WESTERN AND
CENTRAL AFRICA

CAMEROON

World Bank Group

COUNTRY CLIMATE AND DEVELOPMENT REPORT

Main Report

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Table of Contents

Table of Contents 2

Acknowledgments 4

Abbreviations 6

Executive Summary 8

1. Climate and Development 13

1.1. Economic, social, and environmental context 13

1.1.1. Insufficient growth to reduce poverty significantly 13

1.1.2. Natural capital depletion, low human capital, conflicts, and inequalities 14

1.2. Climate change impacts exacerbate tensions and conflicts 15

1.3. Opportunities for decarbonization 18

2. Country Climate Commitments 19

2.1. Climate commitments 19

2.1.1. A focus on mitigation and adaptation 19

2.1.2. Links to national and sectoral strategies and plans 20

2.1.3. Increased subnational commitment with limited implementation capacity and resources 20

2.2. Climate-informed legislation and coordination mechanisms 21

2.3. Institutional readiness for climate change action 23

2.3.1. Integration into planning tools and budget processes 23

2.3.2. Institutional readiness to support people's resilience 23

2.3.3. Risks to climate action due to lack of accountability and quality of data 24

2.4. Financial markets 24

3. Systems Analysis 26

3.1. Introduction, methods, and approach 26

3.2. Food, agriculture, and forestry 26

3.2.1. Food and agriculture 26

3.2.2. Forestry 28

3.3. Physical assets and infrastructure services 30

3.3.1. Resilience, adaptation, and mitigation in cities 30

3.3.2. Hydropower and other renewable energy sources 31

3.3.3. A decarbonization opportunity: flare gas elimination 31

3.3.4 Roads 32

3.4. Life & Work: human capital and social inclusion 33

3.5. Cross-cutting climate issues 36

3.5.1. The private sector perspective and green financing 36

3.5.2. Climate resilience through a *territorial and people-centered approach* 37

4. Macroeconomic and Distributional Impacts 39

4.1. Introduction 39
4.2. Climate scenarios 40
4.2.1. Business as Usual and climate change 40
4.2.2. Climate actions 43
5. Conclusion and Recommendations 48

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[1] The list includes MINADER (agriculture and rural development), MINAS (social affairs), MINAT (territorial administration), MINDDEVEL (local development), MINDHU (urban affairs), MINEDUB (primary education), MINEE (energy and water), MINEFOP (professional training), MINEPAT (economy, planning), MINEPDED (environment), MINEPIA (livestock), MINESUP (higher education), MINFI (finance), MINFOF (forestry), MINMIDT (mining and industry), MINT (transport), MINTP (public works), and MINTSS (social protection).

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Abbreviations

AFOLU	Agriculture, Forestry, and Other Land Use
CCDR	Country Climate and Development Report
CSAIP	Climate Smart Agriculture Investment Plan
BAU	Business as usual
DCP	Directorate of Civil Protection
DRM	Disaster risk management
EU	European Union
EWS	Early warning system
FLEGT	Forest Law Enforcement, Governance and Trade
GDP	Gross domestic product
GGFR	Global Gas Flaring Reduction Partnership
GHG	Greenhouse gas
HCI	Human Capital Index
LMICs	Low- and middle-income countries
LULUCF	Land use, land-use change, and forestry
MINADER	Ministry of Agriculture and Rural Development
MINAS	Ministry of Social Affairs
MINAT	Ministry of Territorial Administration
MINDDEVEL	Ministry of Decentralization and Local Development
MINDCAF	Ministry of State Property, Surveys and Land Tenure
MINDHU	Ministry of Habitat and Urban Affairs
MINEE	Ministry of Energy and Water
MINEPDED	Ministry of Environment, Natural Protection and Sustainable Development
MINEPIA	Ministry of Livestock and Fisheries
MINFOF	Ministry of Forestry and Fauna
MINPOSTEL	Ministry of Posts and Telecommunications

MINT	Ministry of Transportation
MINTP	Ministry of Public Works
NDC	Nationally Determined Contribution
ONACC	Observatoire National sur les Changements Climatiques (National Observatory on Climate Change)
PNACC	Plan National d'Adaptation au Changement Climatique (National Plan for Climate Change Adaptation)
PPP	Public–private partnership
RCP	Representative Concentration Pathway
REDD+	Reducing Emissions from Deforestation and forest Degradation
SND30	National Development Strategy 2020–2030
SCD	Systematic Country Diagnostic
UNFCC	United Nations Framework Convention on Climate Change
VPA	Voluntary Partnership Agreement

Executive Summary

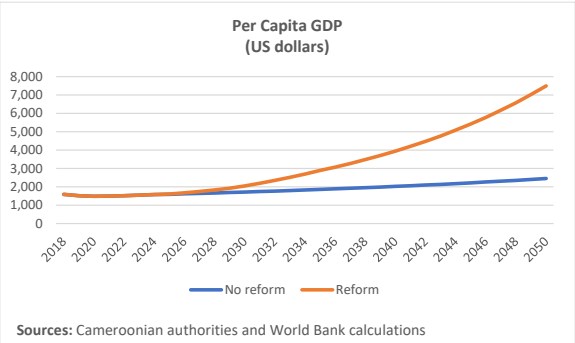
The Earth's climate is changing and Cameroon, like other African nations, is bearing the brunt of this change. Climate change physical risks and already high impacts from acute and chronic hazards expose Cameroon to severe economic and welfare losses and threaten its development path. Understanding the nature and extent of physical risks from a changing climate over the next three decades is crucial. Those risks are estimated to dimension the magnitude of the challenge and highlight the case for action. An extensive use of scenarios ranging from lower to higher CO_2 concentrations is made to assess impacts in the absence of reforms in the Cameroonian development model and support for its adaptation and mitigation action plan as envisioned in its Nationally Determined Contributions (NDCs). As such, this report explores opportunities and trade-offs for aligning Cameroon's development path with its recent commitments on climate change.

Cameroon has not been able to transform its wealth into inclusive development. Despite vast natural resources and a relatively well-educated workforce, Cameroon has a Human Capital Index of 0.4. Economic performance has been falling behind the average for low- and middle-income countries, undermining its aspirations as expressed in its Vision 2035. Over the past decade, real Gross Domestic Product (GDP) growth has not exceeded 4.5 percent; this has only slightly outpaced population growth and has not substantially reduced poverty. Development progress in Cameroon is constrained by low rural productivity, a weak business environment for the formal and informal private sectors, growing fragility, and weak governance in the public and private sectors. These constraints have become more restrictive in the context of the deteriorating security situation and the COVID-19 pandemic and will be heightened by the growing challenges of climate change, urbanization, and demographic pressure. The most recent National Development Strategy 2020–2030 (SND30) acknowledges these challenges and aims at diversifying the economy while redressing social, economic, and environmental imbalances.

Cameroon faces the challenge of changing the current development model to create opportunities to improve resilience and to put the country on a stronger development trajectory. To achieve more rapid, inclusive, and sustainable economic growth, moving away from the state-led development model, and putting the private sector at the forefront of economic activity are indicated. Without reforms, the proportion of the population subsisting on an income at or below the international poverty rate would still be about 15 percent in 2050, well above the global target of three percent, whereas changing the development model could bring that proportion down to about three percent by that year. Cameroon's economy would also be on a more resilient footing to handle the effects of climate change and adapt.

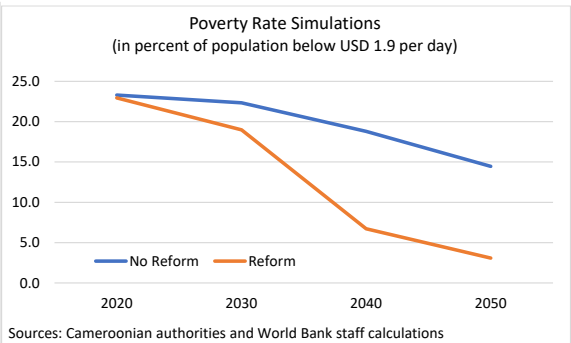
Simulating impacts on growth and poverty with a Computable General Equilibrium Model.
Reform and No-Reform scenarios in development policy

Figure ES1



Sources: Cameroonian authorities and World Bank calculations

Figure ES2



Sources: Cameroonian authorities and World Bank staff calculations

These challenges can be grouped into three broad areas. The first is decreasing the cost of doing business and promoting domestic competition. Lower market concentration and less prevalence of

state ownership would help. It should also imply increased household income for the self-employed and wage earners alike, which is essential in achieving poverty reduction and shared prosperity. Advancing this agenda will be facilitated by cross-cutting reforms including sounder fiscal policy and debt management, better infrastructure for reliable power, water and telecommunications, better connectivity, and more inclusive financial services. The second area is reducing fragility and improving governance. The quality of and access to basic services should improve, responding to the needs of local populations. The ongoing decentralization presents an opportunity to address widening regional disparities. The third area is realizing the potential of Cameroon's labor force. Better health care, nutrition, water and sanitation, basic education, and productive safety nets will help, as will narrowing the skills mismatch, and women's empowerment.

This Country Climate and Development Report (CCDR) finds that climate change is already a threat to the country's development. Cameroon is geographically diverse and has all the climates encountered in Africa. Currently, about two million people (nine percent of Cameroon's population) live in drought-affected areas, and about eight percent of the country's GDP is vulnerable. Tropical forests cover almost 40 percent of the country and provide an estimated eight million rural people with traditional staples including food, medicines, fuel, and construction material. Changes in temperature, rain and droughts put these people at greater risk of increased poverty. Furthermore, populations living in certain regions are more vulnerable to climate hazards, especially in the Far North where debilitating droughts have contributed to alarming rates of food insecurity and loss of livelihoods. The average temperature has risen, with significant regional variations. Extreme temperatures and an intensification of hazards (droughts and floods) are more likely. A changing climate in the next decade, and probably beyond, means the number of people and size of the areas affected by substantial physical impacts will continue to grow. This report finds that climate change will have direct effects on five socioeconomic systems: food systems; natural capital; urban physical assets; infrastructure services in energy and transport; and life & work.

Poor communities and regions with higher poverty levels and those facing fragility, conflict and violence are generally more at risk. The Extreme North, North and Adamawa regions have harsh climates with low rainfall and high temperatures. The population here relies on agriculture and livestock-related work (with the risk of heat stress) and has less financial capacity to adapt quickly.

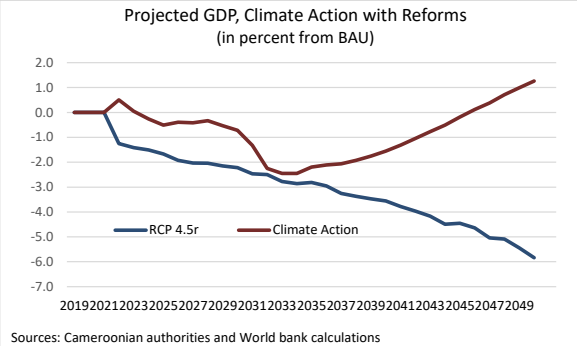
Cameroon has progressed in developing a climate policy, but still lacks a comprehensive regulatory framework to support its goals. The SND30 sets a dedicated objective to combat climate change with a proposed set of reforms to create an environment conducive to economic growth, improved governance and institutions, and decentralization. Cameroon submitted its updated NDC) in November 2021, committing to 35 percent of greenhouse gas (GHG) emission reduction by 2030, conditional on availability of financing. Cameroon does not yet have a law requiring public institutions to integrate climate change into their policy and planning instruments and budget process, and most sectors lack legislation supporting the country's adaptation and decarbonization goals. Furthermore, a significant share of NDCs depend on mobilizing resources by development partners and the private sector. The implementation of the first NDC showed that few measures were adequately funded and the private sector has a very limited capacity to integrate climate change impacts into its business models. Also lacking are the capacity of the oversight institutions to scrutinize climate change actions and performance, and any formal mechanism for consultation.

Climate actions should go hand in hand with development actions. Investments to switch agricultural production toward more resilient activities and crops, expand renewable energy, and render infrastructure and health systems more resilient serve both goals**.** A more favorable business environment and fiscal space would allow the authorities more options to finance climate actions (other than borrowing), and thereby limit GDP losses or even achieve slightly faster growth. A more favorable

business environment would also make it more attractive for the private sector, domestic as well as foreign, to play a bigger role and cover part of the financing. Carrying out climate action investments in a more business-friendly environment is expected to reverse the trend of climate changed-induced poverty. Climate actions would especially favor agricultural households. The country's poverty rate could be reduced five-fold with robust climate and development reforms by 2050: from an expected 15 percent to 3 percent.

Simulating impacts on growth and poverty with a Computable General Equilibrium Model.
Development reform and climate action under the moderate RCP 4.5 scenario

Figure ES3



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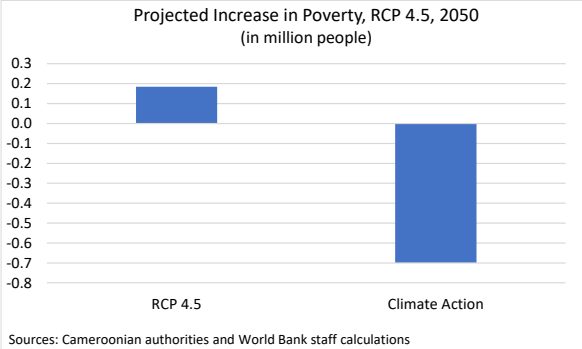

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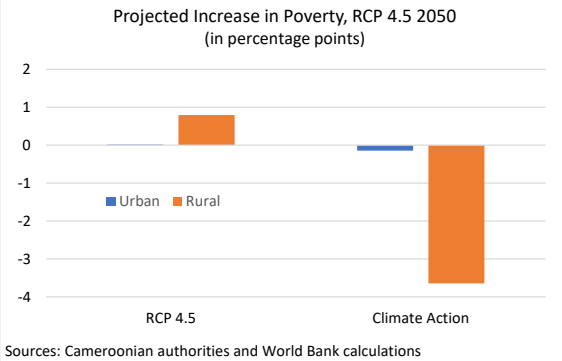
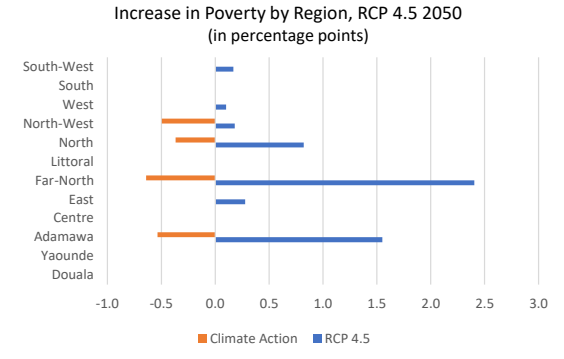


Figure ES6



Note: Representative concentration pathways (RCPs) portray possible future greenhouse gas and aerosol emissions scenarios. RCP scenarios are not specific policies, demographics, or economic futures; RCP 4.5 is described by the Intergovernmental Panel on Climate Change (IPCC) as a moderate scenario in which emissions peak around 2040 and then decline. In this CCDR, we explore impacts under the RCP 2.6 and RCP 8.5 with climate change projected to be less or more severe respectively than under RCP 4.5.

Addressing physical climate risk in Cameroon will require a systematic institutional strengthening and governance improvements economywide. Investments are needed in accelerating adaptation and resilience in urban assets, agriculture, livestock, roads, schools, and the health system. Urgent efforts are needed in decarbonizing, eliminating flare gas, and reversing deforestation. Forests are an opportunity that Cameroon should not miss to remove human-caused emissions from the atmosphere, and be rewarded for it, using innovative carbon pricing and market instruments. Systematic vulnerability assessments will help quantify potential physical and financial damages from climate change.

Adaptation can help manage the multiple risks identified in this report, although it would entail hard choices and could prove costly for affected regions, communities, and households. Preparations for adaptation—whether seawalls, climate-proofed roads, or drought-resistant crops—will need collective

and coordinated action and involvement of the private sector willing to cover some of the costs to reap the benefits of adaptation. There are many opportunities in Cameroon, and further impacts on yields, labor productivity, health, and increased risks from flooding and drought can be stopped by engaging in genuine reforms.

Promoting clean energy and low carbon growth could represent a shift in the development of the power sector. Renewable energy could diversify the electricity mix and improve the performance and resilience of the power system as climate change is less likely to affect the hydropower energy generation. At the same time, energy sector reforms including improvements in operational performance of electricity companies, adoption of payment discipline for electricity bills from the state entities and SOEs and implementation of cost-recovery tariffs, combined with incentives and investments for the elimination of routine gas flaring and venting are important priorities for a low carbon energy development plan.

This CCDR proposes four priority areas: (i) agriculture, forestry and other land use; (ii) cities; (iii) infrastructure; and (iv) human capital. Governance is a cross-cutting reform area for climate action. Seventeen actions in these areas are summarized in the table below.

Priority climate actions by sector/system and cross-cutting governance issues

	Action	Purpose/Objective	Feasibility	Impact
AGRICULTURE, FORESTRY AND OTHER LAND USE (AFOLU)				
1	**Combatting deforestation and forest degradation**	Planting 650,000 ha of degraded land; protection and conservation of 3.3 million ha nationwide.	++	++
2	**Enabling rights-based land use**	Ensures community involvement in land-use outcomes; strengthen community control over forests; build capacity for implementing restoration.	+	++
3	**Revise the Forest Policy/Law**	Assess implementation of the policy and institutional evolution and impact on forests.	++	++
4	**Climate-Smart Agriculture**	Support portfolio of nine priority and integrated CSA investments.	+++	++
5	**Gender Sensitive Adaptation**	Support women's agency for climate adaptation and target women farmers' structural disadvantages to improve rural productivity and food security.	++	++
6	**Conflict prevention and regional/local adaptation for all**	Strategic regional adaptation investments with local climate action plan to minimize amplification of conflict drivers and ensuing violence after climate shocks.	+	++
CITIES				
7	**Sustainable urban planning**	Initiate climate-sensitive development planning: ensure medium- and long-term national/sector development strategies integrate climate considerations.	++	++
8	**Equitable adaptation in cities**	Opportunities for cities to implement equitable adaptation policies; equitable adaptation planning and community engagement with hazard-specific actions.	+	++
INFRASTRUCTURE				

9	**Broader energy sector reforms**	Improve operational performance of electricity companies (loss reduction); adopt payment discipline for electricity bills from the state entities and SOEs; implement cost-recovery tariffs.	++	++
10	**Climate-informed road investments**	Systematically (i) assess road vulnerability, (ii) integrate results of vulnerability assessments in strategic planning and management practices.	++	+
HUMAN CAPITAL				
11	**Climate-smart health systems**	Build capacity of the health system to respond and adapt to climate change.	+	++
12	**Climate-smart schools**	Invest in climate-smart school infrastructure.	+	++
13	**Smart skills and climate-informed education**	Curriculum reform and investment in climate-smart skills for critical sectors.	++	++
14	**Adaptive Social Protection system**	Expand social protection as the country builds the foundations for an Adaptive Social Protection system.	++	++
GOVERNANCE (CROSS-CUTTING FOR CLIMATE ACTION)				
15	**National Law on climate change**	Enact a national law/legislation on climate outlining roles, responsibilities, and mandates of national institutions, and identifying clear mechanisms for coordination.	++	++
16	**Decentralization**	Include provisions in the decentralization law for role and responsibilities of climate action for local governments, including budget lines for climate action financing.	++	++
17	**Inter-ministerial coordination**	Operationalization of the inter-ministerial committee to help to establish a whole-of-government response to climate change across policy development, implementation and evaluation.	++	++

Notes: Classification/prioritization criteria. Impact: +, ++ indicate the expected magnitude of benefits in terms of increased resilience, potential for adaptation, reduced emissions, and overall development impact. Urgency: assessed in terms of its importance as an enabler of further climate and/or development action. Feasibility: assessed in terms of current administrative, political, or financial ease of implementation; +++ = high; ++ = medium; += fair.

