce crop, fish, and livestock production. Crop production is inherently sensitive to climate conditions and is one of the most vulnerable sectors to the risks and impacts of global climate change[84]. The supply of meat and other livestock products will be influenced by crop production trends, as feed crops account for roughly 30 – 40 percent of the cropland in Gabon. Marine fish is predicted to decrease substantially, mainly because Gabon is in the tropical belt. As discussed in section I, by 2041-2050 crop, livestock, and fish productions are expected to decline up to 23 percent, 4.8 percent, and 30 percent, respectively.

To the extent that climate change is a contributing factor to food price increases, it is expected to reduce affordability and impact living standards. Climate change may impact food prices by increasing transaction costs for producers and traders. For example, increased temperatures, precipitation, and flooding that cause roads to deteriorate faster, which in turn influences infrastructure repair and maintenance costs, causes delays in transportation may increase transaction costs for users and hence food prices. As discussed in the transport section, annual road costs and delays due to climate change are expected to worsen significantly under both the means for SSP2-4.5 and SSP3-7.0 relative to the historical baseline. Under the SSP2-4.5 and SSP3-7.0 GCMs on average, annual costs in the 2040s increase by approximately USD 14.4 million and USD 15.9 million, respectively, relative to costs in the historical period. Another factor that may affect affordability is income losses following catastrophic weather events. Floods in Gabon typically affect around 0.33 per cent of the country's total population, posing significant challenges to the local economy. With future climate projections, this number is expected to escalate to 3.4 per cent.

Recommendations (see Annex VII for more details)

- **Prepare a Climate Smart Agriculture Investment Plan (CSAIP).** The plan will identify concrete actions that the government and the private sector can take to boost climate-smart agriculture, both in the form of investment opportunities and policy design and implementation.

- **Support the adoption of climate-smart and water-efficient agricultural practices, with the support of the private sector as a critical catalyst.** This includes adoption of heat-tolerant crop varieties for cassava, yams, taro, groundnut, and vegetables. This adaptation measure aims to reduce the heat stress, particularly for high-value crops. Crop rotation and association are sustainable soil and water management options that allow crop and nutritional diversification, reducing yield gap without increasing the use of external inputs. There is need to develop a sector for export-oriented regenerative agriculture, as well as scale and facilitate access to sustainable certifications. Invest in modern storage and processing facilities and adopt new technologies to transform operations to climate-smart practices.

[83] Global Hunger Index database. https://www.globalhungerindex.org/ranking.html
[84] Parry et al., 1999.

- **Build on infrastructure and current initiatives in timber to process cocoa, palm oil, and other crops domestically to create higher-value products, diversify exports, and generate more income for farmers and agribusinesses**. There needs to be infrastructure upgrades to boost access to markets, reduce costs, and make Gabonese agricultural products more competitive in regional markets. The demand for power in off-grid locations can boost rural electrification and unlock more potential for local commerce.

- **Increase investment in irrigation systems to increase the area under irrigation (from 4,500 to 25,000 ha in medium term):** The climate action scenario includes more widespread use of irrigation for some of the currently rainfed crops and increase the overall amount of crop production under irrigation. Precision agriculture and smart irrigation are key to adapting farming to changing weather patterns, optimizing resource use, and boosting productivity. There is a growing demand for peri-urban, small to medium irrigation systems (e.g., hand-held devices and affordable sensors).

- **Improve and simplify land tenure system.** The rights to access, withdraw, manage, as well as exclude others from land affect both the farmers choice of system and the profit earned from the chosen system. Land tenure also plays a critical role in Climate Smart Agriculture Practices (CSAPs) adoption.

- **Improve governance within farmer producers' organizations (POs).** Enhanced capacity of POs in various aspects, particularly in facilitating the interaction and coordination of actors along targeted value chains through good governance and strong leadership are likely to facilitate adoption of CSAPs.

Promoting sustainable management and local value addition of forests

Thanks to strong conservation efforts, Gabon boasts extremely low rates of deforestation and forest degradation. Over the years, several policies were adopted to promote sustainable forest management and biodiversity conservation. Other factors that associated with forest preservation are its long-term economic reliance on petroleum, a 90 percent urbanization rate, and a continued low population density of 9 people per km^2. In the last decade, with the petroleum sector entering a period of long-term decline, Gabon has moved to increase the forest sector's contribution to the national economy and to employment generation, while aiming at maintaining sustainable forest exploitation practices.

As a result, Gabon is one of the rare "High Forest Cover, Low Deforestation" (HFLD) countries, the fourth-most forested country in the world with over 90 percent forest cover, and with deforestation estimated at less than 0.1 percent per annum.[85] With around 240,000 km^2 of forests, Gabon accounts for 18 percent of the Congo Basin Rainforest. Every year, Gabon's forests absorb around 140 million tons of CO_2, while emitting around 40 million tons, for a net total sequestration of around 100 million tons (equivalent to half of the Netherlands' annual emissions). Consequently, the emissions from the land use sector are mainly due not to deforestation, but to forest degradation.

Deforestation has risen slightly over the period of 2010 to 2018, with total emissions estimated at 9.7 million tCO_2eq/year with a large portion (~40 percent) of historical deforestation considered "temporary" as part of shifting agricultural systems. Currently, only around 2,080 km^2 of land is occupied by agriculture and 40 percent of the cultivated land area is occupied by commercial oil palm. Most "permanent" deforestation during the past decade has been due to the growth of oil palm plantations.

[85] Based on FAO. 2023. Land Use. In: FAOSTAT. Rome. [Cited October 2023], http://www.fao.org/faostat/en/#data/RL. For the 2015-2020 period, average annual deforestation was 19,300 ha, according to the FAO 2020 Forest Resource Assessment, see https://openknowledge.fao.org/server/api/core/bitstreams/3eff2288-0c53-4fd8-ad10-b3f417b71836/content

In contrast, commercial forestry concessions cover around 157,000 km², representing 65 percent of Gabon's forests and 12 percent of the entire Congo Basin Forest area. In addition to commercial concessions, the country has preservation areas and community forestry areas. Out of around 30 $mtCO_2$ of emissions from forest degradation, 19.3 $mtCO_2$ is estimated to be generated by the legal timber harvesting operations and related infrastructure investments of the forestry industry, with illegality in the forestry sector roughly estimated to contribute an additional 10-15 million tons of CO_2 emissions annually.

International environmental conventions, including the United Nations Framework Convention on Climate Change (UNFCCC) and the Convention on Biological Diversity (CBD), are currently unable to adequately compensate HFLD countries for the essential climate services that they provide. The international community does not yet have mechanisms to fully reward the global and regional forest ecosystem services provided by HFLD countries, such as carbon sequestration and storage in intact forests, cooling and rainfall recycling services benefiting other countries, and conservation of globally threatened biodiversity.

Gabon is also unique in Sub-Saharan Africa in having implemented a combination of environment-friendly and employment-generating forest policies and legal instruments for over a decade. These include: (i) an increase in forested national parks covering over 10 percent of the national territory (since 2002); (ii) a ban on log exports and establishment of "Special Economic Zones" (ZES) to promote local value-added timber processing (fully enforced and implemented since 2010); (iii) the introduction of fiscal incentives for sustainable forest management (SFM), with differentiated area fees for non-certified, legality verified and FSC and or PEFC/PAFC SFM certified concessions (since 2010)[86]; and (iv) the development and roll-out of a joint national timber traceability system by the ministries in charge of Forests, the Economy, and the Customs Authority (ongoing since 2022).

Gabon shares one key similarity with other timber-producing countries in Central Africa: the timber industry and concessionaires focus heavily on a very small number of commercial species. In Gabon, one species (Okoumé), accounts for more than half of all industrial timber production. However, 40-50 additional timber species that are not currently exported have been assessed to be technically and commercially viable.[87] Because of this focus on a very limited number of timber species, current harvesting rates in Gabonese forest concessions are extremely low, often ranging from 2 to 5 m^3 per hectare, considerably below the forest's sustainable timber production capacity. In well-managed concessions that implement Reduced Impact Logging (RIL) and other Sustainable Forest Management (SFM) practices, diversifying harvesting to include more tree species would significantly increase overall timber. It would also reduce pressure on those species in danger of overharvesting and improve regeneration and growth of the main timber species, most of which are classified as "non-pioneer, light-demanding" trees, requiring considerable sunlight to mature and grow into the canopy.[88] Reducing reliance on a limited number of species would also help to spread risk and reduce the impacts of hard-to-anticipate effects of climate change or other natural phenomena such as plagues on any of these species.

The implementation of sustainable forestry policies and enforcement of new legal instruments has been fairly consistent and has led to concrete results. Unlike in other African countries, populations of African

[86] The area fees for FSC or PEFC/PAFC certified, legally certified and non-certified concessions are 300 FCFA/ha, 600 FCFA/ha and 800 FCFA/ha, respectively, as compared with the former uniform concession area fee of 400 FCFA/ha.
[87] See e.g. https://www.atibt.org/en/p/90/lesser-known-timber-species
[88] In fact, many of the main timber species do not regenerate well in fully protected forests either. The increased utilization of lesser-known timber species (LKTS), sometimes known as Lesser-used species (LUS), is also promoted as a tool for sustainable tropical forest management by the Forest Stewardship Council (FSC) and the World Wide Fund for Nature (WWF), see e.g. https://www.lesserknowntimberspecies.com/ and https://www.worldwildlife.org/publications/guide-to-lesser-known-tropical-timber-species

Forest Elephants and other threatened wildlife species have increased in Gabon; the number of jobs in the forest industry has quadrupled over the last decade; deforestation and forest degradation have been limited and large amounts of CO_2 have been sequestered by the country's standing forests.[89] Intact African forests, most of which are in Central Africa, have constituted a remarkably stable carbon sink over the 1985-2015 period, sequestering an average of 0.66 tons of carbon per hectare per year (2.42 tCO_2e per ha per year), in contrast with the Amazon forest, due to the long-term increase in tree mortality in the latter.[90] It is important to distinguish between the direct impact of climate change on Gabon's forests and forestry sector in the coming decades, and the likely indirect impacts. While direct impacts up to 2050, as modeled by the University of Ghent for this CCDR, are expected to remain limited, significant risks remain.[91]

First, increasing temperatures will lead to elevated evaporative demand for forests, creating a potential for droughts with a magnitude and intensity that has never been experienced before. This heightened drought potential is expected to become the norm in different parts of the world by 2050, independently of the climate change scenario chosen. There is much uncertainty about the response of tropical forests to those future extreme events. Some models predict large-scale tree mortality events while others expect the ecosystem to remain as productive as before or become even more productive. The big question of how plants will acclimatize to elevated temperatures in tropical forests is currently unanswered, but some models predict a strong decline of forest productivity by 2050 (though most models do not). The modelling exercise performed by the University of Ghent for this CCDR showed that the probability of large-scale climate impacts on forests may well double or triple by 2050, under the most likely emissions scenarios.[92]

Second, independently from direct climate change impacts in Gabon, a tipping point for the country's forests could be caused by deforestation and climate change impacts beyond country boundaries. Land use and climate changes occurring elsewhere in Central Africa might also have direct consequences for Gabonese forests and trigger self-reinforcing feedback loops in the upcoming decades. While the likelihood of large-scale dieback or of a tipping point increases with climate and land use change intensity before 2050, the risk remains more limited than by the end of this century.

In terms of practical implications for forest management, climate change may lead to an increased fire risk, especially in logged-over forests. This in turn would lead to increased costs of sustainable forest management (SFM), requiring the integration of measures to prevent or at least reduce such risks, and avoid the negative social impacts and increased CO_2 emissions that would result from more frequent forest fires.[93] Apart from the increased risk of widespread tree mortality events due to the likely increased frequency of extreme droughts noted above, climate change may also affect the regeneration and growth of certain ecological guilds of tree species more generally. This will have a strong potential negative impact

[89] Gabon's modified Forest Reference Emissions Level, submitted to the UNFCCC in October 2021, estimates that its preliminary projected net removals will be 116.4 million tCO2eq/year by 2025, representing an increase of 7.8 percent compared to 2005 levels, and that its preliminary projected gross emissions will be 25.5 million tCO2eq/year by 2025, representing a reduction of 28 percent compared to 2005 levels, see https://redd.unfccc.int/media/gabon_frl_modified_oct2021_clean_final.pdf

[90] Structurally intact tropical forests sequestered about half of the global terrestrial carbon uptake in the 1990s and early 2000s, removing about 15 percent of anthropogenic carbon dioxide emissions, see Hubau, W, Lewis, S L, Phillips, O L, Affun-Baffoe, K, et al. 2020. Asynchronous carbon sink saturation in African and Amazonian tropical forests, Nature 579, pages 80–87 (2020), https://www.nature.com/articles/s41586-020-2035-0

[91] The following paragraphs are based on the results of the University of Ghent's climate change impact modelling exercise. For more details of their findings, see Annex 2, as well as the separate technical report produced by Félicien Meunier of the University of Ghent.

[92] Climate models resulting from this modelling exercise showed increasing likelihood of large-scale climate change impacts, from about 5% currently to 10-15% in 2050, except for the most optimistic emissions scenario (Mean SSP1-1.9). The study also noted uncertainties of tropical forests' response to unprecedented events such as elevated temperatures and extreme droughts, which could increase risks.

[93] Increased fire risk may also require imposing volume limits on the diversification of timber species harvested, especially in forests bordering on savannah or other fire-prone areas.

on the Gabonese timber industry, whose current dependence on very few commercial timber species increases its vulnerability to such negative climate change impacts.

Climate change is also likely to impact the regeneration and growth of some of the tree species providing a longer-term risk (beyond 2050) to tropical forest viability. Research in Gabon has already found an 80 percent decline in the production of fruit across 73 species in a national park from 1986 to 2018[94]. The researchers hypothesize that climate change (+0.25°C per decade recorded during the same time interval) is responsible for this fruit decline as some tree species have a critical minimum temperature to trigger flowering. The decline in fruit production is already likely having an impact on frugivorous animals, such as elephants, gorillas, and chimpanzees, with the same study finding elephants' body condition to have substantially declined since 2008. Human-wildlife conflict is already a major environmental and social issue in Gabon with approximately 30 human deaths from elephants since 2020 and high agricultural losses. A decline in fruit production may also negatively affect the livelihoods of rural communities that rely on consumption and marketing of non-timber forest products for their livelihoods.

Furthermore, the impact of likely increases in the frequency of climate-related disasters such as landslides, droughts and flooding is expected to have a major impact on rural communities and local peoples dwelling in or near the forests – who are already socially disadvantaged[95]. This, in turn, is likely to lead to indirect impacts on forest and wildlife resources, with negative consequences for both carbon sequestration and biodiversity conservation. Enhancing the involvement of rural communities in decisions on the management of forest and other natural resources and in the sharing of economic benefits derived from these resources will be essential to reduce the communities' vulnerability to climate change.

The indirect impact of climate change elsewhere in Africa on Gabon's forests and forestry sector is harder to predict, but may represent both risks and opportunities for sustainable development.[96] One example is the projection that one third of the current cocoa growing area in Cote d'Ivoire and Ghana, that produce over 60 percent of the world's cocoa, can become unsuitable due to climate change over the next few decades.[97] Although there is great uncertainty on such climate projections, this could create opportunities for other cocoa producing countries in Africa, including Gabon. Gabon could benefit from investing in sustainable, climate-resilient cocoa agroforestry production, if properly planned and done without unsustainable deforestation, as the latter could compromise its access to the main cocoa export markets.

One key additional point to take into account is that changes in forest cover in Gabon are likely to have impacts on the African continent beyond the country's boundaries. In the Amazon, scientific research has confirmed the existence of so-called flying rivers ("*rios voadores*"[98]) feeding the rainfall in the Western Amazon with recycled evapotranspiration blown in from the Eastern Amazon forests.[99] In the absence of

---

[94] Bush et al. 2020. *Long-term collapse in fruit availability threatens Central African forest megafauna*. Science 370 (65210) pp 1219-1222. While the likely impact on the forest megafauna is clear, the impact on the regeneration of the tree species concerned is more difficult to assess, as many tree species produce extremely large quantities of fruits and seeds in an irregular (non-annual) pattern – to avoid lack of regeneration due to wildlife consumption.

[95] As noted in the following section on Human capital promotion, rural communities experience high levels of social gaps, caused by the lack of access to services, markets and resilience measures like food and water security, quality of dwelling and asset ownership. Climate concerns may further exacerbate social inclusion challenges in these areas, particularly when coupled with governance challenges.

[96] The University of Ghent climate change impact modelling exercise report completed for this CCDR recognizes that the limited data available on rainfall recycling by forests in the African continent is a major source of uncertainty in their impact modelling results.

[97] P. Laderach, A. Martinez-Valle, G. Schroth et N. Castro 2013. Predicting the future climatic suitability for cocoa farming of the world's leading producer countries, Ghana and Côte d'Ivoire. Climatic change, (3-4): 841-854, 2013.

[98] See https://riosvoadores.com.br/english/

[99] The physical mechanism underlying these "flying rivers" was first explained in the 2007 publication Makarieva, A. and Gorshkov, V., Biotic pump of atmospheric moisture as driver of the hydrological cycle on land. Hydrology and Earth System Sciences, 11, pp. 1013-1033, 2007. DOI: 10.5194/hess-11

the latter, most rainfall would not be recycled but flow straight back into the Atlantic Ocean, and the Western Amazon would be covered in savannah rather than forest, resulting in a major reduction in GHG sequestration capacity. Similar mechanisms are thought to operate in the African continent, where rainfall in the Central and Eastern Sahelian countries has recovered much better since the 1970-80 droughts than in the Western Sahel.[100] This is likely to be due to the degradation and/or disappearance of more than 75 percent of the forests along the West African coast since 1980, compared to less than 25 percent for the Central African countries. Apart from this rainfall recycling impact, Gabon's forests also have a direct cooling effect, which is important not only for the well-being of rural populations but also at a larger scale.

Considering that the present conservation and utilization of forests in Gabon is currently not only "net zero" but absorbing a net amount of 100 mt/CO_2 annually, a critical overarching challenge is centered on maintaining the forestry *status quo*. Gabon is going through a significant economic transition with expected lower oil production, population growth, and high unemployment. To contribute more to economic returns and jobs, Gabon's forestry sector needs to further increase the value-added and job creation potential of local timber processing, which is already the largest source of formal private sector employment (Box 3.2).

Box 3.2. Forestry – An Opportunity for More, Better, and Sustainable Jobs in Gabon

Gabon's forestry sector holds significant potential for expansion, particularly in increasing domestic value creation and accessing international markets. Forestry is a pivotal sector in Gabon, contributing 3.2 percent to GDP and 6 percent to exports in 2023, and employing nearly 15,000 people in the formal sector. By focusing on products with high value-added, integrating along the value chain and creating domestic value, Gabon can enhance its competitiveness, increasing job opportunities and wages.

Processed wood products, such as sawmill products and furniture, offer higher wages and value added. Forestry's output varies across subsectors, with processed wood products adding more value than raw logs (Figure A). Sawmill products lead in value-added, while furniture production, though smaller, offers higher wages. Expanding these high-value subsectors will require upskilling workers to meet advanced quality standards. Investing in training and education is crucial for workforce effectiveness and sector's growth.

Increases in forestry output will also promote job creation in other economic sectors along the value chain. The forestry value chain spans both upstream and downstream components. It buys goods and services from various sectors, including machinery, transport, agriculture, and construction (Figure B). Higher output in forestry stimulates demand in these related sectors, boosting labor demand and overall growth.

Figure A. Wages per output and value-added per output, selected sectors

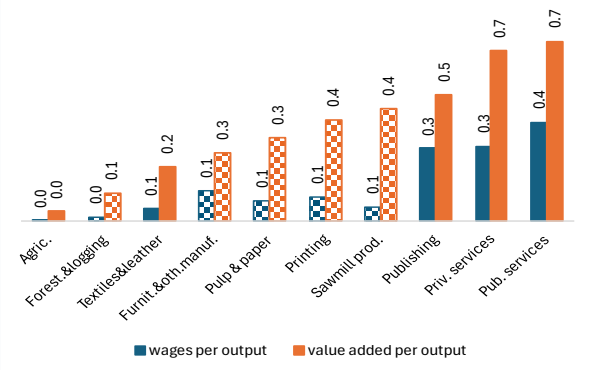
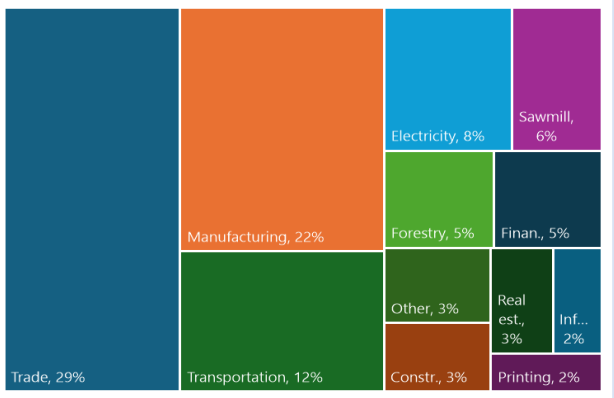


Figure B. Input structure of the Gabonese forestry sector



Notes: (A) Bars with diagonal lines are sectors linked to forestry. Unlisted sectors are Petrol.extr. (0.03, 0.10), Food prod. (0.05, 0.15), Chem., miner., basic metals (0.11, 0.24), Machin.&equip. (0.11 , 0.53), Motor veh.&trailers, 0.12 , 0.25), Electr. & gas, 0.15, 0.30),

[100] Giannini, A., Biasutti, M. and Verstraete, M. M. (2008). A climate model-based review of drought in the Sahel: desertification, the re-greening and climate change. Global and Planetary Change, 64, 119-128.

