



WESTERN AND
CENTRAL AFRICA

REPUBLIC OF CONGO

DIVERSIFYING CONGO'S ECONOMY: MAKING THE MOST OF CLIMATE CHANGE

World Bank Group

COUNTRY CLIMATE AND DEVELOPMENT REPORT

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Preface

Statement by President Denis Sassou N'Guesso at UNFCCC COP27 in Sharm El-Sheikh, Tuesday, November 8, 2022

“...I take this opportunity to reaffirm the firm will and determination of the Republic of the Congo to participate actively in the global effort to combat climate change... I support the President-designate of this COP 27, which is undoubtedly one of the most decisive since the signing of the Paris Climate Agreement in 2015.... COP 27 must be a COP of action after so many announcements for years and so many broken promises. The time has come to move on to concrete action, and our credibility is at stake...The necessary survival of humanity calls for the respect, without delay, of the commitments made and the implementation of effective initiatives, in connection with the preservation of the environment....

...In the face of climate change, reforestation of the planet is, without a doubt, one of the most relevant life-saving solutions...With an estimated forest cover of 220 million hectares, or about 6 percent of the world's forest area and 10 percent of global biodiversity, the Congo Basin is the second most dense and humid tropical forest region after the Amazon. Studies estimate that it may be the last major terrestrial tropical carbon sink in the world, giving vital importance to these forests in the global fight against climate change...The Congo Basin alone captures more than 30 billion tons of carbon dioxide, the equivalent of three years of cumulative emissions from all our countries...It is in this respect that conserving and preserving our forests has become an emergency that commits us all to make a decisive political choice and to express our solidarity with the rest of humanity...

...It should be recalled that the Republic of the Congo recognized very early on the absolute need to protect, restore and expand its forest cover...For 40 years, our entire population has been invited to plant a tree as part of National Tree Day, celebrated in our country on November 6 each year....It is this type of proactive action, coupled with a rigorous forest code, that has allowed us to maintain one of the lowest deforestation rates in the world...

It is in these terms that the Head of State of the Republic of Congo describes not only challenges to the planet, but also of his country to achieve its own economic development goals in the context of a changing climate. Similarly to other developing countries, policy makers in the Republic of Congo face tough questions, such as how to translate short and long-term climate considerations into present day decision-making? How to prioritize investments and policies? What are the trade-offs between immediate benefits and costlier delays? These are the fundamental questions impacting every sector of the Congolese economy, not only the forestry sector to which President Sassou-Nguesso is making a special appeal.

To answer these questions, this report uses a systematic approach, combining available data, models, and tools to provide a range of actionable recommendations that integrate climate and development goals. Some of the recommendations are essential enablers or ready to be implemented immediately, while others must be developed over the next decade.

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The report was edited by Emily Gribbin. Litera Madagasikara prepared the French translation.

Abbreviations

AFD	Agence Française de Développement
AFOLU	Agriculture, Forestry, and Other Land Use
CAFI	Central African Forest Initiative
CCDR	Country Climate and Development Report
CPIA	Country Policy and Institutional Assessment
CSAIP	Climate-Smart Agriculture Investment Plan
BAU	Business-as-usual
DCP	Directorate of Civil Protection
DFI	Development finance institutions
DRM	Disaster risk management
ERP-SL	Emission Reductions Program in Sangha and Likouala
ETS	Emissions trading systems
EU	European Union
EWS	Early warning system
EWRS	Early Warning and Response System
FIGA	Fond d'Impulsion de Garantie et d'Accompagnement
FLEGT	Forest Law Enforcement, Governance and Trade
FMP	Forest management plans
GDP	Gross domestic product
GGFR	Global Gas Flaring Reduction Partnership
GHG	Greenhouse gas
GNI	Gross National Income
HCI	Human Capital Index
HFLD	High Forest Cover Low Deforestation
IFC	International Finance Corporation
LDP	Local development plans
LMICs	Low- and middle-income countries

LULUCF	Land use, land-use change, and forestry
MCUH	Ministry of Construction, Urban Planning and Housing
MESDCB	Ministry of Environment, Sustainable Development and Congo Basin
MFIs	Microfinance institution
MIGA	Multilateral Investment Guarantee Agency
MTBF	Medium-Term Budgetary Framework
NDC	Nationally Determined Contributions
NDP	National Development Plan
NPL	Non-performing loans
NPV	Net Present Value
OPCS	Operations Policy and Country Services
PCGS	Public Credit Guarantee Scheme
PNACC	Plan National d'Adaptation au Changement Climatique
PPD	Public-Private Dialogue
PPP	Public-private partnership
PV	Photovoltaic
RCP	Representative Concentration Pathway
REDD+	Reducing Emissions from Deforestation and Forest Degradation
RIL	Reduced Impact Logging
RoC	Republic of Congo
SCD	Systematic Country Diagnostic
SNAT	Schéma National d'Aménagement du Territoire
SOEs	State Owned Enterprises
SSA	Sub-Saharan Africa
SSNs	Social Safety Nets
UNFCCC	United Nations Framework Convention on Climate Change
VPA	Voluntary Partnership Agreement

Executive Summary

Diversifying Republic of Congo's Economy: Making the Most of Climate Change

Key message 1

The Republic of Congo (RoC) stands at a crossroads in its economic development. The government's National Development Plan (NDP) 2022-26 recognizes the significance of diversification to drive economic growth and its connection with the climate agenda. The plan aims to achieve 4 percent economic growth and 10.7 percent growth in the non-oil economy by 2026.

The country needs to break away from the dominant role of the oil sector. Linking economic diversification efforts with solutions to address climate change presents an opportunity. By assessing risks and opportunities and proposing an effective response through policy reforms, institutional strengthening, and mobilizing climate finance and investments, this report aims to inspire hope and optimism for a more sustainable and resilient future, not only for the Congolese people, but for the planet more broadly.

Through engagement in sectors such as agriculture and forestry, industry, special economic zones, tourism, digital, and housing, RoC aims to broaden its economic base, reducing poverty and unemployment in the process. Evaluated at a cost of US\$14.7 billion over the period (US\$2.9 billion yearly), the plan represents almost 22 percent of GDP (2021) and recognizes the importance of a reform agenda focusing on good governance, a private sector thriving in a good business climate, and environmental protection. RoC has also committed, through its 2021 Nationally Determined Contributions (NDC), to reduce its emissions by 32 percent by 2030 and adapt its economy at a cost of US\$8.2 billion (54 percent under mitigation efforts mainly in transport and energy; 46 percent under adaptation interventions in food, water, cities, and coastal areas). Meeting the NDC targets will require annual investments of 6 percent of GDP. These financing requirements are a challenge, and even more so for a country in debt distress. The NDP does not however explicitly take into consideration the impacts of climate change on the development objectives nor the linkages with the NDC actions. The question therefore is whether RoC can consider a pathway that links diversification and climate in the form of a low-carbon and climate resilient pathway where reforms and capacity needs could help RoC meet its targets—first and foremost meeting development objectives, second reducing the damages of climate change through selective adaptation measures, and lastly leveraging opportunities for additional climate finance to meet development-climate goals within the country's tight financing constraint.

Key message 2

Climate change poses significant risks to its natural, physical, and human capital, and hence to Congo's development objectives. Despite being a low GHG emitting country and accounting for only 0.06 percent of global GHG emissions, RoC is significantly vulnerable to climate change.

Climate change is already making RoC hotter, with more erratic rainfall, and these changes are likely to accelerate in the coming decades. Within the current socio-economic context, the impacts of climate change will be felt strongly especially when it comes to access to food, water, electricity, habitat, health, and education. Vulnerability is high. Thirty-six percent of people are food insecure, and climate change is expected to cause crop yield to decrease by 5-15 percent by 2050. Two-thirds of the current power generated from expensive fossil fuels is only serving 48 percent of the population. With the energy sector in a crisis, meeting all demand with such a mix puts RoC on an unsustainable path. Access to water is also problematic, with 87 percent access to improved water and 27 percent to basic sanitation services in urban areas, but only 45 percent access to improved water services and 6 percent to basic sanitation in rural areas. Diarrheal diseases are also the second leading cause of death among children under 5, 95 percent of which are due to limited access to water, sanitation, and hygiene. Paved roads have been reduced from 2432 to 1800 km due to insufficient maintenance, while transport contributes 1 MtCO₂e emissions (2020). In cities, more than 5.5 percent of urban areas are exposed to floods and 44 percent of the population live in informal settlements. Climate change will make populations with poor access to basic services even more vulnerable to health issues and impact their livelihoods.

Adaptation is a key consideration as the country embarks on its development pathway. The country is ranked 152 out of 185 countries in terms of its exposure, sensitivity, and ability to adapt to the negative impacts of climate change according to the Notre Dame Global Adaptation Initiative's (ND-GAIN) Country Index for 2021². In 2050, it is projected that lower labor productivity due to heat stress may reduce the country's GDP by about 20 percent. The Republic of Congo is not well equipped to respond to climate- and natural disaster-related shocks, such as those affecting agriculture, urban development, health, and water, therefore pushing more people into poverty. By 2050, extreme poverty could be 1 to 3 percentage points higher than without the impacts of climate change. Lower labor productivity due to heat stress is expected to be the main driver for these losses across sectors, but mostly in agriculture and industry, where labor productivity could decrease by 20 percent and 17 percent, respectively. Climate change would also affect labor productivity through increased transmissibility of vector-borne diseases (malaria and dengue) and water-borne (diarrheal) diseases, higher mortality, and reduced ability to work due to illness or caring for relatives. Climate change could increase total health costs from US\$91.4 million to US\$259 million in 2050. All of this is in a difficult environment where the Human Capital Index (HCI) is at 42 percent. Climate change would also imply a loss of about 160,000 jobs, mainly in manufacturing and services, though impacts would be larger given the significant informal employment in sectors such as agriculture and forestry. Climate change challenges the same areas that are critical for the diversification agenda, such as agriculture, urban and rural development, health, and energy, where authorities want to invest and mobilize finance for much-needed spending. These risks disproportionately affect vulnerable populations, exacerbating inequalities. Hence climate change could further dampen national aspirations for growth as articulated in its NDP.

Key message 3

Business-as-usual is not an option. An effective response is needed with policy reforms, institutional strengthening, and climate finance. But under conditions of slow growth and debt distress, Congo needs to prioritize and sequence its response.

RoC has experienced a continued economic decline for almost a decade and has heavily borrowed, putting it in debt distress. Under its current economic model, dependent on the oil sector, the Republic of Congo is unlikely to perform any better in the future. The country has not been able to translate its natural capital into other forms of wealth due to under investment in human capital, limiting the

² Ranking accessed from <https://gain.nd.edu/our-work/country-index/> on 9/20/2023.

productivity of the workforce. Health and education expenditures in RoC are also relatively low when compared to peers. Climate change and a changing global context, with the world moving away from its reliance on oil, have added to the urgency for economic diversification through an appropriate mix of policies, institutional reforms, and investments.

Ensuring sustainable growth and reducing debt distress is the top priority. It is imperative that RoC considers a development model that can deliver (i) its economic diversification aspirations but also caters to (ii) a better understanding of how climate hazards translate into risks, (iii) the potential effects on people, communities, natural and physical capital, and economic activity, and (iv) the implications for government, the private sector, financial institutions, and the international community. Changing the development model will require a more favorable business environment, a greater role for the private sector, stronger institutions, higher labor productivity, and improved infrastructure. The country’s debt would need to decline to reduce its risk of distress and provide fiscal space through greater mobilization of fiscal revenues, appropriate prioritization of public spending, and improved debt management.

The analysis conducted for various development and climate scenarios shows that climate action could complement development. Ten scenarios have been considered in this analysis: (i) two baseline scenarios—Limited Diversification and Sustained Diversification, (ii) four scenarios where two sets of climate conditions that can occur in various regions of the world are included in the two baselines—wet/warm and dry/hot, illustrating the range of possible climate impacts, and (iii) four final scenarios where climate action is introduced to the previous four scenarios. A brief description of the Congo context is presented in the table below:

Table ES1: Growth Scenarios: How the Scope of Diversification Makes a Difference

Selected variables	Limited Diversification	Sustained Diversification
Average GDP growth rate (2023-2050)	1.8 percent	4.0 percent
Average real GDP per capita growth rate (2023-2050)	-2 percent (compare to -3.7 percent over the past decade)	2 percent (compare to -3.7 percent over the past decade)
Overall growth	Composition will gradually shift away from oil production (expected to decline permanently starting in 2025)	Composition will gradually shift away from oil production (expected to decline permanently starting in 2025); Increased productivity driven by technological transformation, improved access to electricity, and an improved business environment
Oil sector	Decline due to the depletion of oil fields and the lack of profitable investment at current and prospective medium-term oil prices, resulting in an average growth of -2.0 percent	Decline due to the depletion of oil fields and the lack of profitable investment at current and prospective medium-term oil prices, resulting in an average growth of -2.0 percent

Non-oil sectors	Average growth projected at 3.5 percent supported by: slow pace of structural transformation; higher public spending supported by reprioritization in public spending and stepped-up revenue mobilization; some improvement in governance and transparency; private investment to increase slowly; no significant improvement in the business environment	Average growth is projected at 7.0 percent supported by: significant structural transformation from oil to non-oil activities with increased agriculture, non-oil industries, and expansion of services; higher public spending on investment and human capital; higher productivity driven by improved access to internet, digitalization of services, electricity, improved training/education, and business environment reforms; improved transport infrastructure; increased private investment, including to scale-up gas production and commercialization, and potash mining; improved business environment
Climate action scenarios		
Climate action	Modeled climate actions have focused on dealing with heat stress by extending the coverage of air conditioning (AC) to 25 percent of households (compared to 3 percent currently). Because of the absence of any fiscal space, these actions are assumed to be financed through part of the proceeds from REDD+.	Modeled climate actions have focused on dealing with heat stress by extending the coverage of AC to 25 percent of households (compared to 3 percent currently). Because of the absence of any fiscal space, these actions are assumed to be financed through part of the proceeds from REDD+.

Source: Original table for this publication.

But nothing will be possible with the current development model where there is no fiscal space. If RoC authorities choose a business-as-usual approach without pursuing measures related to diversification and climate action, the consequences could be severe in the short, medium, and long term. Even with limited diversification efforts, RoC may continue to heavily rely on a narrow range of sectors, leaving its economy vulnerable to external shocks and market fluctuations. The lack of good governance, inviting business climate, and promotion of the private sector could hinder both investment and sustainable growth. In terms of climate action, the absence of adaptation measures could result in escalating climate risks, including increased frequency and intensity of extreme weather events, heightened food and water insecurity, and loss of critical ecosystems. Based on Computable General Equilibrium (CGE) modeling and micro-simulations, the report finds that the long-term implications may include substantial economic losses and increases in extreme poverty.

Table ES2: Summary of the Main Findings

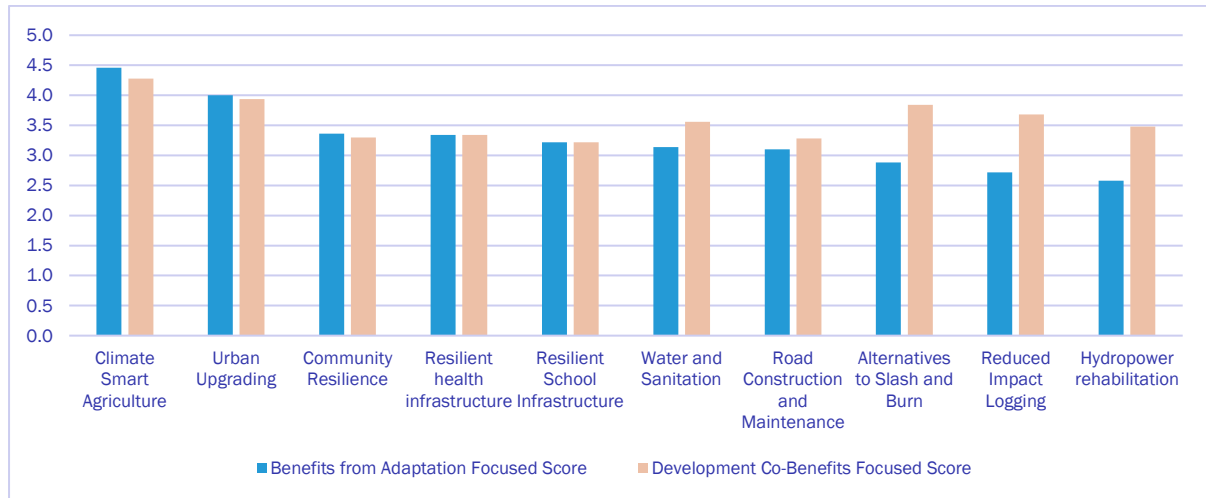
1	<ul style="list-style-type: none"> Under the Limited Diversification scenario, the proportion of the population subsisting on an income at or below the international extreme poverty level would decline only slowly over time to about 40 percent in 2050. Under the Sustained Diversification scenario, that proportion could fall to about 20 percent. This decline would be more pronounced in rural areas with extreme poverty lower by about 40 percentage points (compared to about 20 percentage points in urban areas).
2	<ul style="list-style-type: none"> Looking at the combined effects of the climate change impact channels, RoC's GDP could be between 7 percent (under the wet/warm scenario) to 17 percent lower (under the dry/hot scenario) in 2050 if only limited diversification is achieved. With more ambitious reforms, these losses would be slightly lower (5 percent and 15 percent, respectively), but the economy would be twice as large, putting it in a better place to deal with these losses.
3	<p>Investing in and financing climate action could:</p> <ul style="list-style-type: none"> Reduce GDP losses by 40 to 85 percent depending on the diversification scenario. Go a long way in offsetting the negative effects of climate change on poverty and employment. Offset the increase in extreme poverty stemming from climate change in all scenarios.

- With sustained diversification, extreme poverty could be even lower, by about one percentage point nationally and four percentage points in rural areas.

Source: Original table for this publication.

With the nature of the physical risks identified, RoC has several options to address climate change based on international best practices that are relevant to the specific context of the country. The report analyzes and prioritizes sector specific actions among a long list of policy, institutional, and investment options. These actions and interventions have been assessed in terms of cost, urgency, feasibility, and impact, and for their potential to offer broader synergies with the economic diversification agenda for development. The benefits of these prioritized sectoral actions, although not modeled for impacts on economic growth per se, are critical to the diversification agenda and include both adaptation and mitigation, demonstrating the importance of mainstreaming climate change into macroeconomic and sectoral policies, regulations, and investments.

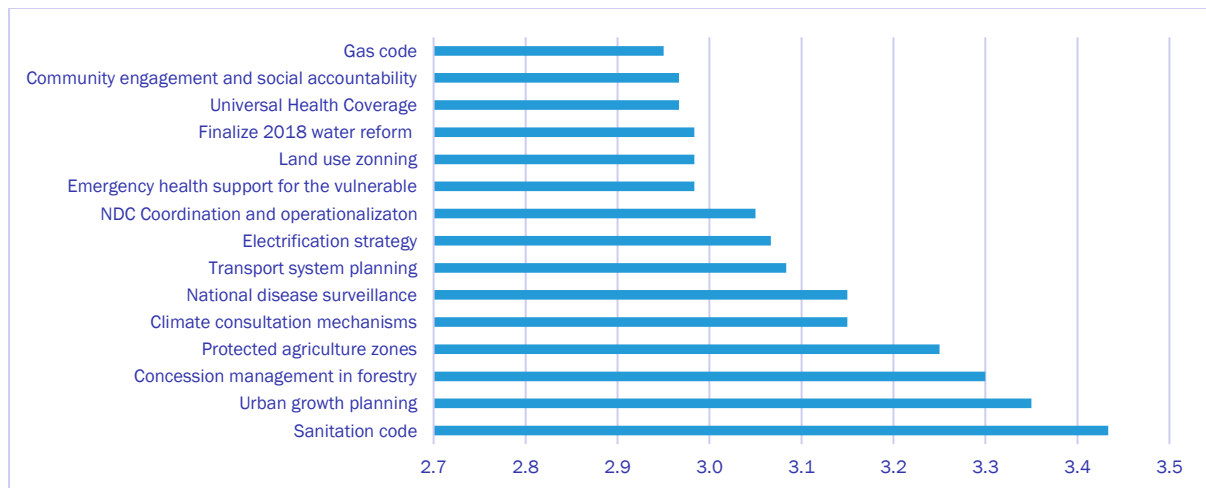
Figure ES1: Top 10 Climate-Smart Investments for Medium to Long Term (by 2035-40)



Source: Original figure for this publication based on World Bank data.

Note: Entries sorted by adaptation focus; scored on a scale of 1-5, 1 being low and 5 being high.

Figure ES2: Top 15 Climate and Development Enabling Policies for Immediate Action (by 2030)



Source: Original figure for this publication based on World Bank data.

Note: Scored on a scale of 1-5, 1 being low and 5 being high.

The CCDR also proposes a low-carbon and climate resilient pathway for RoC to explore for inclusive and sustainable development. The report discusses various steps for stakeholders to consider as RoC charts a growth trajectory with measures that are synergistic for managing climate change impacts. Analysis shows that in charting a different growth pathway, authorities will need to begin by focusing on better governance, improving the business environment, and promoting private sector development. These fundamental pillars are enabling factors for diversification-oriented development as well as for reducing climate vulnerability, in addition to helping diversify the economy away from oil and protect those non-oil sectors from the impacts of climate change.

Undertaking climate resilient development will require a critical set of actions to be handled urgently. Fundamental areas for strengthening policies, regulations, and institutional frameworks that support the low-carbon and resilient development pathway are as follows:

Table ES3: Charting a Low Carbon and Resilient Development Pathway

1	Economic diversification	Promote economic diversification by reducing the country's dependence on oil revenue and fostering the growth of non-oil sectors, such as renewable energy, sustainable agriculture and forest management, tourism, and eco-friendly industries.
2	Renewable energy transition, energy efficiency and conservation	Increase the share of renewable energy in the energy mix by setting specific targets for renewable energy generation capacity and promoting investments in solar and hydro projects. Promote energy efficiency and conservation practices across sectors, including buildings, and transportation, to reduce energy consumption, greenhouse gas emissions, and associated costs. Assess opportunities for reducing gas flaring.
3	Sustainable agriculture, forestry and land use:	Enhance food security and sustainable land use by adopting climate-smart agricultural practices, promoting agroforestry, implementing measures to reduce deforestation and protect biodiversity, and mobilizing finance for forests to provide regional and global public service goods.
4	Green industrialization and waste management:	Support the growth of green industries and clean technologies for the diversification agenda, attracting investments in renewable energy-based manufacturing, sustainable tourism, and eco-friendly production processes in Special Economic Zones(SEZ).
5	Climate resilience and adaptation	Strengthen climate resilience and adaptive capacity by implementing measures to protect people and communities, ecosystems, enhance disaster risk reduction strategies, improve water resource management and health/education systems in the face of climate change impacts identified in the assessment.
6	Job creation and skills development	Generate employment opportunities through the development of diversification-focused green industries, providing skills training and capacity-building programs for green jobs, entrepreneurship, and technology transfer. Skills development should also include teachers and health workers.
7	Access to finance and international cooperation	Enhance access to domestic and international funding sources, climate finance mechanisms, and international cooperation to support the implementation of low-carbon and resilient development initiatives based on the financial sector initiatives proposed.
8	Stakeholder engagement and governance	Foster inclusive governance and stakeholder engagement by involving government agencies, civil society organizations, private sector actors, and local communities in decision-making processes and ensuring transparency and accountability.

Source: Original table for this publication.

Leveraging climate finance through sustainable management of agriculture and forest resources presents a unique opportunity. Today, there are 575,000 Congolese people living on 22.5 million hectares of land covered in rich biodiverse forests. The Congo Basin Forests are a significant global carbon sink, contributing US\$400 million in timber exports and storing over 44 GtCO₂e with the potential to contribute more to the economy as well as to global public goods. Although mitigation is not currently a priority for RoC, certain sectors offer an opportunity for making forests a productive asset for national growth whilst also leveraging additional climate finance through sustainable management of renewable natural resources. RoC should prioritize sustainable actions in forestry, such as alternatives to slash and burn and reduced impact logging for the creation of employment. Doing so can create jobs whilst also generating 6.5 million tons equivalent of CO₂ emission reductions annually to meet the NDC mitigation targets and leverage carbon markets for payments for emissions reductions. Wood and timber processing is another opportunity that RoC should unlock for economic growth. In 2022, the Economic and Monetary Community of Central Africa (CEMAC) countries agreed to ban the export of raw timber to conserve forests and create jobs by locally processing wood. Although countries have agreed, they have not all honored the agreement. The ban should be executed without delay to create national employment if industrialization incentives are adequately calibrated and equitably applied.

Agriculture and forests can go together in Congo. Investments in climate-smart agriculture can improve food security and reduce reliance on agricultural imports. Financing and climate-smart investments estimated at US\$245 million, including through community-based agroforestry-conservation initiatives, can increase yields of key crops such as maize, plantain, and cassava by 50 percent and cocoa by 10 percent. In addition, RoC should pursue the ongoing regional dialogue on compensation for conservation of its natural forests including but not limited to the Congo Basin Forest Partnership (CBFP). The Congo Basin Forests and the peatlands are recognized for their role as a global public good for mitigating GHG emission. Further technical analysis, including natural capital accounting and the production of a roadmap for climate finance readiness could help RoC make informed decisions for scaling up action on sustainable management and reducing deforestation as well as participation in carbon markets. The international development community needs to increase technical and financial support for the protection of the high value carbon and biodiverse forests of Congo for its global public good services..

Meeting financing needs will be a challenge for a country without any fiscal space. For RoC to access a mix of financing instruments, including debt for environment swaps, it would require innovative solutions and financial sector reforms.. Together with implementing a clear roadmap for climate finance, RoC could leverage a mix of public and private financing to meet its development and climate action needs of US\$15+ billion. Management of natural assets, such as forests, could bring in additional financing in the form of payments for emissions reductions

RoC's current efforts to diversify its economy and address climate change challenges provide hope for a sustainable future. The most effective option for RoC to tackle the climate crisis is to grow sustainably and reduce poverty, and climate actions can support these dual goals. A fast-growing and economically stable country will be much better placed to protect its people from the adverse effects of climate change. Therefore, sound macroeconomic management, a conducive business environment, enabling private sector engagement, and broad safety nets are key for building resilience to climate change and laying a foundation for the transition to a low-carbon economy. By mainstreaming climate actions, integrating sustainable natural resource use, and promoting the renewable energy transition in its development strategy, RoC can seize opportunities for economic growth while mitigating climate risks. By building on its current development ambitions, through policy reforms, institutional strengthening, and mobilizing private sector and climate finance, RoC can capitalize on future opportunities and pave the way for sustainable climate resilient development.

1. Climate and Development

1.1. Economic, Social, and Environmental Context

1.1.1. An economy at a critical juncture in its development history

The Republic of Congo is at the crossroads in its economic development. The country's seven-year recession (2015-21) led to a dramatic drop in income per capita and has put the country at risk of falling back into low-income status. Following a period of conflict in the 1990s, RoC managed to secure significant income per capita gains during the early 2000s. However, the country has experienced a continuous decline in economic activity (historically dependent on the oil sector) since 2015 when the last super commodity cycle (circa 2002-14) ended. The COVID-19 crisis was another setback for RoC's recovery from the end of the last oil boom, prolonging the economic recession. While the significant growth improvements in per capita Gross Annual Income (GNI) during the oil boom era helped RoC reach low middle-income (LMI) status in 2005 and near upper middle income (UMI) status in 2014, the end of the oil boom led to a drop in GNI per capita by more than a half between 2014 and 2020, reversing the country's long-term progress in poverty reduction.

RoC has made little progress in reducing the dominant role of the oil sector in the economy and diversifying its productive base to industries with more labor opportunities. In the past decade, the oil sector has accounted for around 40 percent of GDP, 80 percent of total exports, and 60 percent of domestic revenues. Not surprisingly, the hydrocarbon sector, through its direct and indirect impact on the economy, has been driving economic growth in RoC. The dependency on the oil sector has translated into high GDP growth volatility, which affects private investment and long-term economic growth prospects.