1. Climate and Development

1.1. Economic, social, and environmental context

1.1.1. Insufficient growth to reduce poverty significantly

Real gross domestic product (GDP) per capita growth has been disappointing in Cameroon, averaging 1.8 percent from 2014 to 2019, falling short of the high rates achieved in the 1980s. Meanwhile, disparities between regions and income groups in accessing basic services and livelihood opportunities have widened. Cameroon's economic performance is falling behind that of most low- and middle-income countries (LMICs) and falling short of its own aspirations as expressed in Vision 2035 (Cameroon 2009) (figure 1.1). Although poverty slightly declined by 1.9 percentage points from 2014 to 2018, it remained high in 2018, with 35.6 percent of the population living below the national poverty line (figure 1.2).

Figure 1.1 Per Capita GDP and Vision 2035 Aspiration in Cameroon, 2010–28

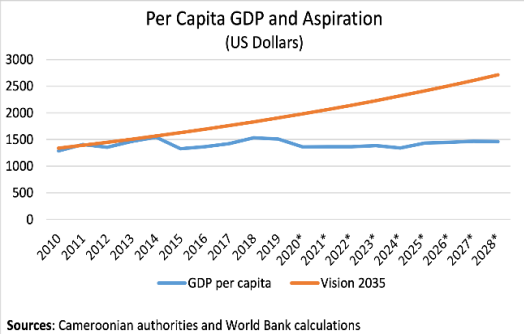
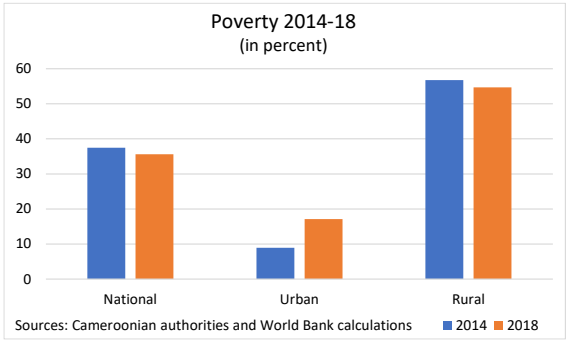


Figure 1.2 National, Urban, and Rural Poverty Rates in Cameroon, 2014 and 2018



Cameroon is a resource rich country that is recovering from the COVID-19 pandemic. Cameroon is heavily dependent on revenues from oil, timber, and agricultural products. The country experienced an economic slowdown during the COVID-19 pandemic, which affected poor and vulnerable populations disproportionately, as they tend to work in agriculture and informal sectors (World Bank 2022). The pandemic has disrupted the supply of food, reducing the availability of food, putting pressure on prices, and jeopardizing consumption and nutrition for poor households. Measures to prevent the spread of COVID-19 disrupted food imports and domestic availability. Supply of imported cereals, such as rice, declined by 70 percent. Imported agricultural inputs also became more expensive, impeding food production by farmers.[2] Nearly two years after the beginning of the COVID-19 pandemic, recovery remains fragile amid the lingering threat of recurrent COVID-19 outbreaks[3] and the possibility of new restrictions.

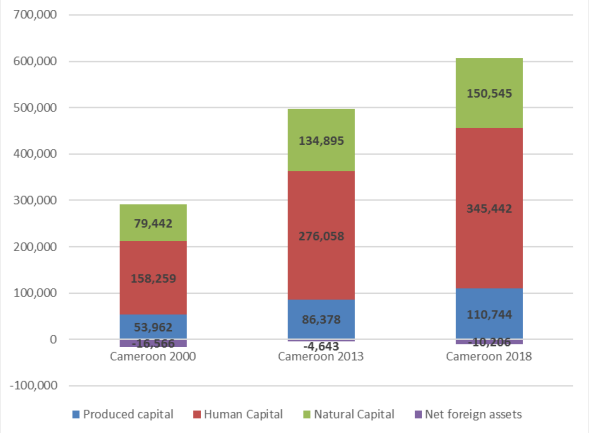
2 Famine Early Warning Systems (FEWS) Network (database), "Cameroon Food Security Outlook," US Agency for International Development, Washington, DC (accessed 2021), https://fews.net/west-africa/cameroon.

3 The Omicron variant, detected in late November 2021, is contributing to COVID-19 flareups across Sub-Saharan Africa.

1.1.2. Natural capital depletion, low human capital, conflicts, and inequalities

Cameroon managed to transform part of its natural capital into other forms of capital. National income and well-being are underpinned by a country's assets or wealth, measured comprehensively to include produced capital, natural capital, human capital, and net foreign assets.[4] Viewed through the lens of wealth, development is a process of building and managing a broad portfolio of assets. Hence, while GDP measures current national income, wealth measures prospects for generating that income. Although Cameroon's natural capital dropped by 2.3 percent between 2013 and 2018, its total wealth per capita increased by six percent, from US$ 22,317 per capita in 2013 to US$ 23,656 per capita in 2018. In absolute terms, Cameroon's wealth rose by 21.1 percent over these five years, from US$ 492,688 in 2013 to US$ 596,526 in 2018, while natural capital increased in parallel by 11.6 percent (figure 1.3).[5]

Figure 1.3 Wealth Components in Cameroon, 2000, 2013, 2018



Despite its increased wealth, Cameroon lags in human capital indicators, particularly in health and education. Despite vast natural resources and a relatively well-educated workforce which has supported the wealth of the country, Cameroon has a Human Capital Index (HCI) of only 0.4 (World Bank 2021),[6] meaning that a child born in Cameroon today will be 40 percent as productive when she grows up as she could be if she had enjoyed complete education and full health. This score is below both Sub-Saharan African and LMIC averages. National averages mask substantial inequality: Cameroon has one of the largest disparities in HCI between the richest and poorest quintiles of the population.[7] Even more alarming is that only 92 out of 100 children born in Cameroon survive to age five, compared to 96 out of 100 across LMICs, and Cameroonian children who start school at age four are expected to complete only 8.7 adjusted years of school by their 18th birthday, compared to 10.4 years across LMICs.

Cameroon faces conflicts in multiple regions, and they pose regional constraints to development. The Far North has suffered the costs of the Boko Haram insurgency, and the sociopolitical crises in the Northwest and Southwest regions are another source of strain. Heightened tensions have occurred in the East, where in 2021 border regions hosted more than 300,000 refugees, mostly fleeing conflict in the neighboring Central African Republic. It is estimated that the western and northern crises have caused a significant contraction of the local economies (World Bank 2020). Because more than 70 percent of the Northwest and Southwest regions' population rely on agriculture for their livelihoods, this

[4] Wealth is defined in this document as the sum of the following asset categories. **Natural capital**: (i) *nonrenewable resources*: 14 types of minerals and fossil fuels; (ii) *renewable resources*: cropland, pastureland, forest timber, forest services (an estimate of nontimber forest products), watershed services, recreation values, protected areas (value estimated as the opportunity cost of converting to agriculture). **Produced capital and urban land**: infrastructure, machinery, buildings, equipment, and urban land (for brevity, we use *produced capital* to include both). **Human capital**: the discounted value of earnings over a person's lifetime. **Net foreign assets**: the sum of a country's external assets and liabilities. Regarding human capital however, a broader framework is recommended as follows: Human capital consists of the knowledge, skills, and health that people accumulate throughout their lives, enabling them to realize their full productive potential (World Bank, Human Capital Project).

[5] "World Bank. 2021. The Changing Wealth of Nations 2021: Managing Assets for the Future. Washington, DC: World Bank. © World Bank. https://openknowledge.worldbank.org/handle/10986/36400 License: CC BY 3.0 IGO."

[6] Calculated from the Human Capital database in World Bank (2021).

[7] The ratio in HCI between the richest and poorest 20 percent of the population in Cameroon is 1.68 (global average: 1.35; global range: 1.12–1.68).

contraction has led to lower incomes (due to reduced employment and agricultural production) and higher consumer prices of basic food commodities such as maize and beans (due to supply chain disruptions). This combination has inflicted a heavy toll on agricultural activities and consequently on household welfare and the most vulnerable populations (World Bank 2020). There has been a similar contraction of agriculture in the Far North, where insurgent attacks forced around 70 percent of farmers to abandon their fields, shut down local markets, and cease farming activities, such as timely planting (World Bank 2020). Further, the conflicts are intensifying and spreading beyond their initial regions. As a result, and if the conflicts were to last until 2025, national GDP could be nine percent lower than might otherwise be expected. In addition, flows of internally displaced people have put significant pressure on already inadequate service delivery capacities, overburdened school systems, and limited employment opportunities in various host regions.

The Systematic Country Diagnostic (SCD) update finds changing the development model would be beneficial for Cameroon (World Bank 2022). Constraints on development in Cameroon include low rural productivity, a weak business environment for the private sector (formal and informal), the country's fragility, and governance of the public and private sectors. These constraints have become more restrictive in the context of the deteriorating security situation and the COVID-19 pandemic and will be heightened by the growing challenges of climate change, urbanization, and demographic pressure. To achieve more rapid, inclusive, and sustainable growth, it is recommended that the government shift its role to be an enabler of economic development instead of seeking to drive it forward.

1.2. Climate change impacts exacerbate tensions and conflicts

Cameroon is geographically diverse and has all the major climates of the continent. The Southwest contains hot and humid coastal and rainforest areas, the mountains in the North have a mild climate, and the northern desert regions are hot and dry. Cameroon is therefore prone to various climate change impacts throughout its different regions (Norrington-Davies 2011). Northern Cameroon has violent winds, floods, landslides, erosion, and increased incidences of drought and desert advancement that have scorched large expanses of land. In the Adamawa, a region exposed to seismic and volcanic risks, landslides caused by heavy rains are the most recurrent risks. It also faces erosion caused by overgrazing. The Western Highlands face gas emissions from Monoun and Nyos lakes due to heavy rainfall and the same climate risks as those in the Adamawa plateau. The South Cameroon plateau has heat waves (a global warming effect) and flooding, landslides, and erosion. In the Southwest coastal and rainforest regions, intense and abundant rainfall cause recurrent flooding, mass movements, and erosion. Northern Cameroon seems to be the most vulnerable to climate change. It has heavy rainfall that alternates with a six- to seven-month dry season and sporadic but significant floods and droughts. This region shows the most intense change, followed by that of the coast and the Western highlands. The South Cameroon plateau appears to be the least affected, but deforestation and mining may jeopardize conservation and accelerate the threats (Cameroon, MINEPDED 2015).

The average annual temperature has increased and mean annual rainfall has decreased over the past decades. Average annual temperature has gone up by 0.86°C over 46 years, from 24.28°C in 1974 to 25.14°C in 2020.[8] The warming has been more significant in the north of Cameroon from 1991 to 2020, and most rapid in December through February and September through November (figure 1.4). In parallel, the average annual precipitation over Cameroon has declined by 2.9 millimeters per decade since 1960, with a particularly low average rainfall in 2015. Cameroon's coast has had the most

[8] Five-year smooth trends; see Climate Change Knowledge Portal (database), World Bank, Washington, DC (accessed 2022), https://climateknowledgeportal.worldbank.org/country/cameroon.

precipitation, and the northern part of the country has been the driest between 1991 and 2020 (figure 1.5).[9]

Figure 1.4 Map of Distribution of Mean Temperatures in Cameroon, 1991–2020

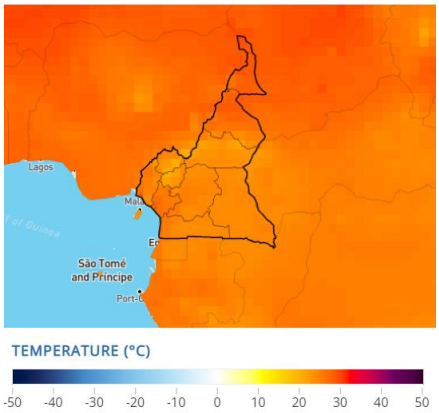
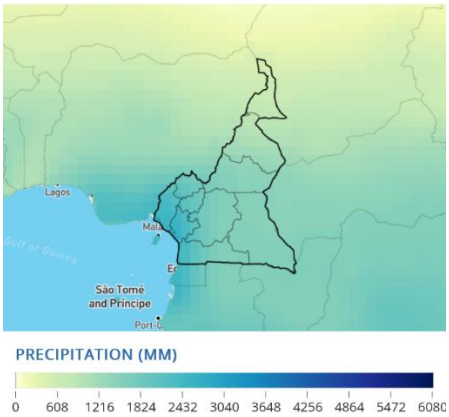


Figure 1.5 Map of Distribution of Mean Precipitation in Cameroon, 1991–2020



Source: Climate Change Knowledge Portal (database), World Bank, Washington, DC (accessed 2022), https://climateknowledgeportal.worldbank.org/country/cameroon.

Climate change is expected to affect Cameroon's climatic zones differently, and extreme weather events will become more frequent and intense. Under the worst-case climate scenario, temperatures are predicted to surge on average by 3.9°C over the next 20 years with wide variations depending on areas. Rainfall is expected to increase on average from 5.8 millimeters over the next 20 years to 10.4 millimeters by 2100 (table 1.1) (World Bank 2022), although precipitation will vary throughout the country (Cameroon 2021). Models are broadly consistent in predicting increases—by up to 15 percent—in the proportion of total rainfall during extreme events, even in seasons when mean rainfall does not increase (UNDP 2012). The country's Sahelian North is predicted to suffer from increased drought, erosion, violent winds, and floods. Its savannah zone is expected to suffer less from flooding risks, but these will increase in all three other zones. In the highlands of the West, erosion, landslides, and drought are projected to become more common. Meanwhile, coastal areas, especially the city of Douala, will likely be vulnerable to floods, sea level rise, erosion, landslides, and violent winds. Cameroon's northern regions are expected to remain the most vulnerable, followed by coastal areas and the highlands (World Bank 2017).

Climate change is an imminent threat to Cameroon's development due the country's dependence on natural resources and Cameroonians' dependence on agriculture for livelihoods and subsistence. Under current climate conditions, about two million people (nine percent of Cameroon's population) live in drought-affected areas, and about eight percent of the country's GDP is vulnerable. Tropical forests cover almost 40 percent of the country and provide an estimated eight million rural people with traditional staples including food, medicines, fuel, and construction material. Changes in temperature, rain, and droughts are putting these populations at greater risk of increased poverty and famine. Between 1980 to 2020, floods and droughts were the second and third most frequently recurring natural hazard in Cameroon on average, or 32.1 percent and 7.5 percent of total natural hazards,

[9] See Climate Change Knowledge Portal (database), World Bank, Washington, DC (accessed 2022), https://climateknowledgeportal.worldbank.org/country/cameroon.

respectively, after epidemics (47.2 percent). The coastal regions, especially the Douala area, have the highest risk of flood mortality.[10]

Table 1.1 Cameroon's Annual Mean Temperature and Precipitation Anomaly Projections under RCP 8.5, 2020–99

CMIP6 Ensemble projection (year range)	2020–39	2040–59	2060–79	2080–99
Annual mean temperature anomaly (°C)	**–0.4 to 1.7** (+0.7)	**+0.2 to 2.9** (+1.6)	**+0.9 to 4.3** (+2.7)	**+1.9 to 6.0** (+3.9)
Annual precipitation anomaly (mm)	**–57.1 to 81.0** (5.8)	**–56.3 to +84.8** (6.9)	**–56.4 to +86.9** (8.8)	**–54.8 to +94.6** (10.4)

Source: Climate Change Knowledge Portal (database), World Bank, Washington, DC (accessed 2022), https://climateknowledgeportal.worldbank.org/country/cameroon. Note: The CMIP6 ensemble projection is based on RCP 8.5. Bold value is the 10th–90th percentile, and values in parenthesis show the median (or the 50th percentile). RCP = Representative Concentration Pathway.

Debilitating droughts in the Far North region contribute to already alarming rates of food insecurity and loss of livelihoods. About 16 percent of the Far North population is in a food crisis. The Mayo-Tsanaga, Mayo-Sava, Logone, and Chari were the most affected departments (départements) during the last quarter of 2021 (UN OCHA 2021). On average, about 1.2 million head of livestock are affected by more than three months of drought every year. Livestock is an important asset and contributor to household food and nutrition security. By 2050, if drastic climate change adaptation measures are not undertaken, more than 2.6 million units of livestock (71 percent of the current total) are expected to be under drought-induced stress conditions annually. More than 100,000 tons of crops, including 20,000 tons of maize, are also affected by weather shocks annually. In recent years, floods have become more frequent and more intense in the Far North, negatively affecting livelihoods, and increasing food insecurity. In 2019 and 2020, torrential rains flooded most departments in the Far North to an extent the country had not seen since 2012, affecting more than 20,000 hectares of farmland. Further, the risks of food insecurity are likely to exacerbate internal migration, worsen already high chronic malnutrition, and threaten to increase stunting rates among children under five years old, affecting their long-term cognitive and physical development.

Harsh climatic conditions can trigger violence in subnational regions affected by socioeconomic exclusion and conflict. In the Far North, volatile climatic conditions obstruct production of the food crops upon which the region depends, and water shortages harm the livelihoods of fishers and farmers as well as herders. Induced by erratic rain patterns and the drying of reservoirs because of severe droughts, water scarcity has fueled violent fights between Choa Arab herders and Musgum fishers and farmers on the Logone-Birni floodplain. Musgum fishers responded to severe drought in August 2021 by digging massive ditches to keep the remaining river water for fishing and crop cultivation. However, the muddy ditches are trapping and sometimes killing herders' cattle, creating additional conflicts with herders (UNHCR 2021). Conflict has restricted market access and obstructed production, reinforcing a vicious circle of violence and damaged livelihoods (Nzouankeu 2021). According to the United Nations (2021), because the drivers of the conflict have not been addressed and economic and social inclusion have not been promoted in areas of the North, violence continues to increase, creating massive displacement spillover effects in neighboring communities that are now more easily targeted.

[10] See World Bank's Climate Change Knowledge Portal (database), accessed 2022, https://climateknowledgeportal.worldbank.org/country/cameroon.

Climate change is damaging Cameroon's human capital accumulation, especially among the poor and the most vulnerable—women, children, and those in rural communities—who are more exposed and have less resilience to climate variability and shocks. In conflict-affected areas, climate change is disrupting people's livelihoods, reducing productivity, affecting health and nutrition outcomes, delaying or deterring learning and educational attainment, creating new security risks, and placing additional strains on overstretched safety nets and institutional capacity. This crisis undermines hard-won development gains.

1.3. Opportunities for decarbonization

Although Cameroon faces severe climate challenges, the country has opportunities to move toward a low-carbon future. There is a significant scope to increase renewables as a proportion of Cameroon's energy mix from currently less than one percent to 25 percent by 2035, given the country's vast renewable energy potential. Today, hydropower is the sole renewable source, but there are opportunities in solar, wind, biomass, and off-grid. Successful deployment of these renewable energy alternatives will require addressing policy and regulatory bottlenecks as illustrated in Chapter 2. Cameroon lacks a renewable energy law to cover renewable electricity purchase tariffs, clarify the rules around the purchase of renewable electricity, and stipulate an auction or tendering process. There is also limited trained manpower and a lack of expertise in new emerging technologies relating to renewables. An absence of competitively priced, long-term financing mechanisms and the lack of stakeholders' awareness of renewable energy financing mechanisms are other factors that limit greater private investment in renewables.