Constr. (0.16, 0.35), Transp. (0.17, 0.86), Hospit. (0.20 , 0.35). Source: (A, B) Release 57 of database the GLORIA global environmentally-extended multi-region input-output (MRIO) database (Lenzen et al. 2022), constructed in the Global MRIO Lab (Lenzen et al. 2017).

To ensure that increased wood processing does harm Gabon's forests, sustainable forestry practices should be strengthened. This can include fully operationalizing timber traceability systems, increasing compliance with legal verification and sustainable forest management certification obligations, and establishing fiscal incentives for increased utilization of wood from "Lesser-known Timber Species". Sweden offers an example of how the productive use of timber and other forest products can be strengthened while maintaining sustainable forest management. Its value chains, including sawmill products, paper and pulp, and furniture production, are designed to meet both domestic demand and high export shares, with 33 percent of wood products and 59 percent of paper products exported. To ensure access to markets, Sweden requires a certification proving responsible sourcing and ensuring reforestation measures that generate additional job opportunities in rural areas. Gabon, meanwhile, is an important champion of "exploiter pour sauver" (harvest to save), having created a major wood industry based on sustainable practices and low deforestation. Policies are underway to digitalize wood traceability, reduce illegal logging, and promote third-party forest management certification. Further investments could be considered to promote downstream wood sectors, contributing to diversification. Their design needs to be based on in-depth analysis, which should include assessments to determine how more and better jobs can be created under different policies and strategies.

Sources: World Bank 2024. Gabon Economic Update; Swedish Wood, 2024.

Timber production has been increasing in Gabon, which registered an overall log production going from 2,820,000 m³ in 2018 to 3,771,000 m³ in 2022, an increase of nearly 34 percent[101]. This led to increases in the outputs of sawn wood (from 960,000 to 1,033,000 m³), veneer (from 389,000 to 465,000 m³) and plywood (from 41,000 to 85,000 m³). Over that same period, however, export values did not rise in tandem with increased timber volumes due to lower timber product unit values globally, down from USD 554 to 473 per m³ for sawn wood (minus 15 percent), down from USD 906 to 654 per m³ for veneer (-28 percent), and down from USD 780 to 672 per m³ for plywood (-14 percent). To promote forestry, Gabon's policy has been to target a further increase in timber production of 20 percent by 2030 from 2020 levels.

Efforts to address this challenge should focus on tertiary timber processing for (semi-)finished products such as construction materials and furniture, and on lesser-known timber species, which have an important potential for increased use without threatening the sustainability of natural forest management. This would not only help to fuel a much-needed economic diversification and partially compensate for the reduction in oil export revenues but also generate significant employment in both rural and urban areas.

Another development challenge is to help local rural communities develop sustainable and diversified non-timber forest product (NTFP) value chains, through building their capacity for sustainable NTFP management, improved processing and conservation, and organization of producer groups for better positioning in the market, as foreseen by the government's 2012 national strategy for NTFP development.[102] Sustainable NTFP production and value-addition can derive from a combination of naturally occurring trees in community forests and planted trees in agroforestry systems. This, in combination with ensuring that local communities gain a fairer share of forest concession and protected area revenues, will be essential for reducing rural-urban inequality.

[101] ITTO Biennial Review 2021-2022 (2023).
[102] A number of healthy NTFP foodstuffs – such as Nkumu (Gnetum spp) and Odika (Irvingia gabonensis) – are already regularly traded in markets in Libreville and other cities in the country. See : « République Gabonaise Ministère des Eaux et Forêts 2012. Stratégie Nationale et Plan d'Actions pour le Développement du Secteur des Produits Forestiers Non-Ligneux au Gabon », https://faolex.fao.org/docs/pdf/Gab165020.pdf

One of the main climate challenges facing Gabon is that, as a "High-Forest cover Low-Deforestation" (HFLD) country, the current rules governing Reduced Emissions from Deforestation and Degradation (REDD+) payment schemes do not allow for Gabon to be adequately compensated for the large quantities of CO_2 sequestered by its standing forests. The country can get some benefits from the increased implementation of Reduced Impact Logging (RIL) under the Degradation part of REDD+, which generates emissions reductions of up to 50 percent of current emissions resulting from timber harvesting.[103] However, from the data in Gabon's modified Forest Reference Emissions Level submitted to UNFCCC in 2021, this accounts for only around 12 percent of the carbon sequestration services provided by Gabon's standing forests mentioned above.[104] New mechanisms for rewarding forest carbon sequestration need to go beyond the existing REDD+ mechanism, which offers little incentive for forest conservation in HFLD countries.

In addition, as noted above, the development of a new international mechanism to reward other ecosystem services provided by the country's forests, such as their direct cooling effect and their role in the recycling of evaporation to boost rainfall in countries to the North and the Northeast of Gabon, is a key challenge for increasing economic returns to sustainable forest management and protection. This applies not only for Gabon but also fir other HFLD countries in the region. As climate change impacts intensify, the recycled rainfall provided to drier African countries by Central African forests could become an increasingly essential contribution to climate change adaptation in the continent.

As noted above, the direct impacts of climate change on the forest sector until 2050 are likely to be limited. However, some impacts on availability of tree and other plant and animal species could have negative implications for the livelihoods of local forest-dependent communities and for the availability of the few timber species currently used by the processing industry.

The indirect impacts of climate change on Gabonese forests, both due to climate change impacts on the behavior of rural communities, wildlife, and the consequences of climate change in other African countries, are likely to be more important. Yet, these impacts are hard to quantify due to the many uncertainties involved. Thankfully, Gabon already has in place some of the most important forest-related policy frameworks, legal instruments and institutional capacities necessary to address climate change adaptation and mitigation in the forestry sector, such as the legal obligations for sustainable management of forest concessions and local value-added processing of timber, tax incentives to motivate concessionaires to comply with these obligations, among others. Building on these frameworks and tools, the country should be able to address the forestry sector development and climate change challenges highlighted above.

Recommendations (see Annex VII for more details)

- **Fully operationalize the digital timber traceability systems to reduce illegal logging and ensure equitable law enforcement**. A series of systems have been designed and are at various stages of implementation and piloting: (a) Supply Chain Traceability System (developed with international NGO Environmental Investigation Agency), (b) System of Control of Legality and Traceability of Timber (SCLT), and (c) e-Governance system to digitize the permitting system.

---

[103] For the Sangha-Likouala Emissions Reductions Purchase Agreement between the Forest Carbon Partnership Facility's Carbon Fund and the Government of Congo (which is similar to Gabon but has a slightly higher deforestation rate), 64 percent of the gross Emissions Reductions (ER, not counting the risk/uncertainty set-aside) were related to the implementation of Reduced Impact Logging (RIL), see https://www.forestcarbonpartnership.org/system/files/documents/Revised percent20ER-PD_English_1.pdf. For Gabon, the percentage of ER related to RIL would be even higher.

[104] Total forest degradation emissions for 2020 are estimated at around 15 million TCO2e. Reducing this by half would generate emissions reductions of around 7.5 million tCO2e, or around 6 percent of the projected net removals of 116.4 million tCO2eq/year by 2025 , see https://redd.unfccc.int/media/gabon_frl_modified_oct2021_clean_final.pdf

- **Increase compliance with legal verification and sustainable forest management certification obligations of forest concessionaires** [increase from approx. 30 percent to 100 percent]. This can be achieved by two key pathways: (a) for concessionaires that have made no progress in meeting these obligations, despite having benefited from repeated postponements of punishment for non-compliance. The second pathway is providing (b) an additional incentive for compliance with legality verification and SFM certification by extending the current differentiation in taxes from concession area fees to include harvested volumes.

- **Establish fiscal incentives for utilization of "Lesser-Known Timber Species."** There is great economic potential to increase timber production, especially in secondary and tertiary wood processing (for semi-finished and finished products, such as furniture and furniture parts) without threatening the sustainability of forest management.

- **Strengthen partnerships with public and private financial institutions to mobilize concessional funding for private investments in sustainable forest management and the processing of sustainably produced timber.** Gabon's strong forestry credentials position it well for growing a market in sustainable commodities. Export opportunities exist for regenerative practices, with agroforestry potentially generating carbon credit revenue and enhancing climate resilience. The next phase of REDD+ and CAFI initiatives can target agri-entrepreneurs with nature-based solutions.

- **Enhance the benefits accruing to local communities from forests, through:** (i) improving arrangements for sharing timber benefits with rural communities living in and near forest concessions and forest carbon sequestration areas, and ensuring that the Local Development Funds that are a legal obligation for any forest concession are appropriately endowed by the concessionaires and used for social investments to improve the local communities' well-being[105] ; (ii) providing support for establishment and sustainable management and utilization of community forests[106], as well as smallholder value chain support for Non-Timber Forest Products (NTFP).

- **Scale-up risk reduction for human-wildlife conflicts, particularly those involving elephants.** Gabon could (a) scale-up the mobile fence program, (b) expand secure elephant corridors to aide migrations, and (c) develop a national insurance for systematic compensation from elephant damages (potentially funded by biodiversity and carbon credits).

- **Strengthen international recognition and financing for Gabon's forest ecosystem services. Gabon and other partners could develop analytical work to further confirm and quantify the financial and long-term economic values of ecosystem services provided by HFLD country forests and rewarding mechanisms.**.

3.3 Human capital development

[105] Decree 105 was adopted to ensure implementation of the clause concerning Local Development Funds in Article 251 of the Forest Law ("Code forestier", Law 16/01 of 31/12/2001). It establishes the model contractual specifications for establishing the Local Development Fund, which aims to share the proceeds of timber harvesting with the local communities affected.

[106] The above-mentioned 2001 Forest Law provides a firm legal basis for community forest establishment and management in Gabon. Its Articles 156-161 state that "a community forest is a portion of the rural forest estate allocated to a village/community to carry out activities or undertake dynamic processes for sustainable natural resource management, based on a simplified management plan", with revenues from their use being the property of the community. A number of legal instruments was adopted since to facilitate the implementation of community forestry – including Decree No. 001028/PR/MEFEPEPN of December 1, 2004, on setting the conditions for the creation of community forests, Order No. 018/MEF/SG/DGF/DFC of January 31, 2013, on setting the procedures for the allocation and management of community forests, and Order No. 106/MEFPRN of May 6, 2014, on the right of reservation of a forest by a village community. But so far only a limited number of community forests has been established.

Preparing health systems to manage climate-sensitive diseases and health emergencies

Diseases such as malaria, acute respiratory infections, HIV, and diarrhea are a high burden for Gabon, being leading causes of death among children under five, along with premature birth. Non-communicable diseases such as cardiovascular diseases, diabetes, renal failure, and cancers are on the rise, creating a double burden, with high mortality rates impacting the population and labor supply. In 2019, water-borne diseases had a high incidence, with 94,094 cases in 100,000 people, and 384 malaria-related deaths were registered, affecting particularly the Northern provinces of Woleu-Ntem and Ogouée-Ivindo. 7.2 percent of non-injury deaths were caused by malaria in 2015-2019, and 2.8 percent by water-borne diseases, while 45 percent of deaths were caused by non-communicable diseases[107]. To address these challenges, Gabon adopted the National Health Policy (PNS) for 2010-2020, aiming to reduce maternal, infant and child mortality and the prevalence of malaria, HIV/AIDS, tuberculosis, and tropical and non-communicable diseases. A more recent policy was adopted for 2024-2034.

Over the coming decades, climate change is set to pose numerous health risks for the Gabonese, with the strongest shocks coming from the higher incidence and mortality of water-borne diseases.[2] Higher temperatures and more frequent heatwaves would increase heat-related illnesses, threatening vulnerable groups like the elderly and chronically ill. Warmer and more humid conditions may also favor the spread of diseases borne by food or water, such as diarrhea and dysentery. However, effects on dengue would be negligeable and the incidence of malaria should decrease in most regions, due to climatic changes leading to less suitable conditions for the spread of mosquitoes (Table 3.4 and Figure 3.12). The spread of diseases due to climate change is expected to decrease labor supply by 0.5 percent by 2050, due to lost hours of work due to deaths and absenteeism due to illnesses affecting workers and their children. It would also have negative consequences for households, for the healthcare system, and learning ability.

Table 3.4. Change in Mortality and Morbidity Rates (per 100,000 people) by disease, 2041-2050

Disease	Original Rates by 2041-50 (continuation of 2019 rates without climate change)		Rate Change in Dry/Hot Mean Climate Scenario		Rate Change in Wet/Warm Mean Climate Scenario	
	Deaths	Cases	Deaths	Cases	Deaths	Cases
Water-borne	17.4	91,731	+2.2	+11,679	+1.2	+6,456
Heat-related	0.8	805	+2.1	+2,118	+0.9	+873
Malaria	45.6	26,558	-1.2	-688	-0.2	-127
Dengue	0.0006	1,039	+0.00003	+44.4	+0.00002	+28.7

Source: IEc. 2024.

Moreover, Gabon is vulnerable to climate shocks and natural hazards, which can spread water-borne diseases. Flooding, lack of housing, informal land occupations, and inadequate sanitation, urban planning and waste management exacerbate health risks, contributing to the spread of diseases. Over 70 percent

[107] World Bank. 2021. Climate Risk Country Profile for Gabon.

of Gabon's population live in coastal areas, which are prone to flooding, sea level rise, and erosion. life-threatening river floods are expected to occur at least once in the next 10 years.

Recommendations (see Annex VII for more details)

- **Increase training and capacity for healthcare staff to improve knowledge and skills to prevent climate-related diseases.** Gabon's 2022 Third National Communication (TNC) to the UNFCCC[108] highlights the need to consider climate vulnerability and adaptation within the healthcare sector. Assessing the health risks associated with climate change is needed to provide actionable information in support of effective adaptation plans.

- **Enhance climate data systems, health monitoring, and workforce capacity to address climate-related health risks.** A system could be set up to monitor climate change effects on health, with indicators on major diseases. The healthcare personnel need training to improve skills to prevent climate-related diseases, and awareness campaigns on health impacts are critical.

- **Establish health security policy and mechanisms to address disease outbreaks.** The COVID-19 pandemic exposed the need to improve health security and pandemic preparedness, by developing stronger regional cooperation, outbreak preparedness, response capacity, surveillance at entry points and laboratory capacity.

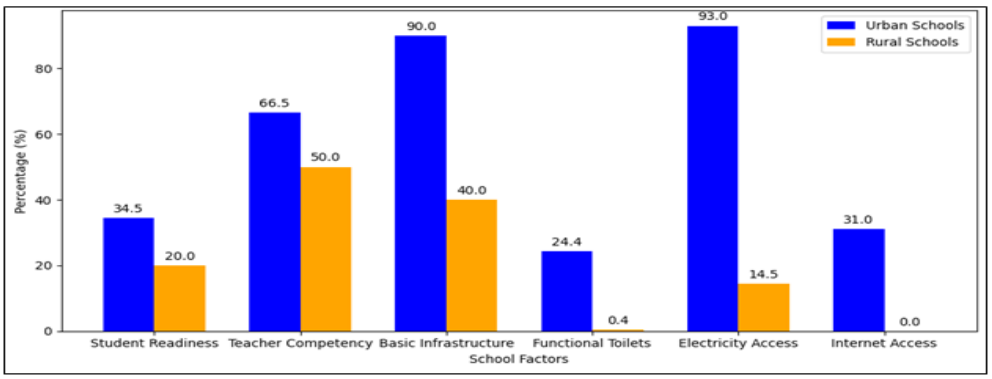
Building climate-resilient education systems and green skills

Gabon's education sector faces significant challenges that threaten its development goals. The 2023 Global Education Policy Dashboard (GEPD) data reveal critical challenges at the primary level, with 73.3 percent of students entering primary school not ready to learn and 89.9 percent failing to acquire foundational literacy and numeracy skills[109]. In addition, teacher quality is a major bottleneck. Only 12 percent of teachers meet required knowledge thresholds in language or math, exacerbating education inequities and indicating an urgent need for investments in teacher training and professional development.

Infrastructure and resource deficiencies further compound these challenges. While most classrooms have blackboards (96 percent) and furniture (86 percent), only 60 percent are adequately supplied with essential learning materials like pens and pencils. Limited access to technology, with only 73 percent of schools having computers and internet. Rural areas are disproportionately affected, limiting opportunities for rural children (Figure 3.14). Only 0.4 percent of rural schools have functional toilets, 14.5 percent have access to electricity, and none have internet.

Figure 3.13 Comparison of Urban and Rural Schools in Student Readiness, Teacher Competency, and Infrastructure Availability

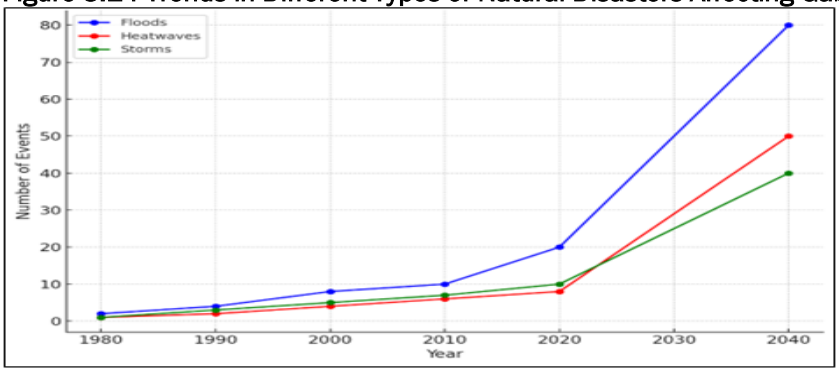
[109] Global Education Policy Dashboard. https://www.educationpolicydashboard.org/



Source: GEPD data for Gabon (2023).

Climate change poses threats to education, perpetuating poverty cycles. Extreme weather such as floods and heatwaves increasingly disrupt schools, particularly in rural areas (Figure 3.15), hindering students' ability to attend school and damaging critical education facilities. Families facing climate-related hardships may be forced to withdraw their children from school to save costs or to have them contribute to household income, reducing enrollment and exacerbating inequities, as poverty-stricken or rural areas are disproportionately affected. Psychological and physical stress from climate change also affect students' ability to focus and perform academically. Anxiety, trauma, and health issues related to climate change events can lead to higher dropout rates and lower academic achievement. For instance, higher temperatures can impact students' performance on exams, affecting education and career prospects.[110] To strengthen the education sector's resilience, the Government has drafted the "*Plan National de Contingence Multirisques pour le Secteur Educatif*" with measures for retrofitting school infrastructure, developing early warning systems, and training stakeholders to respond to crises. The plan also proposes leveraging tools like GEPAS (*Gestion du Patrimoine Scolaire*), a digital platform introduced in 2021 to collect and manage data on school infrastructure and equipment in real time.

Figure 3.14 Trends in Different Types of Natural Disasters Affecting Gabon (1980-2040)



Source : https://climateknowledgeportal.worldbank.org/country/gabon/vulnerability

The relevance of Gabon's curricula is also being challenged by the realities of a climate-influenced future. Integrating climate change education and 'green economy' skills into the national curriculum is essential. By equipping students with knowledge and skills in sustainable practices, renewable energy, and environmental stewardship, Gabon can better prepare its youth for the challenges and opportunities of a

[110] Srivastava, B., Tafere, K., and Behrer, A. (March 2024). High Temperature and Learning Outcomes: Evidence from Ethiopia. World Bank Policy Research Working Paper 10714.

low-carbon economy. Since 2024, the government has started integrating climate change and conservation concepts into the national curriculum and training teachers on environmental conservation.

As Gabon continues to place sustainable development at the heart of its national strategy, the education sector must evolve to support this vision. The previous Strategic Plan for Gabon's Emergence (PSGE) and the National Development Plan for the Transition (PNDT) emphasize the need to transition to a green economy. Expanding and strengthening Technical and Vocational Education and Training (TVET) is critical to this transition, by addressing skills gaps in renewable energy, sustainable agriculture, and environmental protection, thereby fostering a workforce that is equipped to thrive in a climate-resilient economy.