Pro-cyclical fiscal policy combined with weak debt policy and management have shrunk the country's fiscal space and raised concerns about debt sustainability. During the 2010s, RoC's fiscal policy suffered from the boom-bust cycle of international oil prices. In an effort to diversify the economy and close infrastructure gaps, on the back of surging oil prices, RoC expanded public expenditure dramatically during the first half of the 2010s. To execute ambitious investment projects, the country also borrowed heavily on concessional terms to supplement oil windfalls. When global oil prices plunged in late 2014, the country resorted to non-concessional, oil-backed external loans to continue its infrastructure projects. By 2016, however, faced with persistently low oil revenue, the government began to curb expenditure aggressively, especially public investment, to rein in the growing deficit. But short of cash, the government soon became unable to meet its contractual obligations, leading to the accumulation of external and domestic arrears. By 2017, Congo was in debt distress with an unsustainable debt level. The country is currently making substantial progress in restructuring its debt.

The current oil-driven development model is unlikely to deliver sustainable economic growth and productive jobs going forward. The government's motivation to take on the bold structural reforms required to push RoC towards upper middle-income status waned during times of oil windfalls. Importantly, RoC's current economic model—dependent on the oil sector—is unlikely to deliver even the volatile economic growth of the past, challenged by the current uncertain global context, projected depletion of RoC's oil reserves, and the global transition to a low-carbon economy. Moreover, the country has borrowed against its future and is now in debt distress, severely constraining its ability to invest in its human and physical capital. In addition to the unsustainability of overall growth, an oil-based economy provides few opportunities for job creation due to the low labor needs of the hydrocarbon industry. Indeed, the great majority of the Congolese population cannot find a job in the

formal economy, with about three-quarters of the Congolese workforce (including most youth) employed in the informal sector, either self-employed or in low productivity jobs.

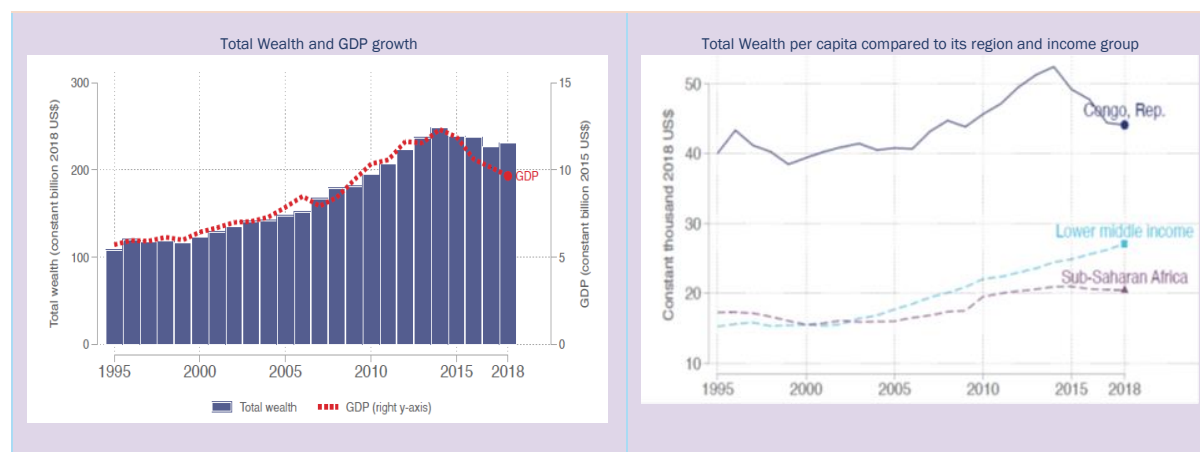
1.1.2. A changing wealth

The World Bank *Changing Wealth of Nations 2021* (CWON) has introduced the concept of wealth as a complementary indicator to gross domestic product (GDP) for monitoring sustainable development in a country. The report showed that development is about managing a broad portfolio of assets—including natural, human, and produced capital. The National Development Plan (NDP), the Nationally Determined Contributions (NDC), and other documents and reports have highlighted some of the challenges facing the Rep. of Congo and the world that have become more urgent and more severe from the rising impacts of climate change and the need for global action on the low-carbon transition, to the loss of biodiversity and ecosystem services, to governments grappling with recovery from the COVID-19 pandemic and the ensuing economic crises. There is now significant recognition of the need for stronger national responsibility and collective action to address these global issues. The protection of tropical forests and reducing dependency on fossil fuels are particularly relevant for the Rep. of Congo as the link between development and climate change is being established.

The pattern of growth of countries that were classified as low-income in 1995 but grew to become middle-income by 2018 offers important lessons for RoC. Countries that transitioned from low-income to middle-income status all accelerated investment in and accumulation of human capital (CWON 2021). However, RoC is among the three exceptions with Mauritania and Zimbabwe — countries that became middle-income largely because of fossil fuel and mineral wealth. RoC and Zimbabwe are considered fragile and conflict-affected states in which building human capital becomes very difficult. Heavy dependence on oil further created difficulties after 2014 when oil prices fell. The extraction of nonrenewable natural capital generates an economic rent, the difference between the cost of production and the estimated revenue from the sale of fossil fuels, that can make it a major source of government income and a big part of the economy. The annualized flow of nonrenewable resource rents between 1995 and 2018 reached more than 50 percent of GDP in the Republic of Congo.

The sum of the stock of total wealth, comprising produced capital, renewable and nonrenewable natural capital, human capital, and net foreign assets in the Rep. of Congo, reached US\$231 billion in 2018. Between 1995 and 2018 RoC's GDP increased by 69 percent, while its total wealth increased by 113 percent during the same period (figure 1.1.). However, wealth accounts also indicate some areas of concern. The change in wealth per capita is a leading measure of long-term sustainability. Declining wealth per capita could indicate insufficient investment in a nation's assets, or that they are being mismanaged or misvalued. In 1995, RoC's total wealth per capita was US\$40,000 and in 2018 it reached US\$44,000s, a change of 10 percent. Figure 1.1. shows RoC's total wealth per capita compared to regional and income group data. Of note is the significant drop in per capita from a high of US\$52,000 in 2014. In addition, Congo's adjusted net savings have mostly been negative over recent decades, indicating that the country has been depleting its natural resources without converting enough of its revenues into other forms of capital (World Bank 2023).

Figure 1.1. Total Wealth, GDP, and Wealth Per Capita in the Rep. of Congo (1995-2018)



Source: CWON (World Bank, 2021).

1.1.3. Sustainable development will require action to diversify assets

Attaining sustainable development in RoC will require substantial action to diversify its assets, focusing on stronger institutions, vigorous human, and physical capital, and the sustainable management of natural capital. In the flagship World Bank report, *Diversified development: making the most of natural resources in Eurasia* (World Bank, 2014), findings suggest that diversifying exports and decentralizing economic structures are not sufficient for countries to develop. Instead, countries should focus on diversifying their national asset portfolios—that is, to ensure a better balance between natural capital (natural resources), produced capital (human and physical), and economic institutions (or intangible assets). Natural capital has historically been RoC’s largest asset and source of wealth, accounting for about 40 percent of Congo’s total wealth since 1995. Despite abundant natural resource wealth, both in renewables (forests, agricultural land) and non-renewables (natural gas, mining), the exploitation of natural resources in RoC has mainly focused on oil, while other natural assets remain largely unexploited. Since RoC’s oil production is expected to decline in the medium term due to local supply issues and in the long-term due to falling demand from the global transition to a low-carbon economy, there is urgency to diversify RoC’s assets.

The drawdown of RoC’s oil resources has not translated into sufficient accumulation of human and physical capital. Underinvestment in human capital limits the productivity of the workforce. Health and education expenditures in RoC are relatively low when compared to peers, and often below budget targets. As a result, RoC’s scores lag on the Human Capital Index, registering very limited progress since 2010. The low quality of education is reflected in the 3.6 year learning gap demonstrated by Congolese students, limiting the country’s ability to take full advantage of its labor force and increase the productivity of its workers. Significant private and public investment spending over recent years contributed to a steady accumulation of physical capital in RoC, but investment was volatile and driven by developments in the oil sector. Consequently, RoC’s coverage of physical infrastructure remains insufficient. Moreover, the low efficiency of public investment has limited the economic and social benefits of public spending. Fostering human capital development and enhancing the quantity and quality of strategic infrastructure would allow productivity gains, supporting diversification efforts.

The decades-long exploitation of natural resources was not accompanied by the strengthening of institutions in RoC, which are essential to build capacity within the government to transform natural resources into physical and human capital. The World Bank’s Country Policy and Institutional

Assessment (CPIA) provides a snapshot of the quality of the country's institutions. In 2020, RoC's overall score was lower than the Sub-Saharan Africa average, and comparatively lower than its 2015 score. This reflects, in part, weaker economic management, which resulted in debt distress and the absence of fiscal space. Pro-cyclical fiscal policies, tightly linked to oil price fluctuations, have amplified the economic cycles in RoC and impacted long-term growth. As such, structural policies are generally weak and have been worsening, with RoC's business regulatory environment not conducive to private sector investment. The capacity of policies and institutions to boost health, education, and social protection has remained mostly unchanged since the mid-2000s, with a need to strengthen service delivery and increase the coverage of social protection. Finally, despite recent progress in transparency and the fight against corruption, RoC's performance in public sector management remains low.

The Congolese government's new National Development Plan (*Plan National de Développement, NDP*) lays out steps for a more diversified and inclusive growth model. The recent protracted recession and its devastating impacts on both Congo's economic output and its citizens' quality of life have heightened the government's awareness of the fragility of oil-dependent growth. Since the presidential elections in March 2021, reforms have accelerated, helping to restore debt sustainability and initiate an economic recovery. The President appointed a new government in 2021 with a strong mandate to undertake reforms to turn around the country's economy. In August 2021, the heads of state of the CEMAC endorsed a declaration committing the member states to a strong second generation reform program to restore the region's macroeconomic sustainability, develop the region's connectivity infrastructure, and accelerate human capital development. To reverse flagging GDP growth and translate its vision for a new development model, in 2022, the ROC adopted a new NDP for 2022-26. The NDP aims to build a strong, resilient, and diversified economy for sustainable and inclusive development. It is articulated around six strategic areas: the development of agriculture and agroforestry, industry, tourism, digital economy, real estate, and special economic zones. It also identifies peace and political stability, governance, the business environment, and environmental protection as four cross-cutting areas that will support successful implementation. The NDP offers a good opportunity to transform RoC's economy and boost inclusive and sustainable development.

However, **the government faces many challenges in achieving this goal.** Building the foundations for more diversified development will require the implementation of a number of policy interventions. To restore macroeconomic stability, the country will have to reduce its debt and provide appropriate fiscal room for critical public investments. This will require improvements in tax compliance and collection of tax arrears, a broadening of the tax base (e.g., streamlining of tax exemptions), continued implementation of energy SOE reforms to reduce transfers, as well as improved debt management. RoC would also need to strengthen its institutions, removing barriers to competition, for instance enhancing trade competitiveness and diversification. In addition to improving its physical capital (electricity supply, transport, and ICT infrastructure) as well as its human capital (skills and labor market flexibility). Special attention should also be paid to natural capital, RoC's most important source of wealth to date, to ensure a shift from oil towards other largely unexploited natural assets, while safeguarding natural heritage assets. Together, these policy interventions could help ensure a better balance between natural capital (natural resources), produced capital (human and physical), and economic institutions (or intangible assets).

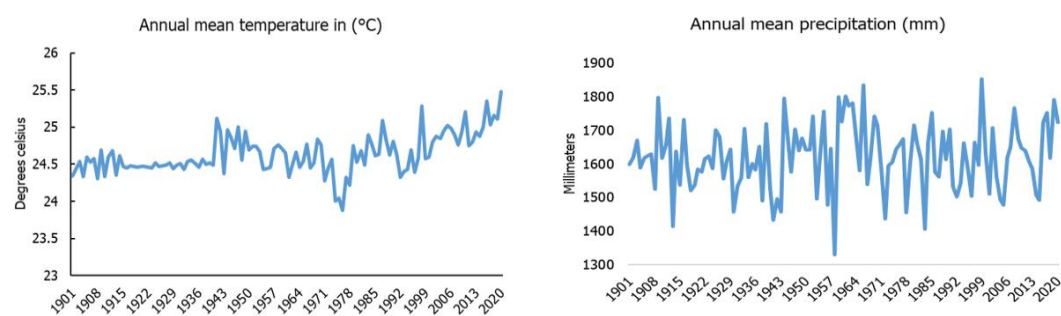
1.2. Climate Change and People

ROC is one of the most vulnerable countries to climate change. At present, RoC has a favorable climate for agriculture and is rich in natural resources such as oil, minerals, and forests. Most of the country has a tropical savanna climate, with tropical monsoon and tropical rainforest climates in the north of the country. It has a bimodal rainfall pattern and temperature structure. Outside of its two largest cities,

it is one of the least densely populated areas in Africa.⁴ These characteristics are relevant in assessing the country's vulnerability to a changing climate. The combination of the country's exposure, sensitivity, and ability to adapt to the negative impacts of climate change is assessed by the Notre Dame GAIN Country Index, which ranked RoC 166 out of 182 countries in terms of resilience to climate change in 2019.⁵ RoC is not well equipped to respond to climate- and natural disaster-related shocks because of its low levels of agricultural technology, lack of climate-resilient infrastructure, shortage of medical staff, and low capacity for natural disaster management response, among others.

Climatic change is already making RoC hotter, with more erratic rainfall, and these changes are likely to accelerate in coming decades. Between 1901-10 and 2011-20, mean annual temperature increased by 0.6°C, along with increases in both average maximum temperatures and average minimum temperatures (figure 1.2). Mean annual precipitation has not changed significantly, but it has been characterized by more erratic and extreme rainfall (figure 1.2).⁶ The intra-seasonal precipitation patterns during the September-November and March-May rainy seasons have fluctuated in recent years, both shortening and lengthening seasons, increasing the unpredictability of rainfall.

Figure 1.2. Trends in Precipitation and Temperature in ROC from 1900-2020



Source: World Bank Climate Change Knowledge Portal.

Climate change is a critical threat to poverty alleviation in RoC. Poverty is characterized by low purchasing power, rural predominance, exposure to environmental risk, population displacement, insufficient access to social and economic services, increasing youthfulness, rapid urbanization, and few opportunities for formal income generation. Like other locations, climate change will hit the Congolese population that already faces social and economic challenges hardest, such as those already living in poverty. There is growing evidence that climate change will cause more harm to those living in poverty because they are more exposed to heat stress and rely heavily on natural resources for survival that are susceptible to destruction by floods and drought (Hope 2009).

The rural poor depend heavily on agriculture. In RoC, 52.5 percent of the population lives below the poverty line, of which, 57 percent live in rural areas that rely heavily on agriculture as their primary income source (World Bank 2017). Rural households who lose part of their income due to climate shocks tend to migrate to urban areas in search of better living conditions and opportunities, thus, adding to the already large number of urban poor also facing environmental hazards related to climate

⁴ Data in this paragraph is sourced from the Climate Change Knowledge Portal, World Bank. (accessed month date, year) <https://climateknowledgeportal.worldbank.org/country/congo-dem-rep>

⁵ Data for six key sectors (food, water, health, ecosystem services, human habitat, and infrastructure) is included. For more information, visit: <https://gain-new.crc.nd.edu/ranking/vulnerability>

⁶ Data in this paragraph is sourced from the Climate Change Knowledge Portal, World Bank. (accessed month date, year) <https://climateknowledgeportal.worldbank.org/country/congo-republic/climate-data-historical>

change. Because agricultural production is primarily a rural activity that sends food to urban areas, any decline and shortage of locally produced agricultural products will also impede food availability and access in urban areas. Consequently, climate change may well result in food access issues that are likely to become more and more significant over time. Not only will the availability of certain staple local agricultural foods be affected, but crop failures can further influence the poverty status of large numbers of people.

The urban poor are disproportionately threatened by environmental hazards and other climate-related risks. Although poverty remains predominantly a rural phenomenon, urban poverty is also significant in ROC. Brazzaville and Pointe Noire are home to more than half of the country's 5.7 million people, and despite a relatively low poverty incidence, about one-third of the poor reside in these two cities (CNSEE 2013). Urban vulnerability to climate change is inextricably linked with poverty. The urban poor are not only more exposed to heat stress, but also tend to live in poorly constructed homes, often in communities exposed to environmental hazards such as floods, landslides, or droughts, and in areas lacking basic health services or infrastructure (Oxfam International 2009). Many people face a growing threat of severe flooding due to increased storm frequency and intensity associated with climate change. Rapid urbanization and urban population increases have also led to large numbers of people, especially the poor, settling and living in fragile areas, such as floodplains in and around urban areas (Douglas et al. 2008).

1.3. Opportunities for Decarbonization

The Congo Basin is one of the three largest forests in the world, the only stable carbon sink, and a key opportunity for RoC. The Congo Basin tropical forests span six countries, including RoC, covering 269 million hectares, second only in area to the Amazon Basin. Weighing carbon removals (by forest growth) against emissions (resulting from deforestation and forest degradation), Southeast Asian forests are a net carbon source, and the Amazon is about to become one (Pirker and Carodenuto 2021). Only the Congo Basin is a stable carbon sink of around 610 million tons of CO₂ per year (Pirker and Carodenuto 2021), with average emissions of around 500 million tons and average absorption of 1.1 billion tons of CO₂ (CIFOR 2022).

Gas flaring is a substantial source of carbon dioxide-equivalent emissions and a wasted opportunity to put gas to use. The World Bank's Global Gas Flaring Reduction Partnership estimates that the total volume of natural gas flared globally was 142 billion cubic meters in 2020,¹² which is enough gas to power all Sub-Saharan Africa (SSA). ROC is among the world's top gas flaring countries, ranked 17th in flaring volumes but only 30th in oil production. Ending or at least substantially reducing routine gas flaring could help RoC comply with its commitments to Zero Routine Flaring by 2030¹³ and reduce its carbon emissions under its NDC. This would not only help address climate change, but ROC could recover and monetize excess gas, instead of flaring it.

¹² World Bank (2021).

¹³ For more information on the Global Initiative to Reduce Gas Flaring: "Zero Routine Flaring by 2030," visit: <https://thedocs.worldbank.org/en/doc/a903b5e6456991faf3b5e079bba0391a-0400072021/related/ZRF-Initiative-text-list-map-102.pdf>

2. Country Climate Commitments

2.1. Climate Commitments

The Congolese authorities have committed to the Paris Agreement to reduce greenhouse gas emissions and advance low-carbon development. Environmental issues and the sustainable management of natural resources are of high priority in RoC's development agenda, supported by the establishment of the Ministry of Environment (ME) and related departments. RoC submitted its updated NDC for the period 2022-30 to the UN Framework Convention on Climate Change (UNFCCC) in 2021, introducing a pledge to cut GHG emissions by 17 percent relative to business-as-usual by 2025, with an additional 40 percent reduction conditional on external support. RoC's higher ambition translates into the coverage of more sectors, all GHGs now included, and 13 priority adaptation activities identified. The role of women and youth in climate action is also highlighted. Target adaptation and resilience areas include energy, agriculture, forestry, water, health, coastal zone, and tourism.

The cost of implementing the NDC measures is estimated at US\$8.2 billion. Mitigation and adaptation measures cost US\$4.4 and US\$3.8 billion, respectively. Conditional measures are estimated at US\$7.1 billion, while unconditional measures will cost nearly US\$1.1 billion.¹⁵ Given the government's lack of fiscal space, the bulk of the funding will largely depend on the mobilization of resources by development partners and the private sector. The implementation of the first measures showed that despite efforts to allocate domestic resources to climate action, few were adequately funded.

The government of RoC has undertaken various initiatives to combat climate change. In 2010, the government adopted a National Climate Change Strategy to mitigate greenhouse gas emissions and adapt to the impacts of climate change. Additionally, the government has implemented several initiatives to protect the country's forests, including the establishment of protected areas and the adoption of sustainable forest management practices. It has also prioritized the development of renewable energy sources, such as hydropower, solar, and wind. In 2020, the country launched a new solar power plant in Brazzaville, which is expected to provide electricity to more than 100,000 households. To help communities adapt to the impacts of climate change, the government has established a national climate information service to provide accurate and timely weather and climate-related information. This service helps farmers and other vulnerable populations make informed decisions about crop planting, water management, and other activities that are affected by weather and climate conditions. The country also participates in regional and international climate initiatives, such as the Central African Forest Initiative (CAFI), which aims to promote forest conservation and sustainable development in the Congo Basin region.

Developing and implementing an effective climate change policy framework remains a challenge. To bolster national climate change responsiveness, RoC developed several climate-specific policy documents and integrated climate change into several sectoral strategies over the past decade (box 2.1). RoC's primary climate change policy document is the 2022-26 Nationally Determined Contributions, which seeks to enable adaptation to climate change in various sectors of the economy—it is not yet accompanied by a budgeted implementation plan. Moreover, the 2022-26 National Development Plan (NDP) and the 2016-2025 National Strategy for Sustainable Development (NSSD), refer to climate issues in sections dedicated to economic growth and environmental protection, risk analysis, and environmental governance, but are not comprehensive and do not target the activities

¹⁵ The NDCs include conditional contributions (23 percent compared to the BAU in 2030) depending on international support and unconditional contributions (12 percent compared to the BAU in 2030) implemented regardless of international support.

included in the 2021 NDC. Recent efforts¹⁶ have also focused on issuing the 2022 guidelines for integrating cross-cutting themes like gender and climate change risk management into NDP investment program development planning and monitoring. Only a few sectors (notably agriculture, forestry, and energy) have made efforts to mainstream climate change in their strategies and plans. For instance, the Ministry of Agriculture developed a climate-smart investment plan to prioritize climate response in its budget. Likewise, strategies for forestry (REDD+ strategy, National Forestry Policy) and energy (National strategy on access to energetic resources) have been developed. Other key sectors for the NDC do not have sectoral strategies or make only a brief reference to climate (as in the case of tourism, water, health, etc.).

Box 2.1: Congo's Climate Relevant Strategies and Plans

National Development Plan (2022-26)
National Sustainable Development Plan (2016-22)
Nationally Determined Contributions (2017-2025-30)
National Forestry Policy, 2014
National Afforestation and Reforestation Strategy, 2018
National REDD+ Strategy, 2016
Investment Plan of the National REDD+ Strategy, 2020
National strategy on Access to Energy Resources, 2017.
Climate Smart Agricultural Investment Plan, 2020
National Strategy and Action Plan for Disaster Risk Management (SNPAGRC) 2022-26

2.2. Institutional Readiness for Climate Change Action

Governance reforms are needed to strengthen regulatory roles and coordinate the implementation of the climate agenda in RoC. RoC's institutions and systems¹⁷ are facing governance issues, which should be improved for the country to efficiently address climate development objectives. RoC depends on external resources to fund its development programs. The country was ranked 164 out of 180 countries in the 2022 Transparency International Corruption Index. Most indicators in the Country Policy and Institutional Assessment¹⁸ are in the red, indicating the need for significant change and improvement. Low efficiency in governance systems combined with weak accountability and stakeholder engagement mechanisms undermine RoC 's capacity to achieve its climate and development objectives.

2.2.1. Integration of NDC climate commitments and climate risks

RoC's weak governance jeopardizes its ability to diversify its economy and make it more competitive to tackle climate risks. Shifting weather patterns and extreme weather events have already impacted infrastructure, food security, water resources, and health and public services. The upfront cost of boosting the resilience of public investments could be offset by lower maintenance and repair costs. Investments incorporating adaptation measures are associated with lower socio-economic costs due to fewer disruptions in public services, reduced exposure of assets to natural hazards, and better household well-being (World Bank 2019) The governance of resilient investments requires RoC's institutions to play an important role in regulation, coordination, and implementation.

¹⁶ See Annex 1 for a more detailed account of the climate and sustainable development commitments and initiatives.

¹⁷ A Climate Change Institutional Analysis (CCIA) has been conducted for this CCDR.

Only key findings and recommendations are presented in this section.

¹⁸ Data in this paragraph is sourced from the Country Policy and Institutional Assessment (CPIA) Databank, World Bank. (accessed 9/13/2023) <https://databank.worldbank.org/source/country-policy-and-institutional-assessment>

Decentralization, spatial and urban planning, and construction regulations²⁰ do not consider climate related risks in public planning, programming, and investment at the local level. Key planning instruments for managing the risks of climate change are currently missing and implementing planned adaptation actions present a significant challenge. Notwithstanding climate considerations in the NDP and efforts to make climate a cross-cutting concern in target sectoral strategies, RoC does not have a long-term climate planning framework. Such a framework should incorporate economy-wide GHG emissions reduction targets for 2050, considering climate trends as well as an economic analysis to support the achievement of long-term climate goals in alignment with other policy objectives. In addition, decarbonization and adaptation targets are not quantified in the NDP. RoC does not have a national climate change policy or plan incorporating the country's adaptation and NDCs objectives. A National Climate Plan is under discussion but authorities are yet to secure funding for this effort.

Some departments and municipal authorities have integrated measures to strengthen climate resilience in their local development plans (LDP), yet regulations do not clarify local mandates in these areas. LDPs sensitive to climate challenges have been elaborated for two districts (Bambama and Zanaga). Nearly 15 forest management plans (FMP) have also been developed as part of local-level mitigation measures within the NDP, but these plans do not feed into the ongoing LDP processes, and they are not aligned with the NDC and NDP planning, monitoring, and assessment framework. In the cities of Brazzaville and Pointe Noire, the Ministry of Construction, Urban Planning and Housing (MCUH) has supported the preparation of two local resilient urban plans, underpinned by the mapping of high and medium flood risk areas and the strengthening of building standards. Five land use maps and master plans (SDAT and PDAT) have also been developed in five departments (Bouenza, Lekoumou, Likouala, Niari and Sangha) in combination with the developed Schema National d'Amenagement du Territoire (SNAT). In conjunction with the 2021 NDC, the MCUH has recently established a drafting committee in charge of rewriting the regulatory texts relating to construction and territorial development. This will integrate considerations related to climate change, such as the restriction of construction in areas at high risk of flooding, building efficiency, and the use of local materials, among others.

2.2.2. Legal and regulatory framework: climate change goals and planning

The lack of legal clarification around "objective" climate change commitments weakens the regulatory framework and makes it vulnerable to changes in political priorities. RoC lacks a comprehensive legal and regulatory framework to support its adaptation and decarbonization goals. There is no national law that requires public institutions to integrate climate change into their policy and planning instruments and budget processes. Even if the NDCs are legally binding,²¹ the government can modify its commitments as it sees fit without opening a debate with national representatives. For local governments, the 2003 decentralization law defines only their role in managing environmental policies, there are no requirements to set adaptation or decarbonation targets, prepare plans and strategies, or report on implementation of climate objectives at the local level. The law transferring some competencies to local authorities (departments and municipalities) defines local government's responsibilities in terms of planning and implementing development policies. The management of climate issues is not explicitly raised, and the regulation has no provision for territorial climate risk and

²⁰ Laws on decentralization (2003), urban planning and construction law (2019), and law on land use and development (2014) do not yet consider the issues related to climate change. A decree on the construction permit, recently submitted to the Council of Ministers, considers environmental aspects, with the requirement of an environmental impact study for all urban infrastructure and construction projects.

²¹ Decree of the 2010 presidency establishing the National Committee for Climate Change and 2021 decree adopting the NDC.

vulnerability assessment. Overall, the absence of an overarching, multisectoral climate law undermines RoC's political commitment to achieving its medium and long-term climate goals.

Weak coordination of decisions limits the government's capacity to integrate climate into climate action planning. RoC ratified several key international treaties, including the UN Framework on Climate Change (1994), and agreements, including the Kyoto Convention (2002) and the Paris Climate Agreement (2015). The National Committee on Climate Change (NCCC), and inter-ministerial committee, was established with the political support of the Prime Ministry to monitor the Kyoto Convention (Decree 2010)²², albeit it was never convened. An inter-ministerial committee was also established in 2010 to support the REDD+ initiative and meetings were held until 2018. As part of the 2021 NDC, the decree was amended to make the inter-ministerial committee more inclusive (including subnational governments, civil society, and the private sector). A new decree establishing the NDC committee under the authority of the Prime Minister, with technical coordination from the Ministry of Environment, Sustainable Development and Congo Basin (MESDCB) has not yet been developed, nor signed. However, this new institutional arrangement does not mention the aspects and responsibilities related to Public Financial Management (PFM) and Public Investment Management (PIM) and the NCCC has no explicit mandate to coordinate climate budgeting and climate PIM decisions within the state. The absence of an effective coordination mechanism for the NDC implementation and monitoring has undermined a coordinated response for the NDC objectives and has led to overlap and duplication.