The Congo Basin is one of the three largest forests in the world, the only stable carbon sink, and a key opportunity for Cameroon. Congo Basin tropical forests cover 269 million hectares, second only in area to the Amazon Basin and larger than the forests in Southeast Asia. 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 CO_2 per year (Pirker and Carodenuto 2021), with average emissions at around 500 million tons and average absorption of 1.1 billion tons of CO_2 (CBFP 2021).

2. Country Climate Commitments

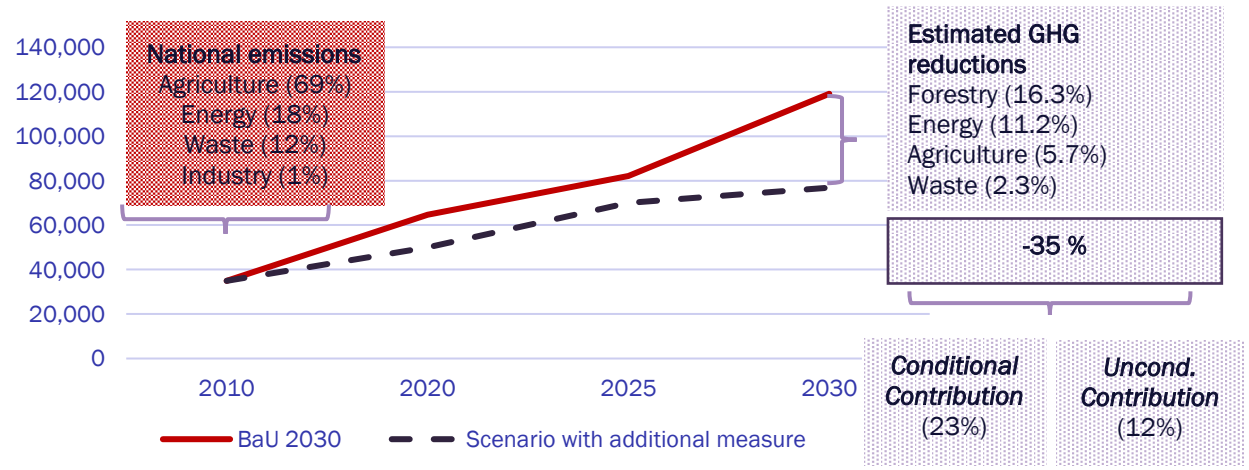
2.1. Climate commitments

2.1.1. A focus on mitigation and adaptation

The Government of Cameroon ratified the Paris Agreement in 2016 and submitted the updated NDC to the United Nations Framework Convention on Climate Change (UNFCCC) in November 2021, committing to 35 percent of greenhouse gas (GHG) emission reduction by 2030 conditional on obtaining financing. At a cost of US$ 25.7 million, the unconditional NDC objective sets GHG emissions of 104.2 metric tons of CO_2e in 2030, representing a 12 percent reduction compared to the business-as-usual scenario in 2030. With support from the international community and private sector via financing, capacity building, and technology transfers, GHG emissions could drop by a further 23 percent (equivalent to 27.36 metric tons of CO_2e in absolute terms), bringing the potential GHG emissions reduction to 35 percent in 2030 compared to the business-as-usual scenario (Cameroon 2021). To achieve this target, the government identified 32 mitigation actions in four key sectors (forestry, agriculture, energy, and waste).

Cameroon's GHG emissions have diminished over the past two decades, although they remain higher than the Sub-Saharan African average. This was achieved through reforestation and a shift of its energy mix toward renewables. Per capita emissions went from 9.32 tons of CO_2e in 1998 to 4.89 tons in 2018, above the 2018 Sub-Saharan African average of 3.45 tons, but below the 2018 world average of 6.45 tons. Emissions per unit of GDP for Cameroon stood at 3.19 kilotons in 2018, higher than both the Sub-Saharan African and world averages, at 2.13 kilotons and 566.17 tons, respectively (figure 1.8).[11] The business-as-usual scenario for GHG emissions predicts a sharp increase by 2030, to reach 119.08 metric tons of CO_2e in 2030, a sharp increase compared to the 2010 level (figure 2.1).

Figure 2.1 Emission Trends Based on Business-as-usual Scenario and Additional Measures in Cameroon, 2010–30



Source: NDC (2021).

The updated NDC reflects Cameroon's vision for adaptation, including the goal to turn climate-related challenges into development solutions in the country's five agro-ecological zones, but does not prioritize

[11] See the CAIT (Climate Analysis Indicators Tool), WRI, available at Climate Watch Data (database), accessed 2022, https://www.climatewatchdata.org.

safeguarding the country's human capital. Proposed measures include 21 adaptation actions in eight sectors and themes, at a cost of US$ 31.85 million.[12] The targeted sectors are: agriculture, livestock, fisheries and aquaculture, forestry, forestry and wildlife, water, sanitation & health, energy, mines and industries, urban development & public works, and tourism.

2.1.2. Links to national and sectoral strategies and plans

Both Vision 2035 and the National Development Strategy for 2020–2030 (Stratégie Nationale de Développement, SND 30), recognize the importance of sustainable development and climate change impacts. Cameroon is grappling with critical challenges to preserve social inclusion, foster economic growth, strengthen human capital, achieve economic diversification and transition to a low-carbon economy while adapting to climate change. Vision 2035 and its second phase SND30 have dedicated objectives to combat climate change. Given the country's diverse social fabric, ecology, and the interactions of communities, Cameroon acknowledges the importance of a "*territorial approach*" to achieving its goals.

Cameroon has initiated developing climate policy documents and integrating climate change in selected sector strategies, notably, agriculture and forestry. Cameroon's key climate change policy document is the National Climate Change Adaptation Plan 2015–19 (Plan National d'Adaptation au Changement Climatique: PNACC), which is accompanied by a costed implementation plan. Cameroon's 2018 National Strategy for the Reduction of Emissions due to Deforestation and Degradation of forests, sustainable management and conservation of forests and increase of carbon stocks (REDD+)[13] addresses gaps and barriers in reducing deforestation and forest degradation, and seeks to enhance carbon stocks. The PNACC assesses the coherence of sectoral policies and laws related to emissions reduction from deforestation and forest degradation and analyzes land and carbon rights for REDD+. Other sectors have also advanced in mainstreaming climate change in their sector strategies and plans (notably the forestry, agriculture, environment, water, and health sectors). A 10-year climate-smart investment plan was developed to prioritize climate response in agriculture and the livestock sectors. In the face of climate hazards, the National Action Plan for Integrated Water Resources promoted a systematic process for the sustainable development, allocation, and monitoring of water resources among sectors.

2.1.3. Increased subnational commitment with limited implementation capacity and resources

Several regional and municipal governments adopted local Climate Change Action Plans (CCAP) and measures to enhance climate resilience, but with limited implementation. Fifty Cameroonian municipalities are members of the Global Covenant of Mayors for Climate and Energy, the largest global alliance for city climate leadership, with over 10,000 city and local government members. Of these 50 members, 26 committed to prepare a local climate plan, and seven have done so. Some were prepared through a climate-sensitive participatory budget process. Climate-sensitive local development plans and local REDD+ plans have been developed by 10 other local governments using a participatory approach.[14] Through sectoral policies, several local governments have developed land management

[12] The NDCs include conditional contributions (23 percent compared to that of business-as-usual in 2030). These depend on international support and unconditional contributions (12 percent compared to that of business-as-usual in 2030) implemented regardless of international support.

[13] "+" signifies the role of conservation, sustainable management of forests and enhancement of forest carbon stocks.

[14] These communities have set up local consultation committees open to representatives of the population to diagnose climate risks and identify solutions that can strengthen community resilience.

tools such as urban development plans, land-use plans, and sector maps, which incorporate climate change aspects or elements (for example, delimitation of flood, no-build, and green zones).

Local governments face major challenges in mainstreaming climate change into their plans, aligning the objectives of local climate plans with the Nationally Determined Contributions (NDCs), funding plans, and building the technical capacity for implementation. Local governments are responsible for municipal solid waste management, urban transport and municipal infrastructure management, the creation of industrial activity zones, and issuing building permits, which are activities with a high potential for emission mitigation. A better understanding of the links between urban services and GHG emissions is essential to create successful climate change mitigation strategies. Yet urban planners and local decision-makers generally lack the tools and resources to make informed choices about the climate change implications of local growth and redevelopment decisions or to measure their effects. Some cities have sectoral sustainability plans (especially for mobility) but lack funding for implementation. Urban building codes, planning regulations, and infrastructure design standards are not yet adapted to climate change mitigation and adaptation requirements. Furthermore, land use is not well controlled, and residents' acquisition of building plots is mainly done informally.

2.2. Climate-informed legislation and coordination mechanisms

Cameroon ratified the UN Framework on Climate Change (1992), Kyoto Convention (2002), and Paris Climate Agreement (2016), which supported the preparation of several national policy documents. These included First and Second National Communications, PNACC, and NDCs. Legal and regulatory provisions have been issued for the energy, water, forestry, and environment sectors, which include climate considerations or provide an initial basis for regulating the actions, and actors to address climate change. The government has strengthened the legal foundations of the Ministry of Environment, Natural Protection and Sustainable Development (MINEPDED) and its agency, the National Observatory on Climate Change (ONACC), and coordination mechanisms responsible for climate change actions. At the subnational level, the 2019 decentralization defines local governments' responsibilities in managing environmental policies, including a provision for climate risk and vulnerability assessment.

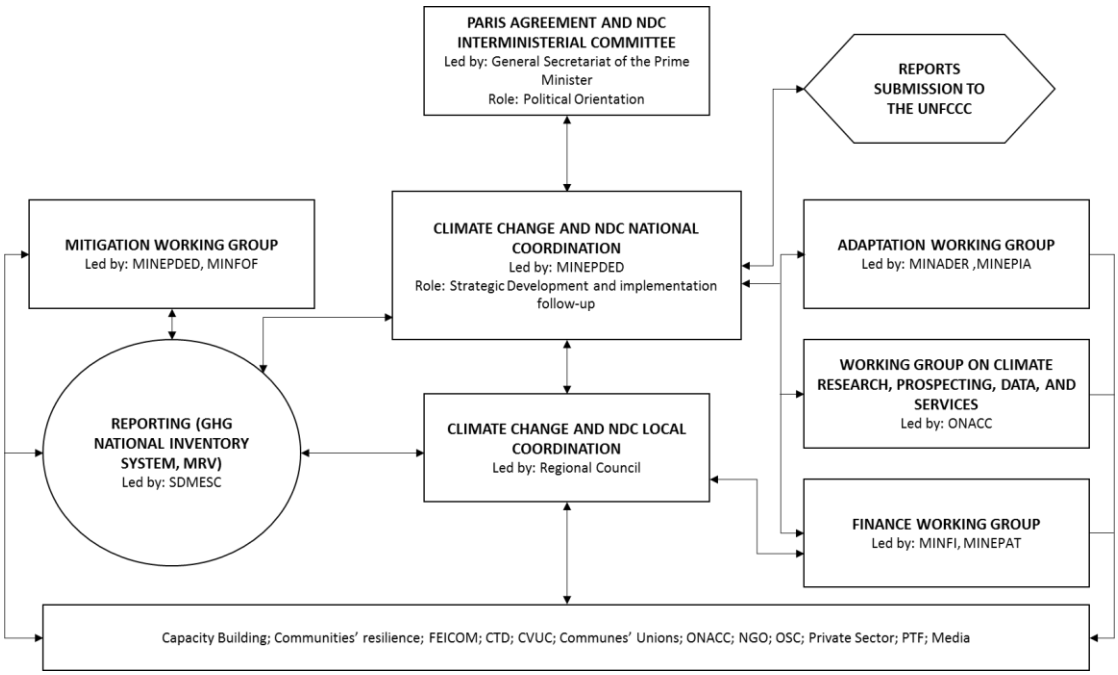
Despite these efforts, Cameroon still lacks a comprehensive regulatory framework to achieve its adaptation and decarbonization goals. No law requires public institutions to integrate climate change into their policy and planning instruments and budget process. Neither the NDCs nor the PNACC are legally binding, and the government can modify them as it sees fit. Most key sectors lack legislation supporting the country's adaptation and decarbonization goals. For example, the Forest Law does not emphasize climate change mitigation and adaptation. The current draft land bill does not address mitigation issues in key sectors, such as agriculture, pastoral, forestry, environmental, industrial, or urban. Local governments have no regulatory requirements to set adaptation targets, prepare plans and strategies, or report on local implementation. The absence of an overarching, multisectoral climate change legislation makes climate policies vulnerable to changes in political priorities and undermines sustained planning over multiple political cycles. The private sector has limited capacity to integrate climate change impacts into business operations. Reasons include risk and uncertainty, knowledge gaps and lack of modeling tools, difficulty in promoting and championing adaptation inside the enterprises, and lack of immediate incentives.

Challenges remain in legislating disaster prevention, mitigation, and management. Disaster risk management (DRM) responsibilities are assigned to the Directorate of Civil Protection (DCP) under the supervision of the Ministry of Territorial Administration (MINAT). The 2005 decree (2005/104) emphasizes the organization of civil protection research activities, capacity building, and control of crisis and disaster operations concerning relief and rescue of victims and transfer of human remains.

However, the legislative profile of DRM has been predominantly ex post disaster-focused, and risk management functions of officers are not explicit in the legislation.

A coordination mechanism was adopted to support the implementation of the NDCs but is not yet operational. In 2017, an inter-ministerial committee under the Prime Minister was established to monitor the Paris Agreement (Decree 2017),[15] however it has never convened. As part of the 2021 NDC, efforts were made to amend the decree to include subnational governments, civil society, and the private sector in the inter-ministerial committee (see figure 2.2), but the decree has not been signed. The absence of an effective mechanism for NDC implementation and monitoring has undermined a coordinated response to attain NDC objectives.

Figure 2.2 Institutional Arrangements of NDC Implementation in Cameroon



Source: NDCs, Cameroon 2021.

Functional responsibilities were strengthened at MINEPDED, but not at other ministries supporting implementation of the NDC. The coordination, implementation, and monitoring of the country's NDCs is mainly under the purview of the MINEPDED and its agency (the National Observatory on Climate Change) and their mandate has been strengthened over the past years. The 2012/431 decree established the organic structure of the ministry, and a subdivision responsible for climate change under the Directorate of Conservation and Natural Resources Management was established in 2012. The 2009 decree on ONACC was amended in 2019, giving it the mission of "*monitoring and evaluating the socio-economic and environmental impacts of climate change and proposing preventive measures, mitigation and/or adaptation to the adverse effects and risks associated with these changes*."[16] As

15. Order 079/CAB/PM of September 5, 2017, sets the number of committee members at 12. Decree 2020/0998/CAB/PM of March 13, 2020, sets out the procedures for the creation, organization, and functioning of inter-ministerial and ministerial committees and working groups. Decree 2018/9387/CAB/PM of November 30, 2018, stresses in article 12 that the composition of an inter-ministerial committee may not exceed 15 members and an inter-ministerial working group may not exceed 12 members.

16. Decree 2009/410 of December 10, 2009, on the creation, organization, and functioning of the ONACC was amended by decree 2019/026 of January 18, 2019. Order 025/PM of February 17, 2017, specifies the organization and functioning of the administrative services of the ONACC and sets out the modalities for exercising this responsibility.

such, MINEPDED takes a center role in NDCs' institutional mechanisms, charged with coordinating climate change working groups and submitting reports to the UNFCCC. Effective coordination is however hampered by overlapping mandates and conflicting roles across sector ministries and agencies. For instance, the decrees creating the MINEPDED, the ONACC, and the Inter-ministerial Committee for Monitoring and Coordination of the Paris Agreement do not clarify specific roles for other ministries and institutions, such as the ministries of finance and planning, sector ministries, the National Meteorological Department, and the National Institute of Statistics. MINEPDED does not have the direct authority to enforce climate policy, and fragmentation of responsibilities throughout multiple institutions, including at different levels of governments, makes coordination difficult.

2.3. Institutional readiness for climate change action

2.3.1. Integration into planning tools and budget processes

The inclusion of a climate agenda in the SND30 has not yet led to incorporating climate change into core planning instruments. Cameroon does not have a long-term climate planning framework to incorporate 2050 GHG emission reduction targets into policies. The MINEPDED plans to develop a national climate plan but has yet to secure funding. Guidelines for integrating adaptation and DRM into development planning were issued in 2017, but few sector strategies and planning tools consider climate change. For instance, despite the potential for community land rights to decrease deforestation, increase carbon storage, and support greater biodiversity, climate change has not been mainstreamed in the land and land use sector (IPCC 2020). Climate risks are not part of fiscal planning, such as macroeconomic forecasting, using a medium-term expenditure framework, nor sector planning for key sectors such as transport, water, waste management, and energy. Yet, fiscal policies can have negative impacts on climate change, such as fuel subsidies that erode the country's ability to achieve its NDC targets. Cameroon introduced program budgeting in 2020, but out of the 37 budget programs, only the agriculture sector has a climate budget program. With no legal requirement for mainstreaming climate risk in the public investment cycle and infrastructure governance, challenges persist in incentivizing planning and budgeting for resilient public investments. Cameroon's procurement regulation provides for elements of sustainable, green procurement, but in practice, its application is limited to environmental impact assessments.

The government has not been effective in mobilizing domestic and external resources to meet the NDCs. A significant share of NDC funding depends on the mobilization of resources by development partners and the private sector. Despite efforts to allocate domestic resources to climate actions, implementation of the first NDC measures showed few of these were adequately funded. When budgeting for climate programs was done by sector ministries, little or no domestic funding was mobilized. Cameroon has applied to mobilize funding available under global funds (for example, REDD+, Green Climate Fund, Adaptation Fund). But limited technical capacity, staff, and resources have undermined the country's ability to advance on accreditation processes, and REDD+ governance issues delayed the application process. It is important to note that Cameroon has yet to comply with the Warsaw Framework for REDD+ adopted by the Nineteenth Conference of the Parties in 2013.

2.3.2. Institutional readiness to support people's resilience

Cameroon's social protection system is not ready to safeguard the poor and vulnerable people from climate-related shocks. A Social Protection Stress Test, performed by the World Bank in 2021, showed gaps in integrating disaster risk management and social protection programs, which prevent Cameroon's early warning system for monitoring food security from informing safety net programs. The test also found that scaling up the delivery system in times of shocks is time- and resource- intensive.

Many of those affected by climate change are not protected by any form of social protection. Despite a substantial expansion of social safety nets in recent years to cover a larger share of Cameroon's extreme poor (25 percent of the poor population by 2022), social assistance is underfinanced and donor dependent, and progress toward permanent institutional and financing arrangements have been limited.

2.3.3. Risks to climate action due to lack of accountability and quality of data

Substantial climate data are produced, but institutional inertia and lack of coordination hamper their quality and effective use. The ONACC, National Directorate of Meteorology, National Statistics Institute, National Mapping Institute, Hydraulic Research Center, and Institute of Geological and Mining Research are involved in data management, producing climate maps, hydrological data, climate impact assessments, or the forestry atlas. However, coordination is lacking, and limited public resources are spread thinly among these institutions, affecting data quality negatively. Data sources and information systems tend to be fragmented, and data management is poor (maintenance of weather stations to ensure consistent data collection, coordination, and sharing). Because of limited funding, data coverage is often confined to selected areas, and information on risks and vulnerabilities is not produced. Some climate information is available on online repositories, such as the ONACC's. Nonetheless, access can be a challenge because of nonfunctioning websites, outdated information, or restrictions.