Recommendations (see Annex VII for more details)

- **Integrate climate change and green economy content into the curriculum.** To prepare Gabon's future generations for climate challenges and provide them with skills to tap into green economy opportunities, it is crucial to embed climate change education into the national curriculum at all levels and regions.

- **Invest in resilient education infrastructure, to withstand more frequent and severe weather events.** It is key to retrofit existing schools and design more resistant ones to floods and storms, protect students and staff, and ensure the continuity of education during and after climate disasters, following the framework from the draft *Plan National de Contingence Multirisques pour le Secteur Educatif*.

- **Enhance access to education in vulnerable regions**. Gabon should aim at improving the quality and relevance of education and at reducing financial barriers with scholarships, assistance to low-income families through school feeding programs, and conditional cash transfers to keep children in school.

Politically, these recommendations align with Gabon's existing commitment to sustainable development and green economy initiatives. Investments in infrastructure upgrades, curriculum development, and teacher training can be offset by long-term benefits of a more resilient education system, reduced disaster recovery costs, improved human capital, and increased climate resilience. Inaction could result in continued climate vulnerability, perpetuation of poverty cycles, and missed development opportunities.

Supporting inclusive, climate-adaptive social protection

Despite Gabon's vast natural wealth, poverty and inequality remain high. In 2017, 33.4 percent of the population lived below the national poverty line. Gabon's poverty rate exceeds the average for UMICs[111] and continues to rise. Growth driven by the capital-intensive oil and mining industries has not produced sufficient jobs and income distribution. The Gini index, a measure of income inequality, declined from 42.2 in 2005 to 38 in 2017, driven mainly by improvements in secondary cities and male-headed households.

Social gaps are widespread, particularly affecting rural communities and women. About 90 percent of Gabonese experience social gaps, with rural provinces of Ogooué-Ivindo, Ogooué-Lolo, and Ngounié being the most disadvantaged due to poor access to services, food insecurity, and a lack of quality housing. Women are disproportionately affected (93 percent), reporting lower asset ownership, fewer job opportunities, and lower education levels than men. Poverty is higher among female-headed households

[111] WDI.

(36 percent vs. 32 percent for male-headed). Social norms further restrict women, making them more vulnerable to resource shortages and gender-based violence.

Social protection and locally led adaptation efforts to reduce poverty and vulnerability remain underutilized. While progress has been made, particularly in addressing health-related risks, coverage for poor and vulnerable households remains insufficient. Social protection in Gabon predominantly serves those in the formal economy, leaving those most vulnerable to climate change without adequate protection. Formal sector employees, constituting 47 percent of all employees and 13 percent of the population, enjoy access to pension and social benefits. Yet, only 16 percent of the poor receive subsidized health insurance, and 17 percent receive other forms of social assistance[112], perpetuating inequalities and undermining the ability to protect those most vulnerable to climate change.

Social assistance targeting the poor and vulnerable in Gabon is almost exclusively focused on health risks. In 2021, non-contributory social assistance spending was just 0.5 percent of GDP, the lowest among UMICs and only a quarter of the UMIC average. Most spending was on health insurance, with health subsidies comprising 89 percent of expenditures supporting the Economically Weak Gabonese (*Gabonais Economiquement Faibles*, GEF). The focus on health should be complemented with climate-smart interventions—such as emergency cash transfers or green labor-intensive public works—to offer more effective protection against growing climate risks (Box 3.3).

In addition, Gabon's social assistance system faces challenges in responding to shocks. The CNAMGS's GEF database requires enhancements for regular data updates and interoperability with other systems. Also, Gabon lacks an early warning system or a national disaster risk management plan, which are essential to preparing for hazards. The reliance on in-kind or cash social transfers, rather than more efficient mobile money systems, further complicates delivery. The absence of an adaptive social assistance framework hampers responses to shocks. For instance, the emergency food assistance program introduced during the COVID-19 pandemic faced challenges, including limited coverage and issues with equitable distribution[113]. Looking ahead, Gabon could strengthen its social assistance system and enhance its ability to provide targeted support in response to covariate shocks, including those related to climate change.

Box 3.3. Climate-smart social assistance interventions

Shock-Responsive Social Registries: These registries help identify and provide targeted assistance to vulnerable populations during climate shocks. The Single Beneficiary Registry in the Dominican Republic uses, for example, various registration methods like home visits, web-based self-registration, and service centers. Its interoperability with other databases ensures accurate data for emergency responses, such as voucher activation during hurricanes and floods, and for energy subsidy reform compensation.

Climate-Smart Public Works: Labor-intensive public works initiatives provide immediate employment while creating community assets. In Ethiopia, green public works involving communities and city administrations focus on flood protection, reforestation, waste management, and urban agriculture—strengthening community resilience to climate change and supporting sustainable urban development.

Cash Transfers for Climate Resilience: Innovative cash transfer programs like Brazil's Bolsa Verde offer financial support to poor families committed to forest preservation and sustainable practices, helping reduce deforestation while improving livelihoods. In Nigeria, anticipatory cash transfers provide one-time

[112] World Bank. 2022. Gabon Country Economic Memorandum.

[113] The Food Assistance Program was allocated a budget of FCFA 5 billion (USD 8 million) to provide 31,000 food vouchers and 4,700 food kits for 60,000 households. The distribution of food vouchers and food kits was entrusted to local authorities (mayors and deputies), which led to capture and leakage. Protests broke out in many locations, as people aware of the program felt unfairly left out. There was wide criticism of the program in social and mainstream media.

payments to households in flood-prone areas, boosting food security and climate-resilient livelihoods. In Guinea, a dedicated financing mechanism supports locally led climate adaptation efforts, building resilience at the local level. These programs highlight the potential of cash transfers to support climate and social objectives.

Climate change can increase poverty, inequality, and social instability, and worsen existing social gaps and inequalities. At the global level, climate change could push over 130 million more people into extreme poverty by 2030, and more than 720 million additional poor people by 2050. Data from Gabon confirms this. It is projected that climate change could increase poverty by up to nearly 2 percentage points by 2050, eroding development gains and impacting living conditions (see Section 4.2). In this context, social protection is crucial for managing climate change-related risks and preventing people from falling (deeper) into poverty. Moreover, the increased frequency of landslides and floods disrupts local security and heightens the risk of gender-based violence. Nearly half (48.6 percent) of Gabonese women report experiencing physical or sexual violence from intimate partners, and extreme weather events further increase the risks of early marriage, domestic violence, harassment, and trafficking. Adding to this, climate change can affect health, and women consistently bear the responsibility of tending to the sick.

Poor and vulnerable populations, as well as forest communities, are disproportionately exposed to climate shocks and have fewer resources to cope. Poor households reported experiencing more climate-related shocks in the past (Figure 3.16). Plantation destructions, income and crop losses affect poor households more frequently due to their greater reliance on agriculture (Figure 3.17). Regardless of occupation, poor households' vulnerability to climate change is worsened by the lack of a social safety net. Furthermore, forest-dwelling peoples and forest-adjacent communities are at risk due to deforestation and lack of land tenure. About 85–95 percent of all land is legally state-owned[114] and the legislation governing community forests does not clearly define which groups can access community forest[s115]. While Gabon's sovereign credit REDD+ model aims at enhancing communities' livelihoods, payments do not go directly to local communities and transparency is limited. There is no independent auditing or feedback grievance mechanism to monitor how payments are used. Systems of green accountability can be put in place to ensure transparency and accountability of climate finance and safeguard local communities.

Figure 3.15 Percent of households facing climate shocks in 2013-2016, by poverty status

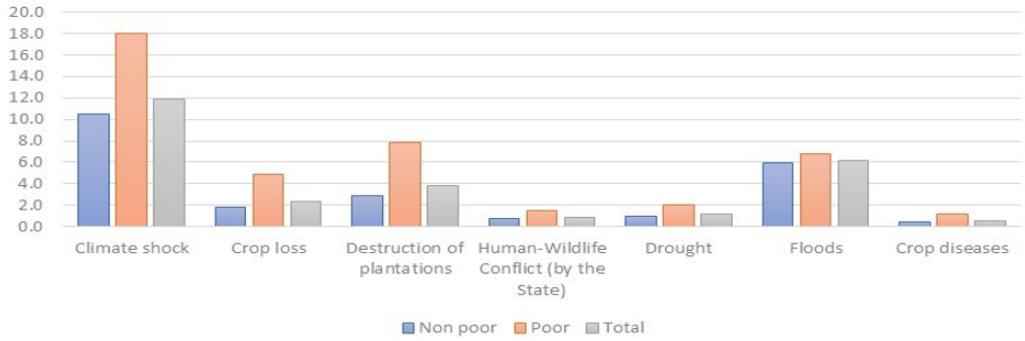
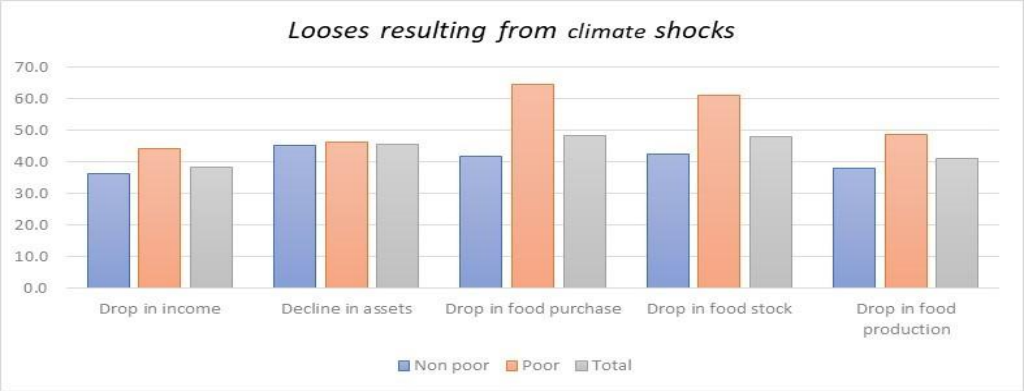


Figure 3.16 Percent of households facing losses from climate shocks in 2013-2016, by type and poverty status

[114] Legault, Danielle D., and Logan Cochrane. 2021. "Forests to the Foreigners: Large-Scale Land Acquisitions in Gabon" Land 10, no. 4: 420.
[115] ClientEarth. 2018. Analyse du cadre juridique relatif aux forêts communautaires au Gabon.



Source: World Bank staff calculations (based on EGEP 2017 household survey). Figure 3.15 indicates the percentage of households that reported being affected by climate shocks in the past 3 years preceding the EGEP 2017 survey. Figure 3.16 indicates the percentage of households that reported experiencing a drop in income or assets, or food purchase, stock and production due to such shocks.

Recommendations (see Annex VII for more details)

A robust social protection system is essential for building household resilience and safeguarding vulnerable populations from climate shocks. By reducing poverty and enhancing coping mechanisms, social protection reduces climate vulnerability. Explicitly incorporating climate change considerations into social protection programs can amplify these benefits.

- **Increase investment in social assistance to expand coverage for the poor and vulnerable.** By aligning its social protection spending with that of UMICs, social transfers could be extended to all poor households, potentially reducing poverty by up to a third[116] and strengthening the safety net against climate shocks.

- **Invest in delivery systems to enhance social protection efficiency and shock-responsiveness.** Gabon can build on its GEF database to establish a national social registry, incorporating global best practices such as dynamic registration rather than census sweeps that are costly and prone to inclusion and exclusion errors[117].

- **Diversify social assistance instruments to offer better protection against climate risks.** Currently, social assistance primarily relies on health service fee waivers for individuals with GEF status, which, while important, provide limited protection against climate risks. Social assistance can enhance economic resilience and mitigate climate shocks (Box 3.3).

- **Implement locally led climate action.** Empowering local communities can strengthen Gabon's ability to adapt to climate impacts and protect vulnerable groups. Strategies tailored to local needs are more effective and have stronger ownership and engagement.

Addressing job gaps and empowering workers for a green economy

Gabon faces a significant challenge in job creation. With a labor force participation rate of 53 percent (including job seekers and employed workers) and a high unemployment rate of 12 percent (active job

[116] See detailed simulations in the World Bank's 2022 Gabon Country Economic Memorandum.
[117] Leite, Phillippe et al. 2017. Social Registries for Social Assistance and Beyond: A Guidance Note and Assessment Tool. Social Protection & Labor Discussion Paper No. 1704. World Bank, Washington, DC.

seekers), a significant portion of the workforce remains untapped (EGEP 2017). Job creation has not kept pace with population growth, doubling the gap between available jobs and the population aged 15 and over from 443,000 in 2000 to 950,000 in 2023, impeding income generation and poverty reduction.

Wage work is the most common form of employment in Gabon, yet it has stagnated since 2010. In 2017, 64 percent of Gabon's employed population were wage workers (EGEP 2017), with over a third in the public sector. In the private sector, wage employment accounts for 53 percent of jobs, but less than half (48 percent) are formal. Self-employed workers constitute 26 percent of the workforce, mainly in agriculture (43 percent), commerce (31 percent) and other services (9 percent). The remaining labor force is made up of unpaid workers (7 percent) and employers (3 percent).

Women, youth, and particularly young women, face systemic barriers in Gabon's labor market. Women have a labor force participation rate of 43 percent and an unemployment rate of 16 percent, compared to 63 percent and 9 percent for men. Youth labor force participation is 40 percent, with youth unemployment at 18 percent, more than double the adult rate. Young women are particularly disadvantaged, with a labor force participation rate of 31 percent and an unemployment rate of 25 percent.

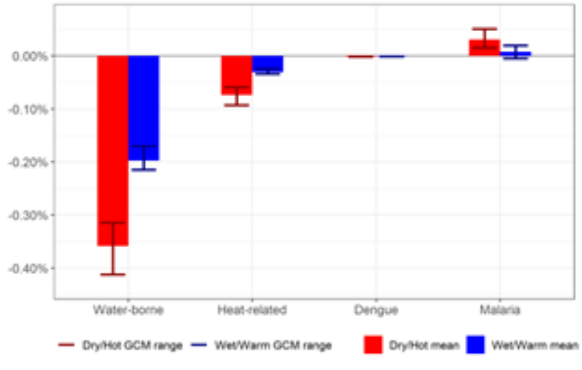
Climate change is expected to reduce labor supply and disrupt labor productivity in Gabon. Its impacts on the labor market are multifaceted, with key concerns including health risks and declining labor efficiency. As discussed above, diseases due to climate change can reduce labor supply by 0.5 percent by 2050 (Figure 3.18). Rising temperatures and frequent heatwaves pose health risks and can diminish labor productivity, particularly for those in physically demanding jobs or without climate-controlled environments. Women and girls are disproportionately impacted (UN Women 2022), exacerbating existing inequalities.

Workers in the agriculture, forestry, and fishery sector are particularly vulnerable to climate change, a key concern for the country's goal to improve food security and create more jobs. Work in the agriculture, forestry, and fishery, the second-largest employing sector with 19 percent of jobs (EGEP 2017), is largely conducted outdoors, exposing workers to rising temperatures, expected to reduce labor productivity by 4 to 8 percent between 2041 and 2050 (Figure 3.18). Adaptation measures such as mechanization, indoor work, and improved cooling systems are critical, and could reduce this decline to 2 to 5.5 percent[118]. Similar vulnerabilities are expected in the construction sector, which also involves physically demanding outdoor tasks, yet is key for improving infrastructure and supporting growth. Although they account for 4 percent of jobs (EGEP 2017), construction workers are also highly susceptible to heat stress. Targeted adaptation measures could limit climatic impacts, such as increases in the use of machinery and automation, building temporary structures to provide shaded areas at work sites, and adjusting work hours to cooler periods.

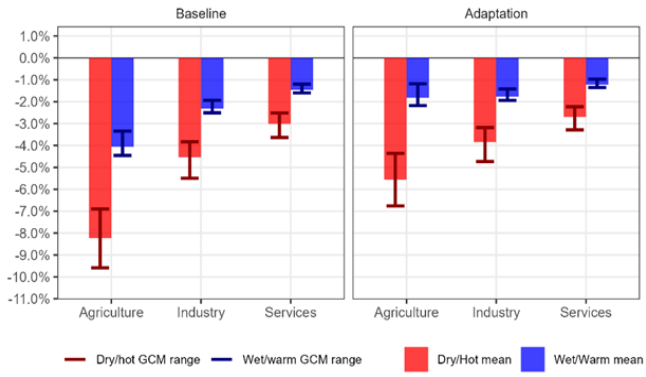
Figure 3.17 Labor Productivity Shocks by Sector, 2041-2050

[118] IEc. 2024.

A. Average Labor Supply Shock by Disease, 2041-2050



B. Labor Productivity Shocks by Sector, 2041-2050



Source: (A, B): IEc (2024)

Furthermore, climate policies will reshape the labor market, with significant implications expected in forestry, energy, and agriculture. Gabon's NDCs outline actions to create new jobs in sustainable forestry and timber processing. In addition, in view of maturing oilfields, the energy sector is poised to shift to renewables, and ongoing large hydropower projects and investments in gas and solar generation can demand reskilling programs and social protection measures for displaced workers. In agriculture, climate-smart practices such as more heat resilient crops and minimizing erosion will also require adequate skills.

Recommendations (see Annex VII for more details)

- **Implement targeted adaptation measures to reduce the adverse effects of climate change on labor productivity, particularly in the agriculture and construction sectors.** Adaptation measures could include mechanization, transitioning to indoor jobs, enhancing cooling systems for indoor workers, and establishing flexible work hours and compensation for lost workdays for exposed workers.

- **Support workforce skilling and reskilling to address skills mismatches and prepare workers for the green transition.**

- **Target women and youth to ensure that they can participate in the green economy**. Gabon should implement policies that remove barriers to employment for these groups, offering targeted training programs, apprenticeships, providing childcare support, and promoting flexible work arrangements.

4. Macroeconomic and fiscal policies to achieve climate and development goals in Gabon

Key Points

- Climate change poses a serious risk for the whole economy; it can provoke annual GDP losses of 3.1 to 5.3 percent and job losses from 2,000 to 5,000 jobs a year by 2050, affecting livelihoods and development. Heat stress and diseases would impact labor productivity, whereas temperature and rainfall changes would affect crops and fish stocks, while urban and coastal floods can damage infrastructure and transport networks.
- Climatic shocks would disproportionately affect the poor and could increase poverty by nearly 2 percentage points by 2050, equal to over 50,000 people. Prioritizing social needs and fairness in climate action will be essential.
- Investing in resilience and adaptation can help Gabon limit the negative consequences caused by climate change. Climate and development needs are strongly intertwined and climate investments can help improve health and living conditions.
- Building resilience is essential to attenuate the adverse effects of a changing climate, but this requires sustainable public finances and adaptation measures that are realistic and aligned with national priorities, based on thorough cost-benefit analyses.
- In view of fiscal constraints, public investments will not suffice for climate adaptation. Private sector solutions, reforms to unlock investment opportunities, expanded domestic and international green financing options, and strengthened public-private partnerships will be needed.

This chapter analyzes the consequences of climate change for Gabon's development, informed by previous chapters. More intense storms, heatwaves, and rising ocean levels can severely damage infrastructure, labor productivity, crops and fish stocks, while water-borne diseases are expected to increase by 13 percent, hampering people's ability to study and work. Overall, climate shocks can reduce the level of GDP by 3.1 to 5.3 percent and increase poverty by 0.1 to 1.7 percentage points by 2050. Natural disasters could worsen Gabon's already constrained fiscal position and add pressure on the financial sector, increasing disaster relief and infrastructure repair costs, and potentially leading to unsustainable debt. By investing in adaptation, adopting growth-enabling reforms, and strengthening private sector involvement, Gabon can unlock green growth opportunities, strengthen resilience and raise more revenues to attenuate the impacts of climate change for the economy and society, especially for the most vulnerable.

4.1 Climate and growth: How can Gabon promote a more robust and inclusive economy, and attenuate the adverse impacts of climate change to its economy and people?

Reforms to unlock Gabon's potential and build a robust growth path

Over the coming decades, Gabon is set to continue experiencing a structural transformation, with non-oil sectors gradually contributing more to the economy. Development plans have been diversifying the

economy away from oil, even if remaining largely based on commodities and leading to moderate growth. Since the early 2010s, policies have been stimulating the mining, agriculture, and wood sectors. Actions such as the log export ban and set up of the Nkok special economic zone have uplifted local value added of timber exports and made the wood sector the largest private sector employer. The share of oil in GDP declined from 16 to 10 percent between 2011 and 2023, a trend expected to intensify post-2025 due to depletion of existing oilfields. Acknowledging urgent need of strong reforms to propel other sectors, the latest national strategy, the 2024-2026 National Development Plan for the Transition (PNDT), aims to improve institutions, infrastructure, and human capital to boost job creation. Growth is expected in non-oil commodity sectors, as in recent years. Reforms in line with the PNDT could help expand agriculture, wood, and manganese production and associated local industries. Services would benefit from digitalization efforts and the potential in ecotourism, while higher firm and household consumption would boost demand for transport, financial services, and trade.