Yet, there are overlapping mandates and conflicts in competencies within MESDCB and with sector ministries and agencies. While efforts have focused on strengthening MESDCB's climate change responsibilities, the institutional and regulatory changes have led to duplication in mandates and tasks within the Ministry's climate change division, undermining the operational leadership of the MESDCB. REDD+ strategy implementation also revealed tensions and ambiguities with MFE and MESDCB and failures to coordinate with the NCCC. The decrees creating the MESDCB, the MFE, and the NCCC do not clarify specific competencies for other ministries and institutions, such as the ministries of finance and planning, sector ministries, and institutions. MESDCB does not have the direct and explicit authority to enforce climate policy, while the fragmentation of responsibilities throughout multiple institutions, including at different levels of governments, makes coordination difficult.

2.2.3. Public sector readiness: challenges and solutions

Climate change is not yet mainstreamed into fiscal planning tools or in the budget process, which undermines the implementation of climate actions. Climate risks have not been incorporated into fiscal planning instruments, such as macroeconomic forecasting and the Medium-Term Budgetary Framework (MTBF), making it difficult to assess the impact of climate on economic outcomes. In contrast, fiscal policy instruments have a negative impact on climate change, such as the fuel subsidies eroding the country's potential to achieve its NDC targets. In terms of budgeting for climate change, RoC introduced program budgeting into law on PFM in 2017, but up to date, only three sectors (energy, agriculture, and forestry) have a climate budget program. In the absence of legal requirements for mainstreaming climate risk in public finance management and public investment cycles, challenges persist in incentivizing planning and budgeting for resilient public investments. RoC's procurement regulation provides specifications on sustainable, green procurement, but in practice its application is limited to environmental impact assessments. The law emphasizes the obligation to conduct environmental impact studies under the supervision of the division in charge of environment. However, it is not explicit in the climate change considerations in the PIM framework and does not require climate-related analysis as part of budgeting, procurement, or accountability mechanisms. No climate indicator

²² Idem

is included in the project selection and allocation criteria of the draft decree on project maturation. The PPP law also misses climate change considerations in risk allocation or contract management.

Lack of strong legislation and weak institutional coherence weaken the response to climate risks. Progress has been made in analyzing and considering vulnerability risks in sectoral programs (REDD+, PIACR, etc.) and in identifying vulnerable populations, including in areas exposed to climatic events, in developing early warning systems and in recording losses and damage caused by climatic events in the agricultural and forestry sectors. The RoC has a 2022-26 National Strategy and Action Plan for Disaster Risk Management (SNPRRC), which is the main instrument for implementing its vision and priorities for disaster risk management. However, its implementation is limited by capacity constraints at the national and local levels, lack of coordination, and insufficient resources. Additionally, many challenges exist in terms of regulation, quality, access, and use of data, for which there is no legal obligation to collect data or define the responsibility and frequency. Data on risks and vulnerabilities is not produced and presented in a disaggregated manner on a geographic basis and the data produced is not easily accessible to the public. In addition, the country faces challenges in using data to identify and implement the most appropriate measures for different situations of fragility. Despite adherence to the Sendai International Framework on Disaster Risk Management, RoC does not yet have legislation that provides a framework for climate risk management with specific institutional responsibilities. These constraints hinder the country's ability to pilot a proactive monitoring system capable of disseminating real-time alerts and anticipating the necessary procedures for effective emergency management.

For the first time, **a climate change budget risk analysis was included in the 2023 Finance Law, although it needs further strengthening.** In 2023, RoC's Finance Law was presented with an annex on budgetary risks. It identifies budgetary risks related to natural disasters over the long term (flooding, erosion, silting and landslides) and the impacts of property damage and loss of life. The annex, which also included mitigation measures from the national environmental action plan, was established for internal use only. However, it lacks quantitative analysis to better understand the risks of public infrastructure exposure to natural disasters and the budgetary impact over the medium term. It also does not contain a qualitative assessment of the risks associated with the infrastructure stock over the long term. The regulatory and supervisory framework for State Owned Enterprises (SOEs) does not promote investment compliance of their investments with national climate policies and guidelines. Under the responsibility of the ministry in charge of budget and SOE, a regulatory framework for SOEs is being prepared, but climate risk aspects have not been included. Yet SOEs operating in carbon-intensive sectors, such as electricity and oil, are increasingly exposed to physical risks related to climate change. The absence of a regulatory framework for SOEs limits their contribution to climate objectives.

While substantial climate data is still to be produced, institutional inertia hampers the capacity to collect, analyze and use climate data for public policy and risk management. Various institutions (CNIAF, ACFAP, DGDD, INS, CNEEPIP, CRCRT, DIST-CRGM, CRTH, GREFE, INRF, etc.)²³ are involved in producing and managing data, such as climate maps, hydrological data, climate impact assessments, and a forestry atlas. However, limited public resources are spread thinly among these institutions, negatively impacting data quality. Data sources and information systems tend to be fragmented, and data management is very weak. For example, the maintenance of weather stations and early warning systems, and response to climate risks to ensure consistent data collection, data coordination and sharing. Owing to limited funding, data coverage is often confined to select geographic areas and

²³ The Directorate General of Sustainable Development (DGDD), the National Institute of Statistics (INS), the Center for the Study and Evaluation of Public Investment Projects (CNEEPIP), the Center for Research on Land Conservation and Restoration (CRCRT), the Directorate of Scientific and Technical Information of the Center for Geological and Mining Research (DIST-CRGM), the Center for Research on the Humid Tropics (CRTH), the Research Group on Forest Ecology and Environment (GREFE), the National Institute of Forest Research (INRF), the National Center for Inventory and Management of Forest and Wildlife Resources (CNIAF), the Congolese Agency for Wildlife and Protected Areas (ACFAP).

information on risks and vulnerabilities is not systematically produced nor in real time. Reports are subject to public presentations and communications, but the monitoring mechanisms have not yet been used to analyze them and feedback on measurement, reporting and verification (MRV) reports and national communications do not exist.

The government has begun engaging stakeholders during the planning stages of developing climate actions. Progress was made in engaging stakeholders through consultative workshops during the preparation of the NDC, sectoral strategies. Local development plans and simple management plan mechanisms were used to coordinate and increase stakeholder and community participation at the local level. However, challenges related to insufficient resources and poor legal clarification of the status of engagement mechanisms as well as participation modalities limit their effectiveness (irregularity, lack of criteria for choosing participants, vagueness on decision criteria, etc.). Overall, the participation of non-governmental actors and feedback loop mechanisms are weak. The ability of stakeholders and citizens to influence decision-making and implementation remains low and challenges persist for private sector involvement.

Transparency and accountability mechanisms for climate policies are at an early stage. Some climate information and documents are available for consultation, but only through discretionary and confidential means. There is no specialized website that houses government climate policies nor an open platform for the public to consult on climate services and information. Several civil society organizations are involved in climate initiatives, but there is no formal mechanism for consultation and no independent climate monitoring in place. There is also very limited capacity within oversight institutions to evaluate and monitor climate change actions and performance. Parliament's involvement in climate change issues is rare, except for a few debates on environmental and sustainable development regulations. Additionally, the Court of Audit does not have any experience in assessing or auditing environmental or climate change projects.

Aligning RoC's adaptation and decarbonization objectives with the country's governance structures is central to achieving the NDP. Short to medium term actions have the potential to positively impact the country's development and poverty reduction efforts and mitigate climate change induced obstacles and losses. Solutions and actions²⁴ to enhance institutional readiness actions must (i) strengthen legislation, coordination, capacity, and planning consistency, and (ii) enhance accountability and access to climate information.

2.3. Financial Sector

Climate change and its related impacts create risks and opportunities for RoC's financial sector. The Congolese financial sector is vulnerable to both, physical and transition climate-related risks, which are expected to materialize due to increased flooding and the country's high reliance on the oil sector. The vulnerabilities in RoC's financial system and banking sector will be exacerbated by its lack of economic diversification and low levels of insurance coverage. At the same time, there are opportunities for RoC's financial sector to contribute to the financing of RoC's NDC, support efforts to diversify the Congolese economy, and reduce the country's oil dependence. Playing a more active role in the climate agenda may provide an opportunity for the banking sector to contribute to a green growth trajectory while benefiting from the opportunities presented by the low-carbon transition.

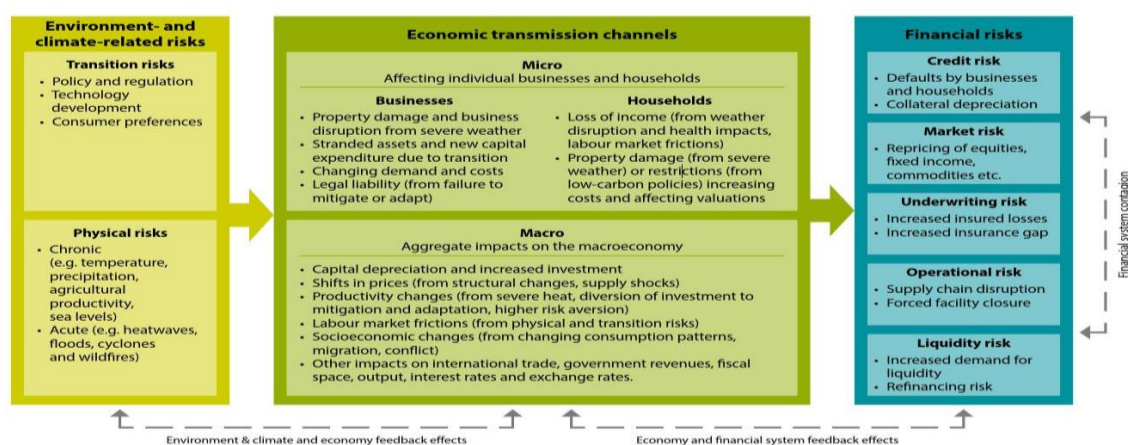
The Congolese financial sector is small, underdeveloped and highly concentrated. The financial sector is dominated by banks, most of which are private subsidiaries of foreign commercial banks. Concentration in the Congolese banking sector is high and long-term loans are rare due to the region's

²⁴ The detailed recommendations, their sequencing, and responsibility are further described in Annex 1.

underdeveloped capital markets. Despite recent progress, financial institutions provide limited financing to the Congolese economy, inhibiting economic growth and development. The banking system has remained resilient despite the COVID-19 pandemic, but non-performing loans (NPLs) remain a concern. At the same time, private sector credit has been growing and capital adequacy ratios are solid, reflecting improved risk-weighted assets and positive credit and deposit trends. The country has 63 microfinance institutions (MFIs) and eight insurance companies. The financial sector is supervised and regulated at the regional level by the CEMAC regional authorities.²⁵

Congo's financial sector faces limited physical risks. Transmission channels for climate related physical and transition risks are shown in figure 2.1. While the impacts of climate change are significant, the risks to financial institutions appear minimal due to the overall underdevelopment and low diversification of the financial sector. Catastrophic risk modeling shows that vulnerabilities to flood risks are highly concentrated by sector and geography, with residential exposure accounting for 81 percent of the total portfolio, and Brazzaville the most vulnerable location. However, the mortgage market in Congo is very small, reducing risks to the banking sector, which could have arisen from properties pledged as collateral being impacted by increased flooding. Similarly, while projected impacts on the agricultural sector are substantial, banks' involvement in agricultural finance is low. The insurance sector is severely underdeveloped and not active in segments of the market projected to suffer from increased climate risks, such as agriculture or flood risk insurance. As insurance penetration is low, households and firms are left to shoulder the bulk of losses from natural disasters. However, while physical risks seem modest to date, the financial risks may increase over time as the economy diversifies and the banking sector plays a more active role in financing the economic development of the country.

Figure 2.1. Transmission Channels for Climate-Related Physical and Transition Risks



Source: NGFS 2020.

The high dependency on the oil sector creates, nevertheless, significant transition risks for Congo's economy and the financial sector. Previous oil shocks suggest that Congo is highly vulnerable to fluctuations in global oil prices, which have a major impact on its economy. Past shocks are indicated as one of the key reasons for increased NPL levels. Congo's banking sector is not directly exposed to the oil industry as oil companies usually bring their own financing from overseas. However, local banks are highly exposed to government business and oil-related value chains. Sovereign risk is also

²⁵ The CEMAC authorities include Banque des Etats de l'Afrique Centrale (BEAC), Commission Bancaire de l'Afrique Centrale (COBAC) and Commission de Surveillance du Marché Financier (COSUMAF). The insurance sector is regulated by the Conférence Inter africaine des Marchés d'Assurance (CIMA), which also covers the West-African Economic and Monetary Union (WAEMU) region. The BEAC and securities regulator COSUMAF recently became members of the IFC-supported Sustainable Banking and Finance Network.

significant as banks hold a significant amount of government securities (one third of local banks' balance sheet) with oil revenue representing a large share of fiscal revenue. In the face of the transition to low-carbon and the decrease in global oil demand, transition risks for Congo's banking sector are only expected to increase over time. With the potential for shocks to become more frequent and oil prices persistently suppressed, banks may see their profits fall and credit risk increase. Absent economic diversification and declining oil revenues will continue to deteriorate financial sector conditions.

To date, the COBAC and the BEAC have not yet undertaken actions to integrate climate-related financial risks into their activities. Climate awareness amongst the financial sector and authorities seems low. A robust supervisory and regulatory response is needed to enhance the resilience of Congo's financial sector to climate risks, as these risks can have an impact on financial stability as well as the safety and soundness of financial institutions. COBAC could play a more active role in strengthening Congo's—and therefore the CEMAC region's—financial sector response to climate-related risks.

Authorities are encouraged to focus on the development of a climate risks and opportunities strategy, coordination, and capacity building. Developing a national or regional strategy could help authorities align financial sector policies, regulations, and incentives with Congo's climate goals (table 2.1). A roadmap covering both the risks and opportunities from climate change can help prioritize actions and coordinate the activities of different stakeholders, including financial and climate policy makers, regulators, and financial institutions at the national and CEMAC level. This strategy should be supported by comprehensive capacity building activities and adequate coordination across key stakeholders.

Integrating climate-related risks into supervisory practices and financial stability monitoring is needed to improve the management of climate-related risks for the financial sector. Developing a board approved strategy for the integration of climate-related risks into COBAC's supervisory practice will be key, including specific milestones related to the micro-prudential supervisory approach and the issuance of supervisory guidance. COBAC could also explore its role in the promotion and assessment of net-zero transition plans for the financial sector.

COBAC should strengthen its technical and data capabilities to conduct a climate risk assessment and improve understanding of the impact of climate change on CEMAC's financial sector. A risk assessment will help supervisors focus their attention on the most relevant risks, as well as provide starting points for financial institutions to improve their internal risk management systems and practices. Due to limited availability and quality of data, authorities and financial institutions should work together to improve the (regulatory) data environment to allow for more meaningful and in-depth risk assessments over time.

Exploring innovative green financing approaches can help authorities leverage increasing investor appetite for green products and the international carbon markets. Given existing institutional and technical challenges, authorities should focus on developing the relevant frameworks and pre-conditions to promote the right enabling environment. This includes continuing to develop and strengthen the regional capital markets—a vital pre-condition for the potential issuance of a sovereign green or blue bond. Efforts should also focus on strengthening the business case for adaptation financing by creating opportunities for private finance mobilization. Congo's participation in international carbon credit markets will require significant work, particularly in the design and operationalization of monitoring systems for the issuance of credits and payments. Development partner support will be critical to advance resilience-building, mitigation, and economic diversification. Greater concessional and grant financing will be needed to complement Congo's domestic efforts, including from international climate funds. Conditional on the successful implementation of ongoing reforms (primarily in the governance space), BDEAC could be an important regional partner.

Authorities are encouraged to consider the role of financial services in providing climate-related support to underserved groups, including through green financial inclusion and tailored climate risk insurance products. Promoting opportunities to expand micro- and parametric insurance for climate risks is needed to address low levels of insurance penetration, and more importantly, protect the most vulnerable populations from the financial consequences of climate change. The development of effective financial inclusion policies and the support of FIGA (the Guarantee and Support Impulse Fund – *Fonds d'Impulsion, de Garantie et d'Accompagnement*) guarantees support for Congolese SMEs to enhance access to green finance and the broader development of green credit markets.

Overall, ensuring the right pre-conditions are in place will be vital for Congo's institutions to effectively address the risks and opportunities from climate change. Given Congo's current capacity and institutional frameworks, building the foundations must be prioritized for the financial sector to increase its involvement in the climate space. Authorities are encouraged to focus on creating a conducive enabling environment, enhancing the credibility of their institutions, and defining the prerequisites for the development of climate finance markets. This includes the development of relevant frameworks, standards, and definitions to support the identification of risks and opportunities. The main recommendations are grouped²⁶ under the following areas: Strategy, coordination, and capacity building; Supervisory and central bank response; Climate risk assessment and data environment; Green financial instruments and institutions; Climate risk insurance products; Green financial inclusion and Public Credit Guarantee Scheme (PCGS).

²⁶ Annex 2 provides details on the measures.

3. Wealth, System and Sector Analyses

3.1. Methods and Approach

This chapter analyzes sectoral policies, investments, and institutional arrangements to encourage green, resilient, and inclusive development through public and private sector interventions. The analysis focuses on adaptation and mitigation efforts associated with the following transitions in Congo: food, forests, physical urban assets, infrastructure services, and life and work. The CCDR looks at systems rather than sectors to identify the impact of climate change on people, physical assets, and natural capital. This approach captures the important interactions among sectors and provides opportunities to analyze the interlinkages between climate change, ecosystems, and human society. The food system covers agriculture, water, and natural resource management. Natural capital covers the nexus between forests, agriculture, and land use. The physical assets and infrastructure system covers urban, energy, transportation assets, and services derived from hydropower and roads. The life and work system encompasses issues related to education and health systems, livelihood diversification, human migration and displacement, safety nets, and risk spreading and sharing.

The analyses use three principles in assessing risks: impacts and vulnerabilities; the solutions available and responses needed; and ways to implement adaptation, mitigation, and resilience to climate change. First, the analysis focuses on **climate-resilient development** as an approach to integrate adaptation and mitigation measures and their enabling conditions to advance sustainable development for all (IPCC 2022). It looks at various climate responses and adaptation options to respond to risks. Second, the analysis captures the **centrality of the Congolese people and their neighbors in Central Africa** in policies on climate change adaptation and mitigation, and in linking development with climate (“people-centered approach”). People affect and are affected by climate change, not only people living in Congo, but also those living thousands of kilometers away or moving to Congo in search of socioeconomic opportunities, sometimes escaping conflict and violence. Developing a “people-centered approach” to this CCDR involves identifying and assessing people’s tangible and less tangible assets, including social capital and human assets such as life itself, knowledge, and basic health. The analysis attempts to explore solutions to prepare people to benefit from a greener and more inclusive transition and protect them from the impacts of climate change and climate policies. Third, **selectivity** is used as a guiding principle. There exists a wealth of information relevant to Congo, and so reviewing and assessing impacts and risks was drawn from a range of important work. However, the aim was not to assemble the entirety of relevant evidence currently available or under development. Instead, this CCDR is designed to be a “*living document*” for authorities and their financial partners to use as a resource to advance climate and development agendas.

3.2 The Changing Wealth and Climate

Combining relevant data and analysis from the WB’s Changing Wealth of Nations (CWON) 2021²⁷ on one hand and the CCDR on the other provides useful information for charting climate resilient development. Focused deep dives covering specific components of the natural capital (agriculture, forestry, and water), human capital (education, health, social protection, and inclusion), produced capital (urban, transport, and energy infrastructure) in the CCDR were particularly helpful in understanding how Congo can meet its development challenges. In addition, measuring the change in wealth per capita, quantifying contributions from individual wealth components, and analyzing their vulnerability to climate change would allow policy makers to monitor the sustainability of development

²⁷ CWON 2021 covers 146 countries over more than 20 years (from 1995 to 2018).

in agriculture, industry, and services, and its resilience to shocks and longer term changes in temperature and precipitation.

Figures 3.1 and 3.2 show the evolution of Congo’s total produced, human, and natural capital between 1995 and 2018, and table 3.1 illustrates the changes in absolute and per capita wealth for the same period. A diverse asset portfolio is more resilient than one overly dependent on a single asset. Congo can choose to invest in different wealth components and achieve a more balanced and resilient asset portfolio. Authorities need to build and manage a comprehensive wealth portfolio and decide what mix of assets would help them achieve their economic diversification strategy as embodied in the NDP. But this strategy will depend on how climate change affects the various components of wealth. Although absolute wealth increased by 113 percent between 1995-2018, there was only a 10 percent increase in per capita wealth, and a decline of 15 percent in human capital.

Having set the scene with recent trends in Congo’s wealth and changing components, the following sections summarize key findings from the deep dives on the connection between climate change and natural, human, and physical capital.

Figure 3.1. Total Wealth Composition in the Rep. of Congo between 1995 and 2018

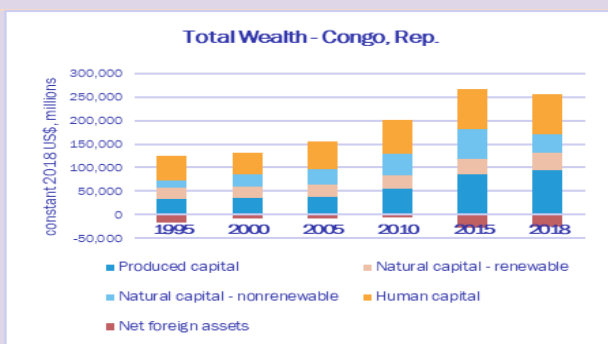
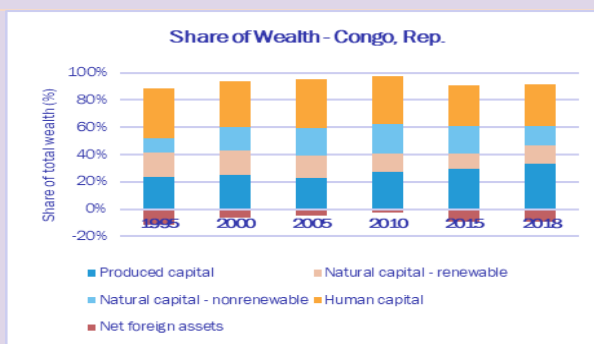


Figure 3.2. Share of Wealth (%) in the Rep. of Congo between 1995 and 2018



Source: World Bank. 2021. *The Changing Wealth of Nations 2021: Managing Assets for the Future*. Washington, DC: World Bank. doi:10.1596/978-1-4648-1590-4.

Table 3.1. Absolute and Per Capita Percent Change in Wealth in the Rep. of Congo between 1995 and 2018

	Millions, constant 2018 US\$	Per Capita, constant 2018 US\$
Total wealth	113%	10.09%
Produced capital	183%	46%
Human capital	64%	-15%
Natural capital	93%	0%

Source: CWON (World Bank, 2021).

3.3. Natural capital

Natural capital comprises renewable assets—such as forests, mangroves, fisheries, and land—and nonrenewable assets, including fossil fuels, metals, and minerals. In 2018, the Rep. of Congo's natural capital per capita reached US\$15 thousand, about 33.2 percent of its total wealth per capita (figure

3.3). Congo is among countries with a disproportionate share of wealth in individual assets, mainly oil and some gas and forests, having faced volatile and even declining wealth since 2014 (figure 3.4). That same year, fossil fuel energy represented 52 percent of Congo’s natural capital wealth and forest ecosystem services and timber covered another 32 percent (figure 3.4). Renewable natural capital represents a very large share of wealth for Congo—it is of great importance to manage this wealth carefully and not deplete natural assets for a short-term income boost.

Figure 3.3. Natural Capital in Congo between 1995 and 2018 (in US\$ million)

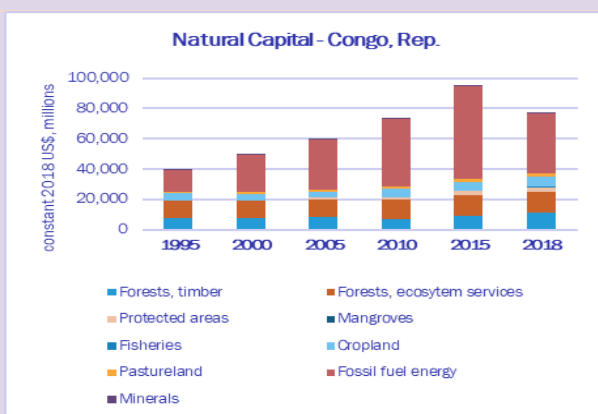
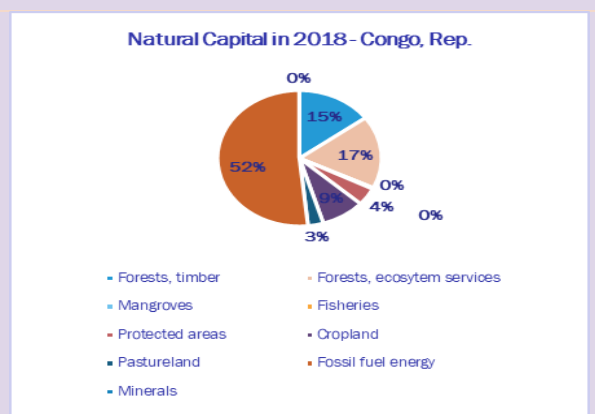


Figure 3.4. Natural Capital in Congo between 1995 and 2018 (in percent)



Source: World Bank. 2021. *The Changing Wealth of Nations 2021: Managing Assets for the Future*. Washington, DC: World Bank. doi:10.1596/978-1-4648-1590-4.

3.3.1. Forestry

Congo's forests can play an enhanced role in sustainable development, significantly contributing to the country's economy and providing various benefits, including for the global public good. Congo is currently a High Forest Cover Low Deforestation (HFLD) country with 23.5 million hectares of rainforest and low annual deforestation (0.1-0.2 percent) and degradation (0.2-0.4 percent) rates. The forestry sector generates approximately US\$400 million worth of annual timber exports per year, accounting for 5.6 percent of the country's GDP and 5 percent of export earnings. It is the second largest source of foreign currency for Congo. The sector formally provides jobs to 7,000 people and another 10,000 informally, making it the second largest source of employment after public administration. An estimated 575,000 Congolese live in forest areas and depend on forests for their livelihoods and sustenance, including Indigenous peoples and other vulnerable groups. The country's forests and peatlands store over 44 Gt CO₂e and sequester an additional 32.5 million tCO₂e annually. The sector has significant potential to increase its contribution to the national economy through optimized forest management of its productive and protective functions. However, for this to materialize, the private sector investment landscape needs to improve.

Although Congo has maintained a low deforestation rate until now, there are challenges and pressures threatening its forests. Deforestation in the south (where more than 80 percent of the rural population lives) is mainly caused by slash and burn farming by smallholder farmers who have no alternatives (poor market linkages for both sale of produce and purchase of inputs, no access to affordable financial services, and no land tenure security making investments in land productivity a lot riskier).

Deforestation and land degradation are leading to soil erosion, exacerbating the impacts of seasonal flooding for rural populations and their livelihoods. The future trajectory of deforestation could shift compared to business-as-usual (BAU) if the government were to explore the expansion of hydropower²⁸ and mining (artisanal and industrial). Both scenarios could result in direct deforestation as well as secondary deforestation by attracting shifting cultivators into the forest, thus further contributing to these challenges. In addition, a growing human population in proximity to forest areas adds pressure to conservation efforts. Besides managing ongoing deforestation, a key priority for Congo is conserving the existing forests to prevent drainage and destruction of 5.5 million hectares of intact peatlands containing 44 million GtCO₂e, the equivalent of 6-7 years of US GHG emissions. The peatlands are overlaid with oil exploration permits, which causes a threat to their integrity. If followed by oil exploitation, this would no doubt result in significant emissions due to drainage efforts. To address these challenges and pressures, Congo should (i) enhance sustainable management of forests, contributing to livelihoods while helping the country leverage climate finance and (ii) mobilize the global community to conserve the high value forests given their global and regional significance within the Congo Basin Forests.