Climate actions also suffer from insufficient accountability and citizen engagement. The government has engaged with stakeholders through consultative workshops for the preparation of the PNACC and NDCs, and other documents, but stakeholders rarely influence decision-making and implementation, and challenges persist for private sector involvement. Furthermore, there is very limited capacity by oversight institutions to scrutinize climate change actions and performance. For instance, Parliament's involvement in climate change issues is rare, and the audit mechanisms cannot evaluate specific plans or policies related to climate change or risk management (in any case, the audit chamber has no experience in this area).

Political economy factors also undermine the prospect of an effective or equitable climate response. Major areas of tension have emerged related to leadership, responsibilities, and the transfer of competencies, pitting leading actors such as the MINEPDED against the sector ministries, or central agencies against decentralized entities. Growing streams of climate finance are also changing incentive structures—leading to rent-seeking behavior—as has been the case with governance issues related to REDD+.

2.4. Financial markets

Implementing the NDCs cannot happen without full engagement of the private sector, requiring a change in the public–private partnership (PPP) framework. Although the legal framework for PPPs has been in place for over a decade in Cameroon, management of PPPs varies among sectors, with some line ministries and agencies conducting PPPs autonomously without involvement of national PPP structures. Sectoral governance issues, however, cloud the horizon and may send negative signals to prospective investors. Restructuring of the energy sector, and the associated financial issues, must be completed if plans for large hydroelectric projects are to be agreed upon. There is strong potential and matching demand from the private sector, but current uncertainties about the financial health of the national off-taker (Eneo), among others, is preventing investments. There are difficulties around port concessions. There is a dispute involving the renewal of the container terminal concession in Douala and the need to improve infrastructure capacity (modernization of the Douala port, connection of Kribi to road or rail infrastructure) to meet future demand. Therefore, a comprehensive review of the PPP

framework and its implementation, including funding for the Support Council for the Realization of Partnership Contracts, the PPP unit, would support the development of climate-smart infrastructure projects. It will be critical to ensure a uniform and efficient implementation based on the capacity and convening power of the national PPP structure, line ministries, and agencies, as well as developing a PPP pipeline based on sector assessments, to create a roadmap for mobilizing private financing.

Developing Cameroonian capital markets is a pathway to access long-term funding for climate investments. Green bonds—an innovative financial product that raises funds for environmentally aligned sustainable development projects in accelerating climate change mitigation and adaption—could provide the needed capital to meet the country's climate commitments. As is the case across the African continent, Cameroon's private and public sectors have lagged other emerging markets in issuing such innovative bonds. In the near term, using concessional finance is a viable option to bridge the gap between public funding and private sector financing, especially in sectors where investors perceive greater risk or there is limited access to reasonably priced financing. Concessional financing can take many forms, such as grants, technical assistance to prepare policies for industry decarbonization, or first loss guarantee.

3. Systems Analysis

3.1. Introduction, methods, and approach

This chapter analyzes sectoral policies, investments, and institutional arrangements to encourage green, resilient, and inclusive development with climate action though public and private sector interventions. It focuses on adaptation and mitigation efforts associated with the following transitions in Cameroon: food, forests, urban physical assets, infrastructure services, and life & 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 interlinkages among climate change, ecosystems, and human society. The food system covers agriculture, water, and natural resource management. Natural capital covers the nexus that encompasses forests, agriculture and land use. The physical assets and infrastructure system covers urban, energy and transport assets and services derived from hydropower and roads. The life & work system is a cross-sectoral umbrella treatment of issues related to the 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 a process to integrate adaptation measures and their enabling conditions with mitigation to advance sustainable development for all (IPCC 2022). It looks at various climate responses and adaptation options to respond to risks. Second, the analysis needs to capture the centrality of the Cameroonian 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 Cameroonians but also people living thousands of kilometers away or those moving to Cameroon in search of socioeconomic opportunities, sometimes escaping conflict and violence. Developing a "people-centered approach" to this CCDR also involves identifying and assessing people's tangible and less tangible assets including social capital and human assets such as life itself, knowledge, or 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 is a wealth of information relevant to Cameroon here. Reviewing and assessing impacts and risks drew from a range of important work including the Diagnostic Report for Cameroon (World Bank 2017), and more recent materials used for the preparation of the SDN30, the NDC Update and other sector strategies.[17] However, the aim was not to be comprehensive or to assemble the entirety of relevant evidence currently available or in preparation. Instead, this CCDR is designed to be a "*living document*" for the authorities and their financial partners to use as a platform to advance their climate and development agenda.

3.2. Food, agriculture, and forestry

3.2.1. Food and agriculture

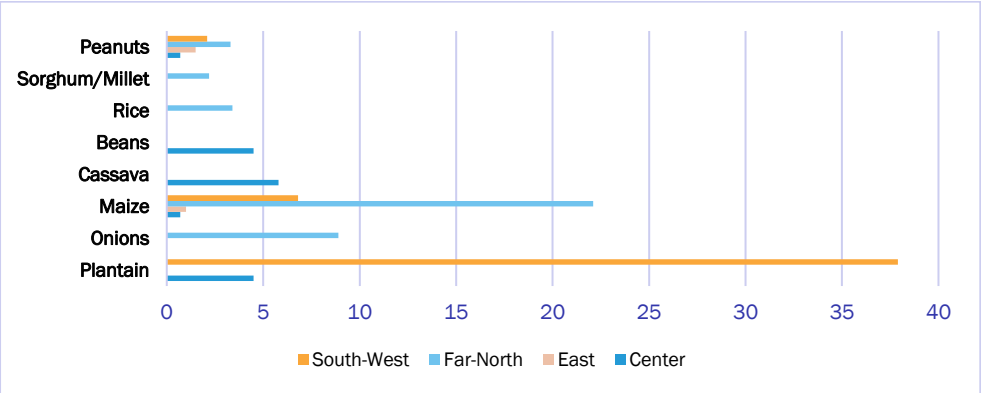
The agricultural sector and the food system are critical contributors to growth, incomes, employment, and trade. The government has ambitions to increase production and productivity in cereals, export

[17] These include Climate Smart Agriculture Investment Plan (World Bank, Government of Cameroon, 2020); Impact of Climate Change on Food Crops (ONACC, 2019); Atlas des Pertes du Couvert Forestier (ONACC, 2021); Stratégie Nationale de Développement du Secteur Agricole/Plan National d'Investissement Agricole 2020–2030 (Government of Cameroon, 2020—Version Provisoire No. 1); Climate Outlook for 2019 (ONACC, 2019); Presentation of the Balance Sheet for the Five-Year Implementation of the Paris Agreement in Cameroon (MINEPDED, 2021).

crops and root vegetables and match its SDN30 objectives for structural transformation, with critical implications for land use. At the same time, small-scale subsistence and cash crop agriculture are considered important drivers of deforestation in Cameroon.

Climate change would accentuate existing challenges in the food system and increase food insecurity. Yields of crops have been hit hard by changes in temperature and rainfall patterns with reductions up to 38 percent over the 1998–2012 period (figure 3.1). The agriculture sector remains the largest source of GHG emissions, mainly due to animal and rice production. GHG emissions of the food system are expected to rise by almost 120 percent over the 2010–2030 period (NDC 2021).

Figure 3.1: Impact of Climate Change Factors on Crop Yields by Region (% Reduction)



Source: ONACC (2019)

All food system stakeholders including government must support climate-smart agriculture, an integrated approach to managing cropland, livestock and forests that addresses the interlinked challenges of food security and accelerating climate change. Technical solutions do currently exist in Cameroon and must be accompanied by climate-smart agricultural (CSA) investments and incentives of the kind proposed in this report. A portfolio of three national interventions plus six investments focused on agroecological zones (AEZs) would target sustainable intensification and the resilience of agricultural production systems. Those priority investments evaluated at a cost of US$ 395 million could improve yields by an average of 29 percent and benefit 2.5 million farm enterprise units. If all those investments are implemented, they would sequester approximately 13.37 Mt of CO_2 (see table 3.1). The results of the cost–benefit analysis over a 20-year period show that Net Present Values of the investments range from US$ 26 million for the irrigated rice system to US$ 321 million for the land development and access to natural resources, for an average return on investment of 3.2 percent. Implementing these investments involves two main challenges: (i) ensuring coordination among several players including six ministries (MINADER, MINEPIA, MINFOF, MINDHU, MINEE and MINEPDED), the private sector (particularly agro-businesses), CSOs, research institutions, professional organizations, and technical/financial partners funding current projects and those in the pipeline; and, (ii) addressing political and institutional barriers including those related to capacity, coordination, budgeting and planning, access and availability of key inputs, technology and financial services, land governance, lack of early warning and emergency response systems, and inclusion of marginalized and vulnerable segments of the population (youth, women, indigenous people).

Table 3.1: Assessment of Climate Smart Agriculture Investment Opportunities

	Beneficiaries	Cost (US$, millions)	Change in Yields (%)	Net Present Value (US$, millions)	ERR (%)	Emission reduction potential (Mt CO_2)
Agro-Climatic Information	1,000,000	25	7	105	5.2	0.50
Soil-Water Management	1,500,000	100	29	294	3.7	1.90
Urban Agriculture	100,000	50	35	83	2.1	1.42
Cotton	200,000	50	31	118	3.0	2.72
Irrigated rice	40,000	20	44	24	1.4	0.60
Maize	250,000	50	33	103	2.6	1.50
Cassava	250,000	50	33	147	3.7	2.31
Agro-forestry	50,000	25	20	42	2.1	3.38
Extensive Livestock	25,000	25	28	39	1.9	-0.96

Source: Cameroon Climate Smart Agriculture Investment Plan (2020).

The livestock sector, accounting for 13 percent of agriculture GDP and employing 30 percent of the rural population, plays a crucial role as a source of food and livelihoods. Despite the large number of animals stocks, production fails to meet demand, and that demand gap is widening steadily due to population growth, urbanization, and a rapidly expanding middle class. Low productivity of local breeds, poor feeding management, weak advisory services, infrequent adoption of improved husbandry practices and limited access to finance and post-harvest infrastructure are among the many constraints that weigh down on the sector.

Frequent droughts, infestation of animals and pastures by vectors, and endemic diseases further exacerbate the above development challenge. Livestock is a major emitter of methane, but the environmental impacts vary greatly between and within different production systems, depending on how they are managed, creating a potential to introduce technical entry points to reduce the GHG emissions while improving food security. While agriculture is categorized as one of the priority sectors for mitigation and adaptation measures, the model used in the NDC update cannot identify the magnitude of change in GHG emissions attributable to productivity gains through improvements in herd structure, feeding and manure management systems in the livestock sector. Using a model that can reflect the impact of livestock management practices on GHG emissions will be of utmost importance in the next NDC.

3.2.2. Forestry

Two decades of data show worrisome deforestation in the Congo Basin. While satellite imagery and other remote sensing technologies have revolutionized the ability to monitor and understand the causes of forest loss in the Congo Basin, the data spanning the past two decades reveal persistent damage to Central Africa's most valuable terrestrial ecosystems.[18] In Cameroon, tree cover trends reveal a loss of roughly 1.53 million ha between 2001 and 2020, of which 47 percent was in primary forests (figure 3.2). The main direct cause of forest loss is expansion of commercial agriculture,

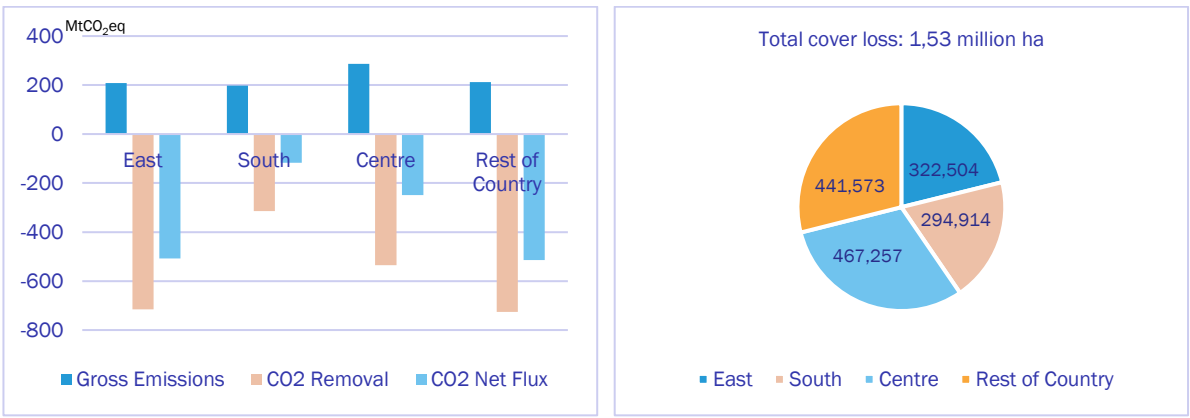
[18] Dr. Eba'a Atyi (CIFOR-ICRAF), Editor of the *Congo Basin Forests–State of the Forests* (2021), kindly provided recent assessments on forests in Central Africa.

augmented by clearing for small-scale agriculture, extractive activities, and roads and other infrastructure, with complex linkages among them. In Ebo, the change is dominated by palm oil and maize production. In Campo, the picture is one of urban expansion, infrastructure (as well as palm); while in the Tri-national Dja-Odzala-Minkebe (TRIDOM) landscape, it is mining, road/rail infrastructure and wood. In Grand Mbam, it is timber and cocoa. And in the North, it is cotton, food crops, fuelwood, and transhumance. An especially worrisome signal in recent data is that forest loss is also increasingly driven by climate change through increased exposure to droughts, fires, storms, and pest outbreaks.

In 2021, Cameroon took seventh place on the list of the world's top deforesters (89,000 ha), after the Democratic Republic of the Congo, which was in second place (500,000 ha). Tropical rainforests are especially valuable for meeting global objectives. Their vegetation and soils sequester vast amounts of carbon, and they harbor a disproportionate share of the world's plant and animal species. Forests play important roles in supporting Cameroon's national economy, generating rainfall and regulating surface water flows important for agricultural production, hydroelectric power generation and municipal water supplies. Forests are also essential for the well-being of some of the most vulnerable Indigenous People and Local Communities, whose livelihoods and cultural integrity are threatened by forest loss.

Forests and natural resources can be managed sustainably, as the SND30 points out. Many causes of the forest loss are amenable to change in the near-term. For example, a large proportion of forest loss is illegal—such as forest clearing within the boundaries of protected areas— and could be addressed through increased law enforcement. Many of the commodities cultivated at the expense of forests—principally oil palm, cocoa, rubber, coffee, and wood fiber—as well as illegally logged timber, are globally traded and thus subject to pressures from government regulation and consumer preferences as reflected in the case of the Cameroon-EU Forest Law Enforcement, Governance and Trade (FLEGT) Voluntary Partnership Agreement (VPA). However, addressing the immediate causes and underlying drivers of deforestation is not easy, and is harder in some areas than others, such as when much of the forest loss is due to small-scale clearing by poor people for subsistence livelihoods. Pursuing a law enforcement approach to address such situations in the absence of viable alternatives is difficult.

Figure 3.2: Cameroon Forest Cover Loss per Region and Associated CO_2 Emissions, Removal, and Net Flux



Source : Hansen et al (2013); Harris et al. (2021)

There are some encouraging signs of progress to curb deforestation in Cameroon and in the Congo Basin. Tropical deforestation is high on the international agenda, and Cameroon is a signatory to the *Glasgow Leaders' Declaration on Forests and Land Use* (November 12, 2021). Cameroonian authorities hope to see many commitments (including the *Joint Declaration to Protect and Sustainably Manage Forests of the Congo Basin*, November 2, 2021) translated into results on the ground. With international commitments, and as part of its own development vision, Cameroon needs to take

concrete steps to increase transparency, accountability, and inclusion in forest management decision-making—in addition to increased finance for forest conservation.

To end deforestation, Cameroon, its neighbors, and the international community have options. Cameroon could target political attention and financial resources to the most important areas, drivers, and actors with the most effective interventions. Thanks to the rapidly expanded quality and availability of forest monitoring data, not only can Cameroon detect where forest loss is taking place, it can identify the causes of that loss, and act on that knowledge. Government can apply policy tools that have proven effective internationally. If forest loss is caused by illegal forest clearing by commercial actors, enhanced enforcement of legal and regulatory requirements can curtail it. Establishing protected areas and recognizing Indigenous Peoples' rights can slow deforestation. Officials can design fiscal incentives such as access to credit or direct payments to reward forest protection rather than subsidize forest clearing. If building roads into intact forests is the main driver of encroachment, officials can find alternative ways to meet legitimate needs for access to markets and services. For companies that produce, trade or purchase commodities associated with deforestation—and for those in civil society who seek to influence those companies—overlaying maps that show forest cover change with related data (for example, locations of concessions) can pinpoint where to prioritize risk management efforts or external advocacy.

Urgent and coordinated actions that Cameroon and Congo Basin partners must consider include: combatting deforestation and forest degradation and restoring forest landscapes; enabling rights-based land use and unlocking forest benefits; support to regional and national forest inventory, analysis, and carbon science; support to the design and deployment of carbon pricing and market instruments to facilitate reduction of emissions; use of fiscal reforms to influence forest conservation and ecosystem health; revision (an update) of the 1993 Forest Policy and the 1994 Forest Law; implementation of the FLEGT Action Plan and implementation of the EU VPA; and support to deforestation-free cocoa and other commodities (rubber, palm oil). These efforts in the Congo Basin would require specific action at the regional, national, and local levels.

3.3. Physical assets and infrastructure services

3.3.1. Resilience, adaptation, and mitigation in cities

Cities in Cameroon are on the front lines of the growing physical risks associated with climate change. They are home to more than half of the country's population and contribute to 44 percent of economic activity. Furthermore, they reside in locations facing drought and extreme heat or at greatest risk of climate change effects, such as coastlines and floodplains. Given existing GHG emission patterns, some climate change is already locked in. Because different cities and regions face different risks and have varying levels of vulnerability, there is no "one-size-fits all" adaptation option for Douala, Yaoundé, Dougmo and Adoumri.

To manage that complexity, Cameroonian cities would do well to concentrate on investing in actions that increase resilience systematically, in addition to adapting to specific hazards. Systematic resilience includes climate-informed planning, national and municipal capacity building for city leaders, and good governance. Vulnerable populations such as children, women, low-income communities, and minority groups need help with resources and adaptive capacity to withstand floods and extreme heat. Financing needs are large, and cities will need to innovate by bringing together public, private, and international finance.

Diagnoses conducted in this CCDR indicate that some adaptation and mitigation options that are effective in some cities may not be feasible in others, given soil conditions, topography, elevation, power composition, age of buildings, and other factors. The government, city leaders, the private sector and

communities have a large array of options for adaptation and mitigation, making it difficult to set priorities and choose a course of action. This diagnostic study has identified, as a starting point, four high-impact actions that can work for many types of city, taking into account risk-reduction potential, cost, feasibility, and stakeholder complexity. More work is needed to provide customized responses for each city, but the study is a useful guide to help government and leaders address the specific climate risks facing their cities.