The Gabonese authorities are implementing reforms to improve governance, foster growth and generate more revenues. Major reforms were launched since the start of the political transition, for instance with a new Constitution adopted in November 2024. Gabon could use the post-transition's momentum to strengthen institutional controls and adopt reforms for more efficient spending, higher transparency and better oversight of public revenues and assets. These reforms could pave the way for more solid growth and free up the resources to meet spending needs, including those related to climate. For instance, Gabon rejoined the Extractive Industries Transparency Initiative in 2021 and validated its membership in early 2025, an important step to foster good governance practices. Other reforms that are recently adopted, underway or planned include the publication of oil and mining contracts in 2024, revising the forestry and mining codes, digitalizing wood traceability, expanding sustainable exploitation of new wood species, digitalizing tax payments and filing, operationalizing the Treasury Single Account, re-creating a debt taskforce to audit public debt, creating agencies for budgetary control and to manage state participations, and improving legal frameworks for public investment and procurement. Support for local firms is being enhanced with credit guarantees, a new public bank for SME credit, and exclusive procurement contracts for SMEs. Large investments in roads, energy, water and other infrastructure are being launched.

However, the pace of economic transformation will ultimately depend on strong reforms; infrastructure gaps and regulatory challenges would continue to hinder growth in the 'business as usual' scenario. Two growth scenarios are considered in this CCDR (table 4.5)[119]. The 'business as usual' case is characterized by moderate growth due to a continuation of the status quo. Current policies, reforms and investments would continue to stimulate diversification and growth. With a timid and delayed adoption of impactful economic reforms, challenges in governance of public finances and business environment would limit the growth potential. As a result, in this scenario, based on historical trends since the 2010s, Gabon's economy would grow by about 2.4 percent (0.7 percent per capita) on average from 2025 to 2050, driven by non-oil commodities such as mining, wood, and agricultural goods.

In the reform scenario, growth-enabling reforms would accelerate economic transformation by building an enabling environment and adequate conditions for firms to invest and expand. In this scenario, major reforms would help reduce governance and business climate challenges, putting the country on a higher growth path, at a projected annual average of 4.7 percent over 2025-2050, translating into higher living standards, with a 3.1 percent annual per capita growth. Structural reforms would pave the way for a more

[119] This CCDR considers two growth scenarios: the BAU (business-as-usual) and reform scenarios. The impacts of climate shocks under a wet/warm future and a dry/hot future are analyzed for both scenarios. In each case, the impacts are projected with and without specific adaptation measures. For more details on growth projections and on the modeling exercise, please consult the CCDR Annex.

prosperous society, based on sustainable mining, wood, and agricultural activities, stronger industrial development, and ecotourism. More private investment would be attracted, and higher exports and consumption would generate more demand.

The reform scenario is based on the PNDT and is centered on converting natural capital into meaningful improvements in human, physical, and institutional capital. Realizing Gabon's development goals requires better governance, directing resources to productive investments in infrastructure, skills, and business conditions. In line with the PNDT, in the reform scenario Gabon would launch a higher-growth path based on a more enabling business environment, better physical infrastructure, a skilled and healthy labor force, and regulations promoting entrepreneurship and private investment. Key reforms include: (i) improving roads, railways, maritime and air transport, and ports; (ii) expanding access and reliability of electricity, digital broadband, water and sanitation; (iii) diversifying trade by tapping into opportunities from the African continental free trade area; (iv) improving governance, business regulations and tax compliance with digital services; and (v) providing better training, healthcare and social protection through more targeted social support and investments in social housing. Sector-focused policies to attract investment and create more jobs aim at incentivizing (i) oil and mining local transformation; (ii) wood production, combating illegal logging and digitalizing traceability; (iii) agriculture, improving access to seeds and inputs, creating high-productivity zones with cooperatives to support farmers, and promoting tuna processing; (iv) ecotourism, with better infrastructure and tourism services.

A crucial challenge will be to ensure a socially optimal use of its vast natural wealth, one that allows Gabon to create a more inclusive, job-producing and resilient growth model. Gabon's extractive industries are not labor-intensive, contributing to high unemployment and poverty. But oil will remain central over the medium-term, while mining industries are set to grow in relevance with the start of exploitation of iron ore at Belinga in 2024, one of the world's largest deposits. Gabon also relies on key forest ecosystem services to sustain livelihoods and the timber economy, as forests provide timber, poles, fuelwood, wild plant foods, and bushmeat for local communities, and also support ecotourism activities. Its vast forest ecosystems, generally well preserved, are estimated to have retained over eight billion tons of carbon in 2020 and are essential in controlling soil erosion and retaining sediments, thus improving the quality of water collected by people and used for hydropower and other sectors[120]. To build solid foundations for growth, it will be important to secure resources through well-managed and efficient spending of public revenues, including those deriving from commodities. If oil, mineral, wood and other natural resources are not well governed and sustainably managed, growth could be based on an extractive economy that depletes natural capital without benefiting the Gabonese. Diversification should not be a goal per se, as it is not sufficient nor necessary for development. The experience of resource-rich countries that achieved sustained higher growth, such as Australia, Botswana, and Canada, show that the core issue is to channel resource revenues into efficient and productive investments in human and physical capital[121]. To unlock its potential, reforms should focus on making the best possible use of natural resources to benefit most Gabonese, by building stronger institutions and human and physical capital.

Successful economic reforms can make a difference, allowing Gabon to go from a modest baseline to a robust and viable post-oil economy. Reforms are ongoing, yet more needs to be done to achieve higher, sustained growth, in a context of vanishing oil reserves and changing global energy demand. Raising living conditions, reducing poverty and strengthening climate resilience will require better management of public

[120] World Bank. 2025 (unpublished). Gabon Forest Ecosystem Accounts 2000-2020. Draft report: February 2025.
[121] Gill, Indermit S., Ivailo Izvorski, Willem van Eeghen, and Donato De Rosa. 2014. *Diversified Development: Making the Most of Natural Resources in Eurasia*. Washington, DC: World Bank.

finances and higher private sector growth. Key fiscal, governance, and economic reforms, including those outlined in the PNDT, would be essential. First, Gabon faces transparency challenges, with oil and mining contracts and SOE financial statements often not published, and a high use of direct contracting. Institutional quality can be improved with rules to foster transparency, accountability, stricter budgetary planning, oversight and execution, and human resource management. Then, more effective spending and tax reforms such as progressive income and property taxation and overseeing and targeting tax expenditures could free up substantial fiscal space. Thus, with more revenues and effective public action, the state could invest more and better in resilient infrastructure and human capital, enhancing competitiveness and job creation, a crucial component of a successful reform scenario. Gabonese businesses face business climate obstacles such as high tariffs that limit access to foreign inputs, non-tariff barriers, inadequate transport and power supply, skills mismatches, competition with SOEs and informality, and heavy regulations. By reducing distortions such as competition issues created by a large state footprint and by providing more affordable access to credit, labor skills, energy and other infrastructure, the country can create better conditions for firms to compete nationally and abroad, bringing more jobs and exports and building a stronger economy.

Table 4.5. Gabon's development pathway from 2025 to 2050: baseline and reform scenarios

Policy area	Baseline scenario	Reform scenario	Key aspects
Growth	Moderate growth in line with historical trends (average 2.4% of GDP per year in 2025-2050)	Higher growth driven by non-oil sectors and stronger economic reforms (4.7% of GDP in 2025-2050)	Structural economic, fiscal, and governance reforms and investments improve human and physical capital, boosting growth and living standards. Key reforms are adopted in line with the PNDT (on infrastructure, institutions, climate resilience, inclusiveness, and diversification centered on agribusiness, wood and mining transformation, and ecotourism). Reforms occur in both scenarios, but to a different degree, being faster and deeper, resulting in higher growth in the reform scenario, whereas delays and implementation challenges would continue in the baseline. Labor market reforms reduce labor rigidities in the reform scenario.
Economic transformation	Primary sector: 11% of GDP by 2050 Secondary sector: 33% of GDP by 2050 Tertiary sector: 56% of GDP by 2050	Primary sector: 10% of GDP by 2050 Secondary sector: 39% of GDP by 2050 Tertiary sector: 51% of GDP by 2050	In both scenarios, a gradual decline in hydrocarbon output is foreseen due to maturing reserves, but attenuated by investments in gas production, especially in the reform scenario. Other commodities, such as mining, wood, and agricultural products, gradually become more prominent growth drivers in both cases, with stronger growth in local industries (agribusiness, wood, minerals) and services (digital, tourism) in the reform case.
Fiscal position	Gradual increase in non-oil revenues to 17% of GDP by 2050 Expenditures increase to over 16% of GDP by 2050 Public debt: 124% of GDP by 2050	Stronger increase in non-oil revenues to 19% of GDP by 2050 Expenditures are contained at 15% of GDP by 2050 Public debt: 56% of GDP by 2050	*Baseline:* deficits increase due to challenges to contain operational and capital expenditures and to mobilize revenues, increasing debt and compromising debt sustainability. *Reform:* sound reforms in tax collection, budget planning, control, targeting, and execution lead to more efficient and productive public spending and higher tax collection, allowing for positive balances (larger fiscal spaces) and contained public debt. Higher investments are needed initially but decrease gradually.

Investment and consumption	Average investment of 6% (public) and 8% (private) of GDP in 2025-2050 Average consumption of 13% (public) and 57% (private) of GDP in 2025-2050	Average investment of 6% (public) and 11% (private) of GDP in 2025-2050 Average consumption of 4% (public) and 58% (private) of GDP in 2025-2050	In both scenarios, oil-related investment would decrease with the depletion of oil reserves, but a larger fiscal space allows for higher public investment in the reform case. In the reform scenario, more efficient and targeted spending reduces public consumption, leaving more room to finance much-needed public investments, which are also assumed to be more efficient due to public investment management reforms. Private sector investment is boosted by a better business climate, while private consumption is supported by stronger income generation due to higher employment and profits, resulting in a higher investment and growth.
Climate adaptation	Moderate efforts implemented due to insufficient fiscal space	Stronger climate adaptation and resilience efforts	In the reform scenario, higher public investment is expected to make the economy more resilient to climate change, and higher mobilization of private sector would help build resilience, in line with the PNDT.
GDP losses associated with climate change ("current policies" scenario)	Average annual losses of 3.5% to 5.3% of GDP by 2050	Average annual losses of 3.1% to 4.8% of GDP by 2050	GDP losses projected in the wet/warm and dry/hot climatic scenarios. In the reform case, higher and more sustained growth is expected to produce a more resilient economy, limiting the impacts of climate change to a certain degree.
GDP losses associated with climate change (with CCDR adaptation measures)	Average losses of 2.1% to 3.8% of GDP by 2050	Average losses of 1.9% to 3.5% of GDP by 2050	GDP losses projected in the wet/warm and dry/hot scenarios. In both the baseline and reform cases, improved disaster risk management, investments in resilient infrastructure, and other adaptation efforts (table 4.6) would reduce GDP losses.

Source. World Bank staff calculations and IEc. GDP losses projected for the wet/warm (SSP2-4.5) and dry/hot (SSP3-7.0) scenarios. Losses are projected with and without adaptation measures, under both growth scenarios. Shared Socioeconomic Pathways (SSP) are climate scenarios that describe different developments and global emissions patterns. Global surface temperatures are projected to rise by 2.0°C by 2041-2060 and 2.7 °C by 2081-2100 in the SSP2-4.5 scenario; temperatures are projected to rise by 2.1°C by 2041-2060 and 3.6 °C by 2081-2100 in the SSP3-7.0 scenario[122].

Investing in resilience to adapt and attenuate the impacts of a changing climate

Natural disasters are already a reality, highlighting Gabon's vulnerability to climate events, which are projected to increase in frequency and intensity. Between 2013 and 2023, floods, storms, and landslides affected 8,600 families in Gabon, costing CFAF 4.4 billion, about 0.04 percent of GDP[123]. Furthermore, landslides and heavy rain at end-2022 destroyed a kilometer of the country's only railway, blocking wood and manganese exports for several weeks and disrupting access to basic goods and drinking water. Heatwaves in early 2024 increased energy demand, causing outages. Future climate hazards can disrupt roads and urban infrastructure, hindering the movement of goods and people and burdening the country with relocation, repairs and disaster relief costs. Heavy rains can accelerate soil erosion and the spread of diseases, affecting soil fertility, food security, and human health. A changing climate would impact labor productivity, power generation, and forestry, agricultural and fishing production, with macroeconomic, fiscal, trade, financial, and social implications. Lower output would reduce incomes for farmers, fishers, and other workers, increasing poverty and vulnerability and decreasing tax revenues while increasing costs to respond to disasters, repair infrastructure, and support impacted populations.

Climate change poses a serious risk for the whole economy; it can provoke annual GDP losses ranging from at least 3.1 to 5.3 percent by 2050, compromising livelihoods and development aspirations. Infrastructure, jobs incomes, fiscal revenues, and natural resources are all exposed to rising climatic threats. A whole-of-economy approach estimated that, without adaptation efforts measured in this CCDR, by 2050 climate change can result in annual GDP losses of at least 3.5 to 5.3 percent in the baseline scenario under current

[122] United Nations. IPCC Report. Summary for policymakers.
[123] Government of Gabon. 2024. Report - Analysis of fiscal risks. Annex to the 2024 budget law.

policies, considering respectively a wet/warm and a hot/dry climate. Total economic losses could be even higher, as the model is limited to eight specific impact channels and does not include impacts of key aspects such as climate change's impacts on forests and hydropower, or potential effects of global decarbonization on Gabon's oil-based economy. Also, GDP impacts do not capture all impacts on well-being, such as on health, livelihoods, or regional, age group, and gender inequalities.

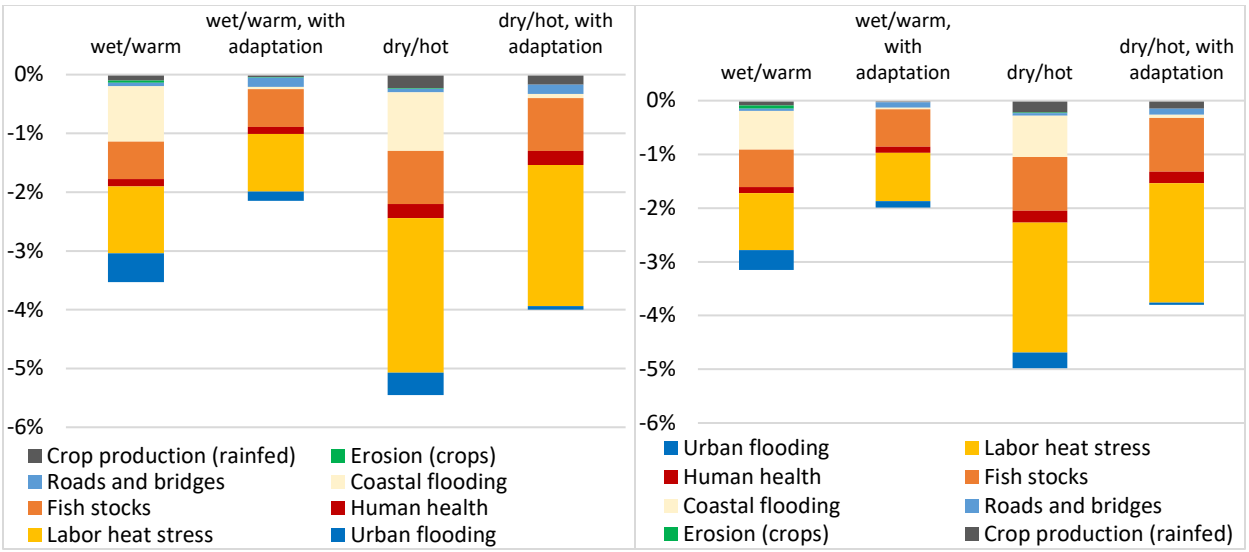
Over the long term, climate shocks can have significant consequences for the country's structural transformation path. Damages to urban and transport infrastructure, and shocks reducing labor productivity and overall human capital, with higher spread of diseases, could impact the development of local manufacturing and services industries. As exemplified in Figure 4.2, over the coming decades climate change could result in a lower economic contribution coming from manufacturing and services. Productivity, income generation, and the overall goals of raising living standards and creating more jobs could be impacted. To tackle such challenges, not only targeted adaptation investments are needed, but also the implementation of a strong economic reform agenda.

Bold reforms would deliver higher growth and poverty reduction and could also help attenuate the negative consequences of climate change, although gains in resilience would still be limited as high potential sectors, like wood and agriculture, are vulnerable to climate shocks. In the reform scenario, the projected annual losses would be slightly lower at 3.1 to 4.8 percent by 2050 (figure 4.1)[124]. Even in the reform scenario, climate change is still projected to have a major impact on growth due to the limited capacity to adjust to shocks. Reforms are set to enable higher growth in sectors that would be strongly exposed to climate change, such as agriculture, fishing, and timber, so Gabon would still face major climate impacts even as it enjoys development gains from economic reforms. The most severe climate shocks would be on labor productivity, especially for outdoor workers in agriculture, timber, and construction. Output in these sectors would expand more in the reform case but this would increase the potential impact of shocks on workers and crops. The impacts on fish stocks, physical capital, and health would also be important. Options to counter fish stock decreases due to warming oceans are limited, for example. Importantly, the long-term economic consequences of climate change in Gabon could be considerably stronger, as the model was limited to certain specific impact channels and provides only an indication of the potential impacts in certain areas.

Figure 4.1. Projected GDP losses (in percent of GDP) due to climate change by 2050, under the baseline and reform scenarios, with and without adaptation measures

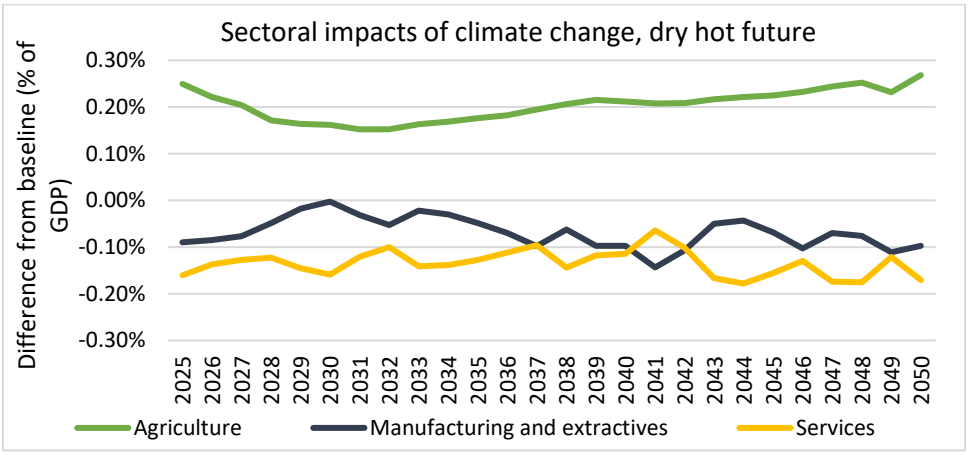
Losses under the baseline scenario *Losses under the reform scenario*

[124] The MANAGE-WB Computable General Equilibrium (CGE) model was used to estimate the impact of climate change to the overall economy of Gabon, by integrating simulations of biophysical impacts caused by climate change to the country's labor supply and productivity, crops, fish stocks, and transport and urban infrastructure. The model considered two growth scenarios in its analysis of long-term development paths, a baseline or 'business as usual' scenario and a reform scenario. For each of these scenarios, the economic impacts of climate change were simulated for the following counterfactuals: two climate scenarios (wet/warm and dry/hot), each with two sets of climate actions (climate damages without adaptations and climate damages with adaptation measures implemented). Hence, in total, four counterfactual climate impact scenarios were simulated. The CGE model has a set of neo-classical assumptions such as perfect competition in commodity markets and price adjustments. However, the scenarios were adjusted to contain rigidities reducing labor mobility across sectors and lower efficiency in public investments in the business-as-usual scenario. Also, to incorporate the need for climate adaptation investments, the model relied on a savings-drive-investment closure. Hence, investments depend on total savings (enterprises, households, public and foreign). The interest rate on government debt and returns on private investment clears supply and demand of loanable funds. Household savings depend on disposable income and returns to savings. Foreign savings is assumed a constant share of GDP. Climate adaptation investments are thus financed by higher savings or crowding out of existing investments, with higher savings generated by higher incomes in the reform scenario. Please see Annex II for more details.



Source. World Bank staff calculations and IEc. GDP losses projected for the wet/warm (SSP2-4.5) and dry/hot (SSP3-7.0) climate scenarios, with and without adaptation measures, in the baseline and reform growth scenarios.