Addressing these challenges and seizing opportunities for climate mitigation require investments and interventions²⁹. The proposed “Alternatives to Slash and Burn” initiative in the southern part of the country was designed to scale up ongoing Green Climate Fund (GCF) investment to help smallholder farmers adapt to climate change. The initiative will use agroforestry tree crops, such as cocoa, to adapt to higher temperatures and increased drought and flood risk, while reducing emissions related to deforestation, and promoting reforestation of degraded savannah areas. A US\$388 million investment in this initiative could benefit around 300,000 smallholders. Scaling up Reduced Impact Logging (RIL) and agroforestry development to additional forest concessions nationwide using the approach undertaken in the Emission Reductions Program in Sangha and Likouala (ERP-SL), combined with sustainable, local timber processing, can benefit approximately 80,000 beneficiaries at a cost of US\$300 million. Together, the two proposed initiatives, which would also attract considerable private sector investment, have the potential to generate an average of 6.5 million tons of additional emissions reductions annually for 20 years (beyond ERP-SL) to meet the NDC mitigation targets and/or leverage carbon markets for payments for emissions reductions.

Additionally, conserving peatlands and biodiverse forests requires significant financial flows and global support. The Congo Basin Forests—totalling 200 million hectares of which Congo makes up 12 percent—are struggling to attract sufficient conservation funding compared to other tropical forests. It is crucial to engage in concerted dialogue with national and international stakeholders to develop adequate institutional and governance arrangements to support incentive mechanisms and secure financial resources for forest and peatland management. Current carbon markets, whether compliance or voluntary, are not set up to reward forest and peatland conservation. The conservation of peatlands can prevent the release of the massive carbon stock (44 GtCO₂e stored in 5.47 million hectares of peatlands). Ongoing regional dialogues with the Global North, including through the more recent “One Forest Summit” in Libreville to mobilize innovative incentive mechanisms, need to urgently materialize into concrete actions to tap into these opportunities. In parallel, Congo should institutionalize policy and governance reforms to signal its commitment to scale up action and leverage new opportunities.

In summary, while Congo's forests currently provide substantial economic, social, and environmental benefits, challenges related to unsustainable practices still pose risks. By investing in proposed

²⁸ For example, implementing just four hydro-electric dams generating 1,400 MW, 10 percent of the overall hydro planned for Congo, could flood 100,000 ha of land—which could easily double the current deforestation rate.

²⁹ A complete analysis of challenges and opportunities in the forestry sector has been completed for this CCDR.

initiatives like "Alternatives to Slash and Burn," Reduced Impact Logging, and peatland conservation, Congo can promote sustainable forest management, adaptation to climate change, and leverage payments for emissions reductions (and in the future, forest and peatland conservation) under existing and evolving global mechanisms. The policy scenario implicit in the scaling up of the two ongoing emissions reduction efforts, "alternatives to slash and burn" in the south and "reduced impact logging/smallholder agroforestry" nationwide, would reduce forest-related GHG emissions by over one third without causing a negative impact on GDP. However, it would not provide sufficient incentives for major forest/peatland conservation without a significant change in the way that climate funding mechanisms reward the maintenance of existing carbon sinks. Key actions that could make this possible include:

- **Enforcement of forest sector reforms** endorsed by the government that promote participatory and inclusive management of natural resources with adequate benefit sharing, respect for the rights of local communities, and in particular, of Indigenous populations (law No 33-2020 of July 8, 2020, on the forest code). The inter-ministerial commission is designated to coordinate reforms and the forestry commission to foster good forest governance and transparency in granting logging permits.
- Enhance **multi-sectoral coordination** (between forestry, agriculture, and mining) for land use planning and integrated landscape management, secure land titling for communities (with clear arrangements in the forest concessions community development zones), and promote policies to unlock opportunities for private investment in climate resilient practices (such as local wood processing for income diversification and reduced impact logging).
- Prepare for participation in **carbon markets** by setting up policy and legal frameworks that meet the requirements of international compliance markets and by building the required institutional capacity. Preparation should **build on existing initiatives** like the World Bank and FAO's support to Congo's readiness efforts for leveraging climate finance, which aims to reduce forest-based GHG emissions.
- Enforcement of the Central African Economic and Monetary Community (CEMAC)³⁰ log export ban, intended to foster wood processing within the country while conserving the forest. However, its implementation has been selective due to foreseen loss of revenue if implemented fully. Full implementation of the ban in Congo in conjunction with developing wood processing value chains to meet national and international demand for processed wood instead of round logs can contribute to national employment if industrialization incentives are adequately calibrated and equitably applied.³¹ Developing processed timber supply chains is an area that would need technical and policy support from the international community whilst Congo improves the business environment for increased private sector investment.
- Explore additional opportunities for **raising finance for investments**. The capital market has limited potential in the short-term to boost green investments given its small size, although there may be opportunities for the government to issue green bonds, debt for nature swaps, and monetizing ecosystem services (such as those which provide compensation to individual and community landowners who commit to protecting forest areas, an initiative launched by the North Congo Agroforestry Project). Further feasibility assessments should be undertaken to explore these avenues, based on the World Bank's ongoing support on natural capital accounting.

³⁰ CEMAC is made up of six states: Gabon, Cameroon, the Central African Republic (CAR), Chad, the Republic of Congo, and Equatorial Guinea.

³¹ For example, the production of parts for garden furniture generates 50 times the employment that basic sawmilling does.

3.3.2. Agriculture and food

Climate change and related weather shocks are causing substantial losses to agricultural output and are disrupting livelihoods in ROC. The country faces accelerated warming and subsequent anomalies in rainfall patterns, which will have major repercussions on crop yields and nutrient content, livestock and fisheries production, biodiversity, and land use. Increased frequency and intensity of flooding will worsen the situation further. Between 2019 and 2021, floods affected about 5 percent of the population and destroyed thousands of hectares of agriculture land and other critical infrastructure (OCHA, 2020;OCHA, 2021), exacerbated food insecurity and malnutrition, and reduced access to safe drinking water (USAID 2022). The rise in temperature is also expected to affect agricultural productivity growth and intensify the prevalence of heat-related and vector-borne diseases³⁶. On average, estimates of agricultural output loss indicate a 5 percent shortfall by 2030 and about 10 percent by 2050 (IFPRI 2017).

The revised 2021 Congo NDC identifies climate-smart agriculture as an appropriate approach to strengthen the resilience of the agricultural sector and reduce the vulnerability of smallholder farmers. Although the NDC indicates that GHG emissions (BAU scenario) from agriculture development will reach 84,833 KtCO₂e. in 2025 and 113,526 KtCO₂e. in 2030 (0.7 percent of national emissions), climate-smart agriculture is an opportunity to (i) diversify the economy, and (ii) curb poverty and deforestation trends. The NDC clearly defines activities that will be key for adaptation to climate change and mitigation of GHG emissions alongside the agriculture value chain, including the need to (i) improve the management of water (both ground and surface water), (ii) increase food productivity through agroforestry, (iii) restore degraded lands, (iv) redirect cash crops cultivation in savannah areas, (v) reduce flood risk, and (vi) promote deforestation free supply chains to reduce GHG emissions linked to deforestation for agriculture expansions. Estimated financing needed for the implementation of the NDC adaptation program and mitigation measures related to agriculture and food security are respectively US\$ 1 260 million and US\$ 2676 million.

A climate-smart agriculture approach could boost resilience to climate change shocks. To prioritize investments that meet the challenges of the agriculture sector in a changing climate, in 2020, the government endorsed a *Climate-Smart Agriculture Investment Plan (CSAIP)* as a major driver towards climate change resilience. The CSAIP emphasizes the adoption of new agricultural approaches, enhancing climate-resilient practices, infrastructure, and innovation. The CSAIP highlights six priority investment actions for the development of a resilient agriculture sector in ROC, namely (i) adopt agroforestry practices, (ii) improve soil fertility and restore degraded lands, (iii) improve water resource management and irrigation, (iv) improve food crops productivity and supply, (v) redirect agriculture development (palm oil and cocoa) in savannah areas, and (vi) develop early warning and response systems (EWRS) for climate preparedness.

Six climate-smart investments could contribute to sustainably increasing agriculture sector productivity and strengthen climate resilience, while reducing greenhouse gas (GHG) emissions and increasing food security³⁸ at a cost US\$245 million. These investments are well aligned with activities proposed in the NDC and target both subsistence crops (mainly maize, cassava, vegetable, and plantain) and cash crops (cocoa and palm oil), which will be specifically cultivated in savannah areas. If fully implemented over 5 to 10 years, about 201,000 people will benefit and the investments will generate US\$ 296 million Net Present Value (NPV), including financial incomes from a potential 12 MtCO₂e in emissions reduction because of agroforestry and deforestation free agricultural practices. Moreover, crop yields

³⁶ Data in this paragraph is sourced from the ThinkHazard! (database), the World Bank and Global Facility for Disaster Reduction and Recovery. (accessed 9/20/2023) <https://thinkhazard.org/en/report/59-congo>.

³⁸ See Annex 3 for details on the investments.

will increase (average 50 percent for maize, plantain, and cassava, and 10 percent for cocoa and palm oil) because of improved (i) soil fertility, (ii) drainage management and irrigation, and (iii) agricultural management best practices. However, challenges persist. Implementation of CSAIP is delayed due to limited internal technical and financial capacities and weak stakeholder engagement. Moreover, poor governance and institutional capacity, particularly in terms of control of the sectors influencing deforestation, weak intersectoral coordination, and lack of land-use planning, are also leading to overlapping and incompatible land uses to put climate-smart agriculture into practice.

An “Integrated Climate Smart Agribusiness Model”³⁹ could serve as a leveraging tool for effective implementation of the CSAIP. There is a need to (i) emphasize land use opportunities in the CSAIP and (ii) create enabling business environments that convene investors (private sector and development partners), which will bring in technologies, financial resources, and agricultural management best practices. The “Model” is a stepwise approach to working with the CSAIP’s key actors, namely the government, private sector, and smallholders. It will be used to facilitate the policy and institutional reforms needed to create an enabling business environment for private sector investments, facilitate the establishment of strategic partnerships for strong engagement of government, private sector, and smallholder farmers in CSA, and accelerate and increase private sector leadership in transforming the agriculture sector (through technology and innovation) toward more CSA at scale.

3.3.3. Oil and gas

The oil and gas sector in the Republic of Congo faces significant challenges and opportunities in contributing to sustainable development. The country's economy relies heavily on the hydrocarbon sector, which accounts for a large share of government income and exports. However, the sector also poses challenges, particularly in terms of emissions from gas flaring. The Republic of Congo is among the top flaring countries globally, ranking 17th in terms of gas flared per barrel of oil produced but only 30th in oil production. In 2021 alone, it is estimated that 1.5 billion cubic meters of associated gas was flared, resulting in approximately 3.8 million tons of carbon dioxide emissions. Addressing gas flaring presents an opportunity to reduce emissions and optimize the use of gas resources.

The dependency on the oil and gas sector also exposes the Republic of Congo to risks associated with the global shift towards decarbonization. As the world transitions to low-carbon energy sources, the country's poor decarbonization performance may reduce the attractiveness of its hydrocarbon resources in a likely stagnating global market. The flaring intensity of oil in Congo was 15.7 cubic meters per barrel of oil produced in 2021, significantly higher than top performers like Norway and Saudi Arabia. Reducing flaring intensity can be instrumental in attracting investment to the sector and maintaining revenue levels. To mitigate these risks, the government has started engaging with private sector operators to address the issue of emissions and optimize gas utilization.

An effective mitigation response for gas flaring and venting requires policy, institutional reforms, and mobilizing finance and investments. The Republic of Congo has already taken steps in this direction by issuing circulars and decrees to regulate flaring and venting. To further enhance these efforts, the country needs to develop a comprehensive gas law that establishes an integrated gas value chain, enabling the utilization of gas redirected from flaring and venting. This would involve monetizing the associated gas through projects such as liquefied natural gas (LNG) exports and domestic gas-to-power development. Private sector investments with an estimated cost of US\$ 450 million could play a crucial role in establishing integrated value chains. Strengthening regulatory enforcement capabilities and providing training for enforcement agencies are also essential. By implementing these measures,

³⁹ Relies on four core principles: deforestation free supply chains, win-win partnerships, medium to long term investments, impacts at scale for people, planet, and prosperity.

Congo can comply with its commitment to Zero Routine Flaring by 2030, reduce carbon emissions, generate additional revenues, and foster a transition towards a more climate-friendly oil and gas sector.

According to estimates, reducing gas flaring by about 50 percent could potentially be cost neutral over a 10-year horizon, considering public and private sector expenditure versus potential returns. Furthermore, optimized flaring performance could generate over US\$50 million per year in extra overall revenues. By monetizing associated gas, the country could recover and utilize at least half of its gas resources, reducing emissions of carbon dioxide and methane. Developing an integrated gas value chain would not only contribute to climate change mitigation but also create economic opportunities and improve public finances. Therefore, it is crucial for Congo to update its legal and regulatory framework, strengthen regulatory capabilities, and attract private sector investments to unlock the full potential of its gas resources and achieve sustainable development goals.⁴⁰

3.3.4. Water

The water sector in the Republic of Congo faces significant challenges and opportunities. Access to drinking water is below its hydrological potential, with 87 percent access to improved water and 27 percent to basic sanitation services in urban areas. In rural areas, the situation is worse, with 45 percent access to improved water services and only 6 percent to basic sanitation. The urban poor must pay five times more for a liter of water due to inefficient service. These challenges contribute to the prevalence of diarrheal diseases, the second leading cause of death among children under five.

On the other hand, addressing these challenges present significant opportunities for sustainable development. By improving access to clean water and sanitation, the Republic of Congo can enhance public health outcomes, reduce the burden of water-related diseases, and improve overall living conditions. Furthermore, sustainable water management practices, such as irrigation and proper water resource utilization, can support agricultural productivity and food security. Expanding water supply and sanitation services in both urban and rural areas can also contribute to poverty reduction and socio-economic development.

Climate change poses considerable risks to the water sector in the Republic of Congo. Projected water availability varies across different climate change scenarios, with the area around the capital, Brazzaville, identified as a hotspot of water scarcity. Sea-level rise and excessive groundwater abstraction further threaten water resources, leading to contamination and saline intrusion. Flooding events can impact public health and contaminate water sources, particularly private boreholes. However, addressing climate change in the water sector presents opportunities to enhance water security, protect against contamination, and build climate-resilient infrastructure. These interventions can safeguard public health, maintain water quality, and strengthen the overall resilience of water supply systems.

The cost of priority response interventions in the water sector, including policy and institutional reforms, infrastructure rehabilitation, and investment in climate-resilient measures, is estimated at up to US\$ 800 million. These investments are necessary to ensure the effectiveness of adaptation and mitigation measures⁴¹. While the initial costs may be significant, the benefits outweigh the costs in the long run. Improving access to clean water and sanitation services can improve public health outcomes, reduce healthcare costs, and increase productivity. Improving sector operational efficiency, in addition to supporting climate mitigation, reduces the sector's fiscal burden for the government. Investments in

⁴⁰ Details on oil and gas measures are in Annex 5.

⁴¹ Details on water measures are in Annex 6.

infrastructure rehabilitation, diversification of water supply sources, and climate-sensitive infrastructure can enhance the resilience of water systems and protect against flood risks and drought. These measures not only contribute to environmental sustainability but also support socio-economic development, poverty reduction, and improved quality of life for the population. Therefore, the costs incurred in response interventions are justified by the long-term benefits they provide.

3.4. Physical Capital

Produced capital measures the sum of investment minus normal depreciation, including assets, such as machinery, buildings, equipment, and intangible wealth, such as intellectual property and mineral exploration, and residential and nonresidential urban land. In 2018 Congo's produced capital per capita reached a total of US\$ 18,000, 40.9 percent of Congo 's total wealth per capita.

3.4.1. Energy

The Republic of Congo's energy sector faces challenges and opportunities in contributing to the country's diversification strategy. It holds the key to placing the country on a low-carbon and resilient development pathway. The current energy generation mix is dominated by gas, which accounts for approximately 70 percent of the country's electricity supply. Hydroelectric power represents a smaller portion, contributing around 28 percent to the energy mix. However, only about 50 percent of the population has access to electricity, with rural areas facing significant energy poverty. The sector faces poor operational and financial performance, with total network losses reaching approximately 40-50 percent. Insufficient investment in maintenance has resulted in ageing infrastructure and limited reliability of electricity supply.

To address these challenges, the Republic of Congo needs to implement policy changes and institutional reforms while mobilizing climate finance and investments. Enhancing access to electricity and reducing emissions require transitioning to a more diversified and sustainable energy mix. Under a business-as-usual scenario, the country's energy demand is expected to grow rapidly, potentially leading to heavy reliance on fossil fuel generation. If current trends continue, the cost of energy could quadruple by 2050. Additionally, CO₂ emissions from the energy sector could double, exacerbating climate change impacts.

Investing in alternative energy sources is crucial due to limitations in gas reserves. Hydropower and solar photovoltaic (PV) projects present significant opportunities to meet the growing electricity demand while reducing dependence on gas-to-power. Expanding the share of hydropower and solar energy in the energy mix would contribute to a more sustainable and low-carbon future.

An indicative energy-planning modeling exercise suggests that to meet the current pipeline of projects would require an investment of approximately US\$5 to US\$6 billion. Indicative emissions profiling and investment needs for potential pathways are elaborated in annex 6. This investment would enable the development of renewable energy projects, enhance the efficiency of gas-to-power generation, and reduce transmission and distribution losses.

Improving the transmission and distribution infrastructure is essential for reducing losses and optimizing energy supply. Addressing these challenges would not only enhance energy access but also contribute to the Republic of Congo's NDC by controlling greenhouse gas emissions through improved operational efficiency as well as improved quality of services, reducing reliance on backup diesel generators.

Private sector participation is vital in financing the development of the energy sector, but structural issues and the absence of a dedicated legal framework pose challenges. Efforts should be made to create a favorable environment for private investment, including the establishment of clear regulations and incentives. Furthermore, enacting reforms to improve the financial and operational performance of the distribution sector will play a vital role in reducing barriers for entry for the private sector to invest.

While renewable energy sources hold significant potential, the country needs to properly manage the environmental and social impacts of such projects. Climate change impacts limit the potential of hydropower, necessitating careful planning and adaptation measures. Solar PV presents a promising opportunity for future generation capacity, with strong solar irradiation across the country. However, onshore wind power potential is limited, and feasibility studies should be conducted to assess its viability before further investment. Incorporating biomass, particularly in agricultural areas, could provide an additional off-grid energy solution – in addition to micro-hydro and off-grid solar – and contribute to sustainable rural development.

To achieve a reliable, clean, and affordable energy system, a holistic energy master plan is necessary. This plan should optimize the interplay between different energy sources, promote renewable energy development, and ensure a resilient and sustainable energy sector for the Republic of Congo. Overall, low-carbon and resilient energy development⁴² must be pursued along two tracks:

- 1) *Optimize the financial and operational performance of the electricity sector to improve quality of service and encourage private sector participation:*
 - Use concession agreements in the distribution sector through the support of a transaction adviser to ensure competitive and transparent recruitment.
 - Redress the operational performance of the distribution utility through targeted capacity-building and investments, including a revenue protection program.
 - Rehabilitate and modernize the transmission and distribution network.
 - Establish an independent electricity sector regulator.
 - Undertake a cost-of-service study and identify revenue requirements.

- 2) *Invest in new and rehabilitated hydropower and variable renewable energy along a least cost decarbonization pathway:*
 - Invest in the rehabilitation of existing hydropower assets.
 - Facilitate investment in greenfield hydropower projects through pre-feasibility studies to encourage private sector participation.
 - Invest in solar PV utility-scale projects.
 - Invest in off-grid solar and solar/micro-hydro mini-grids to meet rural populations.
 - Provide technical assistance in formulating a Least Cost Planning and National Electrification Strategy.
 - Invest in clean cooking solutions.

3.4.2. Transport

The transport sector plays a vital role in the country's diversification agenda, but it faces significant challenges exacerbated by climate change. RoC's road network, spanning 23,324 km, is particularly affected by extreme temperatures, heavy rains, and flooding events, leading to disruptions in transport services and pavement damage. Moreover, underdeveloped infrastructure and inadequate maintenance of the rail network, which extends only 500 km, contribute to the sector's vulnerability.

⁴² Details on the energy sector reform are proposed in Annex 7.

Additionally, the waterways face risks, such as floods, low water levels, and silting up, further hindering navigation, fishing, and biodiversity. Despite these challenges, the transport sector presents opportunities for growth and improvement, making it a key contributor to the country's six economic diversification pillars, from moving agricultural and industrial goods, to delivering tourism services, and connecting people to jobs and services.

Climate change poses risks and presents opportunities to the transport sector. The transport sector's emissions totalled 1 MtCO₂e in 2020, with a reduction from 2 MtCO₂e in 2015. To address emissions, the country's updated NDC set ambitious targets, aiming to cut greenhouse gas emissions (GHG) by 32 percent by 2030. The NDC and sector strategies propose mitigation measures for the transport sector, such as introducing electric vehicles and buses (representing almost 60 percent of the NDC total cost of mitigation interventions) and promoting modal shifts from road to waterways. A GHG accounting analysis carried out by the World Bank⁴³ shows that the total net GHG emissions savings from waterway improvement investments along the Congo (and Ubangi) river would be significant, removing up to 5,100 ktCO₂e over a 20-year evaluation period (in a conservative scenario). If investments are realized along the waterway corridor, this reduction in GHG emissions would be attributed to the expected gradual modal shift (by 2030) from the Douala-Bangui road corridor to the eco-friendly and more cost-efficient Congo-Bangui waterways corridor.

To effectively respond to the challenges and emissions associated with the transport sector, the country must prioritize climate-resilient infrastructure, comprehensive planning, institutional reforms, and increased investments. These actions are essential to build a sustainable and efficient transport system capable of withstanding the impacts of climate change. It requires policy reforms to integrate climate considerations, institutional changes to enhance coordination and governance, and strategic investments to support adaptation and mitigation efforts. By embracing the elements of an effective response, Congo can create a resilient and sustainable transport sector that contributes to the country's economic growth and climate goals.

3.4.3. Cities

Rapid and uncontrolled urbanization has resulted in the growth of informal settlements, with an estimated 44 percent of the urban population living in such conditions. These settlements lack access to basic services, including water and sanitation. Additionally, flooding has become a significant issue, with floods accounting for 88 percent of all recorded disasters. The number of flood events increased significantly after 2000, reaching 73 percent of all recorded events. In the city of Brazzaville alone, eight major flooding events occurred between 1985 and 2020, leading to the displacement of 19,000 people and causing the loss of 161 lives. Furthermore, in addition to high flood hazard classifications, urban centers face medium to high water erosion hazards.

The vulnerability of urban areas to climate change impacts is significant. The concentration of people, infrastructure, and economic activity in cities exacerbates susceptibility to flooding and sea-level rise. Over the past two decades, exposure to flood hazards has steadily increased, with more than 5.5 percent of the country's urban built environment exposed to flood hazards with a 50-year return period. Furthermore, the cities of Brazzaville and Pointe-Noire face specific challenges. Brazzaville has experienced an expansion of the built environment exposed to combined river and rainwater flooding, increasing from 12.6 km² in 1985 to 14.7 km² in 2015. Pointe-Noire, in addition to flood hazards, is also prone to rising sea levels, with a projected loss of land in the southern part of Pointe-Noire Bay. Moreover, projections indicate an increase in mean temperatures in both major cities.

⁴³ Central Africa Regional Waterways Project (PRACAC, P175235) Project Appraisal Document. Report: PAD4868. World Bank.

Mitigating climate change and building resilience in Congolese cities require a comprehensive approach and significant investments. Estimates suggest that approximately US\$9.18 billion will be needed to future-proof cities in the RoC, with around 32 percent dedicated to climate-specific challenges. The priority areas for investment and policy interventions include urban retrofitting, community resilience, solid waste management, urban growth planning and implementation, urban cooling, and regulatory and institutional strengthening⁴⁴. Implementing these measures is crucial for reducing GHG emissions. While urban areas in the Republic of Congo contribute a small percentage of global GHG emissions, they can play a vital role in reducing emissions locally. Cities can achieve emission reductions of up to 90 percent by 2050 through feasible measures, such as compact urban planning, investment in public transit and renewable energy, energy efficiency improvements, and effective waste management.

3.5. Human Capital and Social Inclusion – “Life and Work”

Climate change poses a significant threat to life and work opportunities in the Republic of Congo (RoC), exacerbating existing challenges. The country's Human Capital Index (HCI) stands at 0.42, indicating that children born today will be 42 percent as productive as they could be with full access to education and health services. This HCI is lower than the Sub-Saharan Africa average of 0.43 and well below the average for high-income countries at 0.77 (World Bank, 2021). Additionally, the mortality rate of children under five is 43 deaths per 1,000 children, highlighting the vulnerability of the population. Additionally, approximately 21.2 percent of children under five suffer from chronic malnutrition (stunting), with 8 percent severely stunted (MICS, 2014-2015). These figures underscore the urgent need to address the existing challenges faced by the population, which are further exacerbated by climate change.

Vulnerable populations, such as those in rural areas reliant on rainfed agriculture and living near the poverty line, are most affected by the nexus of work and climate shocks. Rural areas face increased climate variability, leading to internal displacement and migration to urban areas. In recent years, natural hazards and flooding have significantly impacted poor populations in urban and fragile areas (World Bank, 2021). Furthermore, women, particularly in rural areas, face economic and social obstacles that hinder their productive inclusion. Despite representing 65 percent of people working in the agriculture sector, women in Congo lack access to resources and good quality lands. Their focus on subsistence farming makes them more vulnerable to increasing environmental degradation and depletion of natural resources caused by climate change. Indigenous peoples also experience social and economic marginalization, with only 17.8 percent of households being food secure and 40.3 percent experiencing moderate food insecurity. Climate change increases the risks of social and economic marginalization through land and resource loss, discrimination, unemployment, and threats to resilience (World Bank, 2021).

The adverse impacts of climate change on human capital are diverse and far-reaching. Increased incidence of infectious diseases, such as malaria and tuberculosis, is a direct consequence of climate change (GAVI, 2022). In RoC, climate change-induced flooding and heat stress are expected to reduce access to health facilities, leading to reduced vaccination rates and increased vulnerability to diseases (World Bank, 2021). Moreover, reduced agricultural productivity due to climate change exacerbates malnutrition, further impacting human health and the capacity to cope with infectious diseases. With approximately 80 percent of food consumption in Congo reliant on imports, rising food prices due to climate change make it increasingly difficult for poor households to secure adequate nutrition. This situation poses a severe threat to their health and well-being (World Bank, 2021; WHO, 2022).

⁴⁴ Details about policies, institutional reforms, and investments are provided in Annex 8 on cities and climate.

The physical impacts of climate change, such as flooding and heat stress, not only affect human health but also disrupt work and education opportunities. These impacts can force migration, limit access to educational facilities, and lead to school absenteeism. In the face of climate-induced natural disasters, school buildings are often repurposed as evacuation centers, further hindering educational continuity. These disruptions have long-term consequences for the development and productivity of the workforce (World Bank, 2021).

Furthermore, climate change directly affects the productivity of workers and human health through heat stress. The total percentage of working hours lost to heat stress in RoC was estimated at 0.83 percent in 1995 and is projected to rise to 2.11 percent by 2030. The services sector, including the health sector, is expected to experience an increase in working hours lost, rising from 0 percent in 1995 to 0.05 percent in 2030. The economic costs associated with climate change-induced diarrhea are projected to increase nearly six-fold between 2010 and 2050, reaching US\$83.6 million, while total health costs⁴⁵ could increase from US\$91.4 million to US\$259 million in 2050 (World Bank, 2021; WHO, 2022).

Adaptation and resilience measures are needed to reverse the above trends. Climate change is eroding human capital in RoC, affecting education, health, and social protection. Vulnerable groups, including those in rural areas, urban and fragile areas, and women, are disproportionately impacted. Adapting to climate change and building resilience requires addressing the challenges faced by these groups. The adaptation measures under the 2021 NDC update include a US\$415 million package to cover health and migration. But given the nature of the risks and impacts outlined above, the country is entering an era that demands more ambitious and urgent action. Policy changes, institutional reforms, mobilizing climate finance, and targeted investments in education, health, inclusion, and social protection are necessary to improve people's coping ability, resilience, and engagement in low-carbon activities. Based on an assessment of costs, impacts, feasibility, and urgency⁴⁶, the following bold actions are necessary:

(i) Policy changes:

- Climate-proofing health and education facilities to ensure their resilience to climate-induced disasters.
- Integrating climate risk considerations into social protection programming to enhance coverage and effectiveness.
- Expanding the coverage of Social Safety Nets (SSNs) to reach a larger share of the poor and vulnerable population⁴⁷.
- Strengthening the effectiveness of social safety nets by improving targeting, intake, and registration for emergency response and early-warning systems⁴⁸.