The analyses conducted suggest several major considerations to be highlighted concerning urbanization. Acting now is key to avoid being locked in a high-carbon and vulnerable city development pattern, because a large part of urbanization is yet to happen, and prevention now will be more cost-effective than remedial intervention later. Climate adaptation and mitigation produce substantial co-benefits that improve quality of life and inclusion in cities. These analyses propose five actions as a guide to help cities play an important role in making swifter, surer progress in adapting to climate change while seeking opportunities for decarbonization. First, sustainable, and resilient urban planning and development are needed, including anticipating the future rapid demographic growth and promoting a denser spatial development of cities. Second, national and municipal capacities must be built, to enforce the policies and implement the plans elaborated. Third, a policy and institutional ecosystem should be created to strengthen the role of the state as enabler of green and inclusive housing development (both public and private schemes). Fourth, elaborating realistic regulation on building materials, energy efficiency of buildings, and implementing the existing standards for eco-housing must be considered. Fifth, climate-risk adaptation would need to be hazard-specific.

3.3.2. Hydropower and other renewable energy sources

Demand for energy and associated services is increasing. Government is aiming at an access rate of 90 percent by 2030, up from the current 63 percent (SND30). At the same time, GHG emissions resulting from the provision of energy services have contributed 18 percent of total emissions (NDC). There are multiple options for lowering GHG emissions from the energy system while still satisfying domestic demand. As well as having a large potential to mitigate climate change, renewable energy can provide wider benefits. If implemented properly, renewable energy could increase energy access and security of supply, and thereby contribute to social and economic development, reducing negative impacts on health and the environment.

Hydropower and other renewable sources hold promise, but climate change is generally expected to have significant effects on the runoff of river basins in Cameroon, and this may affect the energy generation potential and economic performance of hydropower projects. Climate change impacts on the Sanaga and other river basins could severely impact the hydro-energy generation potential and economic performance of hydropower projects in Cameroon. A significant positive impact of climate change on hydro-energy generation and firm power is plausible, with most scenarios projecting climate changes favorable to increased basin runoff, firm power and annual hydro-energy generated. Successful deployment of the renewable alternatives is hindered by unclear policy and regulatory frameworks, lack of technical expertise, and direct and indirect funding constraints. It is vital that the short- to medium-term policy challenges be addressed broadly, in order to attract private investment in renewable energy.

3.3.3. A decarbonization opportunity: flare gas elimination

Eliminating routine gas flaring and venting is at the core of the growing imperative of minimizing greenhouse gas (GHG) emissions in oil and gas production. Cameroon ranks fifth globally in terms of flaring intensity; its associated gas flaring declined by 25 percent from 2016 to 2021, while oil production declined by 32 percent. Cameroon could learn existing lessons on gas flaring from global

experience on the effectiveness of the legal and regulatory framework, fiscal incentives and disincentives, contractual arrangements, institutional governance, monitoring and enforcement practice, and public–private partnerships. These could guide Cameroon to establish an effective framework to eliminate flaring as a part of its decarbonization strategy.[19]

Cameroon's NDC recognizes the importance of minimizing the waste of natural resources and it specifically mentions reducing gas flaring as an industry priority. But the growing global shift to oil and gas produced with a lower carbon footprint compounds the risks associated with Cameroon's dependence on oil and gas revenues. The implications for Cameroon of a structural change in the global oil and gas markets could include macro-fiscal issues, economic diversification, and reforms in energy and other sectors. Considering the ongoing energy transition and the changing oil and gas supply environment, the global oil and gas markets are expected to experience increased volatility in volumes and prices. For oil and gas from Cameroon to remain attractive, it will be essential to decarbonize the value chain and keep costs low. Establishing the right regulatory and fiscal framework to prepare for this volatile environment, and using the revenues generated from oil and gas to prepare the country for the post-transition energy future are key.

To address the challenges of gas flaring and benefit from its elimination, the following priorities are proposed. First, there is a need to improve effectiveness and enforcement of the current Law on the Commercialization of Associated Gas enacted in 2011.[20] Second, because regulatory measures are largely in place, the country's poor performance in flaring reduction indicates that the focus should be on ensuring enforcement and compliance. Furthermore, establishing an integrated gas value chain (domestic: gas to power; export: gas to LNG) will de-risk and facilitate the gas commercialization process and represent an additional incentive for operators. Third, strengthening the power sector's financial viability is important in reducing gas flaring and venting. If domestic natural gas prices are kept artificially low, or if payments to gas suppliers are routinely delayed with growing arrears, operators and oil producers are more likely to flare the associated gas than to invest in assets and infrastructure to gather, process, and deliver the associated gas to power plants. Fourth, supporting the government in developing a transition strategy over the short and long term will help prepare for global decarbonization. A priority in the near term is to identify and remove barriers in the discussion between the private sector and the government, so that the technical solutions under development can be implemented without delay. Capacity building with a focus on strengthening enforcement capabilities will be key tools to facilitate the process.

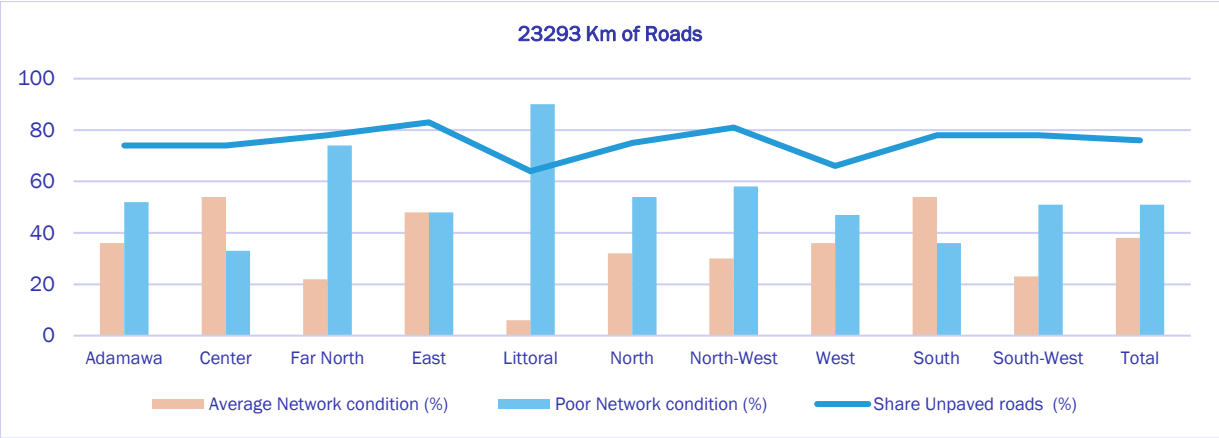
3.3.4 Roads

Due to poor road maintenance and high exposure to climate risks, the road network in Cameroon is particularly vulnerable to extreme climate events. More than 94 percent of roads are unpaved and only 11 percent of the national and regional road networks are considered to be in good condition (figure 3.3). Climate change will take a heavy toll on the road system. Road assets are particularly vulnerable to climate stressors such as higher temperatures, increased precipitation, or flooding. The damage and accelerated aging of roads caused by climate change will necessitate increased maintenance and more frequent rehabilitation. Climate-related damage to the road infrastructure will also cause more frequent disruptions to the movement of people and goods, with direct consequences for economic productivity.

[19] The World Bank could provide the needed support through its Global Gas Flaring Reduction Partnership (GGFR) program.

[20] http://extwprlegs1.fao.org/docs/pdf/cmr109553.pdf

Figure 3.3: Cameroon Road Type and Condition by Region for the National and Regional Network Combined



Source: MINTP/DPPN website, 2020. URL: www.mintp.cm/fr/projets-realisations/presentation-du-reseau-routier. Last consulted on April 11th, 2022.

To protect its road infrastructure against the effects of climate change, Cameroon will need to boost the financial, technical, and institutional capacity of the road sector. Planners and stakeholders have tools available to determine the most cost-effective and appropriate adaptation pathway under a variety of climate scenarios, while recognizing that there is no "one-size-fits-all" solution in Cameroon. First, adapting road transport to climate change is essential to ensure sustainable socioeconomic development in Cameroon. Second, systematic assessments of road vulnerability to climate change will be critical to enable a bottom-up approach to strengthen climate resilience in the road sector. Third, although adaptation to climate change is most critical given the vulnerability of roads, measures to control road transport emissions also need to be strengthened and implemented in a timely manner. Fourth, the lack of data and analytical capacity to assess and mitigate the effects of climate change on roads is severely constraining climate action in the sector. Consequently, addressing knowledge and capacity gaps on climate change and road asset management is urgent. Any effective and efficient climate adaptation strategy for roads will require the availability of reliable data on historic and projected climate variables, granular data on the road network, strategic assets, and traffic, as well as analytical capacity to exploit this data. To do so, investments in data collection and analysis will be essential, and will have to be coupled to renewed efforts to strengthen cooperation and coordination between key stakeholders, including the ONACC, MINEPDED, MINTP, and MINT.

3.4. Life & Work: human capital and social inclusion

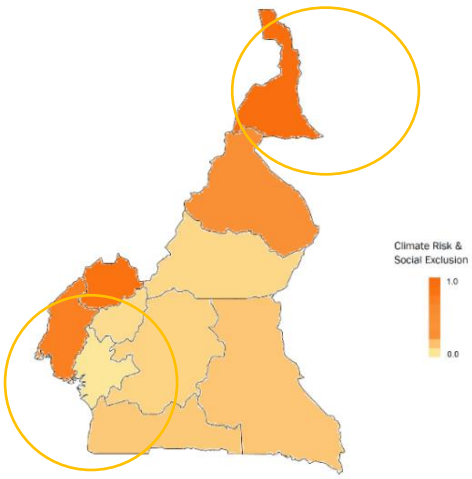
Climate change has differentiated regional and gendered impacts that contribute to the erosion of human capital of Cameroonians and prevent them from having healthy lives and work. Heat stress and harsh climate conditions will continue to worsen, exacerbate the gendered differences, and worsen drivers of conflict contributing to increased violence. An adaptation response needs to be designed to address specific regional vulnerabilities, especially for mitigating the drivers of conflict. Integrating climate adaptation into social protection programs increases resilience, especially when complemented by basic services such as health and education and the needed infrastructure. Targeted support for women farmers, who are disproportionately involved in small-scale agriculture, ensures that they are not excluded from adaptation programs.

Due to geographic disparities in levels of social inclusion in Cameroon, populations living in specific regions are more vulnerable to climatic hazards. A recent Social Sustainability & Inclusion (SSI) analysis

for Cameroon developed an SSI index comprising measures for (i) levels of human capital, (ii) access to labor markets and services, (iii) levels of social cohesion and resilience against exogenous shocks, and (iv) incidence of political conflict. The assessment identifies the Far North, NW and SW regions as areas where levels of social sustainability and inclusion are low. Using the spatial climate risk index measuring vulnerability to floods, heat stress, and droughts, the Far North is also identified as the most vulnerable region in the country (figure 3.4).

Local institutions and human development systems (education, health, and social protection services) are not yet equipped to counteract these complex dynamics of climate change and conflict that are devastating livelihoods. Strategic regional adaptation investments—with local climate action plans—are urgently needed to minimize amplification of conflict drivers and ensuing violence after climate shocks. The following are suggested as first steps: support the decentralization efforts to build the capacity of regional and local institutions to create and promote inclusive and participatory governance, with a specific focus on climate resilience; conduct localized climate assessments to inform the implementation of the NDCs and invest in regional learning and statistical systems to collect better quality data on regional climate-related conflict. Adaptation will be needed across multiple climate-sensitive sectors.

Figure 3.4: Social Inclusion and Climate Risk Combined, by Region



Source: World Bank staff calculations (deep dive on life & work)

Gendered participation in agricultural livelihoods suggests that women are at particular risk of being excluded from livelihoods. As subsistence farmers, women lack capacity to adapt to the changing climate, especially the increased heat in the Far North. Women face even more uncertainty about their livelihoods when men shift their labor from cash crops to food crops. Supporting women's capacity ("*agency*") for climate adaptation—targeting women farmers to overcome structural disadvantages—should be a priority. African countries in general, and Cameroon specifically, are failing to take advantage of the unique knowledge, skills, and perspectives that women have—such as knowledge about local sowing seasons, traditional multicropping practices, wild edible plants, and livestock management. They also play major roles in disaster recovery and resilience. It would be highly advisable to develop gender-responsive policies that remove barriers to women's advancement and utilize their unique skills.

Climate change already has a significant impact on health and education opportunities, eroding human capital. The country has already experienced several epidemics such as trypanosomiasis (sleeping sickness), cerebrospinal meningitis, cholera, and diarrhea. Moreover, waterborne, or foodborne diseases, food and water shortages, as well as a mental illness and malnutrition are observed in the

country. These effects tend to be exacerbated by climate change. While studies of the impact of climate change on health in the country are still limited, one conducted in the western region of Cameroon found negative health impacts among those surveyed.[21] Climate change is known to exert both direct and indirect impacts on educational attainment and learning outcomes (though the relevant mechanisms are not yet well understood). It would help to raise awareness among both teachers and students if the topic of climate change were integrated into the curriculum as a discrete module.

The adaptive capacity of institutions and systems to protect people and build their resilience and preparedness is still limited. Recent analysis shows that the poorest households are twice as likely to have been adversely impacted by climate change than the rich.[22] Climate risks are not yet adequately integrated into social protection programming. Cameroon has an Early Warning System for monitoring food security, yet it is not linked to any social protection program. Twice a year, it assesses food insecurity risks based on factors such as the weather and climate change, markets and trade, agricultural production, conflict, and livelihoods. To date, vulnerabilities have not been assessed against existing adaptive capacity to climate change risks. This knowledge gap will exacerbate existing weaknesses in the health sector, such as (i) poor availability of basic medical equipment and essential medicines; (ii) insufficient, unevenly distributed and poorly qualified health care workforce; (iii) high out-of-pocket costs for health care (over two-thirds of total financing) increasing the burden on households; (iv) weaknesses in emergency preparedness and response planning, biosafety, links between public health and security authorities during a public health emergency, and low infection control practices; and (v) lack of mechanisms to support people and firms after disasters and shocks. The COVID-19 pandemic compounded these weaknesses and led to service disruptions.

Categorizing jobs based on different impacts of the greening process shows that Cameroon has almost no highly polluting "brown" jobs and can gain by promoting upskilling and training. The analysis below (figure 3.5) focuses on three types of jobs in relation to the greening process: (i) "green jobs": jobs where workers perform tasks compatible with environmental sustainability, these jobs are expected to remain in demand;[23] (ii) "brown jobs": those in the most polluting industries, these jobs are expected to be significantly changed and/or replaced; and (iii) "jobs requiring upskilling": those that are expected to endure but will require retraining to become greener. Half of the jobs in Cameroon are categorized as "green", 97 percent of them in agriculture and subsistence agriculture. In addition, 12 percent of jobs "require upskilling": these jobs are mostly concentrated among the most educated. By contrast, "green" jobs have a higher concentration among the least educated, who could benefit from upskilling.

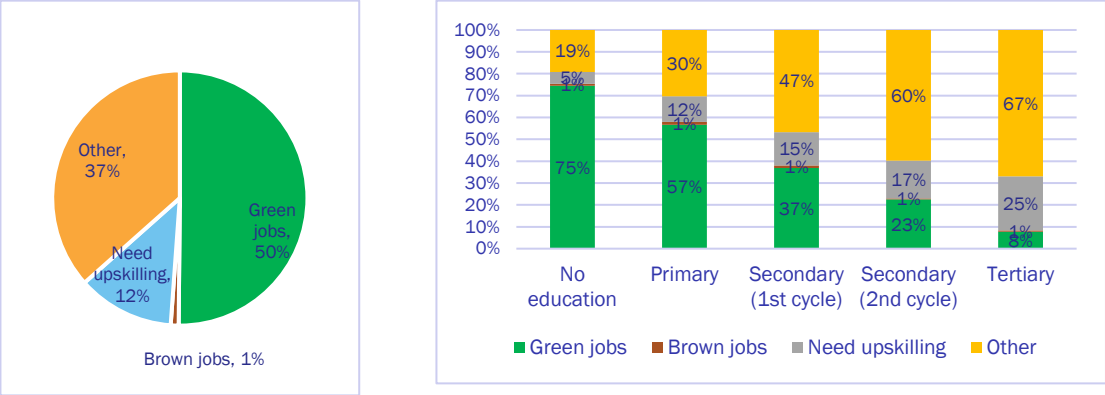
To address the impact of climate on human capital, the following priority investments in line with Cameroon's NDC commitments are proposed. First, build capacity of the health system to respond and adapt to climate change. Second, invest in climate-smart school infrastructure. Third, reform curriculum and investments in climate-smart skills for critical sectors. Fourth, institutionalize social protection and expand it as the country builds the foundations for an adaptive social protection system that is responsive to climate-related risks. Fifth, integrate climate risk information, metrics, and forecasts into social protection to anticipate shocks and achieve comprehensive risk management. Sixth, combine climate risk insurance with social protection as part of a comprehensive risk-layering approach. These actions will have to be complemented with social inclusion measures supporting women's agency for climate adaptation.

[21] Fudjumdjum, H. (2019). Impact of climate change on health: Evidence from multi-stakeholders in the Western region of Cameroon. In: Leal Filho W. (eds) Handbook of Climate Change Resilience. Springer, Cham. https://doi.org/10.1007/978-3-319-71025-9_174-1.

[22] Brunelin, Stephanie; Ouedraogo, Aissatou; Tandon, Sharad. 2020. Five Facts about Shocks in the Sahel. SASPP Operational and Policy Notes Series; Note 1. World Bank, Washington, DC.

[23] The 'green jobs' concept does not have a single universally accepted definition. In the absence of a standard definition of green jobs or how to classify them, this CCDR follows Rahman (2009), Vona et al. (2018) and Makovec and Garrote-Sanchez (2021).

Figure 3.5: Categorizing Jobs based on Different Impacts of the Greening Process (2014)
Share of jobs (left) and distribution of worker education (right).



Source: World Bank staff calculations based on the Cameroun Household Survey (EMAC4).

3.5. Cross-cutting climate issues

Addressing the climate risks analyzed in the previous chapters will require accelerating adaptation, mitigation, and a more strategic and systematic approach for dealing with climate change. The question is how to implement them to ensure their success in this difficult context. Is a change in the approach to tackle climate risksrequired? A few cross-cutting strategic and operational issues are considered next to ensure consistency between the policy recommendations covering human capital, inclusion and social cohesion, food, forestry, renewable energy, roads, and cities and clearly identify trade-offs given the fiscal constraints faced. The deep dives in this diagnosis reveal that a *territorial approach,* customized to the specificity of the locality is more effective than sectoral or thematic approaches.

3.5.1. The private sector perspective and green financing

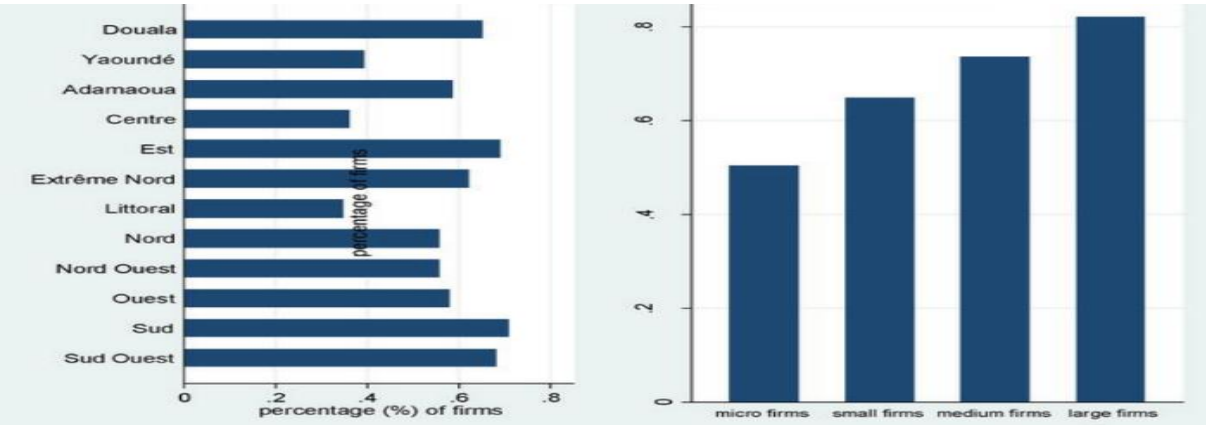
Without the private sector, Cameroon will not surmount its development and environmental challenges. Businesses are highly vulnerable to climate risks, but they can also be a major contributor to the country's mitigation and adaptation strategies, especially by mobilizing additional funds. The transition to a green economy will require a dynamic and responsive private sector able to operate on a level plain field with judicious government support.