Figure 4.2. Projected sectoral impacts of climate shocks, example of the Reform scenario under a dry-hot future

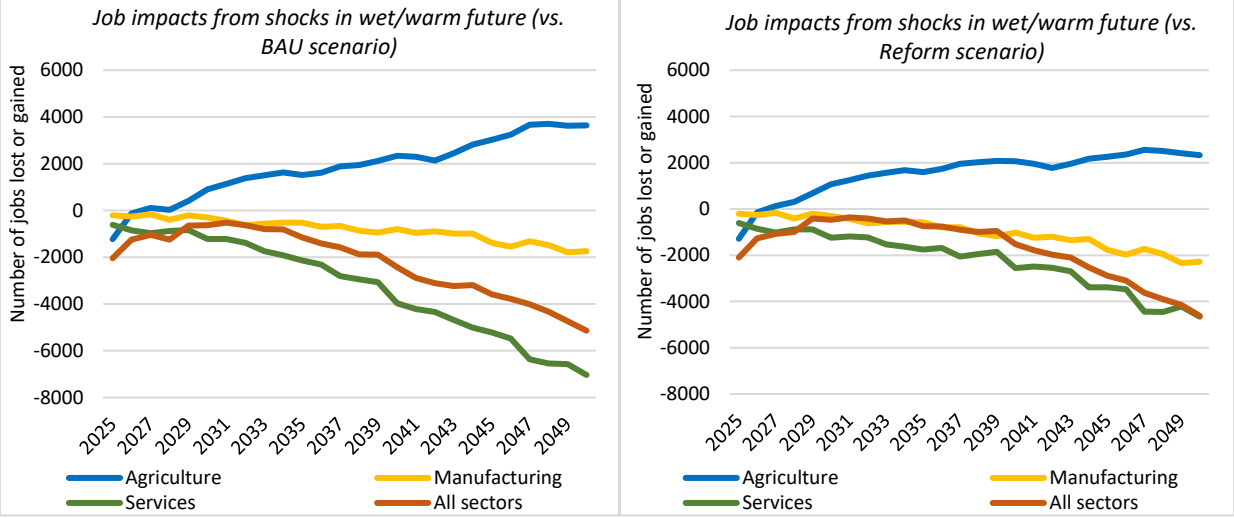


Source. World Bank staff calculations based on the MANAGE-WB CGE model.

In fact, the main aspiration of the reform scenario is not climate resilience per se but achieving higher job-producing growth and poverty reduction, which are Gabon's main challenges – and reforms can also reduce the number of jobs lost due to climate shocks. The reform scenario would still see important GDP losses, but it would produce a much larger economy, nearly doubling total GDP. The benefits for incomes, jobs, and poverty reduction are evident. Even so, Gabon's diversification strategy should consider how future growth drivers and labor markets will be impacted by climate change. For example, while reducing unemployment is a key government priority, climate shocks are projected to reduce employment by about 2,230 jobs yearly in a wet/warm climate, compared to the baseline scenario. Reforms could attenuate this impact by creating a more resilient economy. Labor market reforms would reduce cross-sectoral labor rigidities in the reform scenario, attenuating the impact of climate shocks on jobs. However, the country would still lose about 1,700 jobs a year due to shocks.

Worryingly, job losses would worsen over time, with important consequences for the economy and social stability. Job losses could reach 4,600-5,100 jobs by 2050 in a wet/warm future, and 2,000-3,100 jobs in a dry/hot scenario. This represents about 0.3 percent of the projected active population in 2050, and would concentrate in manufacturing and services, which are key to building a higher value-added economy (Figure 4.3). In comparison, as of mid-2023 there were about 7,000 active job seekers registered at employment agencies[125], indicating the substantial impact that an additional 2,000-5,000 job losses per year due to climate change could have on the economy and on social stability. Total job losses could be even higher, as the model is limited to a projection of certain specific impact channels. For instance, the model does not take into account impacts on forests, which are key for jobs in Gabon. In agriculture, the modeling results suggest that new jobs could be created to compensate for lower productivity of crops from climate shifts, because the sector could need to employ more people to meet agricultural demand. But in reality, lower agricultural productivity due to climate shocks could instead result in lower food production, elevating food prices and impacting food security without necessarily creating more (and less productive) jobs.

Figure 4.3. Projected impacts of climate shocks on Gabon's job market



Source. World Bank staff calculations based on the MANAGE-WB CGE model.

Regional and global climate policies are another source of risks and opportunities for Gabon. While uncertainty is inherent to long-term projections, evolving trends point to aspects to be considered in Gabon's development strategies. Reducing gas flaring can be necessary to maintain Gabon's oil industry competitiveness. EU regulations may impose emission reporting requirements, and Korean firms have been favoring oil purchases from low-emission Norway. Over the long term, Gabon's oil-based economy is also exposed to risks such as a potential decarbonization of global energy demand, which could lead the country with stranded assets and compromise fiscal capacity, in view of dwindling oil revenues. As for agriculture, mining, and wood, stronger certification requirements and sustainable production policies can help comply with importing markets' standards. These are becoming stricter, as exemplified by the recent EU regulation on deforestation-free products and carbon border adjustment mechanism. Thanks to certification promotion and sustainability policies, Gabon's wood products might compete better in stricter global markets. Moreover, regional developments can impact the country, from climate-related migratory crises to climatic disruptions to agriculture and trade, to new markets such as the African intercontinental free trade area. For example, a changing climate can raise costs of imported food but also create opportunities

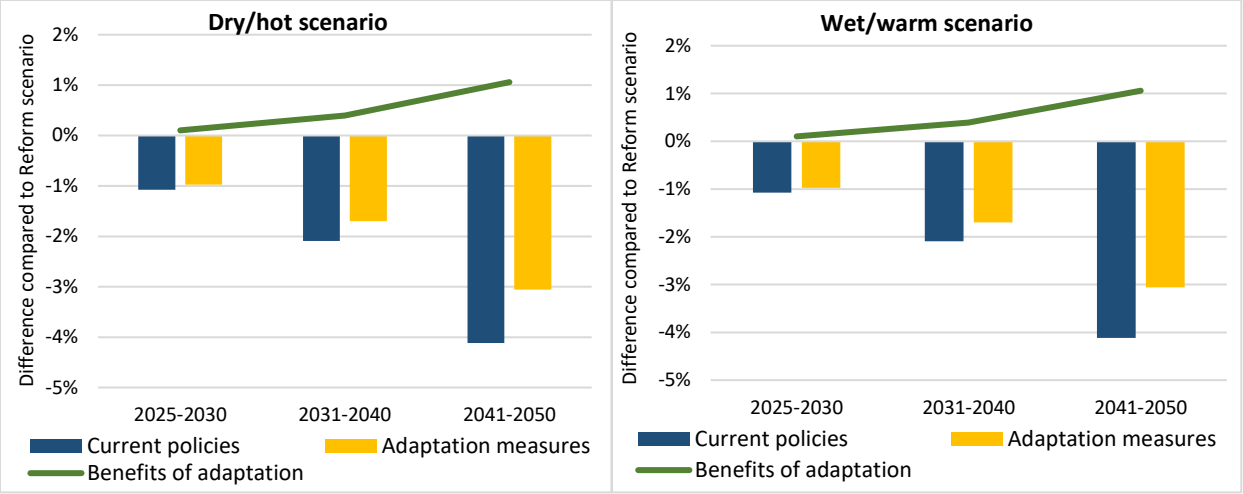
[125] Government of Gabon. 2023. *Bulletin Trimestriel de Suivi de l'Emploi*. No. 10. June 2023.

for coffee and cocoa production due to deteriorating conditions elsewhere, despite the uncertainty surrounding regional climate shifts.

Climate and development needs are intertwined; climate investments can bring other benefits to society, improving health and living conditions. To face climate shocks, a comprehensive adaptation and resilience plan is imperative. Difficult choices will need to be made, in terms of prioritizing between different investments and consumption needs. Adaptation needs represent higher fiscal costs, but successful investment plans must consider resilience. For example, a road expansion that does not consider natural hazards can bring high fiscal costs due to road repairs. Similarly, a social protection program without an emergency strategy would be unfit to counter vulnerability to climatic shocks. Synergies exist between adaptation and development in many areas. A better public transport reduces emissions but traffic congestion, costs of fuel consumption and fuel subsidies, traffic accidents and diseases caused by air pollution. Resilient roads and bridges reduce damages and maintenance costs. Also, improved waste management reduces pollution, whereas commercializing gas associated with oil extraction decreases flaring and energy costs, providing more affordable energy for households and industries. Likewise, investing in more resilient crops can increase productivity, food security and farmers' incomes.

By investing in resilience and adaptation, Gabon can limit the negative consequences caused by climate change to its society and economy, reducing GDP losses from 5.3 percent to 3.8 percent in a dry/hot future. If the country adopts certain measures and policies to adapt to climatic shocks, the estimated economic impacts of climate change would be reduced by 1.5 and 1.2 percentage points in the baseline and reform scenarios. The benefits of adaptation measures are expected to increase over time, becoming stronger by the 2040s (Figure 4.4). Key adaptation investments include resilient roads and bridges, floodproofing critical urban and coastal infrastructure, temperature control for indoor workspaces, and expanding irrigation and heat-resistant crop varieties. The total cost to build and maintain these investments from 2025 to 2050 is estimated at USD 450 million (about CFAF 270 billion, or 2.2 percent of GDP). Over the whole 25-year period, their annual cost would be 0.09 percent of GDP, yet they would result in a 1.5 percent annual net GDP gain (table 4.6). While mobilizing resources to meet these significant costs is a challenge, the alternative 'no action' scenario would expose the economy and people to greater threats and economic losses. Investing in resilient crops, roads, and infrastructure would improve human lives by providing better shelter from floods, storms, and other natural disasters. Moreover, it would be important to consider alternative solutions to areas that would still produce significant economic shocks. Climate change's impacts on labor productivity would still be high despite adaptation efforts such as the expansion of temperature control in indoor spaces. As for fisheries, the sector would suffer important projected impacts, requiring deeper analyses to identify alternative ways to attenuate or manage such impacts.

Figure 4.4. GDP losses due to climate shocks, compared to the 'Business-as-usual' scenario



Source: World Bank staff calculations based on the MANAGE-WB CGE model.

Table 4.6. Gains and costs of climate adaptation investments modeled in the Gabon CCDR, 2025-2050

Climate change impact	Adaptation measure / investment	Estimated total investment and maintenance cost (US$ million)	Estimated annual cost (% of GDP)	Average net GDP gain by 2050 (% of GDP)
Heat stress and labor productivity	Expanding cooling equipment in indoor spaces	114	0.02%	+0.2%
Agriculture (erosion and rainfed crops)	Investing in more heat-resistant crops, improving irrigation	24	0.005%	+0.1%
Roads and bridges	Enhancing the resilience of roads and bridges, rehabilitation of paved and unpaved roads	95	0.02%	n/a
Urban flooding	Enhancing the resilience of existing urban infrastructure, improving urban zoning, floodproofing existing infrastructure in Libreville	110	0.02%	+0.3%
Coastal flooding	Enhancing the resilience of existing infrastructure and improving zoning in coastal areas, floodproofing existing infrastructure	108	0.02%	+0.9%
Cost of modeled investments	-	450	0.09%	+1.5%

Source. World Bank staff calculations and IEc. Notes: Estimated annual costs are discounted and presented as a percentage of GDP in 2024. The projected net GDP gain represents the reduction of economic losses thanks to adaptations measures and investments in resilience. This list is not comprehensive and covers only investments modeled in the CCDR in the areas above. A more comprehensive resilience strategy would involve higher costs. For instance, the estimated measures to attenuate impacts of urban flooding are limited to enforcing flood area restrictions to impede further building within existing floodplains (no cost foreseen) and floodproofing a subset of critical and highly vulnerable infrastructure in Libreville. However, more extensive adaptation measures might be needed to ensure adequate flood protection and resilience for Gabon's cities. An extrapolation of adaptation costs to the country level and accounting for a broader set of adaptation measures to ensure flood protection (e.g. drainage network extensions, investments in beach erosion protection, construction of sea walls) would result in significantly higher costs. Measures need to be aligned with specific local needs, such as challenges faced by Port-Gentil with coastal flooding and other cities with fluvial flooding.

There is also synergy between climate goals and strengthening governance, fiscal stability, private sector growth, and poverty reduction. First, ensuring adequate fiscal space and more effective public action are prerequisites for adaptation. Also, building a robust and inclusive economy is essential for successful

climate action, by raising living standards that enable people, firms, and the government to tackle climate challenges. Optimizing revenue collection and spending and building stronger private and financial sectors are crucial to fund adaptation investments and generate more income for the Gabonese, putting them in a better position to cope with shocks. As detailed in chapter 3, several actions can help mitigate climate change. The country is exposed to trade-offs, since some spending that would otherwise cover other investment and consumption needs could need to be redirected to target climate adaptation. There is thus a need to prioritize and aim to maximize the climate investments that bring most social and economic benefits. Yet, even where there is synergy in climate and growth goals, such as eliminating gas flaring or rationalizing fuel subsidies and tax incentives, strong political will is needed. Reforms can be opposed by groups like firms that benefit from tax incentives or need to invest in gas flaring elimination. Integrating climate considerations into fiscal sustainability, governance, private and financial sector development, and poverty reduction can help alleviate climatic shocks to the Gabonese people, economy, public finances, and infrastructure.

4.2. Climate, poverty and inequality: How will climate change impact the poor and how will impacts be distributed across society? How to support the most vulnerable from climatic shocks?

Over the previous decades, extractives-based growth allowed Gabon to achieve upper middle-income status, but challenges remain in tackling poverty. Gabon saw a substantial decrease in poverty in the early 21st century, with the share of people living under USD6.85 per day dropping from 55 percent in 2005 to 31 percent in 2017. Driven in part by high urbanization rates, which concentrated population and economic activities in a few coastal cities, the poverty headcount decreased across the board, with the most significant reductions observed in urban areas outside the main cities. However, poverty and inequality remain high, with over a third of Gabonese living under USD6.85 per day, above the average for countries with comparable income levels[126]. In rural areas, poverty affects half of the population[127]. Human development is consistently below Gabon's income status, with life expectancy at birth at 66 years, 9 years below the average for its income group. Access to basic services, especially sanitation, is also much lower than in UMIC peers. Several education and health outcomes are also below UMIC averages, resulting in a human capital index of 0.46, compared to an UMIC average of 0.56. In other words, a Gabonese child born today would be 46 percent as productive as she or he could have been.

High unemployment is a major poverty driver, as lack of jobs, income-generating activities, and economic inclusion impedes the population from benefiting from commodity booms.[128] The oil and mining industries are capital intensive, requiring fewer jobs and unable to absorb the labor force. Unemployment is also linked to insufficient investment in human capital and mismatches in labor skills. About one in three young Gabonese is unemployed, while two thirds of job offers often go unfilled[129]. Sectors with strong potential, such as agriculture and wood, face challenges to attract workers to rural areas, given Gabon's high urbanization rate and limited rural public services. Due to high birth rates, about 20,000 people are expected to enter the labor market per year[130], over the coming decades, showcasing the urgency of supporting entrepreneurs and firms to absorb these new intrants. As mentioned, climate shocks are

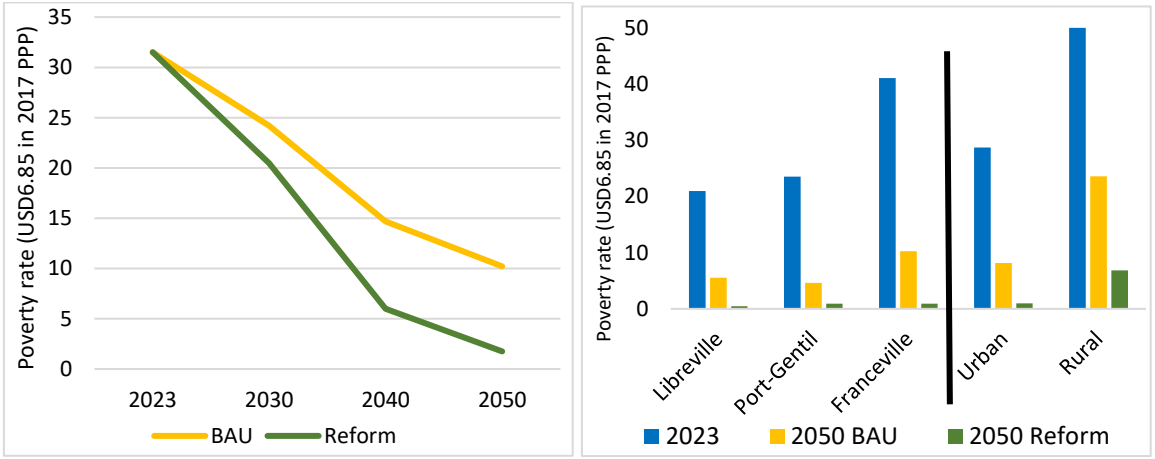
[126] World Bank. 2022. Gabon Country Economic Memorandum.
[127] World Bank Macro Poverty Outlook, Annual Meetings 2024 and National household budget survey (*Enquête Gabonaise pour l'Évaluation de la Pauvreté* 2017, EGEP).
[128] For a more detailed discussion on employment challenges, please refer to section 3.3 of this CCDR.
[129] World Bank. 2022. Gabon Country Economic Memorandum.
[130] UN World Population Prospects. 2023 and Government of Gabon. Gabon's working age population (aged 16 to 65), comprising 1,031,521 people as of 2013, is expected to grow by 2 percent on average from 2025 to 2050.

expected to result in losses in jobs and incomes, with losses concentrated in key sectors like manufacturing and services, aggravating poverty challenges.

Stronger growth is needed regardless of climate shocks; growth-enabling reforms could significantly reduce poverty and inequality, leading to much higher living standards. Microsimulations based on the CGE model indicate that structural reforms could have a major impact on poverty reduction. In the 'business as usual' scenario, with average growth at 2.4 percent from 2025 to 2050, the share of Gabonese living with less than US$6.85 (in 2017 PPP) would decline gradually, from about 30 percent in 2023 to 10 percent by 2050. Many Gabonese would still live in poverty, due to continued challenges to create an inclusive, job-based economy. However, in the reform scenario, reforms improving business conditions and strengthening human and physical capital and the management of public finances would boost private sector growth and job creation, with growth averaging 4.7 percent and poverty dropping much more substantially, to less than 2 percent by 2050. More private investment would expand employment opportunities and distribute incomes, creating more demand and lifting standards across different sectors in the economy.

In the reform scenario, the strongest poverty reductions would take place in urban areas such as Libreville, Port-Gentil and Franceville, due to the concentration of economic activity in cities. Local industries and services would develop especially in the main cities due to agglomeration economy and better infrastructure, concentrating more job opportunities and raising incomes for urban residents. Yet, reforms would still substantially reduce poverty across the country, in rural and urban areas alike (Figure 4.5). Furthermore, the analysis suggests that extreme poverty and income inequality would also see significant reductions. In the reform scenario, the projected poverty reduction is higher at USD3.65/day than at USD6.85/day, suggesting that reforms allow not only to fight overall poverty but are also efficient at lifting up the poorest segments. This scenario would also see a drop in the Gini index by 0.50 to 1.15 points, indicating decreased income inequality thanks to a more inclusive, job-based and participatory economy[131]. However, in the 'business as usual' scenario that index remains constant at best.

Figure 4.5. Decrease in poverty overall and by region under each growth scenario



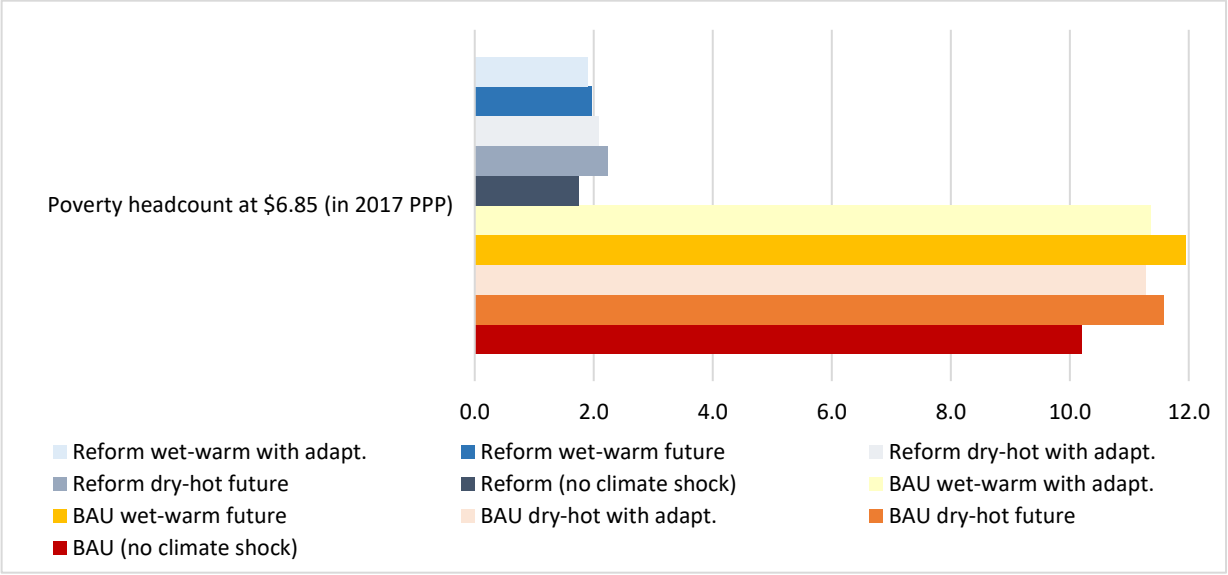
Source: World Bank staff calculations based on the MANAGE-WB CGE + Microsimulation using EGEP 2017 household survey. BAU: business-as-usual. 'Urban' is based on the average of all urban zones. 'Rural' is based on an average of rural zones in the country.