(ii) Institutional reforms:

- Establishing an adaptive safety net system with reliable funding and an institutional setup capable of taking anticipatory actions.

⁴⁵ In 2010, the induced costs of climate change in the health sector were estimated at roughly US\$21 per capita, already representing more than one-third (36 percent) of total current health expenditures at the time and just slightly below total Domestic General Government Health Expenditures per capita the same year (at US\$25.5 per capita).

⁴⁶ See Annex 9 for the assessment details in relation to the human capital and social inclusion.

⁴⁷ Currently, only about 8 percent of the poorest households in Congo are covered by social safety net programs.

⁴⁸ Currently, spending on social assistance fluctuates between 0.3 percent and 0.5 percent of GDP, lagging the Sub-Saharan Africa average of 1.5 percent of GDP.

- Improving emergency planning, preparedness, and response, with a particular focus on ensuring access to health services during climate-induced natural disasters.
- Enhancing institutional support for vulnerable populations, including Indigenous peoples, during emergencies and developing climate-sensitive health insurance programs.
- Implementing institutional protocols to ensure effective climate risk management and resilience-building across sectors.

(iii) Investments:

- Increasing investments in the health sector to improve Universal Health Coverage and strengthen healthcare facilities and services.
- Allocating sufficient budgetary resources to support social assistance programs and the expansion of SSNs.
- Targeted interventions for Indigenous peoples and women in rural areas to promote inclusion, gender equality, increase agricultural productivity, and enhance resilience to climate change.
- Investing in climate-resilient infrastructure and technologies to withstand climate-related disasters and ensure uninterrupted access to essential services.

By implementing these adaptation measures, the country can better address the challenges posed by climate change, protect its human capital, and enhance the resilience of its population, particularly the most vulnerable groups.

3.6. The Private Sector Perspective

Without the private sector, Congo will not overcome its development and environmental challenges. Businesses are highly vulnerable to climate risks, yet they can also be a major contributor to the country's mitigation and adaptation strategies, especially by mobilizing additional funds and technical know-how. The transition to a green economy will require raising awareness of the challenges and opportunities for the local private sector, as well as appropriate enabling policies, regulations, and financing, so that a dynamic and responsive private sector is able to operate on a level playing field with judicious government support.

While these constraints loomed large, there were limited efforts made to ensure that sustainable business models underpin business plans for private enterprises. So far, most businesses in RoC, as is often the case globally, have focused on reducing their GHG emissions rather than on addressing the current and evolving climate change risks and impacts. The reasons for this include risk and uncertainty, knowledge gaps and lack of modeling tools, difficulty in promoting and championing adaptation inside the company, and lack of incentives.

Unleashing the full potential of the private sector will require a concerted effort to increase awareness of the challenges and opportunities presented by climate change in the Republic of Congo. Consultations with the local private sector demonstrated large knowledge gaps around climate change. While the business community recognizes the physical manifestations of climate change, for example, as reflected through increased volatility of weather patterns, they expressed the need for better support in preparing themselves to mitigate these risks. In addition, the very limited knowledge of international market trends (e.g., increased scrutiny of supply chains and their climate impacts) may adversely impact key economic sectors (especially in agribusiness and forestry) in the Congo.

There is an opportunity to strengthen Public-Private Dialogue initiatives to better align climate-related policy recommendations with the needs of the private sector. In this context, it is important to increase the capacity of local private sector associations to conduct Public-Private Dialogue (PPD), with a specific focus on policy reforms targeting decarbonization, such as through the promotion of renewable energy generation (solar, biomass from forestry). Current tax regulations are adding financial liabilities to existing private operators conducting renewable generation activities, such as in co-generation from wood-waste or sugar cane bagasse from agribusiness and forestry operations, which negatively impact energy efficiency and diversification efforts. Similarly, PPD can also help improve inter-ministerial coordination on matters that impact the private sector. Some examples include strengthening consultative processes between the public and private sector on ongoing environmental legislation proposals, which directly impact private sector operations (e.g., in the agriculture and forestry sectors).

Alongside Congo's ambitions to leverage its natural capital, there is a need to build local capacity to provide environmental goods and services. The development of a local ecosystem for environmental goods and services is critical for Congo to advance its climate goals, while supporting greater economic diversification. Opportunities exist for greater assistance to the private sector for activities such as solid waste management, recycling, and participation in the broader circular economy. However, there is a lack of appropriate regulations to support the development of industrial recycling operations, which impacts large corporations operating in the Congo. These industrial operations, many of which are linked to the oil sector, produce hazardous industrial waste on a large scale (e.g., vehicle batteries, waste-oil, used tires) and have been increasingly interested in procuring this type of service locally. In addition, there is a lack of local capacity to provide environmental services, such as carbon footprint assessments, which are demanded of suppliers integrated into global agriculture and forestry value chains. Furthermore, GHG emissions footprint analyses are usually a precondition before allowing local firms to access green financial instruments.

FDI and Climate Change in the Republic of Congo

FDI has a significant role to play in the climate change agenda as a source of private capital to many sectors affected or affecting climate change, such as agriculture, food and forestry, energy, and infrastructure. The so-called "climate FDI", a concept that has not yet received an agreed single definition, but which generally refers to FDI that contributes to climate change action, can be instructive in this regard. The World Economic Forum (WEF) has narrowed down the definition of climate FDI to investments in renewable energy, transportation and environmental technology and services. Using this simplified definition and data from FDI Markets, WEF points out that while globally climate FDI flows have tripled in value between 2015 and 2022 (from US\$88 billion to US\$252 billion), climate FDI in developing countries and emerging markets has underperformed.

The ratio of FDI flows to GDP in the Republic of Congo fluctuates significantly from year to year and registered around 28% in 2021. With 90 percent of FDI flows going into the oil sector, the contribution of climate FDI flows to the Republic of Congo would be expected to be very small. Using the same FDI Markets database and definition of climate FDI, such flows accounted roughly for less than 1% of greenfield capital investments registered during the period January 2003-January 2023.

Given the underdeveloped domestic financial sector, FDI represents an important channel for mobilizing financing to mitigate climate change in the Republic of Congo and contribute to climate adaptation. The challenge for the Republic of Congo is how to unlock flows of climate FDI. Some general measures put forward include aligning investment incentives to NDCs, linking taxes to the level of carbon emissions in investment projects; creating a pipeline of vetted carbon-neutral investment projects; and aligning strategies of investment promotion agencies to NDCs and climate goals.

4. Macroeconomic and Distributional Impacts

4.1. Approach, Methods, and Baseline

The study uses a computable general equilibrium model to examine the impact of climate change on the economy. The study examined dynamic interactions across economic sectors and between economic agents to identify the implications of climate change on the economy's growth pattern through to 2050. The impact of climate change and climate actions on the country's growth pattern and activity development are highlighted in this chapter, along with projected costs and associated implications across regions and gender. The modeling was conducted with huge uncertainties about future climate outcomes, technologies, policies and development paths. The goal of this chapter is thus not to provide definitive answers but to illustrate the broad macroeconomic and distributional implications of various climate actions and scenarios to address poverty and social impacts. It is intended to be a framework for engaging in policy dialogue and provide a basis for further research.

Changing the development model will require actions to address the major challenges to RoC's long-term prosperity—diversifying its national asset portfolio— focusing on stronger institutions, vigorous human and physical capital, and more balanced exploitation of natural capital. Given its limited access to external capital markets, expanding domestic revenue beyond the oil sector is a critical priority for fiscal sustainability, in addition to better management of financial resources. To support economic diversification, RoC must improve the business environment and invest in skills development to promote higher productivity. Barriers to competition should be removed by curbing the market dominance of state-owned enterprises, encouraging private sector participation in electricity and telecommunications, and modernizing competition law and strengthening enforcement capacity. To enhance trade competitiveness and diversification, the government should lower tariffs, review non-tariff measures, conclude regional trade negotiations, and strengthen local markets. Additionally, RoC could support ecotourism development by improving regulation and allocating funding to protect natural assets, strengthening regulatory and enforcement agencies, and expanding transport infrastructure and marketing. To accelerate its lagging human capital development, RoC needs to urgently correct acute disparities in public service delivery between the cities of Pointe-Noire and Brazzaville and the rest of the country, which negatively affect quality of health and education, depriving much of the country's growing young population of future opportunities. Lastly, ensuring long-term viability of the Congolese economy calls for sustainable and responsible management of natural resources.

Two scenarios were examined. One, where there is limited diversification and the economy, while improving its past performance, still falls short of its aspirations. Two, involves achieving the reforms needed for diversification and more sustainable and inclusive growth (figure 4.1). Neither of these two scenarios account for any climate action since the county's development plan includes very few. Simulations suggest that under the limited diversification scenario, the proportion of the population subsisting on an income at or below the international poverty rate would decrease to slightly below 40 percent in 2050, whereas under the sustained diversification scenario that proportion could fall to about 20 percent (figure 4.6). This decline would be more pronounced in rural areas with extreme poverty lowered by almost 40 percentage points (compared to about 20 percentage points in urban areas) (figure 4.4).

The limited diversification scenario represents steady reform momentum and the economy performs better than its historical growth performance (10-year average), but nevertheless still falls short. No new discoveries are assumed in the oil sector, hence after increasing by 0.3 percent over the past decade, oil production is expected to decline by about 3 percent per year. This decline reflects the depletion of existing oil fields and the lack of profitable investments (at current and prospective

medium-term oil prices, driven by a transition to a low-carbon global economy). The adverse development in the oil sector is partially mitigated by improvements in the non-oil sectors, supported by some reprioritization of public spending (e.g., through a reduction of nonrenewable energy subsidies and a gradual increase in public investment), stepped up social spending, and improved governance, including through the implementation of a new anti-corruption law and of the forthcoming organic law of the Supreme Audit Institution. At the sectoral level, the wider adoption of the local content strategy (already used by brewing and sugar companies), which aims to gradually replace imported goods with local products, would increase agriculture production and food manufacturing. Additionally, services would benefit from improved internet access supported by the recent installation of the fiber optic network between Cameroon and Congo. Furthermore, low levels of gas production and commercialization starting in 2024 will also contribute to growth. This scenario nevertheless assumes no significant improvement in the business environment, limited additional fiscal space, and a slow pace of structural transformation. As a result, while GDP will grow at about 1.5 percent annually, this rate will not be enough to keep up with the country's population growth and GDP per capita would decline by a bit less than two percent annually (figure 4.2).

The sustained diversification scenario reflects the country's aspirations as outlined in its 2022-26 NDP. Reforms are carried out to improve the business environment and enable the private sector to assume a greater development role, creating additional fiscal space and diversifying the economy. Regulation favoring greater competition is implemented especially in sectors such as electricity and telecommunications. Improved telecommunication, the digitalization of public services, increased use of digital financial services, and the development of tourism, spurred by strengthened infrastructure, marketing, and collaboration with the private sector, will support growth in services. Higher productivity in agriculture (driven by better training, equipment, quality seeds, and access to financial services) and improved irrigation and transport infrastructure would drive economic diversification. As for the non-oil industry, reforms will support wood processing, regulation and restructuring of the artisanal mining sector, gas production and commercialization, and food processing. This scenario would set the public debt on a declining path (figure 4.3) and assumes increasing labor productivity and larger structural transformation, making the economy overall more resilient (figure 4.5). The same path for the oil sector is assumed here as under the limited diversification scenario. As a result, GDP per capita is expected to grow by about two percent annually.

Simulating Impacts of economic reforms on growth and public debt with a Computable General Equilibrium Model.

Reform and Limited Reform scenarios in development policy

Figure 4.1

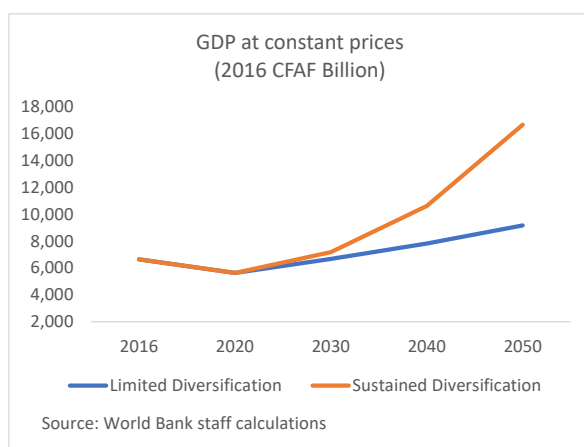


Figure 4.2

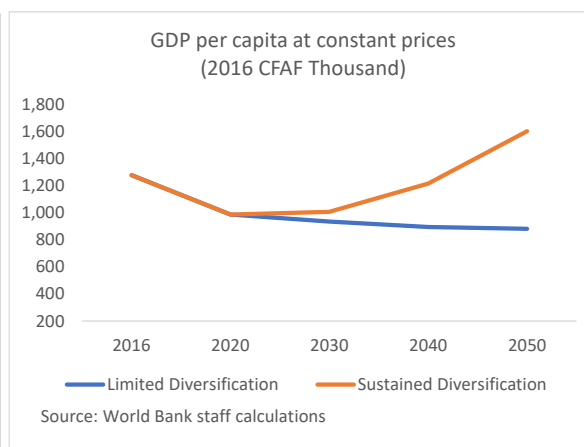
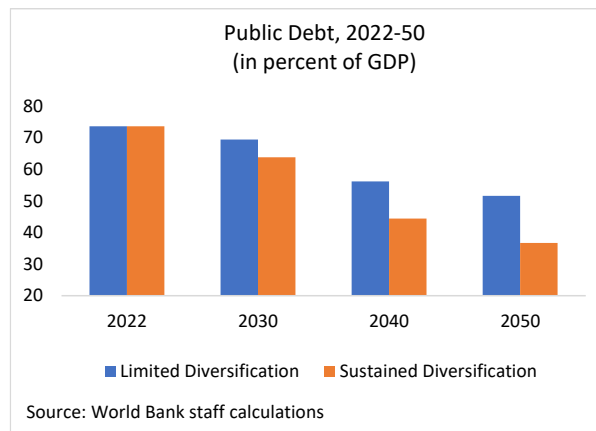


Figure 4.3



Simulating impact of economic reforms on growth by sectors

Reform and Limited Reform scenarios in development policy

Figure 4.4

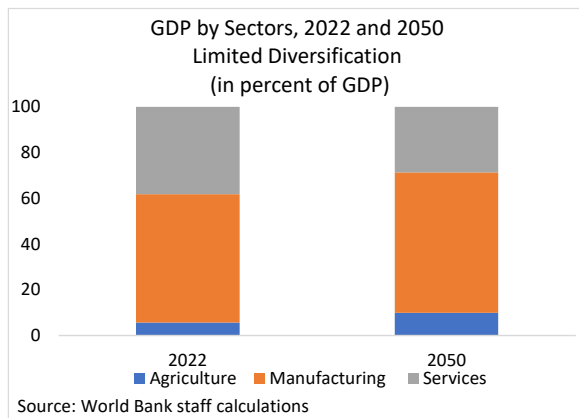
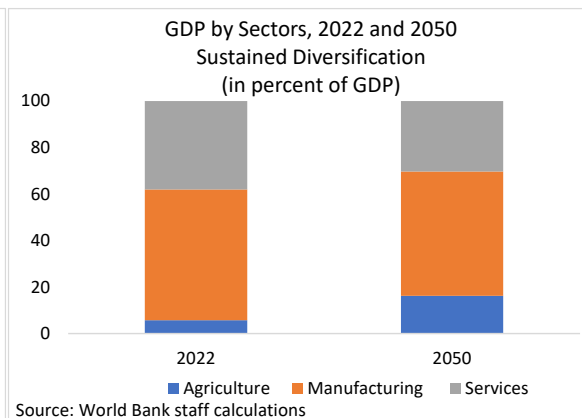


Figure 4.5



Simulating impacts of economic reforms on extreme poverty

Reform and Limited Reform scenarios in development policy

Figure 4.6

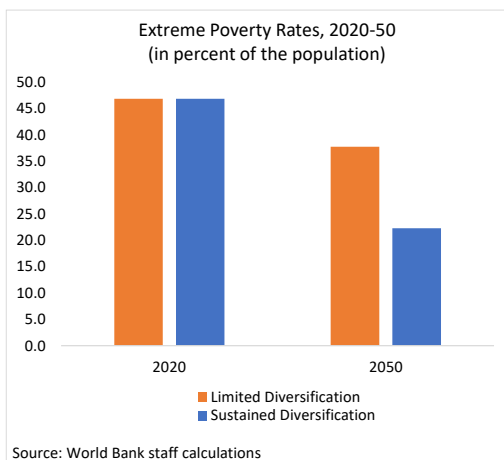
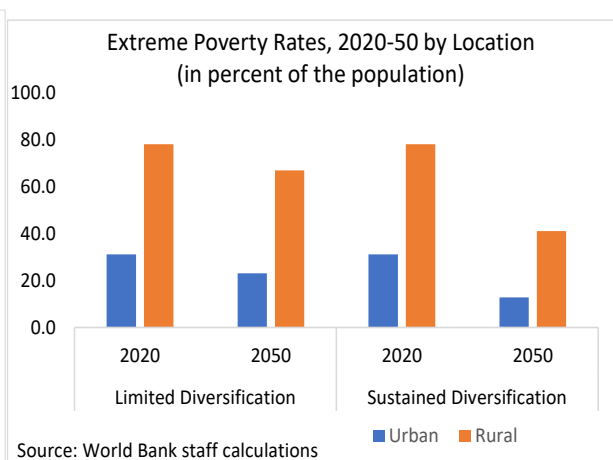


Figure 4.7



4.2. Climate Scenarios and Impact Channels

The future path for climate is uncertain. To address climate uncertainty in the macroeconomic analysis, several climate scenarios were examined.⁴⁹ Scenarios were selected that capture the broadest range of climate change effects across General Circulation Models (GCMs), to assess the vulnerability of the economy and the performance of adaptation options under possible wet versus dry and hot versus warm outcomes. **Dry/hot scenarios:** Three scenarios around the 10th percentile of mean precipitation changes and the 90th percentile in mean temperature changes, across Shared Socioeconomic Pathway scenarios (SSPs) SSP2-4.5 and SSP3-7.0 GCMs, as well as a mean across those three scenarios. **Wet/warm scenarios:** Three scenarios around the 90th percentile of mean precipitation changes and the 10th percentile in mean temperature changes, across SSP2-4.5 and SSP3-7.0 GCMs, as well as a mean across those three scenarios.

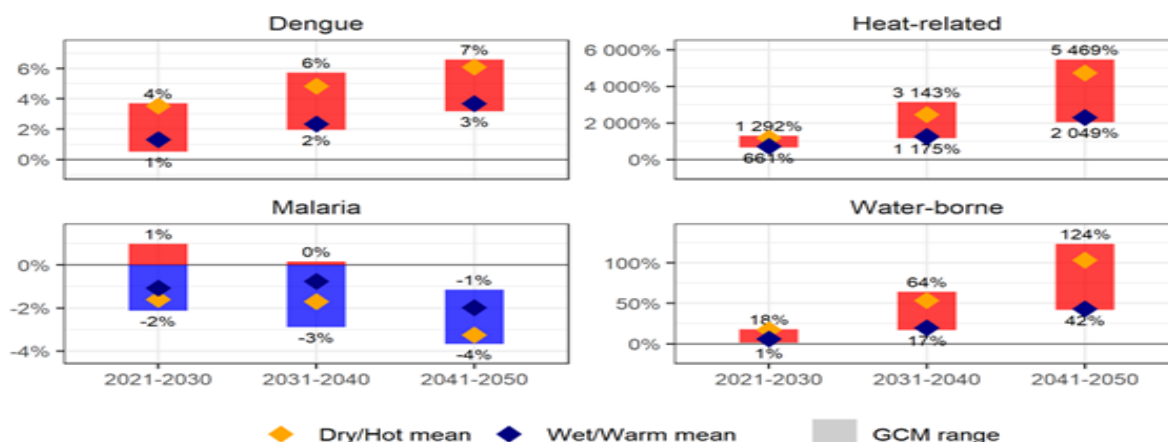
We consider eight channels of impact. The analysis considers impact channels that will inform shocks to the country's macroeconomy. These shocks can be grouped into three categories: (i) human capital, (ii) agriculture and natural resources, and (iii) infrastructure and services. Shocks from each channel are calculated based on changes in climate variables (e.g., monthly precipitation or daily max temperature) for the 30-year period from 2021 to 2050 relative to a climate baseline from 1995 to 2020.

4.2.1. Impact of climate change

Climate change is expected to cause significant economic losses for RoC. Examining the combined effects of the impact channels, RoC's GDP could be between 7 percent (under the wet/warm scenario) to 17 percent (under the dry/hot scenario) lower in 2050 if only limited diversification is achieved. With more sustained diversification, these losses would be slightly lower (5 percent and 15 percent, respectively). Decreased labor productivity due to heat stress is expected to be the main driver of GDP loss across sectors, but mostly in agriculture and industry (figure 4.10). Climate change would also affect labor productivity through increased transmissibility of vector-borne diseases (malaria and dengue) and water-borne (diarrheal) diseases, higher mortality, and reduced ability to work due to illness or caring for relatives (Figure 4.8.). Climate change will increase extreme poverty rates, especially in rural areas, but the declining trend observed under the sustained diversification scenario would result in rates lower than in 2020 by about 20 percentage points under the wet/warm and dry/hot scenarios (figures 4.8 and 4.9). Under the limited diversification scenario, job losses would be concentrated in manufacturing and services, while more ambitious reforms would allow for greater labor mobility and people to leave services for agriculture (figures 4.10 and 4.11). Both men and women would face job losses, but men would be affected to a greater extent. Under the reform and the dry/hot scenario, for instance, climate change would imply a loss of about 160,000 jobs in RoC, 55 percent of which would be held by men (figure 4.6).

⁴⁹ See Annex 11 on climate scenarios and impact channels for a detailed description of the approach. It provides a high-level description of each channel broken down by category.

Figure 4.8. Simulating Changes in Disease Mortality and Morbidity Due to Climate Change



Source: Original figure for this publication based on World Bank GCM data.
 Note: All changes are compared to a climate baseline from 1995 to 2020.

Simulating impacts of economic reforms and climate change on employment and labor productivity (2041-50)

Figure 4.9

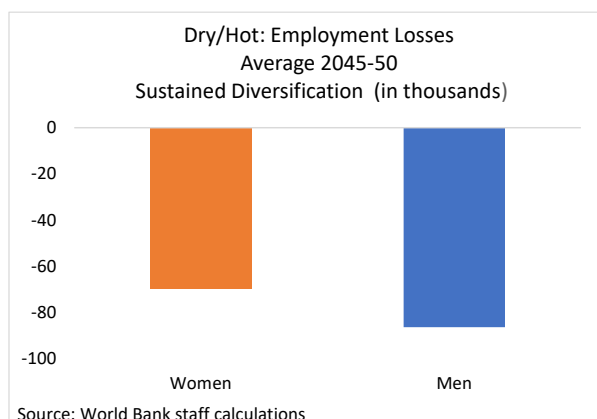
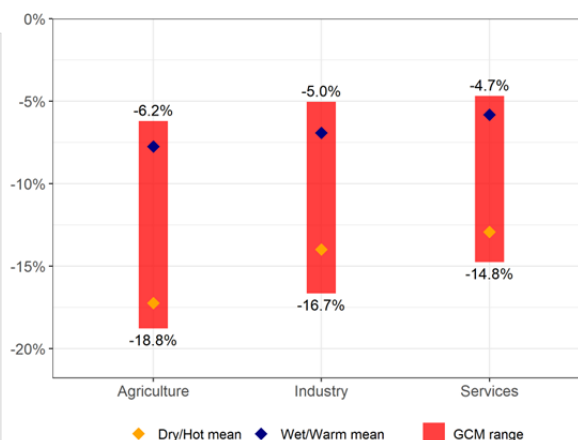


Figure 4.10



Simulating impacts of economic reforms and climate change on extreme poverty

Figure 4.11

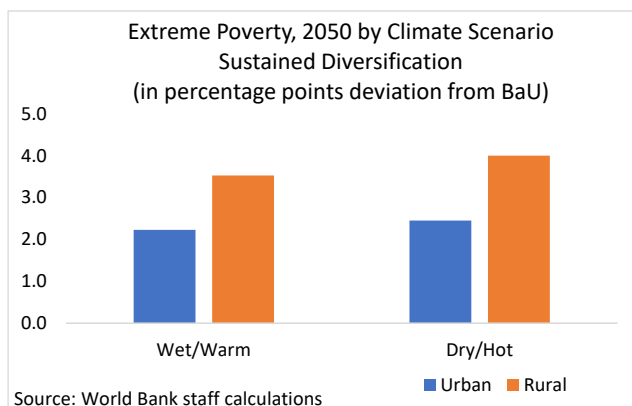
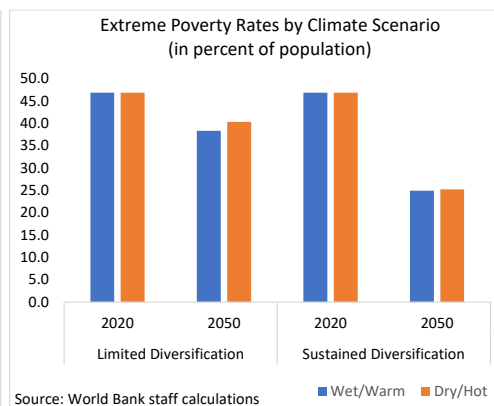
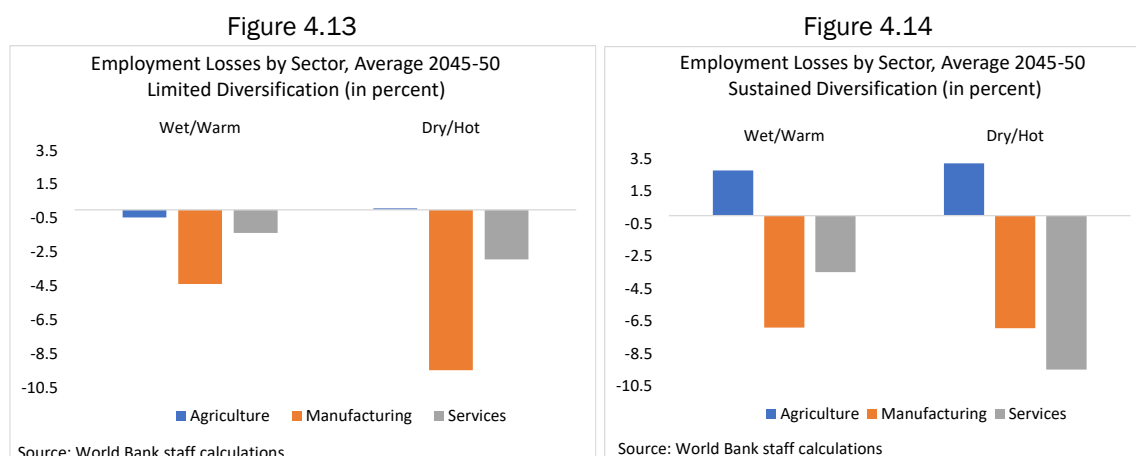


Figure 4.12



Simulating impacts of economic reforms and climate change on employment (2045-50)



4.2.2. Climate actions

Simulated climate actions draw on RoC’s policy commitments. RoC’s 2021 NDC update estimates that about US\$3.8 billion will be needed for adaptation purposes, including to build resilient infrastructure (for the protection of coastal areas, water and sanitation, and urban protection) and to enhance food security through investments in the agricultural sector (République du Congo 2021). While RoC’s contribution to global emissions is negligible, RoC’s 2021 NDC also sets specific investment targets for climate change mitigation. Close to US\$4.4 billion will be needed across a broad range of sectors for RoC to meet its 2030 NDC objectives. Most mitigation investments are earmarked for low-carbon transportation (approximately 60 percent), with the energy sector accounting for the other one-third of the investment needs. Since heat stress drives most of the losses in our model, the simulations have focused on adaptation actions dealing with lower labor productivity, the majority of which could be financed through the proceeds of REDD+.⁵¹

The modeled climate actions would significantly reduce GDP losses from climate change. For instance, rolling out the use of air-conditioners and increasing the percentage of users to 25 percent instead of the current rate of 3 percent could reduce the loss in labor productivity and even eliminate it in industry and services under the wet/warm scenario (figure 4.13). Overall, the modeled climate actions could reduce GDP losses by between 40 percent to about 85 percent depending on the scenario (figure 4.16).