Unleashing the full potential of the private sector will require addressing the constraints discussed in Chapter 1. While these constraints loomed large, there was only sporadic attention paid to ensuring that sustainable business models underpin business plans for private enterprises. The approach so far of most businesses in Cameroon, as is often the case globally, has been to focus 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. Cameroon's 2013 private investment incentive legislation does not fully reflect climate change concerns and would benefit from an update to underscore the private sector opportunities created by promoting a green economy.

Medium and large firms in the South, South-West and West regions are "green." According to firm-level analysis using Cameroon Business Climate Survey 2016, almost 56 percent of firms claim to have a 'green' policy (figure 3.6), which includes practices such as decreasing carbon footprint, reducing and recycling waste, better office energy efficiency, using environmentally friendly materials and equipment, and implementing a green training program for all employees. These 'green' firms tend to be medium

to large and concentrated in areas where rural activities are dominant: the South, South-West and East. Providing support to enable micro and small firms to catch up would be a promising avenue to pursue.

Figure 3.6: Green Practices in the Private Sector: Size (right) and Location of Firms (left)



Source: IFC Staff computations based on Cameroon Business Climate Survey (2016).

3.5.2. Climate resilience through a *territorial and people-centered approach*

This CCDR finds that efficient climate change strategy requires aligning sectoral strategies, policies and investments for **structural transformation and inclusive development.** Given the geographic and cultural diversity of Cameroon, climate risks and impacts are specific to region and context. A *territorial approach* is effective in such a context to achieve a transition toward climate-resilient development. Regional and local authorities, private sector and civil society organizations will all play important roles in this approach.

The *territorial approach* opens channels through which the reforms lead to more climate resilience. The SDN30 notes *"…to address all of the above challenges simultaneously becomes a delicate exercise that requires trade-offs, on the one hand, between competitiveness, social cohesion, and the preservation of natural resources, and, on the other hand, between the different stakeholders who have divergent interests."*[24] The instruments proposed for correcting regional disparities, reducing inequalities, and acting locally are steps in the right direction, to be accompanied by climate actions responding specifically to the challenges and risks that the regions and localities face. Complex challenges may have a single-sector entry point (for example, social protection, agriculture, energy), but can be addressed more effectively through an integrated approach that uses cross-sector coordination to address solutions. Several of the sectors covered in this CCDR are both a problem and a solution, hence linking adaptation and mitigation could make interventions more effective. Table 3.2 proposes a few avenues for operationalizing climate action in a development that is spatially integrated, leveraging the contribution of actors operating at multiple scales and bringing incremental value to national development efforts.

[24] SND30, Section 6.5 Regional Development, paragraph 453.

Table 3.2: Territorial Development and Climate Action: The DOs and DON'Ts in Cameroon

True Territorial Development Successfully Addressing Climate Risks and Responses	Unbalanced Territorial Development Unhelpful in Addressing Climate Risks and Responses
Making "territories" the right framework and an active player in development policy and climate action.	A central government trying to "territorialize" national development and climate policies though a top-down approach.
Multi-actor partnerships are in the driving seat, implicating all relevant local actors that should handle adaptation, mitigation, and resilience interventions.	Regional development processes led by one type of actor.
Supra-regional and national authorities play a catalyzing role in the promotion of a climate-resilient territorial development but should also handle trade-offs and synergies arising from cooperation and conflict between "territories" (such as development of the Congo Basin Forests).	Marginalization or exclusion of local authorities and groups in the process of regional development, preventing the local public sector from playing a key role and ensuring sustainability.
Supportive national development and climate policies exist (decentralization, urban and rural development, energy, transport, health, education, forestry).	Territorial development processes dependent on local dynamics, not underpinned by sound governance, and not coherent with national policies.
A holistic and integrated approach aiming at promoting green, resilient, and inclusive development.	Mono-sector or Mono-system approach to territorial development looking at climate projects and programs without regard for ramifications or implications for other interventions within the "territory".

Notes: principles and lessons learned from analysis conducted in (i) World Bank Cameroon Climate Change Institutional Assessment (2022); (ii) EC Supporting decentralization, local governance, and local development through a territorial approach (2016), Reference Document No. 23 Tools and Methods Collection; (iii) World Bank (2009), Reshaping Economic Geography; (iv). World Bank Cameroon Local Governance and Resilient Communities Project (P175846); Forster et al (2021); Matsumoto et al (2019). .

The CCDR also finds specific people and communities will be impacted differently by climate change. The impacts such as heat and drought on losses of productivity, reduction in agricultural yields, reduced mobility due to degraded roads, deforestation, and land degradation will disproportionally affect low-income people and communities already facing significant economic and social challenges. Success or failure in achieving climate resilience will be measured by how well such people and communities are protected.

Inclusive and lasting multi-stakeholder engagement matters. A *people-centered* approach is especially relevant for the regions of Cameroon experiencing urgent humanitarian, environmental, political, or social crises, as it can help to build trust and confidence through inclusive, restorative and peace-building solutions taking into consideration vulnerability to climate risks. Dealing with groups that are most vulnerable to climate change requires long-term commitment, and continuous engagement with territorial actors, but most importantly immediate action. Participation in the deliberation and decision-making process by the local stakeholders ensures the adopted measures reflect local concerns, and thus enhances the buy-in of the local population and the likelihood of their success.

Technical tools can also help bring people to the center of attention. Such tools include a Social Protection Stress Test, and cover drivers and extent of deforestation, GHG emissions in cities, as well as analysis of climate factors on agricultural yields. More insights could be gained through assessing adaptive capacities of health and education systems, which could then be used to manage current and future climate-related risks. The diagnostics related to land use demonstrate the need for data-informed territorial approaches bringing together multiple stakeholders and levels of governance to improve natural resource management and consider ecosystem services.

4. Macroeconomic and Distributional Impacts

4.1. Introduction

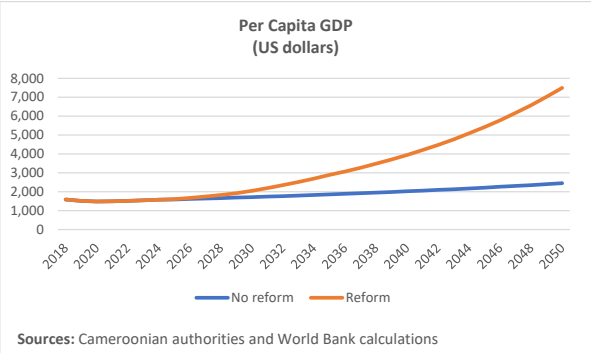
The impact of climate change risks on the economy is examined in this chapter through a computable general equilibrium model. Growth implications are identified through dynamic interactions across economic sectors and between economic agents over a relatively long period. The impact of climate actions identified in the preceding chapter on the country's growth pattern and key sectors of activity is highlighted, along with the projected costs and their distribution implications across regions, income groups, and gender. The modeling is done 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 broad macroeconomic and distributional implications of various climate actions and options to address constraints in managing poverty and social impacts. It intends thus to be a framework for engaging in a policy dialogue and to provide a basis for further research.

Two scenarios were examined: one where no reforms are undertaken and the economy continues along its former trajectory, the other more in line with the country's aspirations, involving reforms needed for faster, more sustainable and more inclusive growth (figure 4.1). Simulations suggest that on its current path, the proportion of the population subsisting on an income at or below the international poverty rate would still be about 15 percent in 2050, well above the global target of three percent, whereas under the reform scenario, that proportion could fall to about three percent (figure 4.2):

- **The no-reform scenario** is based on the country's historical non-oil growth performance (10-year average). No new discoveries are assumed in the oil sector, hence after increasing by about five percent until 2024, oil production is expected to decline by one percent per year. This scenario also assumes no improvement in the business environment, no additional fiscal space, no structural transformation, and that the current drivers of fragility, conflict and violence are not appropriately addressed. As a result, GDP will continue to grow only slightly faster than the country's population with GDP per capita increasing by less than two percent annually.
- **The reform scenario** reflects the country's aspirations as spelled out in its SND30. Needed reforms are carried out to improve the business environment and provide a greater development role to the private sector, creating additional fiscal space. This scenario would set the public debt on a declining path (figure 4.3) and assumes increasing labor productivity and some structural transformation, that is, a declining share of agriculture in GDP, as well as reduced fragility and conflict. The same path for the oil sector is assumed here as under the no-reform scenario. The climate investments included in the SND30 are, however, not assumed in this scenario. As a result, GDP per capita is expected to grow by a robust six percent annually, in line with the performance of middle-income economies that have experienced growth accelerations.

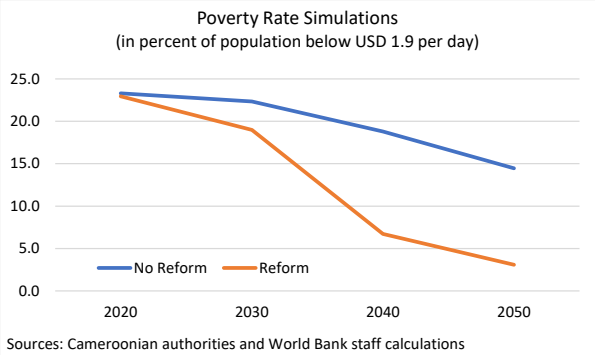
Changing the development model would require actions along three pathways. First, the cost of doing business generally needs to be reduced, and high market concentration and widespread state ownership limiting domestic competition alleviated. The quality of and access to basic services should be improved. It is important to increase household income of the self-employed, both in the agricultural and informal sectors, as well as those earning wages. Actions are needed to achieve sounder fiscal policy and debt management, better infrastructure for reliable power, water, telecommunications, and better connectivity, and more inclusive financial services. Second, reducing fragility and improving governance remain critical. The needs of local populations, the disease burden, and security should be the focus of government attention. The ongoing decentralization process presents an opportunity to help address widening regional disparities. Finally, the potential of Cameroon's labor force needs to be realized through better health care, nutrition, water and sanitation, basic education, and productive safety nets as well as by narrowing the skills mismatch and enhancing women's empowerment. Greater transparency would facilitate all these actions.

Figure 4.1



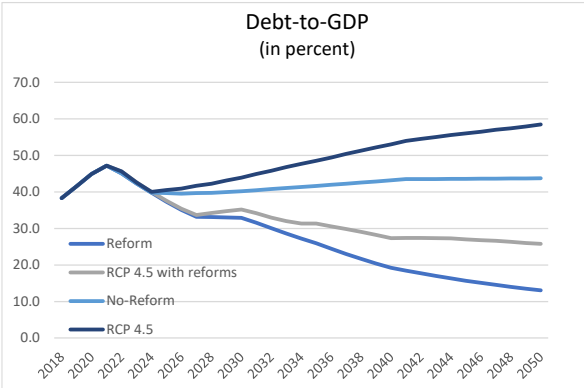
Sources: Cameroonian authorities and World Bank calculations

Figure 4.2



Sources: Cameroonian authorities and World Bank staff calculations

Figure 4.3



4.2. Climate scenarios

4.2.1. Business as Usual and climate change

Switching the development model would make the country more resilient to climate change. The effects of climate change on GDP range between four and 10 percent by 2050 (figure 4.4).[25] The results are reported for three Representative Concentration Pathways—RCP2.6, RCP4.5 and RCP8.5, the largest effect being under RCP8.5.[26, 27] Cameroon's economy would be on a much stronger and more resilient footing under the reform scenario (figure 4.5). Under all RCPs, the effects of climate change would be lower under the reform scenario, the economy being better at adapting to new conditions, and the expected losses would be within the context of a much higher GDP. The same holds for consumption levels (figure 4.6)

[25] These measures of GDP losses only capture flows, however. Previous studies showed lower losses (around four percent of GDP), but also focused on flows (Kompas, T., Pham, V. H., & Che, T. N., 2018; African Development Bank, United Nations Environment Program and United Nations Economic Commission for Africa, 2019). Climate change also affects the country's stock of capital through more frequent extreme weather conditions, for instance and, although the impact on GDP could be limited or even positive since disasters would engender reconstruction and rehabilitation, the erosion of capital may be more important. The simulations presented here do not include any change in frequency or intensity of disasters, nor their costs.

[26] The Representative Concentration Pathway (RCP) is a greenhouse gas concentration trajectory used for climate modeling. The pathways describe different climate futures, all of which are considered possible. The RCPs are labelled after a possible range of change in energy flux in the atmosphere cause by climate change as measured by watts/meter in the year 2100 (2.6, 4.5, and 8.5 W/m^2, respectively).

[27] While long-term GHG emissions in the RCP8.5 are considered overly pessimistic, the CMIP5 climate change scenarios with RCP8.5 provide useful (and not implausible) high-warming scenarios, which would be consistent with continued GHG emissions and high climate change sensitivity or positive feedback from the carbon cycle.

Figure 4.4

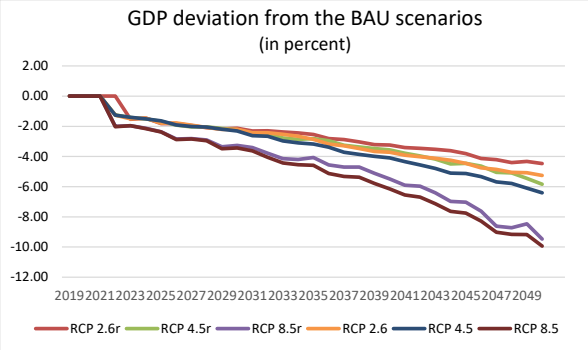


Figure 4.5

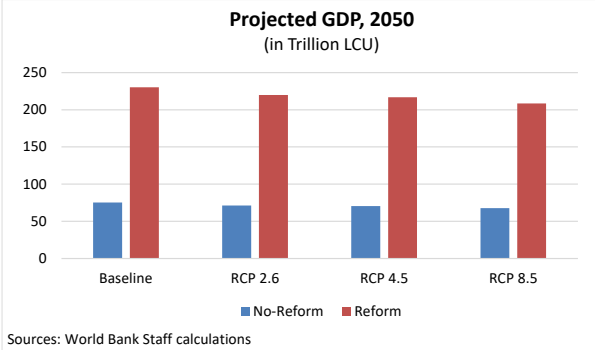
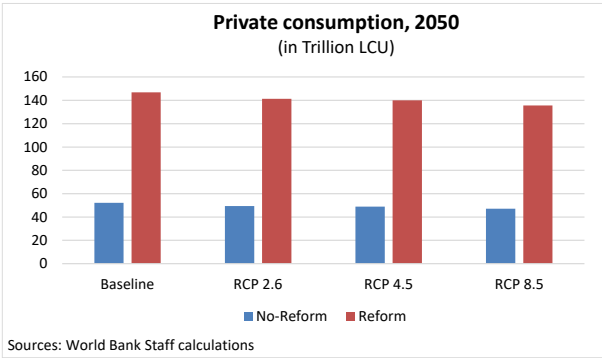


Figure 4.6



Climate change will impact Cameroon's GDP through three main channels: labor productivity, agricultural productivity (yield), and health (figure 4.7)**.** Six transmission channels are modeled: (i) loss of productivity in agriculture; (ii) effect on labor productivity due to heat; (iii) effect on human health which in turn affects labor productivity; (iv) change in land supply due to sea level rise; (v) change in export demand for the services of the tourism sector; and (vi) flood damages to capital. The largest impact comes from direct labor productivity losses due to heat stress (accounting for about 60 percent of the loss in GDP). Higher temperatures leading to more heat stress directly affect the productivity of outdoors labor, affecting agriculture the most. Reduced agricultural yields and lower labor productivity from heat-related health shocks are the two other channels (accounting for about 20 percent and 15 percent of the loss in GDP, respectively). Climate change can also indirectly impact labor productivity through increased morbidity and mortality due to disease resulting from higher temperatures. With climate change, crop yields will be affected by changes in rainfall patterns, increasing evaporative (water) demands, and extreme heat as temperatures rise. Meanwhile, livestock revenues (yields) will be affected by (i) reduced availability of grazing pastures and (ii) heat stress on animals due to temperature and precipitation changes. As a result, agriculture production would decline by 7.5 percent and 8.5 percent under RCP 4.5 in the reform and non-reform scenarios, respectively.

Figure 4.7

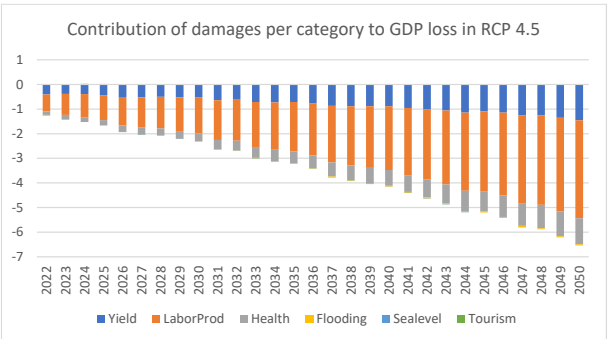
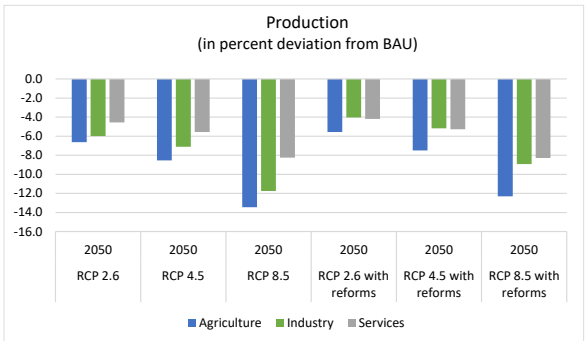


Figure 4.8



Labor demand in agriculture would nevertheless rise as new opportunities emerge, with potentially adverse effects for women. By 2050, the agricultural sector would lose about 10 percent of its output. Labor demand in the primary sector would nevertheless increase, as alternative activities such as fisheries and animal husbandry would pick up. As mentioned previously, climate risks in urban centers and areas close to coastal areas may also drive people to move back to rural areas, as job losses affect services and manufacturing. Overall, employment would decline, which may hurt women, who tend to be subsistence farmers, as men leave industries and services to take up agriculture. Poverty in rural areas is expected to increase, especially in the Far North, North and Adamawa regions (figures 4.11 to 4.14).