Climatic shocks are set to disproportionately affect the poor, increasing poverty by 0.1 to 1.7 percentage points by 2050, compromising progress in the fight against poverty. The distributive analysis conducted in

[131] The Gini index, a measure of income inequality, scores countries based on a scale from 0 to 100 percent (or 0 to 1), where zero represents complete a hypothetical situation of completely equal income distribution across the population, and 100 represents a hypothetical situation where all income is concentrated in one person. Gabon's Gini index was 38.0 in the most recent value, from 2017.

this report revealed that, due to shocks to people's assets and livelihoods, poverty would be higher especially in the BAU scenario, where an additional 52,000 people could fall into poverty (figure 4.6)[132]. Climate shocks would strongly affect the poorest and most vulnerable, and risk eroding development gains, as low-income citizens tend to concentrate in vulnerable sectors such as fishing, agriculture and in outdoor jobs, and have fewer resources to cope with shocks. Also, vulnerable communities often live in areas prone to natural hazards and receive inadequate public services, thus being the least equipped to cope with extreme weather events, which can exacerbate existing inequalities and poverty. Floods and droughts can increase food prices by affecting food producing regions, leading to income losses for farmers while eroding purchasing power and compromising food security. Gabon currently imports much of its food, and the government's ambitions to boost local production and create more agricultural and fishing jobs can be affected by climatic shocks. These shocks can also strain public finances and exacerbate social gaps and different forms of inequality. For example, extreme weather and climate impacts are associated with increased violence against women[133].

Figure 4.6. Projected impacts of climate change on poverty by 2050, under different scenarios



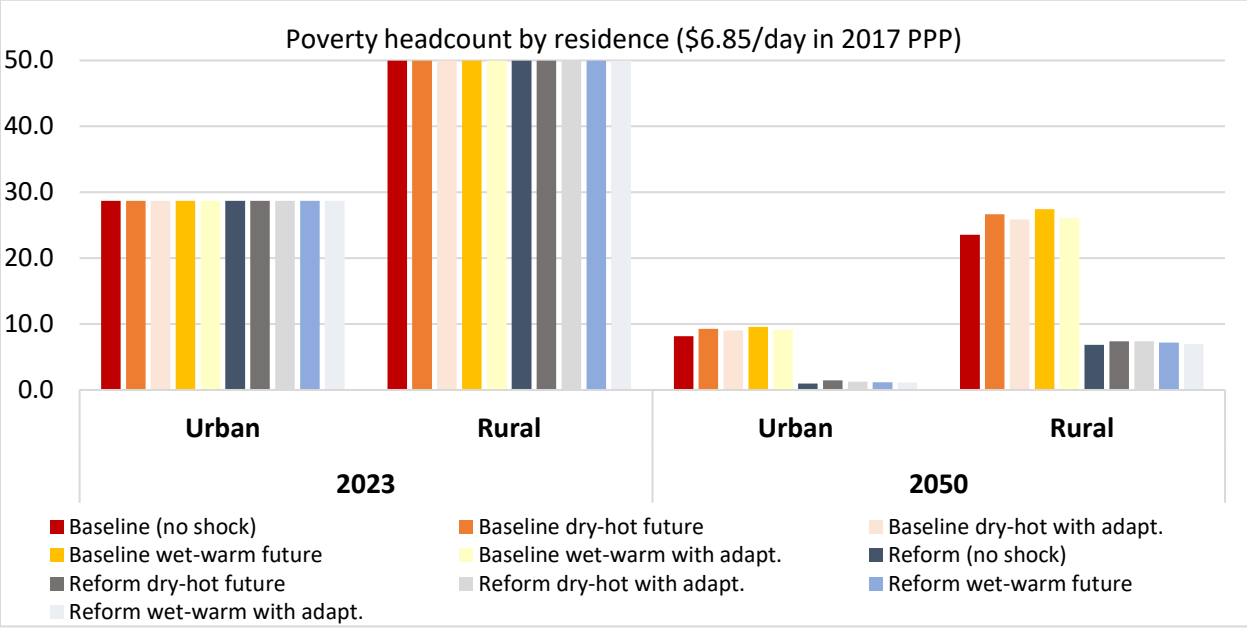
Source: World Bank staff calculations based on the MANAGE-WB CGE + Microsimulation using EGEP 2017 household survey.
BAU: business-as-usual scenario.

Climate change would affect poverty differently across the country, requiring appropriate mitigation measures to alleviate impacts on people. Asset losses due to climate shocks were estimated in different regions. Climate shocks are also expected to impact jobs and income generation throughout the country. The analysis indicates that rural populations would be the most intensely affected, as they rely more strongly on agriculture and on sectors based on outdoor work like forestry and fisheries. Their sources of livelihoods are thus particularly exposed to climate shocks (figure 4.7). The share of rural poor in Gabon was 50 percent in 2023, over 20 percentage points higher than in urban areas. Due to the concentration of economic activity and gains in cities, the disparity between rural and urban poverty would rise to nearly

[132] The microsimulations were based on poverty data from the National household budget survey (*Enquête Gabonaise pour l'Évaluation de la Pauvreté* 2017, EGEP). It is important to note that poverty impacts modeled through the model do not capture the heterogeneity of losses at individual or household level. For methodological details, please consult the CCDR Annex.
[133] Munala, Leso, Allen E. M., Frederick A. J., Ngũnjiri A. 2023. Climate Change, Extreme Weather, and Intimate Partner Violence in East African Agrarian-Based Economies. International Journal of Environmental Research and Public Health. November. Vol. 20, Issue 23; Van Daalen Kim Robin, Kallesøe S., Davey F., Dada S., Jung L., Singh L., Issa R., Emilian C.A., Kuhn I., Keygnaert I., Nilsson M. 2022. Extreme events and gender-based violence: a mixed-methods systematic review. Lancet Planet Health. June. Vol. 6, Issue 6.

three times (23.6 vs. 8.2 percent) by 2050 in the 'business as usual' scenario. Climate shocks would cause asset losses and other economic damages to affect rural populations more severely in both the baseline and reform scenarios, with rural poverty expected to be particularly higher when compared to 'no climate shock' scenarios. Climate change could thus have the perverse effect of exacerbating regional inequalities in a country that already faces long-term challenges to expand access to economic opportunities and to broaden the coverage of basic public services in rural areas.

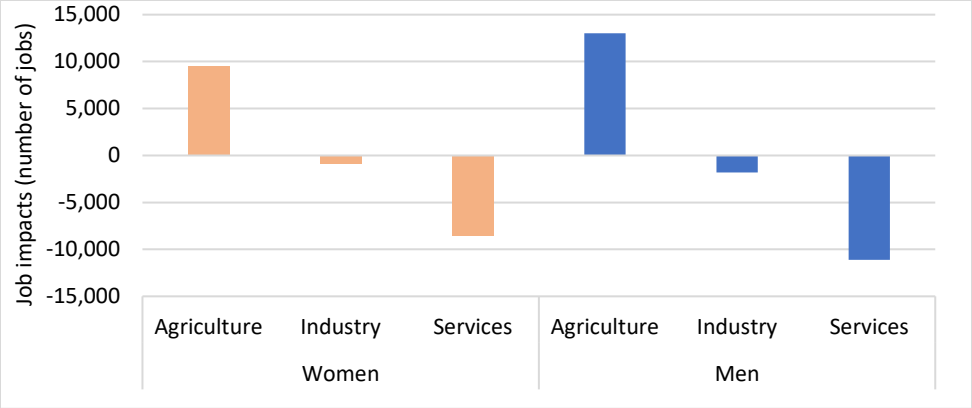
Figure 4.7. Spatial impacts of climate change on poverty.



Source: World Bank staff calculations based on the MANAGE-WB CGE + Microsimulation using EGEP 2017 household survey.

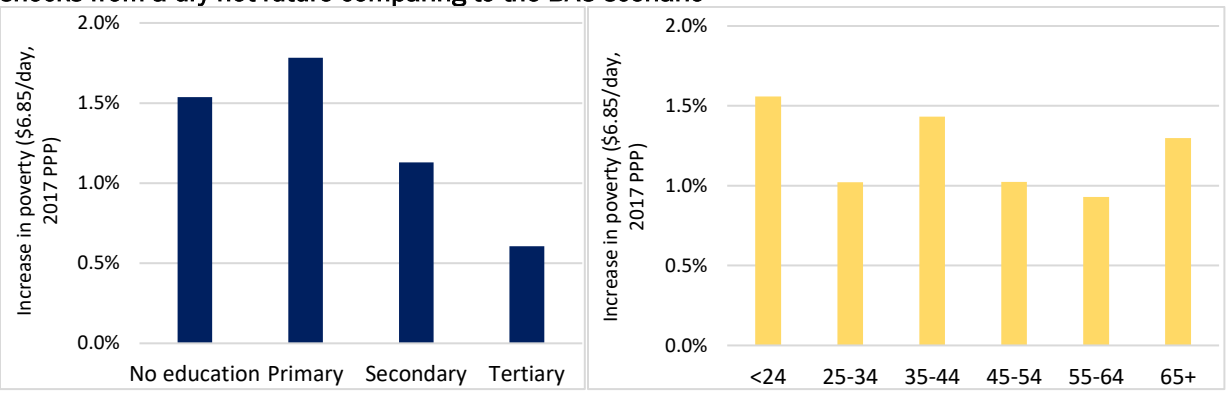
Climate shocks could also have stronger impacts across gender, education level and age groups, requiring an adaptation strategy that takes into account particular groups' needs and situation. For example, in some climate futures, job losses in different sectors could be higher for women or for men, given their presence in each sector and how it will be impacted by climate change (Figure 4.8). The livelihoods of vulnerable groups, such as informal workers, could be more severely affected, as informality is associated with the lack of access to insurance mechanisms, social protection, and other attenuation mechanisms. Likewise, climate shocks could disproportionately affect people with lower education, who often rely on outdoor activities, informal services, and other heavily exposed sectors. For example, in a dry-hot future, by 2050 climate change would increase poverty by 1.8 percent for individuals with primary education, whereas this increase would be limited to 0.6 percent for those with tertiary education, who more often perform indoor work and may have better access to less-exposed economic sectors. Younger people are also expected to be the most severely affected by climate shocks (Figure 4.8). Climate change thus could have the nefarious effect of exacerbating income, gender, regional, and other forms of inequality, as its impacts could be worse on certain vulnerable groups than on the overall population.

Figure 4.8. Annual jobs impacts by gender and sector by 2050: example of climate shocks from a dry-hot future comparing to the BAU scenario



Source: World Bank staff calculations based on the MANAGE-WB CGE + Microsimulation using EGEP 2017 household survey.

Figure 4.8. Projected poverty impacts by education level and age group by 2050: example of climate shocks from a dry-hot future comparing to the BAU scenario



Source: World Bank staff calculations based on the MANAGE-WB CGE + Microsimulation using EGEP 2017 household survey.

Adaptation efforts could mitigate the impact of climate change on poverty, limiting the poverty increase to 0.1 to 1.2 percentage points by 2050. To reduce the burden on the population and attenuate increases in poverty, important investments are needed in resilient transport and urban infrastructure, agricultural crops and practices to mechanize agriculture and reduce soil erosion, and better-suited labor conditions with cooling systems for indoor workers. These could help reduce the social impact of climate change, limiting poverty increases in both the reform and 'business as usual' scenarios. The strongest poverty reduction would be achieved by combining growth-enabling reforms and targeted climate adaptation measures, to attenuate the poverty impacts brought by climate change[134]. To realize this goal, it would be essential to focus on priority and impactful measures, amplifying opportunities for private sector growth and involvement in climate action, while minimizing the impacts on the most vulnerable, including on particular groups.

Adopting a people-centric approach to the climate agenda

To address these challenges, a people-centric approach prioritizing social fairness in resilience and adaptation is crucial. This involves implementing policies to protect and support the poor and vulnerable, such as introducing resilient social safety nets, reinforcing disaster risk management and climate preparedness, and improving access to affordable healthcare. Social protection in Gabon is fragmented and under-funded, primarily through healthcare subsidies for citizens registered as economically vulnerable

[134] Estimates based on the climate action scenario, using microsimulations described in Annex II.

(*Gabonais Economiquement Faibles*, GEF). Gabon spends about 0.5 percent of GDP on social protection, four times less than its income level peers. As discussed in chapter 3, a stronger and well-targeted social protection program could help reduce poverty; increasing social spending to 1.5 percent of GDP could reduce the poverty rate by about 7 percent[135]. Integrating responses to shocks would better equip social safety nets to protect the most vulnerable from climatic hazards, fostering a more inclusive and resilient society that is better prepared to handle the impacts of climate change. A broader, stronger social protection system remains a priority to improve well-being and protect the most vulnerable. In combination with such a program, specific social actions and initiatives could be designed to target the needs of different groups, such as women, the youth, agricultural workers, and forest communities.

Also, the principle of fairness in climate transition requires governments to consider social justice in climate action to ensure that the poor do not bear the burden of climate policies. For instance, removing fuel subsidies should be accompanied by compensatory measures such as targeted social safety nets for vulnerable groups. These could be funded by savings from reduced fiscal costs to subsidize fuel prices, aligning progressivity and environmental goals. Similarly, social justice should also be considered in other fiscal policies, investments, and climate actions. Additional policies could support groups in certain locations, such as populations in areas expected to experience more severe climatic shocks.

Gender and disability considerations should also be embedded in disaster risk management and climate action, along with interests of forest communities. Gabon's recent adoption of gender-responsive budgeting exemplifies a commitment to social inclusion, which could strengthen disaster risk management. Emergency response must cater to specific needs of vulnerable groups, and data disaggregation by sex and disability is vital to identify inclusion gaps in emergency service delivery. For example, emergency supplies should include specific items for vulnerable groups so that their needs are met during emergencies, and a gender-based violence action plan for disaster risk management could help address risks of violence faced by women and girls during disasters. Also, the rights and knowledge of communities living in forest areas must be respected. One example is by developing accountability mechanisms, such as climate finance tracking and grievance redress systems to verify end-uses and inform benefits for forest zone residents. Mechanisms to encourage accountability on uses of funds are critical for climate action's success. In Gabon, they could be further developed based on existing programs such as community forests, which grants local communities the right to use forests while promoting sustainable forest management[136].

Beyond targeted social policies, broader reforms to foster private investment, firm growth, and job creation will be essential for social stability and reducing poverty and vulnerability to climatic shocks. To secure jobs for its growing young population, a new economic model will be needed, one that is more inclusive and centered on higher competitiveness and private sector participation in job-intensive sectors. As discussed in the following sections, structural reforms can secure more public and private investment to meet development and adaptation needs, such as improvements in public financial management, transparency of resource revenues, public services, infrastructure, and business regulations. These reforms will play a

[135] World Bank. 2022. Gabon Country Economic Memorandum.

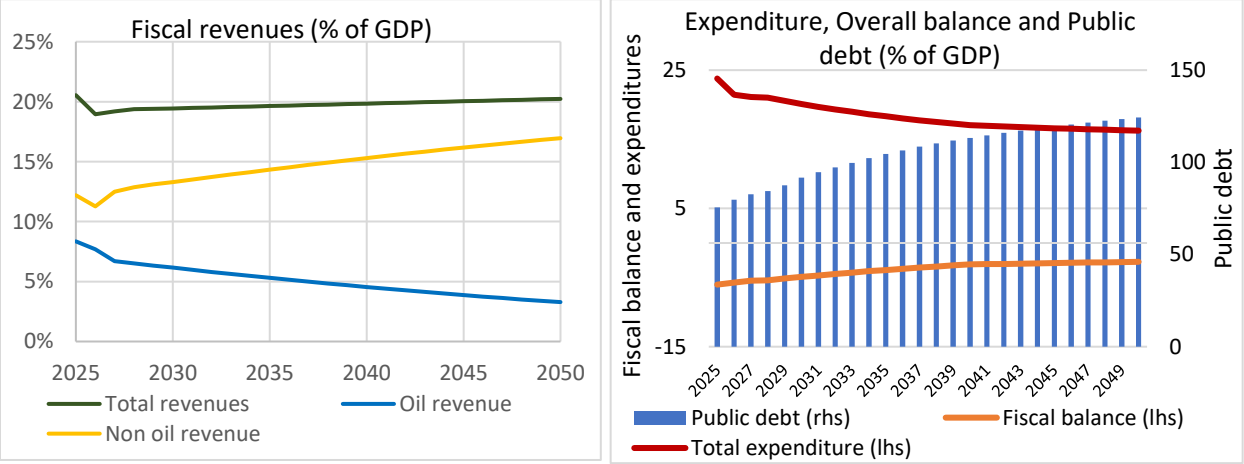
[136] Gabon's 2001 forest code regulates community forest management, with permits first issued in 2013 and relaunched in 2022. The country has numerous community forests, which make up 3 percent of total forest area. The code mandates that concession holders contribute to local community projects, and since 2014, regulations have required forestry operators to pay fees to support these communities. A pilot phase in 2016 resulted in benefit-sharing agreements between communities and concession holders, but due to implementation challenges, some communities have engaged in legal disputes over not receiving benefits, highlighting the need to enhance community forestry governance and benefit-sharing practices. World Bank. 2024. Gabon Economic Update 2024: Designing fiscal policies for sustainable forestry.

crucial role in creating more job opportunities, contributing to a more resilient and robust economy, and reducing poverty and exposure to climate shocks.

4.3. Fiscal implications: How will climate change impact public finances and what will be the cost to adapt and build a more resilient economy?

Gabon's public finances are under severe pressure due to strong spending demands, volatile commodity prices, and prospects of declining oil revenues, requiring fiscal reforms to meet development and climate needs. Oil output should decline from 85.2 million barrels in 2024 to 75.9 million by 2027[137], pursuing a declining trend afterwards. This decline, coupled with commodity price volatility, may hinder public investments, including for climate action (Figure 4.10). Non-oil growth should come largely from commodities like wood, iron, and manganese, keeping the budget exposed to volatile markets. A procyclical budgetary approach, with public spending increasing during high oil prices, prevents the building of fiscal buffers. Gabon also faces rigid spending requirements amid elevated debt levels and financing costs, with wage bill and interest payments consuming, respectively, 27 and 12 percent of public revenues in 2023. Risks to debt sustainability and liquidity increased due to expansionary fiscal policy, with public debt projected to rise from 72.1 percent of GDP in 2023 to around 80 percent by 2026. Despite efforts to clear past payment arrears, the accumulation of arrears continues to increase, reaching 1.6 percent of GDP by late 2024.

Figure 4.10. Fiscal projections (percent of GDP)



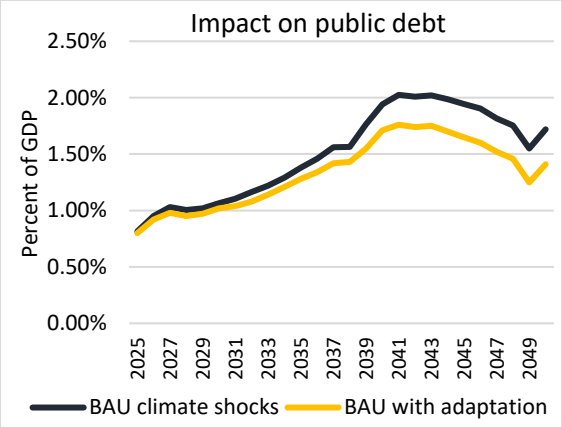
Source. World Bank staff calculations. Projections based on the baseline scenario.

Climatic shocks can further strain the budget and compromise Gabon's already challenging fiscal and debt situation. Implementing the PNDT will require substantial investments in roads, energy, water, schools, hospitals, ports, airports, and digital infrastructure. Climate pressures can overstretch the fiscal capacity, making it more difficult to control the fiscal and debt situation. As exemplified by recent floods and heavy storms affecting different cities, natural disasters are increasing in frequency and intensity. A single catastrophic event can add significant outlays to repair damaged infrastructure and provide relief for affected people, including shelter, food, and relocation, in addition to causing losses in incomes and tax revenues. Between 2013 and October 2023, nearly 10,000 households were affected by floods, storms, fire, and landslides, costing the state CFAF 4.4 billion, or 0.16 percent of public revenues. Faced with increased spending needs, and with a lower economic output due to economic losses caused by climate

[137] Government of Gabon. 2024. Macroeconomic and fiscal framework 2025-2027. Budget law debate 2025. June 2024.

shocks, the Government may resort to higher borrowing, adding to currently elevated debt levels. Targeted adaptation measures, however, while bringing a fiscal cost, can help alleviate fiscal and debt pressures caused by climate change. In an example considering the average climate shocks from dry-hot and wet-warm futures, the implementation of adaptation investments allows to attenuate the level of such shocks, reducing the fiscal effort needed to address them and, in consequence, the overall impact on debt (Figure 4.11).