⁵¹ According to a macroeconomic modeling exercise done specifically for the Congo CDDR, implementing REDD+ (for payment for emissions reductions - ER) at scale will have a positive impact on GDP of at least +0.45 percent, rising to +2.7 percent of GDP in 2050 for more ambitious ER scenarios and for higher carbon prices (> US\$5 per tCO₂e) expected in the near future. Part of these payments could finance climate adaptation actions.

Simulating impacts of climate action on labor productivity and GDP

Figure 4.15

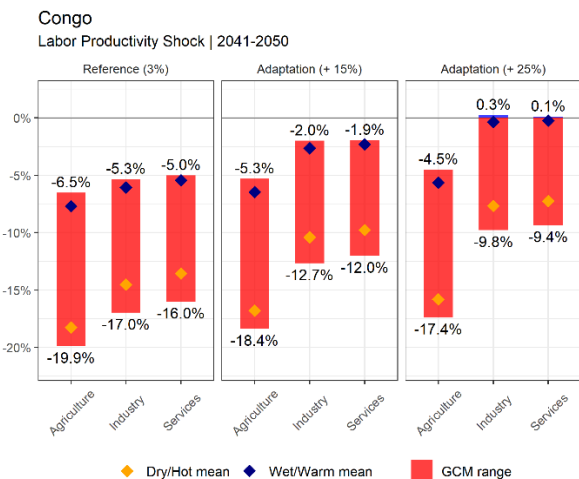
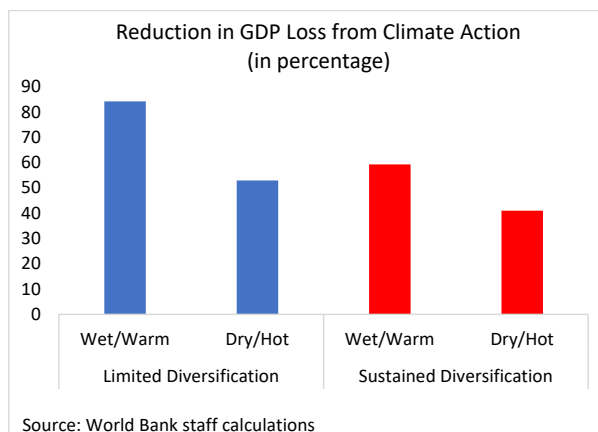


Figure 4.16



The modeled climate actions would also contribute to offsetting the negative effects of climate change on poverty and employment. The simulations suggest that climate actions could offset the increase in extreme poverty stemming from climate change in all scenarios (figure 4.17). Under the sustained diversification scenario, climate actions would bring extreme poverty rates 1-1.5 percentage points lower than under the baseline projections (figure 4.18). With limited diversification, extreme poverty would remain higher even after climate actions, but only by about 0.5 percentage points, driven by higher urban poverty. Additionally, new jobs would be created, particularly for women (figure 4.23). With limited diversification, new jobs created from climate actions in agriculture would not be enough to fully compensate for the employment losses in manufacturing and services (figure 4.21). However, under the sustained diversification scenario, net job gains are likely (figure 4.22).

Simulating impacts of climate action on extreme poverty and employment

Figure 4.17

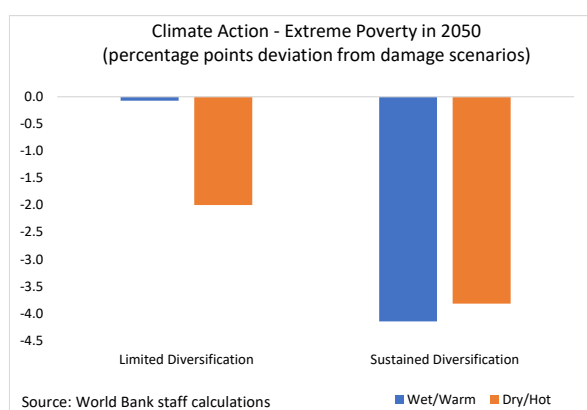


Figure 4.18

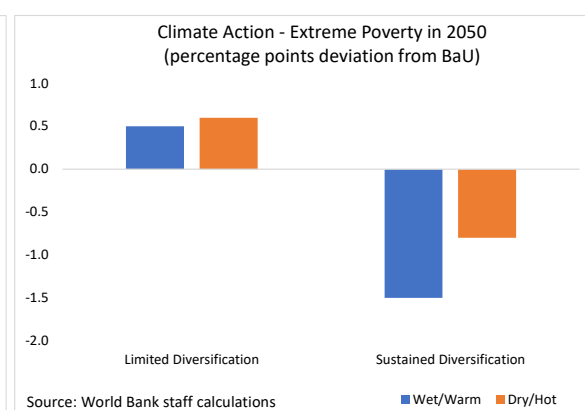


Figure 4.19

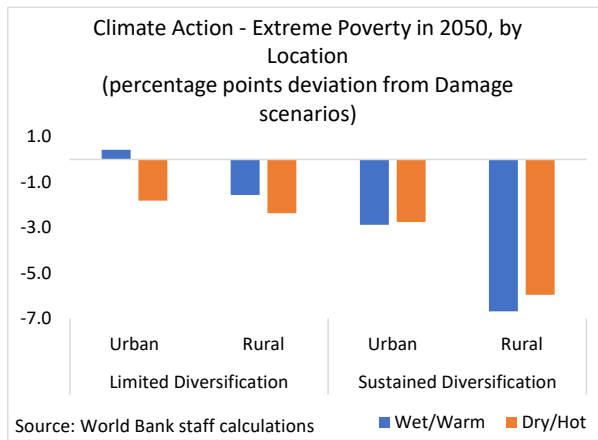
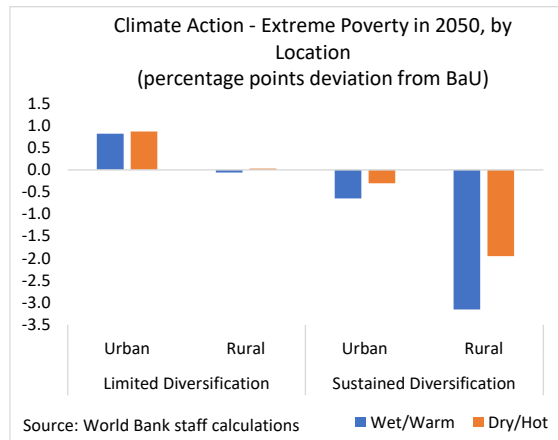


Figure 4.20



Simulating impacts of climate action on employment

Figure 4.21

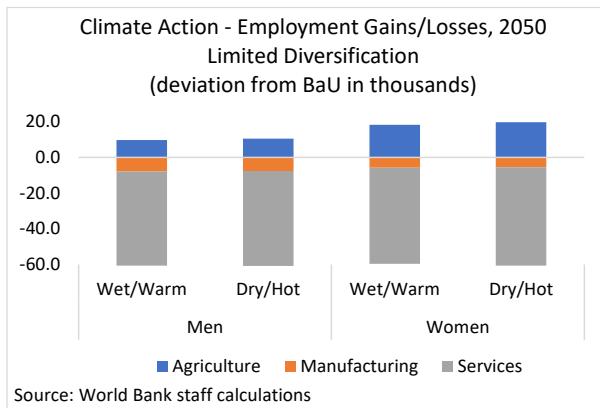


Figure 4.22

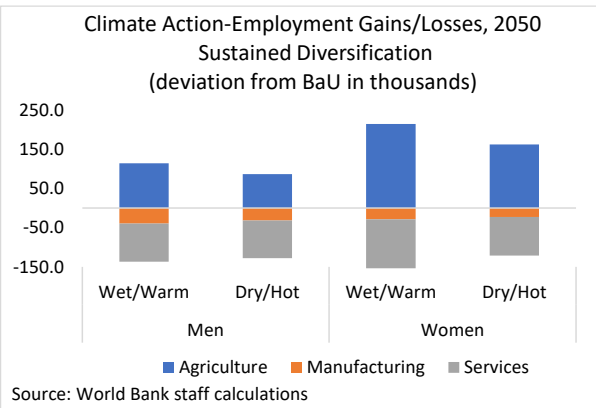
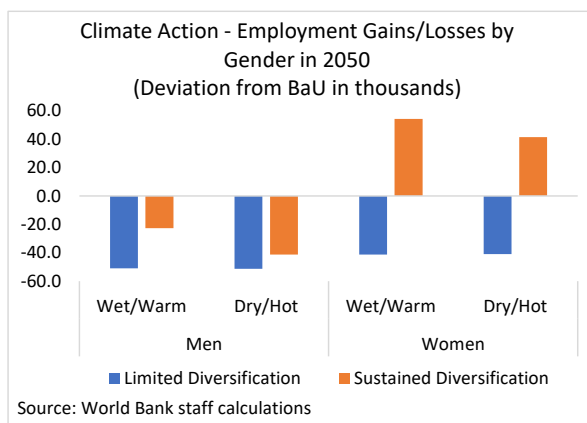


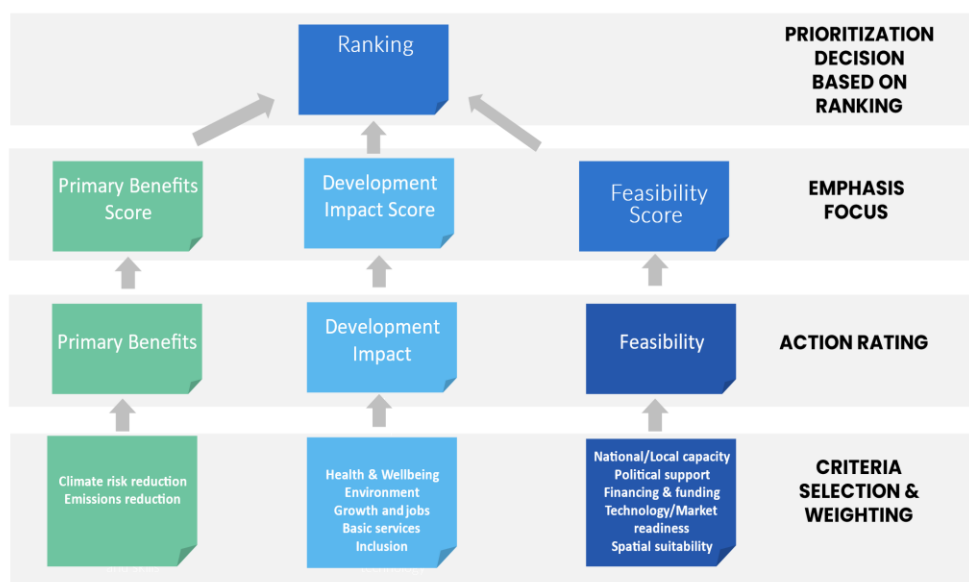
Figure 4.23



4.3. Climate and Development Action Selection and Prioritization

The analysis presented in chapters 1-3 provided a long list of climate actions in various areas based on relevant sources (NDC, NDP, sector strategies, assessment, and project evaluations). Actions were in the form of policies, institutional reforms, and programs and projects specific enough to be quantitatively assessed based on primary climate benefits (climate risks reduction, emissions reduction), development impacts, and feasibility. Based on the strength of available data and evidence provided, this list was assessed against several performance criteria. The goal of this process was to recommend an approach to help policy makers mitigate climate risks, based on transparent and participatory consultations, prioritizing implementable actions that will increase climate resilience, reduce emissions, and promote environmental, social, and economic benefits in the context of Congo’s diversification agenda. The selection and prioritization of climate actions followed the process described in figure 4.24 below. The method identified emissions sources and climate hazards⁵², screened, selected and weighed options, and rated them based on information from the impact channels identification work (Industrial Economics 2023) as well as macroeconomic and distributional impacts from the macro-modelling and micro-simulations presented above. The process helped identify the most effective actions that would have the greatest impact on climate resilient development. At the same time, the macro- and micro-simulations provided a strong basis to link these climate actions to the overall development objectives and pathways identified (baselines with various degrees of economic reform, hot/dry or wet/warm climate scenarios, and climate action), and assess their feasibility⁵³.

Figure 4.24: Climate Action Rating Framework for Congo



Source: Original figure for this publication based on World Bank data and evaluations.

⁵² Drawing from the background papers prepared for this CCDR, relevant national and sectoral strategies, and documentation from programs and projects.

⁵³ Annex 11 provides the long listing and ranking of climate-smart investment, policy, and institutional reform priorities proposed in this report in relation to sectors, systems, and cross-cutting themes.

A set of 17 climate-smart investments have been identified in this CCDR to improve conditions and prioritize the development of the country's natural, human, and physical capital. Figure 4.25 presents the top 10 investment priorities⁵⁴ based on a combined score of climate benefits, development impact, and feasibility. **Climate-Smart Agriculture** ranked highest for climate benefits and obtained a relatively high score for overall development impact. Investment into this area can improve the resilience of agricultural systems to climate hazards, while also contributing to economic development and poverty reduction, and helping to reduce emissions. **Urban Upgrading** scored highly for climate risk reduction and slightly lower for overall development impact. Investment in urban upgrading can help reduce emissions from urban areas and improve the resilience of urban infrastructure to climate hazards, while also improving living conditions and economic opportunities for urban residents. **Community Resilience** had a relatively high score for both climate benefits and overall development impact. Investment into this area can help build the capacity of communities to cope with climate hazards and other shocks, while also contributing to social and economic development. It is worth noting that the scores for **Resilient Health Infrastructure, Resilient School Infrastructure, Water and Sanitation, and Road Construction and Maintenance** are relatively close to each other, indicating that these investments may have similar potential to build climate resilience and promote sustainable development. On the other hand, investments with lower scores for both climate benefits and overall development impact are **Hydropower Rehabilitation, Reduced Impact Logging, and Alternatives to Slash and Burn**. These investments scored relatively lower, likely because not all of the benefits have been quantified, yet they might still have significant potential to contribute to climate resilience and sustainable development by offsetting negative climate impacts in other sectors.

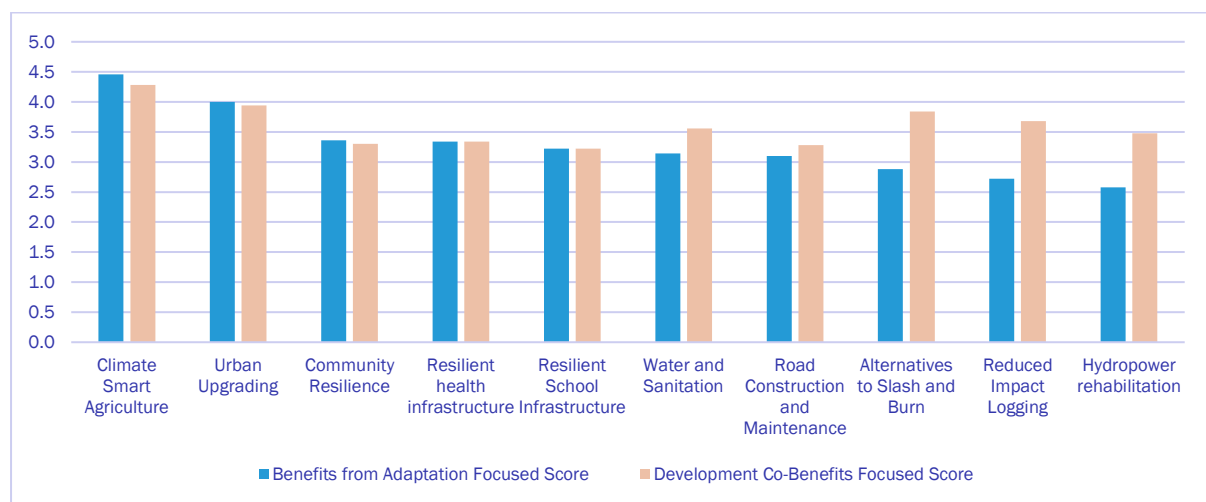
However, **putting RoC on a low-carbon and resilient development path through smart-investments will require stronger institutions, more effective policies, and better governance**. Among a list of enabling factors identified in the CCDR assessment, immediate and short term action is needed on several fronts (figure 4.26). To develop **natural capital**, concession management in forestry, protected agriculture zones, land use zoning, and gas codes are needed to protect and manage the country's natural resources, such as forests, agriculture, and gas reserves. The policies and reforms that impact **human capital** are the sanitation code, national disease surveillance, emergency health support for the vulnerable, universal health coverage, and community engagement and social accountability. These policies aim to improve the health and well-being of the country's citizens, which is crucial for economic development and social stability. By implementing these policies, Congo can better protect and valorize its human capital, which is its most valuable resource. The policies and reforms that impact **physical capital** are urban growth planning, transport system planning, electrification strategy, and finalizing the 2018 water reform. These policies aim to improve the country's infrastructure and promote sustainable economic development. By implementing these policies, Congo can better manage and valorize its physical capital, which is crucial for the country's economic growth and competitiveness. For example, urban growth planning can help promote sustainable urban development, while transport system planning can help improve the country's transportation infrastructure, reducing congestion and improving access to markets. An electrification strategy can help promote the use of renewable energy sources, while finalizing the 2018 water reform can help improve access to clean water and sanitation, reducing the incidence of waterborne diseases. In terms of governance, **NDC coordination and operationalization** can help the country meet its climate commitments and serve as a platform to mobilize funding for climate-smart investments while strengthening its institutions with the right type of technical assistance.

It is important to note that these scores are based on a specific set of criteria and may not capture all relevant factors for decision-making. Therefore, additional analysis and stakeholder engagement may

⁵⁴ The other climate-smart investments were: Modal Shift to Waterways, Integrated Gas Value Chain, Solid Waste Management, Solar PV Capacity, Modernization Transmission & Distribution Network, Hydropower Greenfield, EV and Bus Transportation.

be necessary to determine the most appropriate investments and financing instruments in relation to the macroeconomic and debt situation. The recommendation is that policy makers consider the potential trade-offs and synergies between actions when making decisions. By prioritizing actions that have the greatest potential for **synergies** and minimizing **trade-offs**, Congo can achieve multiple goals with a single action. The intention of this analysis is not to make immediate decisions but rather to help policy makers initiate a process to make informed decisions on the policies, institutions, and investments needed to support a **low-carbon development path**. All stakeholders (authorities, private sector, civil society, communities, and Congo’s technical and financial partners) will need to engage in an inclusive and transparent process to collectively decide on a climate and development action plan. Further analyses and studies are still needed to decide on an even more focused set of actions that would best address the current development and funding challenges.

Figure 4.25. Top 10 Climate-Smart Investments Sorted by Adaptation Focus



Source: Original figure for this publication based on World Bank data.

Note: Investments are scored on a scale of 1-5, 1 being the lowest and 5 the highest.

Figure 4.26. Top 15 Climate and Development Enabling Policies



Source: Original figure for this publication based on World Bank data.

Note: Policies are scored on a scale of 1-5, 1 being the lowest and 5 the highest.

4.4. Scaling Up Investment and Climate Finance

A comprehensive analysis of Congo's climate finance **inventory⁵⁵ demonstrates the total amount invested, US\$57 million over the period 2019-2020, and the proportions allocated to mitigation, adaptability, or a mix of the both.** Adaptation channeled the highest amount of funds at US\$39 million, making up approximately 65 percent of the total climate finance allocation. Mitigation efforts received US\$14 million, accounting for 23.3 percent of the total allocation. The remaining US\$4 million or 6.7 percent of the total was allocated towards multiple objectives. The data on climate finance by institution reveals a stark contrast between public and private sector investment. Out of the total amount of US\$57 million, US\$56 million comes from public institutions, while the private sector contributes a mere US\$1 million.

The distribution of climate finance disaggregated by institution, provides insight into the sources of funding for climate projects. The analysis shows that of the total amount invested, the majority comes from public institutions, with US\$33 million from multilateral development finance institutions (DFI), US\$12 million from multilateral climate funds, and US\$11 million from the government. The US\$1 million investment from the private sector is from an unknown source, indicating a potential lack of transparency, or reporting from private institutions.

It appears that most of the climate finance in Congo, US\$35 million, is allocated towards the AFOLU sector, which includes agriculture, forestry, and other land uses, as well as fisheries. The second-largest sector to receive climate finance is "others and cross-sectoral" with an investment of US\$18 million. The water sector received US\$2 million, while there are no indications of any investment in energy, transport, or industry.

The data suggests that multilateral climate funds have provided nine grants totaling US\$9 million, while also providing US\$3 million in debt financing. The government of Congo has invested the highest amount of climate finance at US\$11 million, indicating its commitment to addressing climate change challenges in the country. Multilateral DFIs have also invested heavily in Congo's climate finance efforts with US\$29 million in project-level market rate debt financing and US\$4 million in low-cost project debt financing.

The breakdown of climate finance by thematic area and instrument, provides valuable insight into the allocation of funds towards different climate projects. It reveals that mitigation efforts received a total investment of US\$14 million, with US\$13 million invested in debt instruments and only US\$1 million in grant instruments. In contrast, adaptation projects received US\$39 million in investment, with US\$16 million in grant instruments and a larger share of US\$23 million in debt instruments. The multiple objectives thematic area received a total of US\$4 million, with US\$3 million in grant instruments and US\$1 million in unknown instruments.

Delivering on the goals of the Paris Agreement and the Glasgow Pact (with its focus on the Congo Basin Forests) requires substantial investment and action, as identified in the various assessments in chapters 1-3 and the macro- and micro- simulations in chapter 4 of this report. The assessments undertaken for this report focused on three major areas where economic diversification and climate considerations tend to converge: (i) natural capital, including agriculture and forestry, (ii) the energy transition, encompassing zero carbon generation, transmission and distribution, energy storage, and low emission transport infrastructure, and (iii) adaptation and resilience, covering urban upgrading, community resilience, water supply and sanitation, solid waste management, and climate-smart health and education systems. The NDC investment needs in Congo amount to approximately US\$8.2 billion,

⁵⁵ Conducted for this CCDR.

with US\$4.4 billion allocated to mitigation (98 percent is conditional on external financing) and US\$3.8 billion to adaptation (73 percent is conditional on external contributions). This CCDR assessment has identified around US\$15.5 billion in total investment needs, including the NDC requirements. Additionally, broader investment needs for diversifying the economy have been assessed at US\$14.5 billion with only 14 percent covered by domestic resources.

Fulfilling the Republic of Congo's key investment needs will require a mix of financing that can be supported by specific climate finance instruments adapted to the country's circumstances. Grants and concessional financing, such as those provided by bilateral and multilateral sources, can offer affordable and favorable terms to address the financial gap. Concessional and semi-concessional loans can provide access to additional financial resources while maintaining reasonable repayment conditions. Guarantees can help mitigate risks for private investors, encouraging their participation in climate projects. Disaster risk management instruments can provide insurance coverage and financial support in the face of climate-related disasters. Table 4.1 below summarizes RoC's investment and spending priorities for the diversification of the economy and climate action, as well as the mix of financing needed from external sources⁵⁶. The scale of investment needed in Congo over the next 5-10 years in addition to the country's high debt situation will require a debt and financing strategy that not only tackles the current debt difficulties but also offers a major revamp to Congo's approach to mobilize finance for development as it moves away from its reliance on oil.

The Republic of Congo will need to mobilize additional climate finance. The country should explore thematic bonds, such as green or sustainable bonds, which attract investors focused on environmentally friendly projects. However, these instruments would still contribute to the country's high debt and debt service levels. Debt for climate swaps could provide opportunities to restructure existing debt obligations in exchange for climate-related investments. Carbon taxes and emissions trading systems (ETS) can generate revenue and incentivize emissions reduction. Offsetting mechanisms can be utilized to neutralize emissions through certified projects. Reforms in fossil fuel taxes and subsidies can redirect financial resources towards climate-friendly initiatives.

The Republic of Congo could also leverage public-private partnerships to attract private finance and expertise, particularly in sectors like energy, transport, and industry. Regulatory and policy developments can create an enabling environment for climate investments by establishing clear frameworks, incentives, and standards. By adopting a comprehensive approach that combines these various climate finance instruments, the Republic of Congo can effectively address its investment needs and advance its climate and development objectives while aligning with the goals of the Paris Agreement and the Glasgow Pact.

The risks and opportunities that climate change poses to the financial sector, presented in chapter 2, will have to be addressed urgently. The financial sector in RoC is vulnerable to both physical and transitional climate-related risks, with increased flooding and the country's reliance on the oil sector of major concern. The lack of economic diversification and low levels of insurance coverage exacerbate the vulnerabilities of the financial system. However, there are opportunities for the financial sector to support the country's climate goals, economic diversification, and reduce oil dependence. The

⁵⁶ This CCDR provides an approximate estimate of investment needs to align the country's development and climate objectives. While investment needs identified in some sectors (e.g., agriculture, forestry) represent the *additional* investments needed to boost resilience and put Congo on a resilient and low-carbon development path, only gross investment needs, based on a pre-existing infrastructure investment needs assessment (e.g., energy, transport, and urban development) or through a simplified assessment for this CCDR (e.g., water, education, health). As such, defining the costs and "additionality" of these investments has been different across sectors and systems. Due to time constraints and data availability, additional work must be conducted to establish a harmonized approach to compare investment needs in the resilient and low-carbon pathway with the needs in a baseline scenario based on the country's development priorities to support diversification or current investment levels. The list of policy and institutional studies and investment assessments suggested in this CCDR should provide relevant material to assess investment needs for the low-carbon and resilient development pathway.

assessment emphasized the need for a robust supervisory and regulatory response to enhance the sector's resilience to climate risks. It suggested developing a climate risks and opportunities strategy, integrating climate-related risks into supervisory practices, improving data capabilities, exploring green financing approaches, promoting financial inclusion, and seeking international support for resilience-building and mitigation efforts. These are therefore key enablers or requisites to mobilize climate finance. Despite the challenges posed, there are significant opportunities to overcome these obstacles. Strengthening partnerships, embracing innovative financing mechanisms, and pursuing sustainable economic diversification in a more aggressive way can enhance access to climate finance and facilitate the implementation of climate-related projects. By seizing these opportunities and addressing the challenges, RoC can accelerate its transition towards a low-carbon and climate-resilient future. It can also contribute to sustainable development and global climate goals if the international community acts in a more ambitious and urgent way to help it tackle the physical risks posed by climate.

In summary, further technical assistance from the WB would allow for a more detailed assessment of the total financing needs, estimated at US\$15.5 billion (table 4.1). The summary table compares various estimates made in the NDC, the NDP and other strategic and sector documents used for this CCDR. Additional support could also be used to more accurately assess the feasibility of the additional investment from the private and public sectors.

Table 4.1: Comparison of Financing Sources for Climate Investment and Spending Priorities

Area	Investment opportunity	NDC Adaptation	NDC Mitigation	NDP	CCDR	Financing source Incl. Climate finance opportunities (debt + grants)
Agriculture	Climate-smart agriculture	1,260	4	1,320	180	Multilateral Development Banks Private finance Feebates for agriculture value chains
Forestry	Afforestation and conservation		8	370	690	Concessional finance Performance payments, Debt for nature swaps Debt free finance
Oil/Gas	Gas flaring		43		450	Private finance with risk Performance payments
Power	Gas and zero carbon generation		1,361		3,600	Private finance with risk
Power	Transmission and distribution				1,500	Multilateral Development Banks Concessional finance
Power	Storage and back-up				900	Multilateral Development Banks Concessional finance
Transport	Low emission transport infrastructure		2,668		2,668	Carbon tax Multilateral Development Banks
Industry	Industrial processes			6,510		Private finance
Industry	Energy efficiency		56			Private finance
Buildings	Energy efficiency		191			Private finance Green bonds
Water	Water supply and sanitation	720			650	Climate finance Concessional finance
Health	Climate-smart health systems	400			550	Climate finance Concessional finance
Education	Climate-smart schools				850	Concessional finance
Social protection	Safety nets				500	Concessional finance

Social inclusion	Targeting programs/community empowerment	15			125	Multilateral Development Banks Concessional finance
Cities	Community resilience				665	Multilateral Development Banks Concessional finance
Cities	Urban upgrading	1,390		4,100	1,900	Multilateral Development Banks Green bonds Sustainability bonds Concessional finance
Cities	Solid waste management	10	68		250	Multilateral Development Banks Climate finance Concessional finance
Services	Tourism			1,650		Multilateral Development Banks Private finance Wildlife Conservation bonds
Services	Digital			590		Multilateral Development Banks Private finance with risk
	Total	3,795	4,399	14,540	15,478	

Notes:

1. This presentation for Congo is adapted from a framework proposed by Songwe, Stern, and Bhattacharya A (2022) and Rozenberg and Fay (2019).
2. Power: Investments under power are tentative and cover development as well as the additional investments needed to boost resilience and put countries on a low-carbon development path. An evaluation with the Electricity Planning Model needs to be conducted based on Rep. of Congo specific data. This CCDR proposes two critical products in a *Systematic Least-Cost Generation and Transmission Development Plan* and a *National Electrification Strategy* that will assess those additional investments and propose external financing sources including climate specific finance.
3. Education, health, and social protection investments and spending priorities need to be evaluated using country data. Costs are tentative.
4. Forestry investments do not include costs for peatland conservation.