Figure 4.9

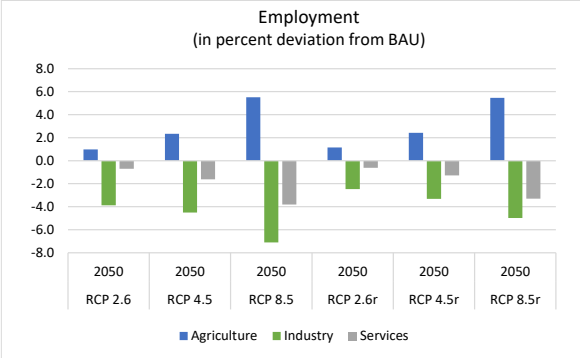
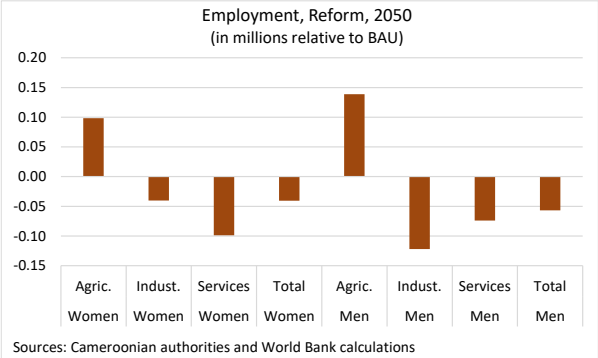
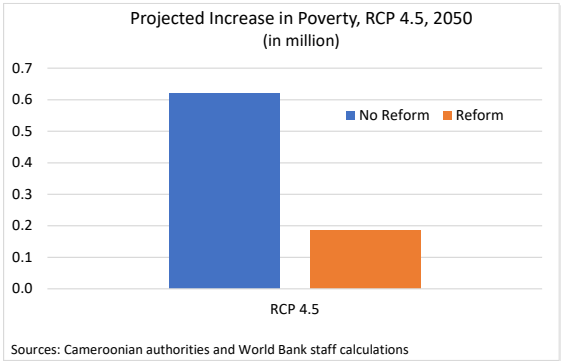


Figure 4.10



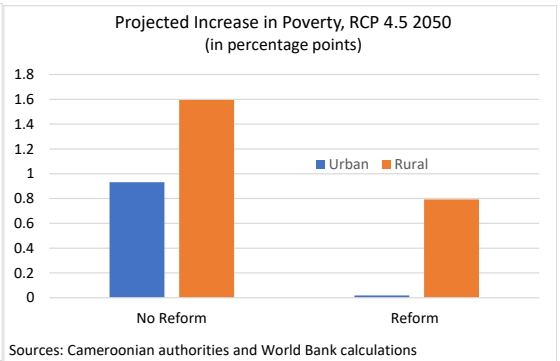
Sources: Cameroonian authorities and World Bank calculations

Figure 4.11



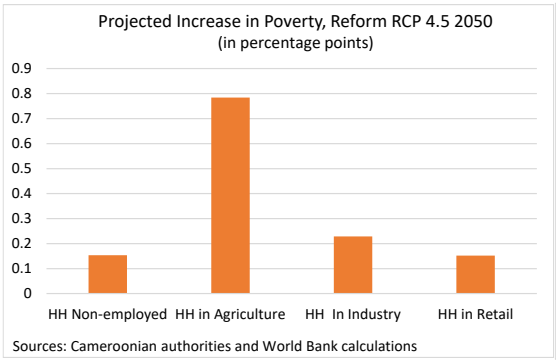
Sources: Cameroonian authorities and World Bank staff calculations

Figure 4.12



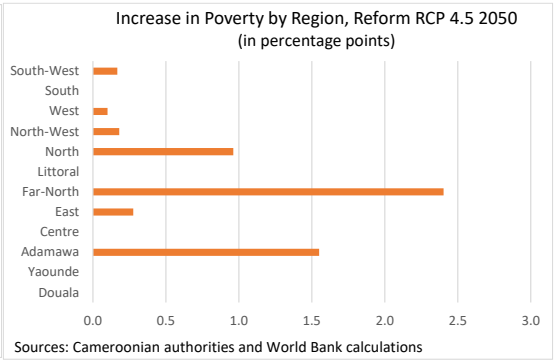
Sources: Cameroonian authorities and World Bank calculations

Figure 4.13



Sources: Cameroonian authorities and World Bank calculations

Figure 4.14



Sources: Cameroonian authorities and World Bank calculations

4.2.2. Climate actions

Simulated climate actions draw on Cameroon's policy commitments. Nature conservation and adaptation to climate change are a pillar of the country's SDN30. The authorities plan to: (i) strengthen actions relating to sustainable management of natural resources (soil, flora, fauna, water); and (ii) take adequate measures to adapt to and mitigate the effects of climate change, including floods and landslides in some cities and rural areas. Under the no-reform scenario, only actions toward adaptation are included in the simulation (table 4.1). Investments amounting to about US$ 32 billion over the next 10 years in all our five systems aim at switching agricultural production toward more resilient activities and crops, expand renewable energy, and render infrastructure and health systems more resilient (see table below). Under the reform scenario, additional mitigation measures are included to switch agricultural production toward activities and crops with lower GHG emissions. These investments amount to another US$ 26 billion over the next 10 years. Climate action under the reform scenario would also imply the elimination of fuel subsidies (estimated to amount to 2.9 percent of GDP as of 2022), replacing them with more targeted forms of assistance to the most vulnerable segments of the population.

Table 4.1 Adaptation interventions modeled for the CGE + Microsimulations

Channel	Adaptation intervention	Benefits	Costs US$ billion	Information source
Food				
Agricultural and livestock productivity	Promotion of climate-smart agriculture in select crop and livestock value chains (use of adapted crops, varieties, breeds, and land/water management).	Various benefits related to increased yields (including cassava, maize, cotton, rice, horticulture, livestock).	3	NDC CSAIP Food deep dive
Energy and Road Infrastructure Services				
Diversification of energy supply and increased energy efficiency	Investment in hydropower and other renewable energy sources.	Increased supply.	5	NDC Hydropower deep dive
Resilient infrastructure	Investments and climate-informed management of national/regional transport systems (including climate-proofed standards for road design, construction, and maintenance).	Long-term savings in O&M costs; better connectivity and operation of the road transport network.	6.5	NDC Roads deep dive
Urban Physical Assets				
Resilient urban infrastructure	Investments and climate-informed management of urban transport systems (including climate-proofed standards for road design, construction, and maintenance).	Long-term savings in O&M costs; better connectivity and operation of urban road transport networks.	2.5	NDC Urban deep dive
Forests				
Conserved, managed and protected forests	Agro-forestry and crop diversification Afforestation and reforestation	Various benefits depending on the intervention (including increase productivity and resilience of land; provide additional income generation; sustain ecosystems services by reducing vulnerability).	2	NDC CSAIP Forests deep dive
Land use	Hydromet, early warning investments; land-use planning; land governance.	Various benefits depending on the intervention (including selecting proper and sustainable land uses; avoids mismanagement and misuse of resources; enhancing resilience to	3	NDC Food and Forestry deep dives

		climate change and preserving the environment from degradation).		
Life & Work				
Health	Adaptation of national health system; adaptation action plan and vulnerability assessments; strategies and programs to help communities prepare for the health effects of climate change.	Various benefits depending on the intervention.	10	NDC Life & Work deep dive

Note: Adaptation costs are based on unit cost estimates obtained from international and local sources summarized in the deep dives, and sector strategy documents.

Under the no-reform scenario, little participation from the private sector can be expected, and the government needs to foot the additional costs of climate actions. As no greater fiscal mobilization nor expenditure prioritization are expected, these costs would need to be covered through borrowing, worsening an already rising debt path and raising concerns about the country's fiscal sustainability (figure 4.15). This higher debt would come at the expense of private consumption and investment, offsetting any beneficial effect these actions could have on adaptation and the country's economic activity, adding to the losses from climate change (figures 4.16 to 4.18). By contrast, were these climate investments to be financed by a greater prioritization of public spending or through a greater mobilization of fiscal revenue, they would to a great extent protect GDP and consumption levels in the medium term while implying some short-term costs (figures 4.19 to 4.24).

Figure 4.15

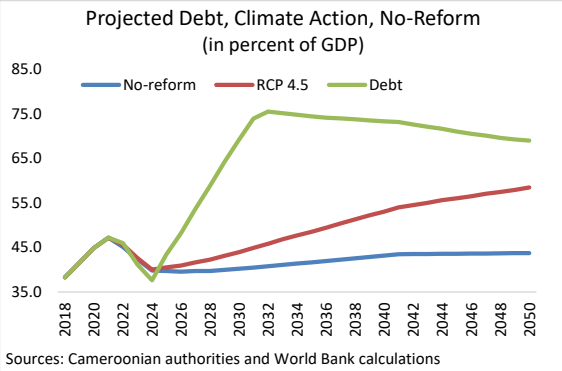


Figure 4.16

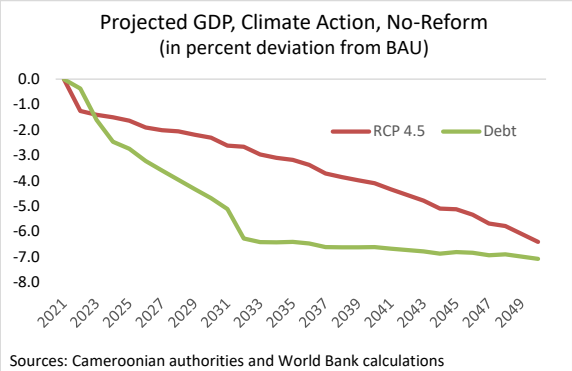


Figure 4.17

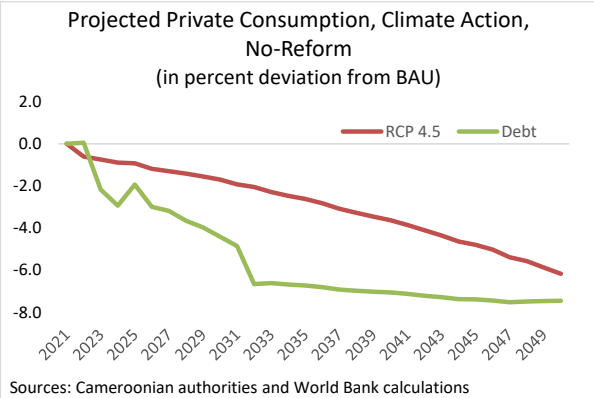


Figure 4.18

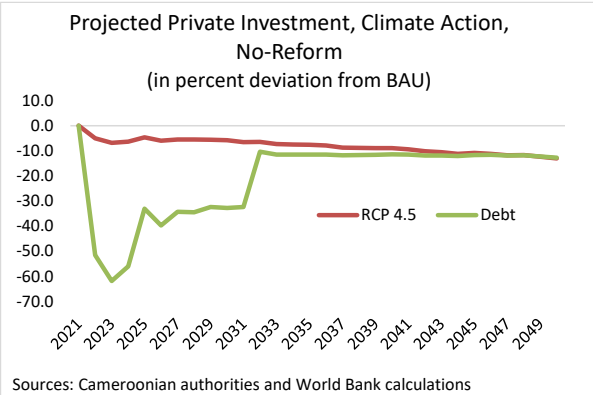
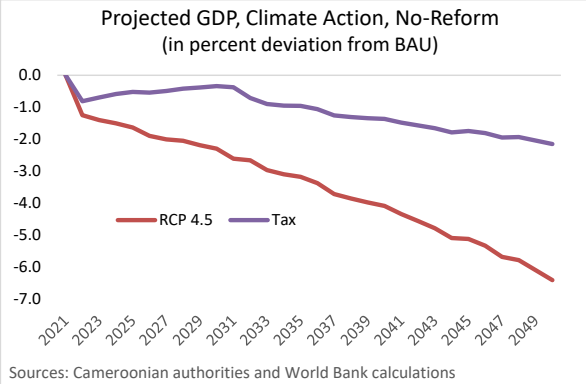
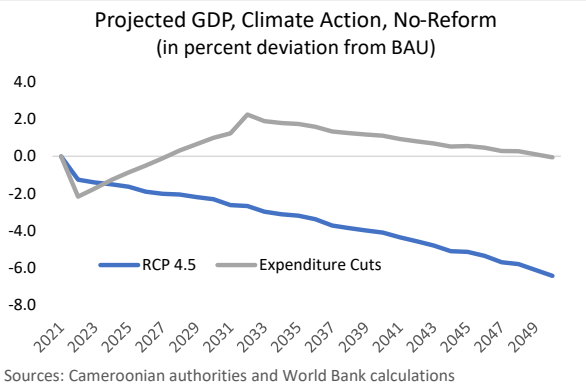


Figure 4.19



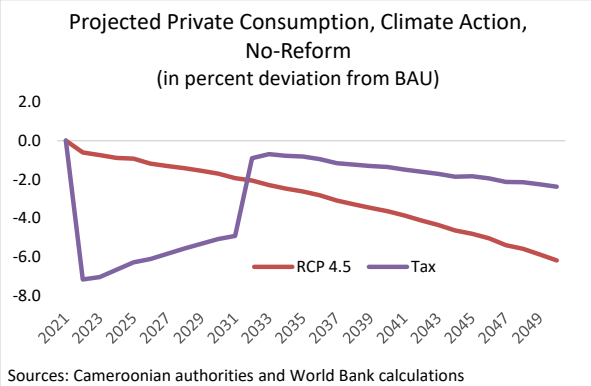
Sources: Cameroonian authorities and World Bank calculations

Figure 4.20



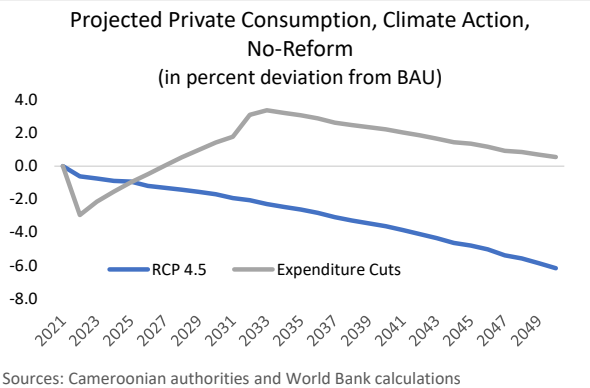
Sources: Cameroonian authorities and World Bank calculations

Figure 4.21



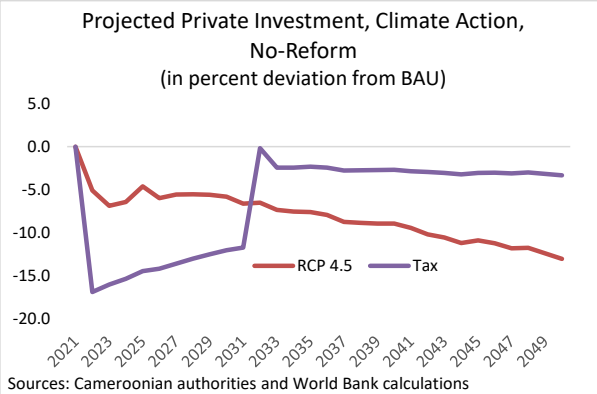
Sources: Cameroonian authorities and World Bank calculations

Figure 4.22



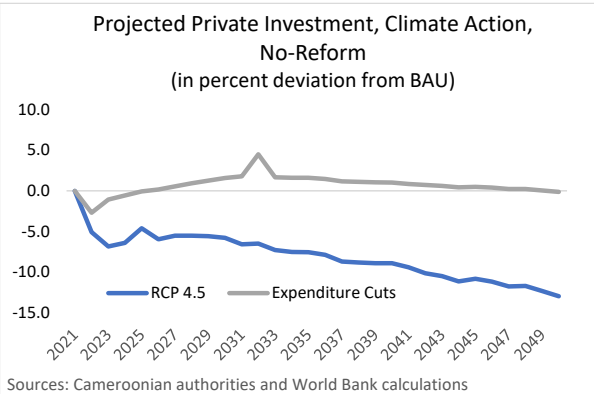
Sources: Cameroonian authorities and World Bank calculations

Figure 4.23



Sources: Cameroonian authorities and World Bank calculations

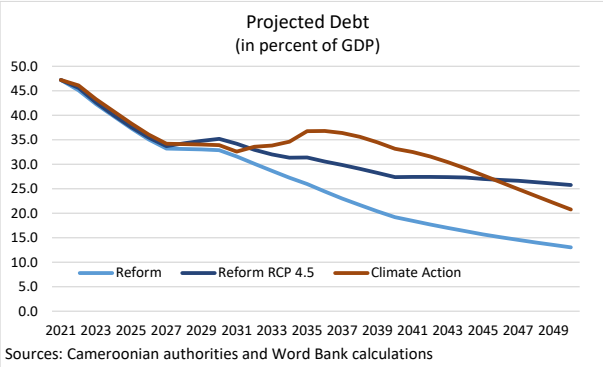
Figure 4.24



Sources: Cameroonian authorities and World Bank calculations

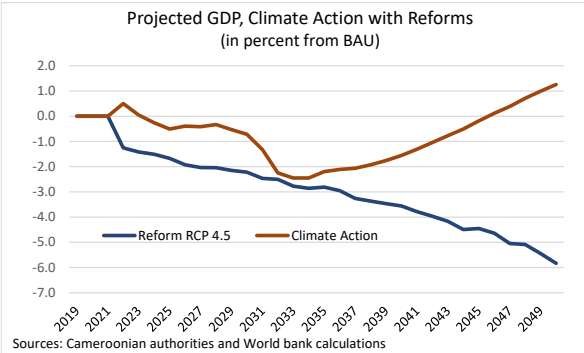
By contrast, under the reform scenario, climate change could turn into an opportunity. A more favorable business environment and fiscal reforms allow the authorities financing options (other than debt), which limit GDP losses or even achieve slightly faster growth. A more favorable business environment would also make it more attractive for the private sector, domestic as well as foreign, to play a bigger role and cover part of the financing. For illustrative purposes, one third of the costs of climate action are assumed to be covered by domestic resources and the remainder through international support, in line with the NDCs. The national (public) part would be covered through borrowing, higher taxes and greater public spending efficiency. Under this scenario, the losses in agriculture are reversed; and rising productivity would allow higher production while freeing people to move away from agriculture and into activities in industry and services. Overall, there will still be some job losses for men (figures 4.25 to 4.31).