Figure 4.11. Projected impact of climate shocks on the public debt (additional debt in percent of GDP)



Source. World Bank staff calculations based on the MANAGE-WB CGE.

Building resilience is essential to attenuate the adverse effects of a changing climate to Gabon's economy and people, but this requires first and foremost sustainable public finances. The costs of attenuating climate risks need to be balanced against social spending needs and broader development, fiscal, and debt sustainability goals. Addressing development and resilience needs will require improved fiscal sustainability and management of public finances. To protect public finances and ensure that Gabon will have the resources to adequately deliver public services, invest in its people, and face climate risks, it will be crucial to implement stronger reforms to mobilize more domestic revenues and to ensure targeted, transparent, well-managed, and efficient public spending.

To be feasible and aligned with the country's priorities, climate adaptation measures should undergo thorough cost-benefit analysis to prioritize them against other public spending options. A pragmatic approach is needed to determine how and where to prioritize climate adaptation, especially with constrained fiscal resources and given that cost-benefit analysis can be approximative. For the case of Gabon, given the expected strong impact of climate change on the economy, potentially causing up to 5.3 percent in GDP losses by mid-21st century in a dry/hot future, climate adaptation should be a priority. These measures can, as mentioned, help minimize economic damages and losses to 3.8 percent of GDP. At the same time, if the right policies are adopted, climate change can be an opportunity, as there is synergy across some fiscal and climate goals. Fiscal policies can help enhance resilience to climate change while generating more revenues for the state and improving spending efficiency.

Green fiscal policies: Generating more revenues for climate and development

The Gabonese authorities have been targeting domestic revenue mobilization as a key pillar of their financing strategy. Customs offices at the North border were digitalized at end-2023, and a new digital platform for tax filing and payment was launched in April 2024. From September 2023 to February 2024, tax and customs revenue collection consistently surpassed budgetary targets, with an average execution

rate of 132 percent[138]. However, Gabon needs to raise revenues more substantially in the post-oil era. Non-oil tax revenues stood at 10.1 percent of GDP in 2023, compared to an average of 13 percent in Sub-Saharan Africa and 27 percent in high income economies. Important gains could be derived from rationalizing tax incentives and exemptions, which cost CFAF 352 billion in 2023, equal to 2.8 percent of GDP and 19 percent of tax revenues. Improving tax administration, tax compliance, and transparency of oil and mining revenues will also be key. Other actions could include combating tax evasion, expanding property taxes and shifting focus to income taxes to minimize the focus on consumption taxes due to their regressive nature. Reversing the trend of pro-cyclical budgetary policy, which depletes finances in times of low commodity prices, is critical for stabilizing finances. Saving up resources from resource revenue windfalls–oil accounted for 46 percent of total revenues in 2023–, would provide more resources for periods of crisis but also for climate action.

An important opportunity for synergy across growth, revenue collection, and climate goals comes from the forestry sector, a major pillar of the national economy. Thanks to its promotion of a sustainable wood industry, Gabon has combined strong environmental conservation policies with a growing forestry sector. Between 2010 and 2020, the value of wood provisioning services by Gabonese forests grew from USD116 to 166 million, while deforestation rates remained low[139]. The timber industry accounted for 3.2 percent of GDP and 6 percent of exports in 2023, becoming the largest private employer and contributing about 1.5 percent of fiscal revenues in 2023, almost four times more than in 2016. Despite this rise, forestry revenues remain low compared to their potential. The sector benefits substantially from tax incentives, which have a high fiscal cost. Underreporting and illegal logging are another source of revenue losses. Efforts are being made to limit tax benefits, but in 2023 wood sector firms received CFAF 18.1 billion in benefits, equal to 96 percent of all corporate income tax benefits and 5 percent of total tax expenditures[140].

Fiscal reforms could further integrate climate-smart fiscal policy instruments for forestry and other forest-based sectors, generating more fiscal revenues while promoting sustainable practices. For example, land area fees (*taxe de superficie*) are designed in Gabon to incentivize sustainable forestry, through an approach that could be extended to other fiscal instruments. They are levied on forest concessionaries at varying rates based on certification levels. Firms pay lower taxes in certified forestry concessions (FSC or PAFC), concessions with legality certification face a moderate increase, and firms in uncertified concessions are subject to higher tax rates. Similar approaches could be considered for other taxes and fees levied on wood and other key industries such as mining and agriculture. Fiscal policies could be part of a broader strategy including ongoing efforts to digitalize wood traceability and fight illegal logging[141]. Policies could also target revenue generation and job creation in sustainable forest-based sectors beyond timber, such as bushmeat, wild nuts and foods like nkumu, odika, and honey, medicinal plants, and ecotourism. Non-wood wild resources and forest-based tourism are estimated to have generated, respectively, USD19 and 21 million for Gabon in 2020, remaining below their potential. Stronger policies are needed to promote sustainable growth of non-wood forest-based sectors, raising livelihoods and tax collection[142].

There is also strong potential in gas flaring reduction efforts, which can simultaneously contribute to revenue collection, economic, and climate goals. As discussed in chapter 3, reforming and enforcing legislation to reduce gas flaring can help reduce emissions while improving energy supply, creating jobs in

[138] Ministry of Economy and Participations. 2024. Bilan des 200 jours. Gouvernement de la Transition. Mars.
[139] World Bank. 2025 (unpublished). Gabon Forest Ecosystem Accounts 2000-2020. Draft report: February 2025.
[140] World Bank. 2024. Gabon Economic Update 2024: Designing fiscal policies for sustainable forestry.; Karsenty, A., Forni, E., Djanang, W. 2020. Réduction de la fiscalité forestière pour les concessions certifiées avec compensation aux États. Paris: CIRAD; Karsenty, A. 2024. Ecological taxation: How can a fiscal bonus-malus (feebates) mechanism be implemented? Paris: CIRAD.
[141] World Bank. 2024. Gabon Economic Update 2024: Designing fiscal policies for sustainable forestry.
[142] World Bank. 2025 (unpublished). Gabon Forest Ecosystem Accounts 2000-2020. Draft report: February 2025.

the gas industry, and generating more gas-related revenues. Tackling gas emissions associated with oil and gas production, namely methane from leaks and venting and CO_2 from flaring, is a challenge in Gabon, which has higher emission levels per production volume compared to many of its peers. Gabon is the world's 33rd largest oil producer but ranks 19th in absolute flare gas volumes and 2nd in flaring intensity (cubic meter of gas flared per barrel of oil produced). Gas flaring is a top source of emissions, corresponding to about 23 percent of Gabon's total emissions. Also, losses associated with flaring represent about 3.5 percent of oil production, or CFAF 107 billion (1 percent of GDP) considering an average price of US$ 70 per barrel[143]. Implementing and enforcing supporting regulations for the hydrocarbon code (Law No. 002/2019), which foresees sanctions on gas flaring, is key. Implementing decrees are needed to set details on definitions, exceptions, permits and fines and payments. To make an efficient use of its natural resources for domestic purposes and potentially as an export product, Gabon could upgrade its laws and regulations covering production emissions, ensuring enforcement, and encouraging integrated gas value chains for an efficient use of associated gas. The benefits for development and climate are evident, at it could replace high-cost liquid fuels with more affordable gas, especially given that affordable and reliable power is a major concern for firms and households.

Other green fiscal policies with revenue-generating potential include rationalizing tax expenditures for oil, mining, and agriculture, while providing tax benefits for green energy projects. Tax incentives are widely used in Gabon. They have social and economic purposes but have a high cost: tax expenditures represent 16 percent of revenues in 2024, or 3.2 percent of GDP. Efforts have been made to rationalize these expenditures over time. Yet, there are opportunities to improve control and oversight to reduce revenue losses and better target incentivizes to green sectors. For example, VAT exemptions for farming inputs and other tax incentives could be restricted to sustainable agricultural activities, reducing revenue losses while incentivizing sustainable practices that reduce pressure on forests. Another example are tax incentives for oil and mining, which cost the budget CFAF 124 billion (about US$ 206 million)[144], or 30 percent of total tax expenditures and nearly 5 percent of all government revenues. Different options for rationalizing incentives exist. Whereas tax incentives for mining exploration last three years in Nigeria and five in Côte d'Ivoire, they can go up to eight years in Gabon. Rationalizing their cost would reduce foregone revenues, part of which could be directed towards targeted tax incentives for green energy investments such as solar power, reducing energy production costs and contributing to meeting a rising demand[145].

Finally, other tax policies that could be used for climate and revenue collection goals are increases in excise taxes levied on high-emission vehicles such as luxury cars. A tax on luxury cars was introduced in 2019 but abolished in 2024, replaced by a tax on new vehicles. The authorities could redesign taxes on vehicles based on motors sizes, emission profiles, or prices to make importing less polluting cars cheaper. For example, Mauritius uses fiscal policies to incentivize clean vehicles, with higher rates for more polluting cars and lower rates for used hybrid and electric cars[146]. Social justice considerations are crucial, such as a focus on high-end cars and other luxury goods instead of vehicles utilized by less wealthy individuals.

Expenditure policies: improving targeting and efficiency for fiscal and climate goals

On the spending side, there is room to improve governance and expenditure policies and benefit both climate and the budget, by enhancing spending efficiency and management of public finances.

[143] UNPD 2022. Etude sur la Fiscalité Verte au Gabon. Rapport Final.
[144] UNPD 2022. Etude sur la Fiscalité Verte au Gabon. Rapport Final. Tax incentives for oil and mining sectors include domestic VAT incentive for oil refinery (CFAF 84.8 billion), reduced 5 percent VAT rate for imports for the oil and mining sectors (CFAF 32.9 billion), zero rate VAT on imports for oil sector (CFAF 5.6 billion), and domestic VAT incentive for mining (CFAF 0.4 billion).
[145] UNPD 2022.
[146] UNPD 2022.

Development, social, and climate needs can create competing pressures and pose trade-offs for spending decisions. While these must be considered in an overall strategy aligned with national priorities, there are opportunities for synergy. Reforms to improve the quality and efficiency of public spending can expand the fiscal space, facilitating investments for development and adaptation. With more efficient public action, the state would need to spend less and could achieve better results. For example, better oversight and transparency of resource revenues, treasury flows, and anticyclical budgetary policies can help Gabon build more reserves. Better budgetary planning and execution, SOE oversight, and agency interconnection and coordination would enhance fiscal stability and budget credibility. Ongoing reforms, such as the creation of agencies to manage state participations and budget and financial oversight, and reactivation of interministerial treasury committee meetings to improve cashflow control, could be expanded.

Climate considerations could be strengthened in budgetary and investment management processes, with evident benefits for climate resilience. Reforms in public procurement processes and investment management are key for successful climate action and for improving infrastructure and human capital, enabling firms to invest and grow. Legislative reforms are being planned, including regulations on procurement and public investment. An implementation decree for the public investment management law is in preparation, with a key reform could be to include climate resilience aspects. Similarly, climate-smart budgeting policies could be developed to better consider resilience in budget planning.

Another spending policy that could be reformed involves fuel subsidies, which benefit mostly the wealthy, have a high fiscal cost, and disincentivize firms and households to adopt greener behaviors. Fuel subsidies are used to alleviate living costs, but they consumed about 0.7 percent of GDP in 2023, which was 70 percent of public health spending allocations. Despite their social goals, fuel subsidies are regressive, being mostly captured by wealthier households who consume most fuel. And they create environmental distortions, incentivizing polluting energy sources by reducing their cost. This has impacts for the future, even if Gabon has a small population and is a net carbon absorber. Past attempts to reduce fuel subsidies had limited success. Fuel prices were partially liberalized in 2015, and a price adjustment mechanism was adopted in 2016, but in view of social impacts and lack of adequate social protection, subsidies were reintroduced in 2021. Then, they were removed for industrial consumption by mid-2022 but reintroduced in 2024. Gabon could consider reforms to reduce fuel subsidies, cutting a regressive spending and reducing distortions. International experience suggests focusing on fuels consumed by the wealthiest, adopting a gradual approach with temporary price smoothing mechanisms, and broad communication and participation, demonstrating the use of fiscal savings and mitigation measures to the public[147]. Finally, providing alternatives like extensive public transportation, adequate sidewalks and bike lanes, and using liberated resources for targeted social spending to support the most vulnerable is essential[148].

4.4. Financing needs: How to facilitate private sector participation and mobilize climate finance to address climate and development needs?

Creating opportunities for private sector growth and participation in climate action

Gabon's fiscal constraints mean that public investments will not suffice for climate adaptation; solutions will also need to come from the private sector. The private sector plays a critical role as financier, innovator, and provider of climate-friendly goods and services, but also as contributor to and affected party of climate impact. A successful transition to a low carbon economy and adequate climate adaptation will require both

[147] World Bank. 2023. Gabon Economic Update 2023: Reforming fossil fuel subsidies.
[148] World Bank. 2023. Gabon Economic Update 2023: Reforming fossil fuel subsidies.

public and private investment. Without the private sector, it will be extremely challenging to fund much-needed climate adaptation investments in Gabon. Tapping into private sector expertise and public-private financing schemes in key sectors such as renewable energy, transport, digital transformation, and water and waste management will be essential. Likewise, enabling private sector financing and adoption of green technologies and services and helping firms mitigate asset damage risks will alleviate resource pressure and build resilience. However, private firms in Gabon have limited role in an economy characterized by high informality (52 percent of GDP) and state participation (48.5 percent of formal jobs)[149].

Reliance on oil has crowded out other sectors, limiting diversification, job creation, and private sector development, and the climate crisis is creating numerous risks and opportunities for firms. Relying on expected declining oil reserves would not be a sustainable growth model. Without sustained job creation, the climate crisis can lead to significant job losses and adverse social consequences. Hazards such as floods can impact business continuity and profitability, requiring strong adaptation measures. Yet, the climate crisis may also bring opportunities, with firms able to gain competitive advantage by aligning with growing global demand for greener products. Business opportunities include markets for certified wood and agricultural products, which tend to generate higher value thanks to green labeling. Gabon has pioneered in the wood sector, having tax rates on land area fees that incentivize certified wood production. This brings in innovation and allows firms to become more productive and 'competitively green'[150]. However, private sector consultations indicated a need for better support in climate action and knowledge around evolving market requirements and on addressing climate risks. Public-private dialogue can help better align climate-related policy recommendations with private sector needs, such as by strengthening consultative processes on environmental legislation proposals that directly impact business operations[151].

Private firms face challenges such as a complex business environment, market failures, distortions, lack of firm capability, and limited and costly access to finance (both green and traditional), which hinder competitiveness and climate goals[152]. Firms in Gabon face a challenging competition framework, and a trade and investment regime that does not foster innovation, including in environmental aspects. Distortions include fuel subsidies, non-priced externalities, a large SOE presence, and monopolies in power and other sectors. Low managerial capabilities lead to inefficient energy use and adoption of efficient technologies. Firms also lack support to access information, markets and compliance with standards. Green innovation is undermined by lack of awareness of low-carbon technology and green financing options, an inadequate intellectual property regime, an underdeveloped research ecosystem, and insufficient investment in education and training. Furthermore, firms, and SMEs in particular, have limited access to credit. Finally, the political economy can be an important obstacle to the climate agenda, as incumbent firms and holders of brown assets may have an interest in resisting greener alternatives.

To enable private firms to grow and participate in climate action, Gabon needs to accelerate reforms to stimulate private sector development, remove barriers to trade and strengthen public-private engagement. To boost firms' growth and job creation, Gabon is investing in energy and transport and digitalizing public services. Efforts are ongoing to support access to credit for SMEs, improve labor skills, and develop agriculture, artisanal mining, and sustainable wood production. The informal sector is around half of the economy and should be supported through, for example, micro-finance for climate-resilient agriculture or skills training for informal artisans in sustainable practices. Additional measures could support private

[149] World Bank. 2022. Gabon Country Economic Memorandum.
[150] World Bank. 2024. Gabon Economic Update 2024 Designing fiscal policies for sustainable forestry.
[151] World Bank staff's private sector consultations in Libreville (March 2024).
[152] Leonardo Iacovone et al. 2023. Finance, Competitiveness and Innovation. TIC. World Bank. December 2023. "Businesses and Climate Change".

investment in green sectors and climate adaptation, including incentives for research, innovation, energy efficiency, and green financing through regulatory improvements (taxonomy, standards), financial incentives, and in de-risking tools (credit information, guarantees, credit lines, and concessional finance). It would be crucial to involve the private sector to ensure that policies adequately address their needs.

A first important step is to improve transport and energy infrastructure to facilitate trade and business activities, including through public-private partnerships (PPP) and foreign direct investment (FDI). To attain both development and climate goals, Gabon will need better access to transport systems and more reliable electricity, along with improvements in trade, business conditions, and investment facilitation. Political and economic stability are crucial for private sector engagement in long-term climate investments. For example, reforms could be designed to foster PPPs, to help lower the cost of public investments and promote adequate infrastructure maintenance, which is crucial for physical capital development. Developing Gabon's PPP framework can enable private investment to support climate and development priorities.

Scaling up private investment in infrastructure, especially water and energy, is central to the decarbonization agenda, but the (local and foreign) private sector can also play an important role in adaptation. Reforms could open space for more active private involvement in adaptation efforts. In the water sector, the authorities intend to use PPPs to leverage private sector financing and technical skills. Projects could be accelerated with a roadmap to attract private financing, a stronger focus on PPP capacity building and pipeline development. Also, given the sector's centrality, reforms in the power and water utility (SEEG) and the Ministry of Water and Energy should be prioritized to create an enabling environment for private operators to enter and grow in commercial segments of water and electricity. Foreign investment can also play a role in climate adaptation, particularly in agriculture, food and forestry, energy, and infrastructure. Exploring climate FDI opportunities could help mobilize more financing, especially given the strong financing needs and the underdeveloped domestic financial sector. Global climate FDI flows have tripled between 2015 and 2022, from US$88 billion to US$252 billion, but have underperformed in developing countries[153]. FDI flows in Gabon stood at 5.2 percent of GDP in 2022, yet more than 80 percent went to oil, highlighting a potential for stronger climate FDI flows.

Secondly, Gabon could redesign its incentives policies to ensure coherence with green practices. Actions could involve: i) Mapping relevant tax and incentive policies to identify misalignments of policy objectives; ii) Reviewing incentives' costs and benefits; iii) Improving governance and value for money, by streamlining or redesigning schemes, and/or considering alternate non-incentive policies. For example, spending on fuel subsidies could be redirected towards targeted support for vulnerable households, and tax incentives for agricultural inputs could be rationalized to target more sustainable agricultural practices, reducing pressure on forests and on the budget[154].

A third policy option would be to invest in local environmental goods and services, to promote better waste management and stimulate the circular economy. Developing a local ecosystem for environmental goods and services is critical for Gabon's climate goals, while supporting the economy. Opportunities exist for greater assistance to the private sector for activities such as solid waste management, recycling, and the circular economy. However, appropriate regulations to support the development of industrial recycling operations are lacking. Some industrial operations produce hazardous industrial waste on a large scale (e.g., vehicle batteries, waste oil, used tires) and could be interested in local environmental services.

[153] World Economic Forum. 2024.
[154] World Bank. 2024. Gabon Economic Update 2024: Designing fiscal policies for sustainable forestry.

Promoting domestic financial sector support for climate action and green growth

Banks, insurance companies, and regional markets could help finance climate action in Gabon, but reforms are required to strengthen and mobilize the financial sector. While being broadly sound and resilient, the financial sector remains narrowly concentrated in commodities. Comprised of seven financial institutions accounting for over 90 percent of assets, the Gabonese financial sector has remained resilient despite the COVID-19 pandemic, with credit to the private sector growing by about 26 percent between 2021 and September 2023, and non-performing loans declining from 14 percent in 2020 to 12 percent in 2023[155]. However, credit penetration and diversification are limited due to weak legal and judicial environments, poor contract enforcement, and weak credit information systems. The banking sector primarily focuses on large corporations and government securities, with limited exposure to the climate sensitive agricultural sector. A significant portion of outstanding credit comprises short-term loans, as deposits are predominantly checking deposits. The private credit to deposits ratio in Gabon in 2023 is 67 percent compared to an income group median of 88 percent, suggesting space for credit development. Domestic credit to private firms, at about 14 percent of GDP, is considerably lower than the Sub-Saharan Africa and UMIC averages of, respectively, 26.4 percent and 139.4 percent of GDP in 2022[156].