4.5. Charting a Low Carbon and Resilient Development Pathway

Charting a **low-carbon and resilient development pathway** for Congo involves a comprehensive planning process that includes the following steps: assess the current situation, define long-term goals, stakeholder engagement, scenario development, policy and regulatory framework, investment and financing strategy, implementation plan, monitoring and evaluation, communication and awareness, review, and adaptation. Table 4.2 outlines the contribution of the report and 10 steps to implement the process for Congo stakeholders and their partners. It is important to note that developing a low-carbon and resilient development pathway is an iterative and ongoing process that requires continuous collaboration, learning, and adaptation to the evolving circumstances of the country.

Table 4.2: CCDR Contribution and Next Steps

Critical steps		CCDR contribution	The way forward
1	Assessing the situation	Assessed the country's economic sectors, natural resources, energy profile, and existing policies. Identified the key challenges, dependencies on oil, and vulnerabilities of the natural, human, and physical capital to climate change.	
2	Defining long-term goals	Set clear and ambitious long-term goals for transitioning to a low-carbon and resilient economy: economic diversification, climate adaptation, and reducing carbon. These goals are aligned with international commitments, such as the NDCs, and the Paris Agreement, and reflect the country's specific priorities and circumstances identified in the 2022-26 NDP.	
3	Stakeholder engagement	Engaged a wide range of stakeholders, including government agencies, civil society organizations, private sector representatives, and local communities.	Continue seeking inputs, ideas, and expertise to develop a shared vision for the pathway.

4	Scenario development	<p>Developed different scenarios that outline potential pathways (business-as-usual, limited reform, low-carbon, and resilient development). Considered various factors such as the energy mix, infrastructure development, land use planning, and policy frameworks. Assessed the benefits, costs, and risks associated with the various scenarios at the macro and micro levels (including indicators on growth, debt, sectoral allocation, poverty, etc.). Most critical findings:</p> <p>Limited Diversification: growth at 1.8 percent (2021-50) with oil production declining by 2 percent annually because of maturing existing fields and lack of new investments as the global economy transitions to low-carbon; extreme poverty at 38 percent in 2050.</p> <p>Sustained Diversification Reforms: growth at 4.06 percent (2021-50) with oil production declining by 2 percent annually because of maturing existing fields and lack of new investments as the global economy transitions to low-carbon; extreme poverty at 22 percent in 2050.</p> <p>Sustained Diversification + Climate Damages and Action: half of GDP losses from climate damage could be reduced, but GDP would still be almost double in real terms compared to under the Limited Diversification scenario; extreme poverty at 21 percent in 2050.</p>	
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5	Policy and regulatory framework	<p>Formulated areas for strengthening policies, regulations, and institutional frameworks that support the low-carbon and resilient development pathway in the following areas.</p> <ol style="list-style-type: none"> 1. Economic Diversification: Promote economic diversification by reducing the country's dependence on oil revenue and fostering the growth of non-oil sectors, such as renewable energy, sustainable agriculture, tourism, and eco-friendly industries (as recommended in the WB Country Economic Memorandum). 2. Renewable Energy Transition, Energy Efficiency, and Conservation: Increase the share of renewable energy in the energy mix by setting specific targets for renewable energy generation capacity and promoting investments in solar and hydro projects. Promote energy efficiency and conservation practices across sectors, including buildings, and transportation, to reduce energy consumption, greenhouse gas emissions, and associated costs. Address opportunities for gas flaring. 3. Sustainable Agriculture, Forestry, and Land Use: Enhance food security and sustainable land use by adopting climate-smart agricultural practices, promoting agroforestry, and implementing measures to reduce deforestation and protect biodiversity. 4. Green Industrialization and Waste Management: Support the growth of green industries for the diversification agenda and clean technologies, attracting investments in renewable energy-based manufacturing, sustainable tourism, eco-friendly production processes in SEZ. 5. Climate Resilience and Adaptation: Strengthen climate resilience and adaptive capacity by implementing measures to protect people and communities, ecosystems, enhance disaster risk reduction strategies, improve water resource management and health/education systems in the face of climate change impacts identified in the assessment. 6. Job Creation and Skills Development: Generate employment opportunities through the development of diversification-focused green industries, providing skills training and capacity-building programs for green jobs, entrepreneurship, and technology transfer. Skills development should also include teachers and health workers. 7. Access to Finance and International Cooperation: Proposals have been made to enhance access to domestic and international funding sources, climate finance mechanisms, and international cooperation to support the implementation of low-carbon and resilient development initiatives based on the financial sector initiatives proposed. 8. Stakeholder Engagement and Governance: Proposals have been included to foster inclusive governance and stakeholder engagement by involving government agencies, civil society organizations, private sector actors, and local communities in decision-making processes and ensuring transparency and accountability. 	<p>Continue formulating and strengthening sector and economy-wide policies, regulations, and institutional frameworks.</p> <p>Enact laws and regulations to promote sustainable agriculture, forestry, water and sanitation, renewable energy, and urban planning.</p> <p>Ensure coordination among different government departments and agencies starting with an NDC coordination mechanism and operationalization.</p> <p>Formulate and strengthen financial sector mechanisms to improve access to domestic and international funding sources, climate finance mechanisms, and international cooperation.</p> <p>Formulate frameworks for fostering inclusive governance and stakeholder engagement as per recommendations from the Climate Change Institutional Assessment (budget screening, coordination, consultation, regulations, planning, and data disclosure).</p>
6	Investment and financing strategy	<p>Identified climate-smart investment opportunities in key areas and the additional financial resources required to implement the pathway. Identified debt vulnerabilities. Proposed various options for accessing funding sources.</p>	<p>Develop a comprehensive investment and financing strategy. Explore specific options for accessing domestic and international funding sources, including climate finance mechanisms, grants, loans, and private sector investments. Prepare various Republic of Congo and region (CEMAC, Tropical Forests) specific packages for the upcoming 2023-25 events on Finance and International Cooperation in relation to people, climate, and biodiversity (e.g., Africa Climate Summit, G20 India, SDG Summit, IMF/WB Annual Meetings, UNFCCC COP 28, and G20/COP30 in Brazil).</p>

7	Implement ation plan	<p>Developed a list of specific actions, timelines, and responsible entities. Prioritized climate-smart investments based on their potential climate and development impact and feasibility. Prioritized key policy and institutional interventions. Checked their alignment with the NDP goals. Actions include capacity-building measures, technology transfer, and skills development.</p> <p>Trade-offs have been identified in relation to economic impact, employment transition between agriculture, industry, and services (with the macro-modeling and micro-simulations). Shifting away from oil dependency may initially impact the country's revenue and economic growth, especially if there is a lack of alternative revenue streams. Diversifying the economy requires careful planning and investment in the new non-oil sectors. Transitioning to a low-carbon economy may lead to job displacements in certain sectors. It is important to consider strategies for retraining and providing alternative employment opportunities for affected workers while considering the gender and regional implications. Developing renewable energy infrastructure and implementing climate-resilient measures in agriculture, transport, and cities require substantial investments. Balancing the financial costs of infrastructure development with other development priorities can be challenging.</p> <p>Synergies have been identified between health and environment, energy security, and climate resilience. Diversifying the energy mix by incorporating renewable sources as proposed enhances energy security and reduces dependence on fossil fuels. This can provide greater control over energy resources and decrease vulnerability to price fluctuations. Pursuing climate-resilient practices, such as those suggested on sustainable agriculture and forest management, can enhance the country's ability to adapt to climate change impacts, protect ecosystems, and promote food security.</p>	<p>Develop a detailed implementation plan that outlines the specific actions, timelines, responsible entities, and monitoring mechanisms. Prioritize actions based on their potential impact, feasibility, and alignment with the country's development goals. Ensure the plan includes both hardware and software actions to support the pathway.</p>
8	Monitoring and evaluation	<p>The list of interventions proposed includes key studies and sector strategies in cities, energy, agriculture, forestry, transport, and social protection that could be used to establish a robust monitoring and evaluation framework and define key indicators related to reducing losses from climate change and generating growth through diversification.</p>	<p>Establish a robust monitoring and evaluation framework to track progress on the implementation of the pathway. Define key indicators, collect data, and regularly assess the effectiveness of measures. Use the findings to make necessary adjustments, learn from experiences, and improve the implementation process.</p>
9	Communic ation and awareness		<p>Engage in effective communication and awareness campaigns to build public support, raise awareness about the benefits of the low-carbon and resilient development pathway, and encourage behavioral changes at the individual and community levels.</p>
10	Review and adapt		<p>Regularly review the pathway's performance, assess emerging opportunities and challenges, and adapt strategies accordingly. Incorporate new technologies, scientific advancements, and international best practices to enhance the pathway's effectiveness over time.</p>

5. Conclusions

The Republic of Congo faces significant development and climate challenges. Approximately 35 percent of the population lives below the poverty line, with limited access to basic necessities such as food, clean water, electricity, education, and healthcare. Only around 30 percent of the country's population has access to electricity, hindering progress in education, healthcare, and other essential services. The country's reliance on oil exports has hindered progress in other sectors, resulting in limited economic diversification and employment generation in the past decade. Oil exports account for more than 80 percent of RoC's total export revenue, leaving the country vulnerable to fluctuations in global oil prices.

Furthermore, the difficult macroeconomic environment makes it challenging to mobilize financial resources to diversify the economy. The country's limited economic diversification and reliance on oil exports have hindered progress in other sectors, resulting in limited employment generation and economic growth. Building the foundations for more diversified development will require the implementation of critical policy reforms targeting Congo's intangible capital – its economic institutions (CEM, 2023). Ensuring a better balance between natural capital and economic institutions requires removing barriers to competition, accelerating digital transformation, improving supply of electricity, enhancing trade competitiveness, improving efficiency of logistics, and supporting eco-tourism development.

In addition to these development challenges, the Republic of Congo is highly vulnerable to the impacts of climate change. The country experiences climate hazards, such as prolonged droughts, increased frequency of floods, and rising temperatures, which directly impact agricultural productivity, water availability, and human health. Addressing these climate risks is vital to ensure a sustainable and resilient future for the country. Neglecting climate action will expose the country to escalating climate risks, including food and water insecurity, loss of critical ecosystems, and increased vulnerability of communities, especially the most marginalized. The consequences are already evident, with 36 percent of the Congolese population experiencing food insecurity and labor productivity declining by up to 20 percent due to heat stress. Moreover, the lack of climate action exacerbates existing challenges, such as limited access to improved water services, inadequate sanitation, and crumbling road infrastructure, further impacting the health of the most vulnerable populations due to increased exposure to waterborne diseases, food insecurity, and poor nutrition.

The Congo Basin Forests, covering approximately 60 percent of the country's territory, are a critical natural asset for the Republic of Congo. These forests play a crucial role in carbon sequestration, biodiversity conservation, and providing livelihoods for local communities. However, unsustainable practices such as illegal logging and lack of enforcement of existing regulations, such as for concession management pose a threat to this invaluable ecosystem.

The Republic of Congo (RoC) stands at a critical juncture where linking economic diversification efforts with climate action is paramount for a sustainable and resilient future. The risks of economic and environmental inaction are substantial. Without diversification, RoC's economy will remain vulnerable to external shocks, hindering its growth potential and exacerbating poverty and unemployment. For example, projections suggest potential GDP losses ranging from 7 to 16 percent by 2050 under various climate scenarios, posing a significant threat to the country's economic stability.

The cost of inaction, as demonstrated through rigorous analysis, could entail significant economic losses, widening social inequalities, environmental degradation, and displacement of communities. However, amidst these challenges, there are immense opportunities to be seized. For instance, RoC's natural resources, such as its rich biodiverse forests covering 22.5 million hectares, contribute to timber exports worth US\$400 million and store over 44 GtCO₂e. These forest lands could be turned

into a productive asset by scaling investments that produce returns, including for enhancing employment and adaptive actions. By promoting sustainable natural resource use and responsible practices, RoC can safeguard valuable ecosystems while supporting the long-term viability of industries like timber. Overall, the **proportion of the population subsisting on an income at or below the international poverty rate will increase to over 50 percent in 2050 in a no reform scenario**. Looking at the combined effects of the climate impact channels, **RoC's GDP could be between 7 percent (under the wet/warm scenario) to 17 percent (under the dry/hot scenario) lower in 2050** if only limited reforms are carried out. **Climate actions could reduce GDP losses by between 40 percent to about 85 percent** depending on the scenario.

Considering these challenges, the CCDR emphasizes the need for a holistic approach that aligns climate action with development goals, considering the specific context of the Republic of Congo. Implementing policy reforms, strengthening institutions, and mobilizing climate finance will be key in driving these transformative changes. By investing in people and communities, better protecting and valorizing Congo's natural assets, and better managing and climate-proofing transport, energy, water, and urban infrastructure and services, the country can embark on a path towards sustainable development while addressing climate change. These investment priorities need to be built over time, requiring a phased approach and the mobilization of substantial resources. However, immediate policy and governance changes are necessary to create an enabling environment for their implementation.

For these investments to materialize, and to mobilize finance, the country needs a “structural transformation” of its economic institutions. Public institutions must be strengthened to deliver on four fronts:

- **Physical capital: Better capacity to plan, finance, and manage its physical assets to deliver on infrastructure and services in electricity, transport, water, sanitation, and urban development.** Developing a comprehensive transportation system plan, implementing effective urban growth planning strategies, strengthening sanitation regulations, and enforcing proper waste management practices, in addition to improving the operational and financial performance of the energy sector, would go a long way to climate-proof physical capital.
- **Human capital: Investing in ‘climate informing’ and readying the education and health systems and social services.** The country will need to strengthen its capacity to provide health services, and knowledge and skills while targeting the most vulnerable segments of the population. The focus should be on enhancing national disease surveillance systems to enable early detection and response to climate-related health risks. This includes strengthening disease monitoring and reporting mechanisms, improving data collection and analysis, and building the capacity of healthcare professionals to address climate-sensitive diseases, such as malaria, meningitis, and diarrhea.
- **Natural capital: Strengthening land, water, gas, and forestry regulations.** Enforcing and strengthening regulations related to natural resource management will promote sustainable resource use and conservation. This includes implementing measures to prevent illegal logging, promoting sustainable land management practices, and improving water resource governance.
- **Governance and finance: Strengthening legislation, coordination, capacity, and planning on two fronts:** (i) better climate governance and (ii) making the financial sector aware of climate risks, offering adequate instruments for reducing those risks, and engaging in carbon markets.

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Annex 1: Institutional and Governance Priorities

The country⁵⁸ has two main laws on sustainable environmental management and sustainable development:

- Law No. 74-2022 of 16 August 2022 on sustainable development.
 - Environmental Protection Act (currently being adopted by Parliament).
- Other instruments on environmental management and climate change, include:

- Nationally Determined Contribution (NDC);
- Second National Communication;
- National Strategy for Sustainable Development;
- National Strategy for Disaster Risk Reduction and Action Plan;
- National Environmental Action Plan;
- Action Plan for the Implementation of the Nationally Determined Contribution;
- Master Plan for the Drinking Water Supply of the City of Pointe-Noire;
- National Action Program to Combat Desertification;
- Action Program to Combat Land Degradation, integrated into the National Development Plan and national ecological planning;

Other instruments are being developed as of August 2023 such as:

- Law on the sustainable management of peatlands in Congo;
- National Low-Carbon Strategy;
- Biodiversity Strategy and Action Plan;
- Third National Communication (TNC);
- First Biennial Report (BUR1);
- National Strategy for the Blue Economy;
- National Adaptation Plan;
- New Project document on the Environmental and Social Monitoring Mechanisms Support Program.

Relevant projects drawn from the NDC include:

- Protection of Mangrove Ecosystems and Sea Turtles for the Improvement of the Well-being of Coastal Communities in the Departments of Pointe-Noire and Kouilou;
- Adap'Action
- Strengthening Climate Change Adaptation Capacities of Vulnerable Communities living in the Congo River Basin;
- Integrated Conservation of Peatland ecosystems and the Promotion of Ecotourism in the Landscape of Lac Télé;
- Peatland Conservation and Sustainable Management (IKI 2);
- Key Biodiversity Areas;
- Environmental Radio and Television;
- Sustainable Land Use Program (with a peatlands component).

Based on the climate change institutional assessment, Table A1.1 presents the key recommendations in terms of governance and institutional strengthening.

⁵⁸ This compilation is drawn from the speech by H.E the Minister of Environment, Sustainable Development and Congo Basin, Ms. Arlette Soudan-Nonault, delivered at the closing of the workshop to validate the World Bank Country Climate and Development Report (Brazzaville, August 10, 2023).

Table A1.1: Institutional and Governance Recommendations

Theme	Recommendation	Responsibility	Timing
Strengthen legislation, coordination, capacity and planning consistency	Within the drafting law on environmental protection, establish a climate change framework regulation	MEDDBC	ST
	Set up and operationalize an NDC coordination mechanism and develop medium and long-term climate strategies and plans	MEF MEDDBC	ST
	Strengthen climate screening in budget and infrastructure	MEF	ST
	Strengthen national and local institutions for planning, implementation, and reporting capacities for climate actions	tbd	ST
Enhance accountability and access to climate information	Establish a climate consultation mechanism to build trust and enhance accountability of the government's actions on climate change	MEDDBC	MT
	Disclose climate data on an online platform to improve access to information	MEDDBC CNIAF, ACFAP, DGDD, INS, CNEEPIP, CRCRT, DIST-CRGM, CRTH, GREFE, INRF	MT

Source: Background paper on Climate Change and Institutional Assessment.

Notes: "ST: short-term" is 1–2 years; "MT: medium-term" is 2–5 years. Responsible institutions referred to : The Ministry of Environment, Sustainable Development and Congo Basin (MEDDBC), Ministry of Economy and Finance (MEF), the Directorate General of Sustainable Development (DGDD), the National Institute of Statistics (INS), the Center for the Study and Evaluation of Public Investment Projects (CNEEPIP), the Center for Research on Land Conservation and Restoration (CRCRT), the Directorate of Scientific and Technical Information of the Center for Geological and Mining Research (DIST-CRGM), the Center for Research on the Humid Tropics (CRTH), the Research Group on Forest Ecology and Environment (GREFE), the National Institute of Forest Research (INRF), the National Center for Inventory and Management of Forest and Wildlife Resources (CNIAF), the Congolese Agency for Wildlife and Protected Areas (ACFAP).

Annex 2: Climate Risks and Financial Sector Initiatives

Theme	Recommendation	Responsibility	Timing*
Strategy, coordination, and capacity building	Develop a national/regional strategy on climate risks and opportunities	CEMAC, COBAC, BEAC, COSUMAF, CIMA, Ministry of Economy and Finance, CNEF	ST
	Establish a national/regional taskforce	CEMAC, COBAC, BEAC, COSUMAF, CIMA, CNEF	I
Supervisory and central bank response	Develop a supervisory/regulatory climate risk strategy	COBAC, BEAC	I
	Issue supervisory guidance on climate risk	COBAC	MT
Climate risk assessment and data environment	Conduct a climate risk exposure assessment	COBAC	ST
	Build up data capabilities	COBAC, BEAC, CNEF, COSUMAF, financial institutions	ST
Green financial instruments and institutions	Continue developing and strengthening regional capital markets [to issue future GSS bonds]	COSUMAF, BEAC	I-MT
	Build foundations for carbon credit markets	BDEAC, Ministry of Economy and Finance, Ministry of Environment, Sustainable Development and Congo Basin, CNEF	I-MT
Climate risk insurance products	Promote opportunities to expand micro- and parametric insurance for climate risks	CIMA, Ministry of Economy and Finance, CNEF	ST
Green financial inclusion and PCGS	Develop comprehensive green financial inclusion policies and regulations	Ministry of Economy and Finance, CNEF	ST-MT
	Strengthen and expand the role of FIGA to support access to climate finance for SMEs	Ministry of Small and Medium Enterprises, CNEF	ST






Source: Background paper on the Financial Sector Assessment.

Notes: "I: Immediate" is within one year; "ST: short-term" is 1–2 years; "MT: medium-term" is 2–5 years. Responsible institutions referred to are:

- Commission Bancaire de l'Afrique Centrale (COBAC)
- Communauté économique et monétaire de l'Afrique centrale (CEMAC)
- Banque des Etats de l'Afrique Centrale (BEAC).
- Commission Bancaire de l'Afrique Centrale (COBAC)
- Commission de Surveillance du Marché Financier (COSUMAF).
- Conférence Interafricaine des Marchés d'Assurance (CIMA)
- Comité national économique et financier (CNEF-Congo)

Annex 3: Climate-Smart Agriculture Investments

In agriculture, incentives for the wider adoption of climate-smart agricultural practices are an important element of Congo's resilience strategy. This includes facilitating the imports of irrigation and weather monitoring technologies, which allow for better management of weather-related risks, such as droughts or erratic rainfall, as well as increased R&D investments of drought-resistant seed varieties for crops, such as maize, soybeans, castor beans, and other oilseeds. In addition to meeting the demand for increased food production, such oilseeds are also being used as inputs to produce biodiesel. These incentives would go a long way in providing a good enabling environment to materialize the following investments.

	Proposed investments a [scale/main commodities targeted]	Beneficia- ries	Total cost (US\$, millions)	Share of cost to address climate challenge (%)	Benefits Change in yields (%)	Emission reduction potential (Mt CO2)
	Adopt agroforestry practices National (maize +plantain + cassava)	20,000	26	61	50	4
	Improve soil fertility and restore degraded lands Savannah areas in the center and southern parts of the country (cassava)	108,000	39	28	7	0.15
	Improve water resource management and irrigation Center part of the country (cassava + cucumber)	11,000	59	79	169	5.4
	Improve food crops productivity and supply National (maize)	10,000	29	88	54	2.25
	Redirect agriculture development (palm oil and cocoa) in Savannah Areas Center and southern parts of the country (cocoa)	2,000	51	100	5	0.34
	Develop early warning response Systems (EWRS) for climate preparedness National (cassava)	50,000	41	88	9	N/A
	Total	201,000	245	74	n.a.	12

Source: Background paper on Climate-Smart Agriculture for this CCDR. Note: Share of cost to address climate challenges is based on assessment of specific activities supported by the investment. CSAIP has a clear description and costing of activities. Source: Congo Climate-Smart Agriculture Investment Plan (2020).

Annex 4: Natural Capital Initiatives

	Direct Beneficiaries	Cost (US\$, millions)	Area restored /Deforestation avoided/ Improved forest management	EIRR (%)	EIRR +CO2 ER (%)	Emission reduction potential (Mt CO2)	Ease of feasibility/Impact
Alternatives to slash and burn in Southern Congo	300,000	388	12,000 ha/year restoration for 6 years 10,000 ha/year avoided deforestation	14	38.7	60.9 over 20 years	Medium ++ term (by 2030) Impact: High +++
Reduced impact logging and smallholder agroforestry	80,000	300	5 million ha improved forest management	10-18	30-50	70.2 over 20 years	Medium ++ term (by 2030) Impact: High +++
Conservation of protected areas and peatlands	WIP	WIP	5.47 ha avoided deforestation and peatland drainage				Low + (beyond 2030) Impact: High +++

Source: Background paper on Forestry for this CCDR.

Notes:

- The costs for Alternatives to Slash and Burn (ASB) initiatives in the south is modeled on the US\$46.6 million project PREFOREST, developed by FAO and the government of Congo for the five Southern "Départements" that form the "bread basket" of Congo and approved by the Green Climate Fund in 2021. The PREFOREST project (see <https://www.greenclimate.fund/project/fp159>), with a budget of 46.6 million, will target 41,373 beneficiaries and generate 16.8 million tCO2e of emissions reductions over the 20-year lifespan of the investments. Scaling this up to 300,000 beneficiaries would require an investment of US\$338 million, plus US\$50 million for the above-mentioned cross-sectoral policy and institutional reforms. The emissions reductions would not scale in the same way as the number of beneficiaries, since "deforestation hotspots", where ER can be generated more efficiently, are already covered by other projects.
- EIRR percentages for alternatives to slash and burn were taken from the 2022 FAO PREFOREST project feasibility study. The feasibility study found an EIRR with CO2 emissions reductions included of 63.4 percent. The corresponding figure for the ASB initiative would be lower, as the cost per tCO2e emissions reduced would be higher.
- According to RoC's 2018 National REDD+ Investment Program, the surface area of forest concessions outside the Likouala and Sangha Departments (which are covered under the FCPF CF ERPA) is 7,156,321 ha. It is assumed that around 70 percent of these concessions can be brought under improved forest management, including practices generating GHG emissions reductions, such as Reduced Impact Logging (RIL) and sustainable agroforestry development for smallholders living in and around the concessions.
- EIRR percentages for reduced impact logging and smallholder agroforestry are based on a study done by the USFS in the Eastern Amazon, in a selective felling system similar to the one practiced in RoC. The same study also found that the NPV of the subsequent harvest (after 20-25 years regeneration) was 29-56 percent higher as a consequence of reduced damage to the growing stock.
- The EIRR with CO2 ER for reduced impact logging and smallholder agroforestry was an author's estimate.
- The emissions reduction potential for reduced impact logging and smallholder agroforestry is based on calculations in a separate Excel sheet, based on Umanay et al. 2019 Selective logging emissions and potential emission reductions from reduced impact logging in the Congo Basin. Forest Ecology and Management 437 (2019) pp.360-371.
- Origin of resources to cover the cost of ASB: (i) climate adaptation and mitigation finance for US\$ 203 million; and (ii) development finance for US\$ 185 million.
- Origin of resources to cover the cost of RIL: (i) climate mitigation finance for US\$ 203 million; (ii) development finance for US\$ 100 million. And (iii) private finance for US\$ 100 million.

Annex 5: Oil & Gas Initiatives

Area	Specific measure(s) describe specific	Type	Adaptation mitigation or both	Urgency	Ease of feasibility	Impact (benefits)	Approximate estimated costs (US\$)
New and comprehensive Gas Code	Legal technical assistance to support the development of a Gas Code to establish an integrated gas value chain	Policy	Mitigation	+++	+++	+++	300,000
	Building regulatory capabilities through capacity-building support	Policy	Mitigation	+++	++	++	600,000
	Gas master planning	Policy	Both	+++	++	+++	1,000,000
	Private sector investments in integrated gas value chains	Investment	Both	++	++	++	450,000,000

Source: Background paper on Energy and Oil & Gas for this CCDR.

Notes: Types include Investment, Incentive/Policy/Financing, or Institutional reform/Capacity strengthening

Urgency is ranked from High “+++”, Medium “++”, and Low “+”

Ease of feasibility represents a combined feasibility score on economic, financial, social, political, and administrative feasibility.