Figure 4.25



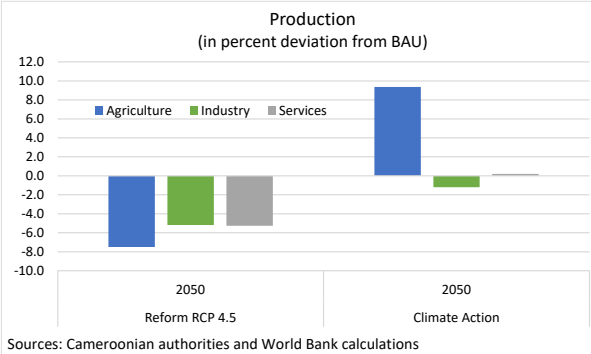
Sources: Cameroonian authorities and Word Bank calculations

Figure 4.26



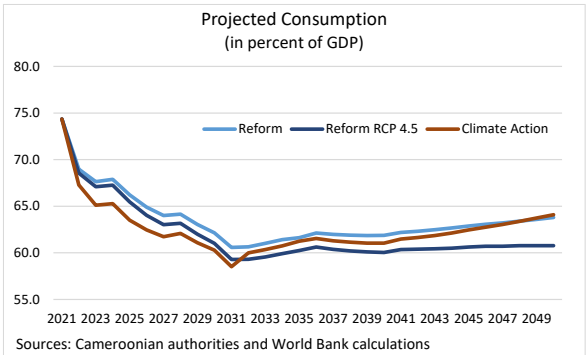
Sources: Cameroonian authorities and World bank calculations

Figure 4.27



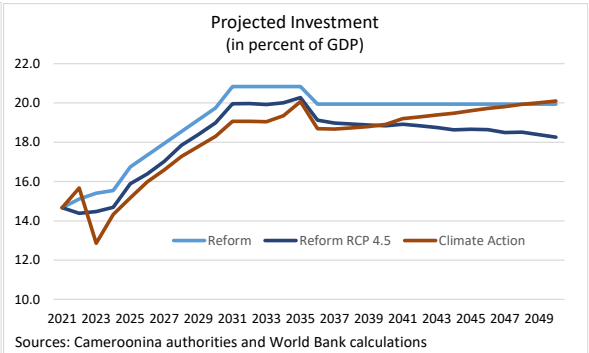
Sources: Cameroonian authorities and World Bank calculations

Figure 4.28



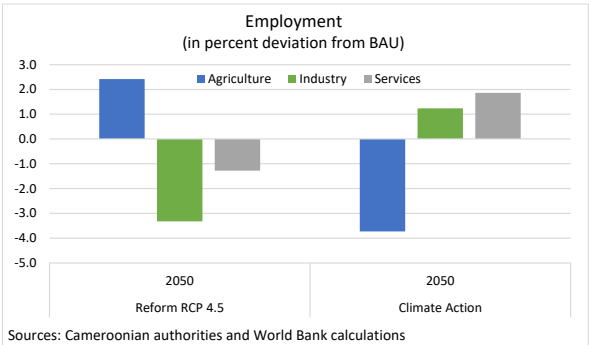
Sources: Cameroonian authorities and World Bank calculations

Figure 4.29



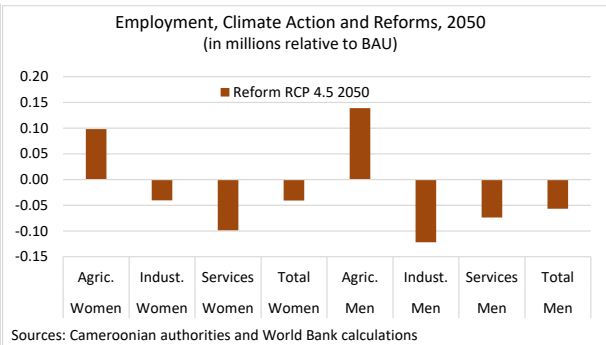
Sources: Cameroonina authorities and World Bank calculations

Figure 4.30



Sources: Cameroonian authorities and World Bank calculations

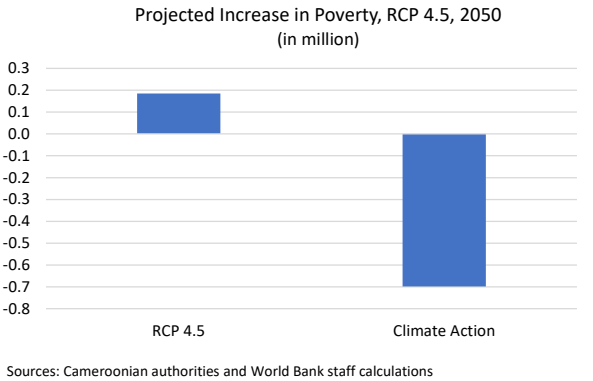
Figure 4.31



Sources: Cameroonian authorities and World Bank calculations

Under the reform scenario, climate actions help Cameroon tackle its poverty challenges. Carrying out climate action investments would not only reverse the increase in poverty that could be expected from climate change but lead to almost a million fewer people living in poverty (figure 4.32). Climate actions would especially favor the households in the agriculture sector by reducing the poverty rate by almost five percentage points (figure 4.33). The same pattern would be observed for households (HH) in rural areas and in the vulnerable regions of the East, the West and the North (figures 4.34 and 4.35).

Figure 4.32



Sources: Cameroonian authorities and World Bank staff calculations

Figure 4.33

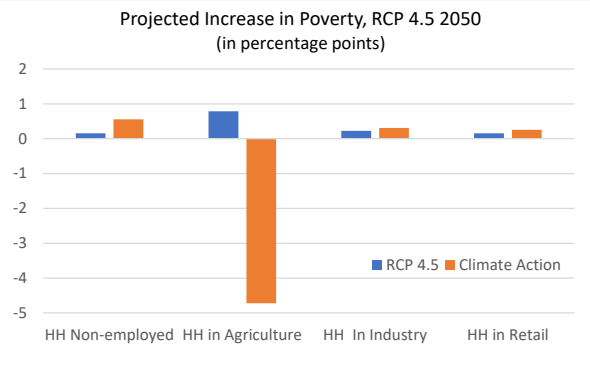
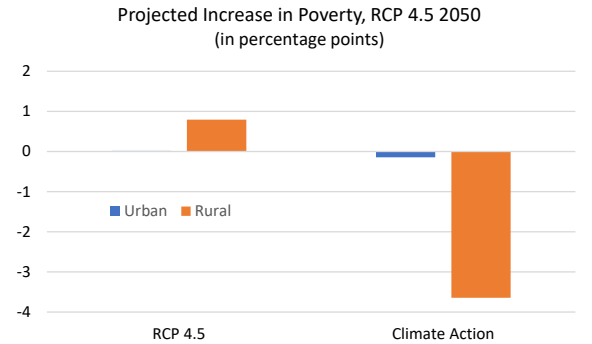
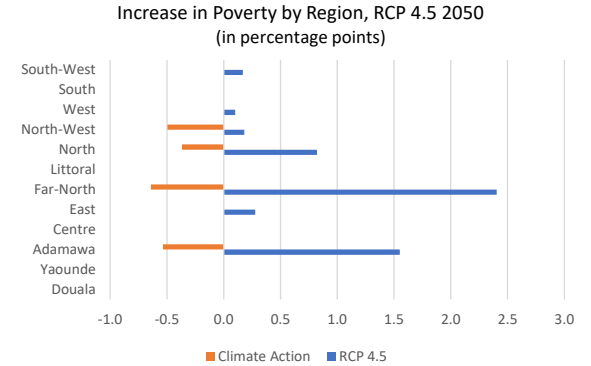


Figure 4.34



Sources: Cameroonian authorities and World Bank calculations

Figure 4.35



5. Conclusion and Recommendations

This CCDR proposes **four priority areas** in development and climate action.

Priority Area 1: Agriculture, Forestry and Land Use

The Agriculture, Forestry and Land Use system in Cameroon faces a range of interlinked challenges: being the country's economic driver, ensuring food security, and building resilience to climate change. When addressing these challenges, additional factors and opportunities arise: improving equity and community participation in managing natural capital, developing innovative solutions for agriculture and livestock, reducing deforestation, land degradation, and agro-conversion of forest, promoting legality in the timber sector, and raising profits from diversification and value addition. Cameroon needs to develop an integrated view on these challenges and opportunities with the right mix of governance improvements and policy reform, especially in forestry support, institutional improvements, and public–private partnerships to mobilize financial resources for climate-smart agriculture and livestock. Climate-resilient agriculture, forestry and other land use (AFOLU) would go a long way in integrating adaptation measures and their enabling conditions with mitigation (including those in SDN30 and NDC) to advance sustainable development in all agro-ecological zones of the country. An "*AFOLU & Climate Commission"* would bring together the stakeholder ministries (for example, MINADER, MINEPIA, MINFOF, MINEPDED, MINEPAT, MINFI and MINDDEVEL), the private sector affected by and affecting climate change (enterprises of all sizes), and adequate representation from civil society to strategize and operationalize a land and ecosystems transition action plan. Its purpose would be to implement effective resilience, adaptation, and mitigation options in an integrated way and with realistic costs and pragmatic financing mechanisms (including taxation, subsidization, and carbon pricing).

Priority Area 2: Cities

Solutions for main and secondary cities would be based on natural features, economic endowments, social conditions, and institutions. Cities will have to craft their own climate-resilient path by paying particular attention to governance, planning, capacity, and finance, with the central level addressing systemic resilience interventions including risk assessment, climate-informed planning, early warning systems and protocols. Urban planning and development would be handled in a more inclusive and integrated way, while longer-term planning would be established at local, municipal, regional, and national scale together with effective regulation and monitoring, and financial and technological resources and capabilities to foster an urban transition, along the model currently implemented in the World Bank-financed *Inclusive and Resilient Cities Development Project*.

Priority Area 3: Infrastructure

As Cameroon seeks to bridge the important infrastructure gap and improve the quality of life of every Cameroonian (SND30), it is critical to invest in sustainable infrastructure that adapts to uncertain future climatic conditions. As highlighted in the NDC, infrastructure is also responsible for some of the emissions and for a large share of the adaptation costs. To achieve the country's development and climate targets, a radical change in infrastructure planning, delivery and management is needed. Cameroon needs an infrastructure system transition that would support resilience, reliable power systems, and efficient water use. An "*Infrastructure & Climate Platform"* would bring together the stakeholder ministries (for example, MINEE, MINDHU, MINPOSTEL, MINT, MINTP, MINDHACF, MINEPDED, MINEPAT, MINFI and MINDDEVEL), the private sector, and civil society to collaborate on more effective governance, institutional, policy and financing arrangements in the energy and transport sectors.

Priority Area 4: Human Capital and Social Development–Life & Work

Vulnerability of people to climate change differs substantially among and within regions in Cameroon driven by patterns of intersecting socioeconomic development, unsustainable land use, inequity, marginalization, and governance. It is found to be higher in locations with poverty, limited access to basic services and resources, conflict, and high levels of climate-sensitive livelihoods (small-scale farmers and pastoralists). Vulnerability at different spatial levels (North, Southwest, Northwest) is exacerbated by inequity and marginalization linked to gender, ethnicity, low income, or combinations thereof as shown in the Life & Work assessment but also in some of the other deep dives. This CCDR seeks to stimulate a discussion on how human capital losses caused by climate change could be averted. Cameroon must first identify the gaps and opportunities in the adaptive capacity of its human development systems including health, education, social protection, as well as other areas such as infrastructure and food. It must also focus on building human capital and links with the green transition through actions such as reskilling, curriculum reform, and energy efficiency. A "*Human Capital & Climate Commission"* would bring together the stakeholder ministries (for example, education, health, social affairs, water, agriculture, planning, finance and local development), the business community delivering human development services, and adequate representation from civil society to strategize and operationalize a human systems transition action plan. Its purpose would be to implement effective resilience and adaptation options in an integrated way and with synergies across sectors and systems (as per the pillar on development of the human capital and well-being in SDN30).

A *territorial approach*: strong stakeholder engagement for inclusive local climate action

As outlined in the diagnostic, people living in different regions and territories face different impacts while they themselves have varying levels of vulnerability. Therefore, strategic regional adaptation investments with local climate action plans are a much-needed approach to address local vulnerabilities and minimize amplification of conflict drivers and ensuing violence in conflict areas. As a first step, this would require support for the decentralization efforts to build the capacity of regional and local institutions to create and promote inclusive and participatory governance, with a specific focus on climate resilience; and localized climate assessments to inform the implementation of the NDCs, with investment in regional learning and statistical systems to collect better quality data on regional climate-related conflict. Also, in each of the regions, adaptation will be needed across multiple climate-sensitive sectors, such as agriculture, water, land, forest, roads, health, and education as identified in the different deep dives. Therefore, specific investments to support local governments will be needed for programming to increase the adaptation capacity and the resilience of people by ensuring the integration of climate change considerations into planning, budgeting, implementation, and decision-making at the local levels. This type of locally led climate investment will help address the nuanced local climate risks that face each of the regions, mitigate drivers of conflict that could be amplified after climate shocks, and promote an inclusive development approach putting people and communities at the center of climate action.

Moving toward a *territorial approach* requires an inclusive and lasting multi-stakeholder engagement. It would require mapping of all stakeholder and vulnerable and excluded groups to ensure inclusion of all; establishing meaningful engagement to ensure ownership by all groups and promoting greater accountability for climate financing funds; strengthening local and regional governments and supporting long-term engagement. The four priority areas and the set of 38 feasible interventions (table 5.1) are an opportunity to conceive climate-smart policies, investments and institutional reforms while ensuring consistency across systems and with climate commitments taken in the SND30 and the NDCs. Of these, 17 are high-potential, far-reaching interventions that should be considered first.

Table 5.1: Priority climate actions by sector/system and cross-cutting issues

Action	Purpose/Objective	Urgency	Feasibility	Impact
AGRICULTURE, FORESTRY AND OTHER LAND USE (AFOLU)				
Combatting deforestation and forest degradation	Planting 650,000 ha of degraded land; protection and conservation of 3.3 million ha nationwide.	High	++	++
Enabling rights-based land use	Ensures community involvement in land-use outcomes; strengthen community control over forests; build capacity for implementing restoration.	High	+	++
Support to Forest Inventory	Generate knowledge on forests; improve understanding of carbon uptake and storage.		+++	+
Support to design and deploy carbon pricing	Support in the development and implementation of carbon pricing instruments.		+	+
Use fiscal reforms to influence forest conservation	Set up a stronger inter-ministerial collaboration and coordination between MINFOF, MINEPAT and MINFI on the introduction of differentiated taxation in favor of legality.		++	+
Revise the Forest Policy/Law	Assess implementation of the policy and institutional evolution and impact on forests.	High	++	++
Climate-Smart Agriculture	Support portfolio of nine priority and integrated CSA investments.	High	+++	++
Strategy for Climate-Smart Livestock	Design a strategy to identify actions with potential to reduce GHG emissions; identify roles of stakeholders for implementing low-carbon livestock options.		+++	+
Gender-Sensitive Adaptation	Support women's agency for climate adaptation and target women farmers' structural disadvantages to improve rural productivity and food security.	High	++	++
Conflict prevention and regional/local adaptation for all	Strategic regional adaptation investments with local climate action plan to minimize amplification of conflict drivers and ensuing violence after climate shocks.	High	+	++
CITIES				
Sustainable urban planning	Initiate climate-sensitive development planning: ensure medium- and long-term national/sector development strategies integrate climate considerations.	High	++	++
Climate-informed and empowered city leadership	Building national and municipal capacities to enforce policies and implement plans.		+	+
Green and inclusive housing	Creating a policy and institutional system to strengthen role of state as enabler of green and inclusive housing development.		+	+
Eco-housing norms	Elaborate realistic regulation on building materials, energy efficiency of buildings, and implementing existing standards for eco-housing.		+	+
Equitable adaptation in cities	Opportunities for cities to implement equitable adaptation policies; equitable adaptation planning and community engagement with hazard-specific actions.	High	+	++

INFRASTRUCTURE				
Renewable Energy (RE) law	Prepare a specific renewable energy law to cover renewable electricity purchase tariffs, clarify the rules around the purchase of renewable electricity, and inclusion of mandatory auction or tendering process.		+	+
Human capital for RE	Improve human capital to address limited trained manpower and lack of expertise in new emerging technologies relating to RE.		++	+
Broader energy sector reforms	Improve operational performance of electricity companies (loss reduction); adopt payment discipline for electricity bills from the state entities and SOEs; implement cost-recovery tariffs.	High	++	++
RE financing mechanisms	Address absence of competitively priced, long-term financing mechanisms, lack of stakeholders' awareness in RE financing mechanisms.		+	+
Law on the Commercialization of Associated Gas (LCAG)	Improve effectiveness and enforcement of current Law on the Commercialization of Associated Gas (LCAG).		++	+
Capacity of the energy industry regulator	Enhance resources and capacity for the regulator to ensure enforcement and compliance.		++	+
Financial viability for gas flaring	Strengthen the power sector's financial viability to reduce gas flaring and venting.		+	+
Strategy for decarbonization	Support development of a national transition strategy preparing for global decarbonization.		+	+
Emissions mitigation plan for road resilience	Prepare emissions mitigation plan and design climate-informed road policies; ensure it does not increase vulnerability of road users.		++	+
Enhancing knowledge on risks, impacts and road adaptation options	Strengthen databases for climatological data, road infrastructure, traffic, and road use.		++	+
Planning, financing, and managing climate-resilient roads	Increase coordination and cooperation between ONACC, MINT, MINTP, Municipalities, Regions and Road Fund.		+	+
Climate-informed road investments	Systematically (i) assess road vulnerability, (ii) integrate results of vulnerability assessments in strategic planning and management practices.	High	++	+
Public–Private Partnerships for climate-resilient road maintenance	Expand and sustain maintenance for climate resilience by leveraging private sector solutions.		+	+
HUMAN CAPITAL				
Climate-smart health systems	Build capacity of the health system to respond and adapt to climate change.	High	+	++
Climate-smart schools	Invest in climate-smart school infrastructure.	High	+	++
Smart skills and climate-informed education	Curriculum reform and investment in climate-smart skills for critical sectors.	High	++	++
Adaptive Social Protection system	Expand social protection as the country builds the foundations for an Adaptive Social Protection system.	High	++	++
Climate risk insurance and social protection combination	Combining climate risk insurance with social protection as part of a comprehensive risk-layering approach.		+	+

Gender-Sensitive Adaptation	Support women's agency for climate adaptation and target women farmers' structural disadvantages to improve rural productivity and food security.	High	++	++
Conflict prevention and regional/local adaptation for all	Strategic regional adaptation investments with local climate action plan to minimize amplification of conflict drivers and ensuing violence after climate shocks.	High	+	++
GOVERNANCE (CROSS-CUTTING FOR CLIMATE ACTION)				
National Law on climate change	Enact a national law/legislation on climate outlining roles, responsibilities, and mandates of national institutions, and identifying clear mechanisms for coordination.	High	++	++
Decentralization	Include provisions in the decentralization law for role of local governments: responsibilities for climate action, including budget lines for climate action financing.	High	++	++
Inter-ministerial coordination	Operationalization of the inter-ministerial committee to help to establish a whole-of-government response to climate change across policy development, implementation and evaluation.	High	++	++

These climate actions go hand in hand with a broader set of development reforms. Actions to make the economy more resilient, more efficient, and more flexible would be needed to accompany climate actions. These reforms would trace out three pathways. First, the cost of doing business generally would need to be reduced and the quality of basic services and access to these improved. Increasing household income of wage earners and the self-employed, either in agriculture or in the informal sector, will be important to achieve greater resilience. Wide-ranging actions would be critical and could include sounder fiscal policy and debt management, better infrastructure for reliable power, water, and telecommunications as well as better connectivity, and more inclusive financial services. Second, reducing fragility and improving governance would be critical. Actions need to be taken to reduce the high market concentration and widespread state ownership limiting domestic competition. At the same time, the state should become more responsive to the needs of local populations, their socioeconomic status, disease burden, and security context. The ongoing decentralization process presents an opportunity to help address widening regional disparities. Finally, the potential of Cameroon's labor force needs to be realized through better health care, nutrition, water and sanitation, basic education, and productive safety nets as well as by narrowing the skills mismatch and enhancing women's empowerment. Greater transparency would facilitate all these actions.

Implementing Cameroon's transition and climate-resilient development: what role for the WBG? The WBG could strengthen its support and assistance on climate change resilience, mitigation, and adaptation through the various instruments at its disposal. With support to both the public and private sectors, and in coordination with other technical and financial partners,[28] WBG can support climate-change actions using its convening power, policy dialogue, global knowledge, and financing to help Cameroon achieve climate-resilient development. The priority areas recommended by this report inform the preparation of the Cameroon Country Partnership Framework for 2023–2027.

[28] Two of the active coordination mechanisms are: (i) "*Cercle de Concertation des Partenaires du MINFOF et du MINEPDED*," providing support and coordinating donor interventions/positions on issues related to the forestry sector; serving as a platform to exchange and provide common positions on issues related to REDD+, illegal logging and related trade, and imported deforestation; landscapes approaches; and roads and protected areas; and (ii) *Le Groupe de Travail sur l'Energie, l'Environnement et le Changement Climatique* ," which played an important role in supporting Cameroon's NDC preparation and participation at COP26.

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