Policy options to mobilize local climate finance include operationalizing the Climate Fund and greening the *Société de Garantie du Gabon* (SGG), Gabon's guarantee fund. Once operational, the Climate Fund could pool resources from various sources and offer tailored financial products such as concessional loans, equity investments, and technical assistance grants, to support climate action by private sector entities, including SMEs. The fund could be housed within a commercial bank with GCF accreditation or the sovereign wealth fund (FGIS). Strong institutional capacity, governance, and transparent operational guidelines would be critical to the fund's success. The fund could work in synergy with a green guarantee fund and risk-sharing facilities offered to banks, providing a comprehensive suite of financial instruments to support climate action. Indeed, the SGG could be made into a "Green Guarantee Fund" to support climate-positive investments. This would involve developing eligibility criteria, establishing robust environmental and social safeguards, and building capacity in impact monitoring.

Supporting banks with risk-sharing facilities and sustainability-linked loan (SLL) issuance can also help enhance banks' involvement in climate action. The authorities and development partners could support local commercial banks with green project appraisal, risk management, unfunded risk-sharing facilities and trade finance facilities linked to climate action, and SLL issuance. This would allow to mobilize private capital through credit enhancement, leading to lower risks and costs and generating multiplier effects. For instance, development partners could cover 50 to 75 percent of losses on eligible loan portfolios, depending on risks and market conditions, incentivizing banks to lend to projects they would otherwise deem too risky, while building experience and capacity in green finance. Commercial banks can also benefit from technical assistance in preparing a sustainable finance framework, structuring SLLs, setting ambitious yet realistic performance targets, establishing robust monitoring, reporting, and verification systems, and marketing SLLs to investors. This would help build capacity of local banks in sustainable finance, as evidenced by similar initiatives in other emerging markets[157].

Investing in capacity building for local banks and the private sector is essential to unlock private finance to climate investments in Gabon[158]. Gabon's climate finance landscape faces several capacity gaps, including

[155] Commission Bancaire de l'Afrique centrale - Secrétariat Général, analyse financière dynamique des données CERBER, décembre 2023.
[156] WDI.
[157] IFC. 2021.
[158] https://documents1.worldbank.org/curated/en/099553509062329031/pdf/SECB0S02837b0e0ed0ad7608b9f1d682ab0.pdf

limited financial and private sector capacity to identify, develop, appraise, and implement climate-related projects. Capacity-building programs should prioritize sectors that are critical for development and have strong climate mitigation and adaptation potential, including banking, wood transformation, ecotourism, energy, mining, agriculture, and infrastructure. Enhanced understanding of climate risks and opportunities and project appraisal capacity can reduce banks' perceived risks associated with green lending, making them more willing to finance climate-related projects. For instance, in forestry, capacity building can focus on transforming significant waste into green energy solutions that cut energy costs.

Reducing information asymmetries by implementing a credit bureau could benefit climate and growth goals, enabling local banks to engage more with green sectors' financing. Credit to the private sector goes mainly to large corporations, and SMEs and local entrepreneurs struggle to obtain credit due to information asymmetry and credit quality concerns. Gabon can support the greening of its credit guarantee fund and encourage local commercial banks to adopt green practices to attract more global climate financing. The banking sector has started to explore means to increase SME lending[159], especially as the SGG is providing solutions that reduce lending risks and support green projects[160]. The World Bank has supported reforms to establish a credit bureau in the region. Gabon could accelerate its implementation and encourage banks and other companies to provide more credit information to improve reporting quality. Enhancing SGG's capacity to attract global green funds and provide more credit services to SMEs, especially those operating in wood processing, agricultural, eco-tourism, and other green sectors, is also crucial. Yet, guarantees and credit information alone will likely be insufficient to pivot banks toward longer-term, potentially lower-return green projects (especially for SMEs). The transformation of the SGG and credit bureau efforts should be complemented with more fundamental reforms in the banking sector to enhance competition.

In addition, involving insurance providers in climate resilience strategies, such as by developing a disaster risk financing strategy, is essential. With climate change, a disaster risk financing strategy could help Gabon protect its forests, marine ecosystems, farms, and households. The insurance sector is relatively shallow, with about 10 companies issuing annual premia in life and general insurance of about 1 percent of GDP, compared with an average 3 percent in Sub-Saharan Africa and 6 percent worldwide. Parametric or disaster risk insurance is largely absent, creating funding gaps in response mechanisms to even small-scale- disasters. Moreover, the regional central bank, the Bank of Central African States (BEAC), does not systematically integrate climate-related risk analysis in the banking sector. Ongoing World Bank support to strengthen regional financial institutions in CEMAC has provided tools and enhanced capacity of BEAC and the regional banking commission, COBAC, to conduct macro and micro banking sector stress testing to shocks. The project is also supporting a regional roadmap to bring in climate-specific considerations in banking sector prudential regulation[161]. Developing a disaster risk financing strategy could help strengthen financial resilience against disasters, by identifying suitable financing sources and instruments for different types of shocks and by promoting parametric insurance.

Gabon could consider opportunities for green bond issuances in regional capital markets. The country contributes significantly to regional capital markets' development, but they remain shallow and brown. In 2023, Gabon was among the leading issuers of treasury securities on the public securities market managed

[159] Three banks are already partnering with the guarantee fund, and 3 others have committed to sign before the end of 2023.
[160] The SGG was initially capitalized by the FGIS and is hosted under the structure of Okoumé Fund (the incubation and investment fund of the Government which also hosts the SGG).
[161] Even though no bank in Gabon has yet a specific or formal green mandate, the BEAC is considering a strategy to promote sustainable and responsible investment practices or climate related disclosure. To this effect, the BEAC became a member of the Network of Central Banks and Supervisors for the Greening of the Financial System (NGFS), which explores the macro financial impact of climate change, in December 2023.

by the BEAC, with total issuance of CFAF 1,527.5 billion, or 23.8 percent of CEMAC issuances[162]. Gabon also issued public bonds listed on the CEMAC regional stock exchange (Bourse des Valeurs Mobilières de l'Afrique Centrale, BVMAC), for CFAF 188.8 billion in 2021, CFAF 175.0 billion in 2022 and CFAF 154.6 billion in 2023. In the equity market, Gabon's reinsurance company (SCG-Ré) was floated on the stock exchange in January 2023. Yet, Gabon has no experience using the capital market to raise climate-related financing either for government or private sector entities. The domestic market's potential could be tapped by operationalizing the framework for green bond issuances according to the International Capital Markets Association (ICMA) framework. The Government and capital market authorities could create an enabling environment for green bonds with supportive policies and regulations, incentives for green investments, and promoting transparency and disclosure of sustainability information.

Exploring options to mobilize international climate finance

While Gabon's forests offer an obvious solution to tap into international climate finance, forest carbon finance mechanisms were not structured for High Forest Low Deforestation countries like Gabon. Global climate finance for tropical forest countries through programs like Reducing Emissions from Deforestation and Forest Degradation (REDD+) was structured to address the needs of countries which need to reduce deforestation, which does not address the needs of Gabon. Gabon's forests cover about 90 percent of the territory and absorb 140 million tons of carbon dioxide annually, seven times more than they emit, and its deforestation rate is very low, at 0.05 percent in 2010-2020[163]. Though it was the first African country to receive results-based carbon financing[164], in 2019-2020, Gabon received a modest sum of about $83.2 million annually in climate financing[165]. It is thus important to have realistic expectations regarding carbon markets, while preparing to optimize other opportunities from sustainable uses of forests. There is much uncertainty regarding the capacity and timeliness of the international community's response in providing adequate compensation for standing forests which provide global public goods such as biodiversity and carbon sequestration. Gabon's forests are a depository of goods and services beyond timber, which offer great potential for development, and their sustainable management will continue to provide Gabonese people resilience through jobs, food security and ecosystem services, and could generate payments for carbon, when such mechanisms become viable. An ongoing World Bank study estimates the total asset value of Gabon's forests at CFAF 948.9 trillion (USD 1571 billion) in 2020, comprising carbon retention, wood and other resources, sediment retention, and tourism[166].

Investing in new forests, through reforestation, afforestation, and improved forest management, can enhance Gabon's strengths in job creation and climate resilience and generate carbon credits by improving forest quality and demonstrating additionality. Investments in forests, could build upon Gabon's existing strengths in forest management while addressing key constraints related to incentives, private sector capacity, and concession arrangements. However, alignment with international standards and best practices in sustainable forest management will be critical for attracting private investment. In the short term, it can be difficult to fully develop the robust institutional capacity for the monitoring, reporting, and verification that these instruments demand to be credible. Given the challenges faced in the business environment and public sector capacity, a clear roadmap could be adopted for building this specific type of governance infrastructure. Gabon's unique context as a High Forest, Low Deforestation country requires

[162] Banque des Etats de l'Afrique centrale, Statistiques mensuelles du marché des valeurs du trésor, No. 30, Janvier 2024
[163] World Bank. 2024. Gabon Economic Update 2024: Designing fiscal policies for sustainable forestry.
[164] Through a 10-year, $150 million REDD+ agreement with the UN-led Central African Forest Initiative (CAFI).
[165] Most of this ($82.9 million) was received from public sources such as bilateral and multilateral DFIs and governments, while a small portion ($0.26 million) was received from institutional investors. Climate Policy Initiative (2022), The Landscape of Climate Finance in Africa, https://www.climatepolicyinitiative.org/dataviz/landscape-of-climate-finance-in-africa-interactive-data-tools/#map
[166] World Bank. 2024 (draft report). Forest Ecosystem Accounts for Gabon 2000-2020: Ecosystem Extent Accounts, Forest Ecosystem Condition Accounts, Forest Ecosystem Services and Asset Accounts. December.

careful consideration of incentives to ensure that the investment aligns with its historical conservation focus and long-term strategic goals. Success will depend on rewarding conservation, avoiding perverse incentives, the active participation of the private sector, particularly in forest management, ecotourism, and equitable and transparent benefit sharing with communities.

Future climate-based financial solutions could include mobilizing concessional and semi-concessional financing from donors and global climate funds, as well as thematic bonds and other market-based financing for development projects. Gabon could explore innovative financial structures from concessional and semi-concessional resources from development partners (Box 4.4), such as liquidity backstops to incentivize private investment in green projects. For instance, a price floor could be created under a power purchase agreement for a renewable energy project. Despite their small size, funds such as the Green Climate Fund (GCF) and the Global Environment Facility (GEF), can help attract public and private investment by enabling risk-sharing instruments and developing technical capacity and have financed initiatives in Gabon. The Union Gabonaise de Banque is GCF-accredited and the Caisse des Dépôts et Consignation (CDC) is being accredited. Other entities that could be accredited include the Gabonese Fund for Strategic Investments (FGIS), and the National Agency for National Parks (ANPN).

The first African country to issue a 'blue bond', Gabon has potential to tap into green and other thematic bonds at the regional and global levels to finance climate action. Thematic bonds are fixed-income securities issued in capital markets to finance projects related to a theme such as climate, education, or ocean conservation. Sustainability-linked bonds tie financial performance to the achievement of pre-determined key performance indicators, while green, social, and sustainable-labeled bonds provide funding earmarked for specific projects. Gabon has pioneered a debt-for-nature swap to support marine ecosystems in August 2023, raising US$500 million to buy back US$430 million of foreign debt at lower interest[167]. In designing such operations, the terms and conditions, transparency, and structuring need to be well-designed to ensure that the environmental, social, economic, and fiscal goals are aligned, and that the operation is most beneficial to the country[168].

Depending on market conditions, Gabon could explore further opportunities for sustainability-linked bonds (SLBs) in the international or domestic market. An SLB is a performance-based instrument where the issuer commits to ambitious sustainability performance targets (SPTs). By linking the bond's coupon to specific targets, Gabon could access lower-cost financing and align its debt management strategy with its sustainability goals. Such bonds require specific governance frameworks to ensure proper reporting on the use and impacts of proceeds. While local capital markets are still relatively small, they can be an alternative mechanism for climate finance when banks are hesitant to extend loans. Guidelines for green bond issuance in CEMAC were developed by the capital markets regulator, COSUMAF, with IFC support. A key enabler to build investor confidence and SLB credibility is a high-level political commitment to strengthen agencies' capacity, develop the sustainable finance framework, define SPTs, establish the monitoring system, engage with investors, and ensure high standards of transparency and disclosure To reduce financing costs and attract a wider range of investors, international financial institutions can provide credit

[167] Structured by TNC with U.S. International Development Finance Corporation support, the debt swap attracted criticism for not complying with best practices, as it was not backed by a blue bond framework conforming to principles established by the International Capital Markets Association. https://www.reuters.com/sustainability/sustainable-finance-reporting/gabon-buys-back-500-mln-nominal-debt-for-nature-bond-tender-2023-08-08/; https://www.wsj.com/articles/gabon-joins-blue-bond-wave-with-500-million-debt-refinancing-a1a651d4.
[168] Debt for development swaps (for nature and climate) are a mechanism by which a country reduces debt obligations, with savings channeled to specific purposes. They involve high transaction costs and risks, requiring strong debt management and project monitoring and evaluation capacity. They can be more effective than loans in countries where fiscal space is limited and part of the outstanding debt portfolio is appropriate for swapping (expensive terms, trading at a discount in case of Eurobonds, etc.). Swaps can also be preferable if they provide higher savings in present value terms. Thus, careful consideration should be given, with a full cost-benefit analysis also regarding intangible aspects, such as market perception as it may be seen as a type of debt relief or restructuring.

enhancement for the SLB, through options such as partial credit guarantees, first-loss tranches, and political risk insurance. Another market-based option are outcome-based bonds, issued by the World Bank to allow private investors to support specific project outcomes, with returns based on outcomes.

Finally, alternative investment vehicles, such as private equity and venture capital funds, could be developed to channel more funding to companies with climate and green projects. Capital market development in Gabon remains relatively low, and firms have limited experience raising funds through public offerings. Recent market data on CEMAC underscores the persistent shallowness and illiquidity in regional financial markets; only seven companies are listed, primarily in Cameroon. To enhance capital mobilization for climate, the pool of investors must be expanded, and private equity funds should be encouraged. With World Bank support, COSUMAF has established regulations to foster private equity and venture capital activity in the region. In Gabon, the Okoumé Fund could support businesses in attracting financing from global green funds. Importantly, aligning the tax regime with global standards and creating an investor-friendly environment could help attract more private capital towards green projects.

Box 4.4. International experience with innovative climate financing solutions

In recent years, countries in different regions have been adopting reforms and actions to promote climate financing instruments. An example was Senegal's adoption of a sustainable financing framework for bond issuance in June 2023, combining means and results-based approaches and expenditure categories for use of proceeds-type thematic instruments as well as key performance indicators. The framework has been reviewed by Moody's ESG Solutions and complies with international best practices set out by the International Capital Markets Association and the Loan Market Association. Senegal's framework lays out seven expenditure categories related to social outcomes and three expenditure categories related to the environment, including climate adaptation and forest and biodiversity preservation.

5. Conclusions and Recommendations

Gabon is at a crossroads, and the decisions taken today will have important impacts for the country's future. Major institutional and economic reforms are underway, aiming to pave the way for a new long-term development path. The political transition the country is undergoing provides an opportunity to reform institutions and set the foundations for new governance and economic models. Enhanced institutional controls and transparency mechanisms for resource revenues and public finances would be instrumental in enabling an optimal use of natural resources to generate improvements in human and physical capital, in order to sustain a higher, sustainable and inclusive growth model. Progress has been achieved over time, in terms of poverty reduction and diversification into sectors such as the wood industry. Yet, stronger efforts are direly needed, as oil reserves are expected to diminish, requiring strong action to switch to more diversified growth drivers. In this sense, ensuring that sustainable forestry, agricultural, fishing, and mining activities generate higher growth and create more jobs is critical to avoid a depletion of natural resources, allowing them to continue benefiting future generations of Gabonese.

Improvements in institutional frameworks and policies aimed at reinforcing climate preparedness would build a more resilient economy and society. Heatwaves, storms, floods and landslides already impact Gabon, with heatwaves affecting the population and straining energy capacity in 2024. A year before, growth was impacted by rail disruptions caused by inclement weather, blocking wood and manganese exports and hindering supply of water and basic goods in certain regions. Over the coming decades, climate shocks are expected to cause more damages to Gabon's cities, roads, people, crops, and ecosystems, leading to important economic losses and increasing poverty and vulnerability. There are, however, many solutions that could help alleviate the impacts of climate change and strengthen infrastructure, ecosystems, and human capital, as discussed in detail in chapter 3. The priority actions that could help reinforce climate preparedness and minimize the risks and threats posed by climate change, as well as advance climate goals, are presented in Annex I. The reform recommendations, which aim at improving governance mechanisms and strengthening the resilience and quality of crops, roads, energy and water systems, digital and urban infrastructure, waste management, and health, education, and social protection systems, would bring benefits for both development and climate outcomes. While there are important considerations regarding the fiscal capacity and different development priorities, reforms and investments in climate adaptation can bring synergies and benefits for society at large, by building stronger foundations for higher growth, thanks to improved human and physical capital.

Gabon's rich and well-preserved forest ecosystems can serve as a building block to develop a higher value-added and sustainable forestry economy, allowing to address environmental and economic needs. Proactive and innovative policies adopted by Gabon include the imposition of sustainability certification requirements for forest concessions, the creation of preservation areas, and investments in digital wood traceability systems. Deforestation rates were kept low over the years and a local forestry industry has emerged, marking Gabon's status as a champion for climate action. Yet, challenges remain to combat illegal logging and move up in value chains, creating more jobs and expanding sustainable production of other species beyond Okoumé and non-timber products. Going forward, to preserve its rich ecosystems and achieve higher job creation and living standards, accelerating and deepening reform efforts to promote sustainable forestry will be key. In addition, a participatory approach is needed to ensure that forest communities, civil society, and the private sector are included in the design of forestry policies.

There are also multiple opportunities and synergies across actions to attenuate carbon emissions and achieve development goals, in key sectors such as energy. Gabon is investing in hydropower and solar

energy generation, tapping on its vast potential to expand renewable energy sources. Abundant water resources can be utilized to produce more clean and affordable energy for the country, while investments to improve service quality and interconnect power networks can help address growing energy needs. The implementation of rules preventing gas flaring associated with oil extraction can also serve environmental and economic aims, by expanding energy sources and reducing reliance on costly and polluting fuel-based energy production. Likewise, investments in public transport and road resilience can help cut transport costs, improve connectivity, and reduce air pollution and emissions from the transport sector.

Ensuring sustainable public finances and further involving the private sector will be essential for successful climate action, as well as to support a higher growth path. In view of the country's strong spending needs and limited fiscal space, prioritizing and improving the efficiency of public spending, and strengthening non-oil revenue collection will be necessary to meet development and climate adaptation needs. Green fiscal policies can contribute to fiscal and environmental goals, like reforms to reduce gas flaring and fuel subsidies. Likewise, reforms are needed to unlock opportunities for private sector investment in both development and adaptation, through instruments such as public-private partnerships. Improvements in governance and in the business environment, to facilitate trade, access to credit, electricity, and transportation, and a skilled labor force, would also contribute to attracting foreign and local investment, stimulating higher growth and thus building resilience. Higher living standards, incomes, and revenues would enable the government, firms and households to dispose of more resources to face climatic shocks.

Furthermore, opportunities could be explored to mobilize climate financing in the future, contributing to environmental goals while optimizing financing sources. Gabon has pioneered environmental policies, being the first African nation to receive results-based carbon financing and having concluded a recent blue bond in 2023, though payments have been modest. International support is not, at the current moment, capable to adequately compensate countries such as Gabon for the preservation of forests and the associated climate services they provide to the world. Yet, there are financing options that could be considered to further mobilize global support for climate action, as discussed in chapter 4. First, ensuring preparedness for when international climate financing is more sizeable and more effective would require strong governance and internal controls and standards, including on benefit sharing plans. In addition, Gabon should explore innovative financing mechanisms involving private investors, development partners, and global climate funds, such as greening the sovereign wealth fund, concessional and semi-concessional financing, green portfolio guarantees, sustainability- and performance-linked loans.

Finally, a just climate agenda needs to place people at its core. Reform strategies and investments to adapt to and help mitigate climate change need to be designed in line with Gabon's broader development context. Social considerations are crucial to avoid that policies have adverse effects on poverty and social inclusion. Gender aspects, and the needs of specific groups such as rural populations and forest communities, are important elements in a fair climate agenda. Social protection systems need to be expanded and strengthened to help alleviate poverty. If resilience aspects are included, this could allow Gabon to better respond to climate shocks and other emergencies and support vulnerable households in critical moments. Policy actions need to be carefully designed to protect and support the most vulnerable, to promote social cohesion and opportunities for society at large, including through stronger economic participation and job creation in green and blue sectors. In other words, climate action needs to be a lens used by the country to further advance its social and economic goals.