Annex 6: Water Sector Initiatives

Area	Specific measure(s)	Urgency	Ease of feasibility	Cost	Impact benefits
<i>Policies and Institutional reforms</i>					
Water sector reform	A. Finalize the 2018 water sector reform by operationalizing services, including to potential private sector operations, including performance contracts covering energy efficiency and non-revenue water targets.	+++	++		
Potable water master planning	B. Update and develop master plans for drinking water supply in urban and rural areas until 2035 in the context of climate change and considering various vulnerabilities.	++	+++		
Water legislation	C. Integrate climate information into national water legislation reforms, training on water management based on practical risks, and upgrading tariff reforms to include the additional costs of climate risk reduction.	+++	++		
The institutional and legal framework in the sanitation	D. Strengthen the institutional and legal framework in the sanitation subsector, including the adoption of a Sanitation Code, the definition of regulatory measures, framing the way septage is collected, transported, and disposed, to reduce risks to public health and to the environment	++	+++		
<i>Investments for mitigation and adaptation</i>					
Mitigation	E. Promote energy efficiency of LCDE water supply systems (including reduction of water losses)	+++	+++	\$50-100m	
	F. Encourage and support the use of renewable energy in agricultural irrigation and drinking water supply	++	++	<\$50m	
Adaptation	G. Increase the climate resilience of water infrastructure by diversifying water supply sources for more than 50,000 people (rainwater, surface water and groundwater), including in Pointe-Noire with abstraction from deeper aquifers or surface water	++	+	>\$200m	1.4 million ppl
	H. Expand water supply services in urban areas to decommission private boreholes and improve protection of LCDE boreholes	++	+	>\$200m	1.0 million ppl
Both	I. Improve the septage management chain and treatment capacity, to reduce GHG emissions associated with untreated fecal sludge	+++	+++	\$100-200m	2.4 million ppl

Source: Background paper on water for this CCDR. Notes: Costs and impact benefits are based on preliminary estimates from the water sector assessment and will require further analysis.

Annex 7: Energy Sector Recommendations

Area	Specific measure(s) describe specific	Type	Adaptation mitigation or both	Urgency	Ease of feasibility	Impact (benefits)	Approximative estimated costs (US\$)
Redress financial and operational performance of the sector	Concessioning or affermage of the distribution sector through the support of a transaction adviser to ensure competitive and transparent recruitment	Policy	Both	++	+	++	TBD
	Operational performance redressal of the distribution utility through targeted capacity-building and investments	Capacity / Investment	Both	+++	+	++	TBD
	Rehabilitation of the transmission and distribution network	Investment	Both	++	++	++	TBD
	Establish an independent electricity sector regulator	Capacity	Mitigation	++	+	+	TBD
Investments in renewables	Invest in rehabilitation of existing hydropower assets	Investment	Both	+++	+++	+++	100,000,000
	Facilitate investment in greenfield hydropower projects through pre- feasibility studies to encourage private sector participation	Investment	Both	++	++	+++	10,000,000
	Invest in solar PV utility- scale projects	Investment	Mitigation	+	++	++	TBD
	Investment in off-grid solar and solar/micro- hydro mini-grids to meet rural populations	Investment	Mitigation	++	++	++	TBD
	Technical Assistance in formulating a Least Cost Planning and National Electrification Strategy	Policy	Both	+++	++	+++	500,000
	Invest in clean cooking solutions	Investment	Both	+	+	++	TBD

Source: Background paper on Energy and Oil & Gas for this CCDR.

Notes: Types include Investment, Incentive/Policy/Financing, or Institutional reform/Capacity strengthening

Urgency is ranked from High “+++”, Medium “++”, and Low “+”

Ease of feasibility represents a combined feasibility score on economic, financial, social, political, and administrative feasibility.

Annex 8: Sustainable and Resilient Cities

Area	Specific measure(s)	Urgency	Ease of feasibility	Impact
Urban upgrading	Prepare and implement upgrading programs in the two largest cities, Brazzaville and Pointe-Noire (<i>Investment</i>).	Medium/long term	+	+++ Population of Brazza & Pointe-Noire (approx. 3.12 m people)
	Implement an innovative program to limit the emergence of informal settlements by developing housing opportunities in parallel to urban upgrading while promoting a more compact urban growth, coordinated with urban upgrading (<i>Investment</i>).	Medium/long term	+	+++ All country's urban areas (approx. 4 m people)
Community resilience	Elaborate a national flood and erosion risk management strategy, integrate risk information in urban plans for all relevant cities, devise urban river restoration plans, and develop early warning systems on areas at risk (<i>Institutional capacity strengthening</i>).	Medium term	+++	++ Impacts localized in at-risk areas
	Build drainage and urban flood defense systems in the most vulnerable neighborhoods (<i>Investment</i>).	Medium term	+	++ Impacts localized in at-risk areas
	Conduct studies and prepare projects for the development of resilient and efficient water treatment and collective sanitation systems (<i>Institutional capacity strengthening</i>).	Short term	+++	+++ Total country's urban population (4 m)
	Build capacity and raise awareness of water resource management and climate more broadly among residents (<i>Institutional capacity strengthening</i>).	Short term	++	+++ Total country's urban population (4 m)
	Promote labor-intensive approaches in construction and waste collection for creating jobs in low-income communities, refugees, and IDPs (<i>Policy</i>).	Medium term	++	++ Refugees, IDPs, vulnerable communities
Solid waste management	Establish a well performing municipal waste management system in major cities, including relevant investments for waste collection, recovery and treatment (<i>Investment</i>).	Long term	+	+++ All urban areas - - Country's urban population (approx. 4 m people)
	Improve the waste management regulation, including the environmental standards used to manage treatment facilities and implement necessary reforms to create a well-functioning waste sector (<i>Institutional reform – Policy</i>).	Medium term	++	++ Impacts expected in the longer term
	Conduct studies on the entire waste value chain, and organize community engagement campaigns on waste reduction, (<i>Institutional capacity strengthening</i>).	Short term	++	+ Impacts expected in the longer term
Urban growth planning and implementation	Develop strategic and operational urban development documents at the national level and at the local level for all cities in the country; all urban development plans have to be action- and investment-oriented, to integrate climate-risk information, and to	Medium term	++	++ All urban areas (approx. 4 m people)

	identify hazard-prone areas, non-constructible land, and public spaces (<i>Institutional capacity strengthening</i>).			
	Financing the implementation of innovative and practical mechanisms to strengthen the resources needed to implement existing and future urban planning documents (<i>Financing</i>).	Short term	+	+++ All cities - Country's urban population (approx. 4 m people)
	Develop pilot projects to promote integrated transport and land use planning so as to increase access to public transport and improve land management in major cities (<i>Investment</i>).	Medium term	++	++ National and municipal institutions, cities of Brazza & Pointe-Noire (3.12 m people)
Extreme urban heat	Develop a program to (i) adapt major urban roads in large cities according to sustainable design principles and promote the use of NBS and climate-friendly materials and (ii) create greening and reforestation spaces to combat both urban heat and erosion (<i>Investment</i>).	Long term	++	++ Impacts expected in the longer term
	Integrate sustainable planning principles into urban development plans and capital investment programs (<i>Institutional capacity strengthening</i>).	Medium term	+++	++ All urban areas (approx. 4 m people)
	Improve the building construction code, to promote building energy efficiency, bioclimatic designs, the use of local materials, and to consider adaptation to climate-related (<i>Policy</i>).	Medium term	++	++ Impacts expected in the longer term
	Develop a program for incentivizing private developers to build green buildings and housing (EDGE label for example) (<i>Incentive</i>).	Medium	+++	+++ All urban areas (approx. 4 m people)
	Institutional strengthening for developing and implementing national strategies and regulatory frameworks to allow for private sector participation in improving urban areas (<i>Institutional capacity strengthening</i>).	Long term	++	+++ Country's urban areas (approx. 4 m people)
Regulatory and Institutional strengthening	Create urban agencies to accelerate settlements upgrading in major cities (<i>Institutional capacity strengthening</i>).	Long term	+	++ Impact on major cities (approx. 3.12 m people)

Source: Background paper on Cities for this CCDR. Notes : Urgency: S-M-L ; Feasibility: Combined feasibility score on economic, financial, social, political, administrative, High +++, Medium ++, Low +; Impact: High +++, Medium ++, (e.g. # of people, # of institutions, Area etc.....)

Annex 9: Human capital and social inclusion initiatives

Area	Specific measure(s)	Urgency	Ease of feasibility	Cost	Impact benefits
Education	Education should provide students with knowledge and skills to make decisions and take actions to tackle climate change.	High	Medium	US\$100m annually	High
	Education actors should anticipate, prepare for, and adapt to the effects of climate change.	High	Low	US\$70m annually	High
Health	Increase investments in the health sector, particularly to improve Universal Health Coverage.	High	Medium	US\$20m annually	High
	Promote resilient climate-smart health infrastructure, with energy-efficient design.	High	Medium	US\$20m annually	High
	Improve nutrition outcomes in areas where climate change is a main driver of food insecurity. Provide emergency food and nutrition support.	High	Medium	US\$15m annually	High
	Improve emergency planning, preparedness, and response, focusing on ensuring access to health services during climate-induced natural disasters.	High	Medium	US\$20m annually	High
	Enhance national disease surveillance (integrated labs and systems) for communicable and non-communicable diseases.	High	Medium	US\$20m annually	High
	Ensure health sector support for vulnerable populations during emergencies – climate-sensitive health insurance programs.	High	Medium	US\$15m annually	High
Social protection and inclusion	Support targeted interventions for women in rural areas to promote gender equality and increase agricultural productivity.	High	Medium	US\$80 million	High
	Strengthen Community Engagement and Social Accountability mechanisms to ensure transparency of climate financing.	Medium	Medium	US\$30 million	High
	Increase financing and boost coverage of the poor in rural areas and vulnerable urban areas based on climate-related shock exposure analyses and updated poverty data.	High	Medium	US\$100m annually	High

Source: Background paper on Human Capital and Inclusion for this CCDR.

Annex 10: Climate Scenarios and Impact Channels

The future path for climate is uncertain. To address climate uncertainty in the macroeconomic analysis, a total of ten climate scenarios were selected, two of which focus on emissions uncertainty, and eight of which capture uncertainty across climate models. The climate scenarios were provided by the World Bank’s Climate Change Knowledge Portal (CCKP) for 29 General Circulation Models (GCMs) from the Coupled Model Intercomparison Project 6 (CMIP6) suite of IPCC model outputs. On the CCKP, each GCM has up to five combinations of Shared Socioeconomic Pathway (SSP) and Representative Concentration Pathway (RCP) emissions scenario runs. For each GCM-SSP combination, CCKP provided a modeled history from 1995 to 2014 and projections from 2015 to 2100, for monthly mean temperature and precipitation and 1x1 degree grid resolution. Two of the ten scenarios were selected to allow for comparisons across emissions scenarios. These are referred to as mitigation scenarios. Our first three scenarios follow the following specifications:

- **Ensemble average of SSP3-7.0 GCMs:** Pessimistic Case. Scenario in which warming reaches 4°C by 2100, due to lax climate policies or a reduction in ecosystems and the ocean’s ability to capture carbon.
- **Ensemble average of SSP1-1.9 GCMs:** Optimistic Case. Represents reductions in GHG emissions in line with limited 1.5°C of warming by 2100.

A second purpose is to select scenarios that capture the broadest range of climate change effects across GCMs to assess the vulnerability of the economy and the performance of adaptation options under possible wet vs dry and hot vs warm GCM outcomes. We select the following set of eight scenarios, based on changes from the baseline climate through to 2031 and 2050 (table A.4.1).

- **Dry/hot scenarios:** Three scenarios around the 10th percentile of mean precipitation changes and the 90th percentile in mean temperature changes, across SSP2-4.5 and SSP3-7.0 GCMs, as well as a mean across those three scenarios.
- **Wet/warm scenario:** Three scenarios around the 90th percentile of mean precipitation changes and the 10th percentile in mean temperature changes, across SSP2-4.5 and SSP3-7.0 GCMs, as well as a mean across those three scenarios.

Table A.4.1. Selected Climate Scenarios Used in Analysis

Type	Scenario
Mitigation	SSP1-1.9 mean
	SSP3-7.0 mean
Dry / hot future	SSP3-7.0 MRI-ESM2-0
	SSP3-7.0 ACCESS-CM2
	SSP3-7.0 CANESM5
	Dry/hot mean
Wet / warm future	SSP2-4.5 MPI-ESM1-2-LR
	SSP3-7.0 MPI-ESM1-2-LR
	SSP2-4.5 INM-CM5-0
	Wet/warm mean

Impact Channel Results

We consider eight channels of impact. The analysis considers impact channels that will inform shocks to the country’s macroeconomy. These shocks can be grouped into three categories: (i) human capital,

(ii) agriculture and natural resources, and (iii) infrastructure and services. Table A.4.2 provides a high-level description of each channel broken down by category. Shocks from each channel are calculated based on changes in climate variables (e.g., monthly precipitation or daily max temperature) for the 30-year period from 2021 to 2050 relative to a climate baseline from 1995 to 2020.

Table A.4.2. Description of Impact Channels Selected for the Analysis

CHANNEL OF IMPACT		DESCRIPTION
Human capital		
1	Labor heat stress	Shock to labor productivity from daily heat stress to indoor and outdoor workers. Considers occupation-specific work ability curves from ILO.
2	Human health	Shock to labor supply from changes in the incidence and mortality of vector-borne (malaria and dengue), water-borne (i.e., diarrheal), and temperature-related diseases.
Natural capital: agriculture and natural resources		
3	Rainfed crops	Shock to crop revenues through changes in yields. Based on FAO crop-specific yield response functions to rainfall availability and heat stress.
4	Erosion	Shock to crops from topsoil erosion and flooding due to vegetation conditions. Impacts on erosivity from changes in rainfall based on the RUSLE model.
5	Livestock	Shock to livestock revenues through changes in productivity by animal and product type. Considers extreme heat and feed availability effects through animal-specific curves.
Physical capital: infrastructure and services		
6	Urban flooding	Shock to capital in selected cities from peak precipitation events that result in pluvial flooding. It considers drainage and flood depths through the Itzi model, and damage estimates through depth-damage curves.
7	Sea-level rise and storm surge	Shock to coastal capital from changes in mean sea level and storm surge, using a bathtub approach.
8	Roads and bridges	Shock to capital due to damages and maintenance on roads and bridges modeled through the IPSS model. Also considers labor supply effects of road disruptions.

Impact Channel 1 – Labor heat stress: Climate change can impact labor supply by increasing workday temperatures and decreasing the number of hours an individual can perform work. By 2050, increasing temperature may result in a reduction of labor productivity ranging from around -7 percent to -21 percent. From 2041-50, labor productivity shocks are expected to be highest for the agriculture sector, while the industry and services sectors are expected to experience similar shocks. The wet/warm mean is expected to result in a -7.5 percent, -7 percent, and -5.5 percent shock across the agriculture, labor, and services sectors, respectively. The dry/hot mean is expected to result in more pronounced declines of -17.5 percent, -14.5 percent, and -13 percent shock across the agriculture, labor, and services sectors, respectively.

Impact Channel 2 – Human health: Climate change may impact human health through increased incidence of and deaths from vector-borne diseases such as malaria and dengue, heat-related diseases, and waterborne infectious diseases that cause acute diarrhea, which all influence the total labor supply. By 2050, increasing temperatures may result in a labor supply shock ranging from around

-0.05 to -0.18 percent. From 2041-2050, labor supply shocks are expected to be highest from heat-related diseases, followed by waterborne and vector-borne diseases. The wet/warm mean scenario is estimated to result in a -0.075 percent labor supply impact in total. Shocks from the dry/hot mean scenario are higher, with impacts estimated at around -0.156 percent in total.

Impact Channel 3 – Rainfed crops: Under climate change, crop yields have the potential to be affected by changes in rainfall patterns/irrigation water availability, increasing evaporative demands, and extreme heat as temperatures rise. By 2050, climate change may result in production shocks ranging from 1.5 percent to -11.5 percent. From 2041-2050, negative impacts to crop production are highest from the dry/hot mean which is expected to result in a -7 percent shock to crops by 2050. The wet/warm mean is anticipated to result in smaller negative production shocks of around -1 percent by mid-century.

Impact Channel 4 – Erosion: Erosion can be detrimental to landscapes, impacting plant and animal life, reducing the efficacy of reservoir storage and hydropower production through sedimentation, and causing declines in agricultural production by removing valuable nutrients from the topsoil, all of which can be made worse if climate change intensifies future rainfall intensity. By 2040, erosion risk will be highest in the southern and northern regions of the country, with impacts more pronounced under the wet/warm mean. Additionally, we expect the dry/hot mean to result in some decreases in erosion and a decrease in production for selected crops, with shocks ranging from -1 percent to -6 percent by mid-century. Under the wet/warm mean erosion risk intensifies in the period from 2041-2050 with southern and northern regions becoming more vulnerable. Under the dry/hot mean, erosion risk remains relatively constant. On average, the dry/hot mean is expected to result in a -2 percent shock to crop production while the wet/warm mean is expected to result in a -5 percent shock during the period.

Impact Channel 5 – Livestock: Climate change poses risks to livestock production from both direct and indirect effects. Increasing heat stress on animals (direct effect) causes reductions in productivity, while climate change can also cause potential reductions in the availability of feed sources (indirect effect) resulting in lower energy intakes and reduced yields. By 2050, increasing temperatures may result in a livestock production shock ranging from around -1 percent to -4 percent. By 2041-50, climate change is expected to result in the greatest impact to cattle milk, chicken eggs, and goat and sheep meat. The wet/warm mean scenario is estimated to result in a -1.5 percent impact to total livestock productivity by 2050. Overall, shocks from the dry/hot mean scenario are higher, with livestock productivity impacts estimated at around -3 percent by 2050.

Impact Channel 6 – Urban flooding: Under climate change, projected increases in the frequency and severity of storm events will worsen urban flooding impacts. Urban flooding is already a challenge in the region due to urbanization, land use degradation, and inadequate flood protection. A more detailed assessment of this channel will be presented in the Decision Meeting draft.

Impact Channel 7 – Sea-level rise and storm surge: Rising mean sea levels and temporary flooding from storm surge events threaten coastal infrastructure and land. By 2050, sea-level rise and storm surge will result in a -0.5 percent and -0.02 percent capital shock, respectively. Throughout the period, the change in mean sea-level relative to baseline conditions is expected to increase. By early century, relative changes across selected scenarios are similar with sea-levels expected to increase by 0.1 meters by 2030. The spread between the scenarios increases slightly by mid-century with SSP3-7.0 resulting in a shock of -0.5 percent incremental capital losses.

Impact Channel 8 – Roads and bridges: Climate change may impact road and bridge infrastructure due to increased temperatures, precipitation, and flooding that cause roads and bridges to deteriorate faster, which influences infrastructure repair and maintenance costs and causes delays for passengers. By 2040, we estimate that additional annual damages relative to the baseline will range from US\$10 million to US\$80 million, and additional delay hours will range from 1.5 million to 7 million hours.

The overall approach taken to link the pillars of Congo’s development strategy, the NDC action plan and the transmission channels identified and discussed in the various deep dives assessments and build the specific content of the climate scenarios is summarized in Table A.4.3.

Table A.4.3 Climate, Capital and Diversification: An Overview of Transmission Channels and Linkages Used for the Macro-Modeling and Micro-Simulations

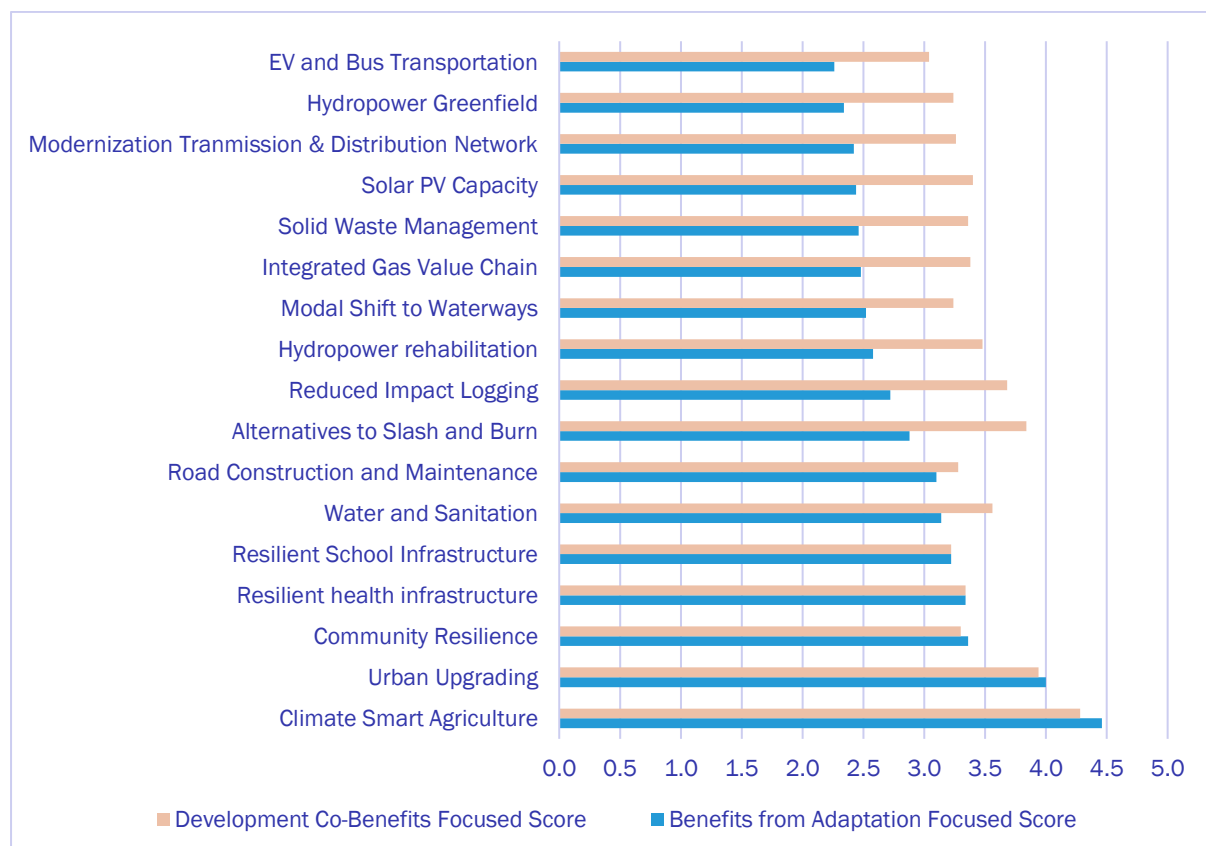
	DIVERSIFICATION PILLARS IN NDP	NDC LINKAGES	NDC LINKAGES	NATURAL CAPITAL	HUMAN CAPITAL	PHYSICAL CAPITAL
	SECTORS AND SYSTEMS	ADAPTATION ACTIONS	MITIGATION ACTIONS			
1	Agriculture & Forestry	Food security Climate induced migration	Agriculture Forestry	Soil erosion Rainfed crops Livestock	Labor heat stress	
2	Industry incl. Agribusiness, Oil & Gas, and Manufacturing	Landslides	Agriculture Biomass energy Energy distribution Forestry Replacement of fossil fuel Fugitive emissions Renewable energy Transport		Labor heat stress	Labor heat stress
3	Special economic zones	Water and sanitation Inland flooding Cities Waste	Energy efficiency Landfill Renewable energy	Soil erosion		Urban flooding SLR Roads-Bridges
4	Tourism	Coastal flooding & SLR Inland flooding Waste	Energy efficiency	Soil erosion	Human health	Urban flooding SLR Roads-Bridges
5	Digital economy		Energy efficiency		Labor heat stress	Urban flooding

						SLR Roads-Bridges
6	Habitat	Water and sanitation Inland flooding Cities Malaria and VBD Climate induced migration Landslides Waste	Energy efficiency Landfill Renewable energy Transport		Human health	

Annex 11: Selection and Prioritization of Recommendations

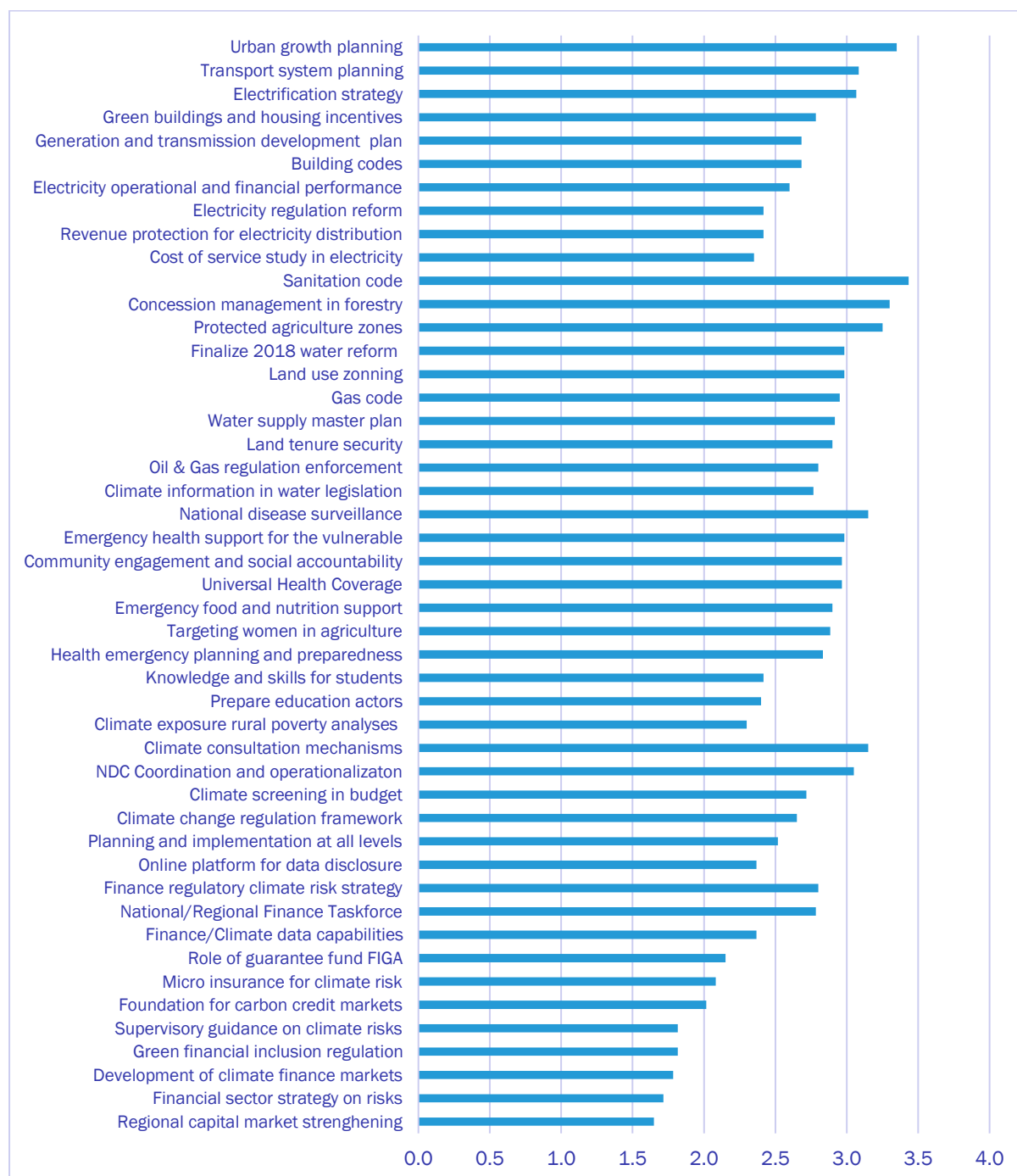
In this CCDR climate action planning, action prioritization refers to the process of identifying the actions (policies, institutional reforms and strengthening, investment programs and projects and other activities) needed to deliver on a resilient and low-carbon development pathway identified through the sector and economy-wide diagnostic. This diagnostic provided a series of actions intended to change course. But how to prioritize these climate and development actions? A simple action selection and prioritization tool was designed to support public and private stakeholders in selecting and prioritizing climate and development actions, through a comparison of costs, benefits, and challenges. The output of this process followed in this CCDR (covering climate hazard and emissions context, action development, initial screening, action refinement, criteria selection and weighting, action rating, and final prioritization) is summarized in the two graphs below.

Figure A.11.1. Scoring of a Long List of Climate-mart Investment Priorities



Note: Investments are scored according to various degrees of climate and development benefits provided and their feasibility. Investments are ranked from 1-5, 1 being low and 5 high.

Figure A11.2: Scoring of a Long List of Policies and Institutional Reforms Priorities



Note: Policies and institutional interventions are scored according to an equal weighting of climate benefits, development benefits and ease of feasibility (from high to low and within each cluster of systems, sector or cross cutting theme). Items are ranked from 1-5, 1 being low and 5 high.