COUNTRY FOCUS REPORT 2022

GHANA

SUPPORTING CLIMATE RESILIENCE AND THE JUST ENERGY TRANSITION

Country Economics Department (ECCE)

October 2022

AFRICAN DEVELOPMENT BANK GROUP
GROUPE DE LA BANQUE AFRICAINE
DE DÉVELOPPEMENT

ACKNOWLEDGEMENTS

The Country Focus Report 2022 was prepared in the Vice Presidency for Economic Governance and Knowledge Management, under the general direction of Mr. Kevin Urama, Acting Vice President and Chief Economist, and Mr. Emmanuel Pinto Moreira, Director, Country Economics Department. The drafting of the Ghana Country Focus Report was led by Mr. Theo Braimah Awanzam, Senior Macroeconomist under the supervision of Mr. Zerihun Alemu, the Acting Lead Economist for West Africa. Data related to climate financing were compiled and estimated by Mr. Andinet Woldemichael and Mr. Adamon Mukasa from the Macroeconomics Policy, Forecasting and Research Department. The report benefited from external review by Ms. Florence Charlier and Mr. Konan Nguessan. The data appearing in the report were compiled by the Statistics Department, under the supervision of Louis Kouakou, Manager, Economic and Social Statistics Division. Tricia Baidoo provided excellent administrative and logistical support. Editing was done by Ms. Anne Mcgilvary Mcgoogan, while the layout of the report was done by Romeo Kokou.

TABLE OF CONTENTS

GHANA

Ghana is highly vulnerable to climate change due to its location along the Atlantic Ocean in a tropical climate zone. This increasingly exposes the country to the risks of climate change including rising sea levels, drought, higher temperatures and erratic rainfall, which negatively impact the socio-economic development of the country. As a result, Ghana needs to increase its climate resilience to mitigate the negative impacts of climate change on the economy and livelihoods in the country.

This note discusses recent trends on climate change and a just energy transition in Ghana. The note is structured in four sections as follows: Section 1 discusses recent economic developments and prospects; Section 2 is on climate resilience and a just energy transition; Section 3 assesses financing climate resilience and a just energy transition; and Section 4 presents the conclusions and recommendations.

1. RECENT MACROECONOMIC DEVELOPMENTS AND OUTLOOK

Recent macroeconomic developments in Ghana have been impacted by shocks to the economy emanating from the COVID-19 pandemic and the Ukraine-Russia crisis. The economic outlook depends largely on the rate of ongoing COVID-19 vaccinations and the continuation of the Ukraine-Russia crisis. This section provides details of recent economic developments and outlook as well as potential risks to the outlook.

1.1. Recent macroeconomic and financial developments

Real GDP Growth: Despite the ongoing COVID-19 pandemic, Ghana's economic recovery is underway with a strong rebound in economic growth in 2021 compared to 2020. Overall real GDP growth is estimated to increase from 0.4 percent in 2020 to 5 percent in 2021. On the demand side, growth is expected to be supported by an increase in household consumption and commodity exports due to the recovery of the global price for oil, gold, and cocoa, whilst on the supply side, the services sector is expected to rebound following the normalization of trade, education, health and social work, hard hit by COVID-19 lockdowns.

Monetary policy and inflation: Headline inflation is expected to be contained within the Bank of Ghana's (BoG) targeted range of 6 percent to 10 percent. It increased to 10 percent in 2021 from 9.9 percent in 2020 driven by surges in food inflation. The Ghana Cedi strengthened against the US Dollar with a depreciation of 1.8 percent in September 2021, compared with 3.9 percent in 2020. This is thanks to increased international

Table 1 - Macroeconomic indicators	2017	2018	2019	2020	2021(e)	2022(p)	2023(p)
Real GDP Growth	8.1	6.2	6.5	0.4	5.0	5.3	5.1
Real GDP Growth per Capita	5.9	4.0	4.3	-1.8	2.8	3.2	3.0
Inflation	12.4	9.8	8.7	9.9	10.0	15.0	11.1
Overall Fiscal Balance, Including Grants (% GDP)	-4.0	-3.8	-7.3	-15.2	-12.8	-10.3	-9.1
Current Account (% GDP)	-3.3	-3.0	-2.7	-3.1	-2.1	-2.6	-3.3

Source: Data from domestic authorities; estimates (e) and prediction (p) based on authors' calculations. AfDB Statistics Department, April 2022

reserves from USD 8.6 billion (4.0 months of imports) in 2020 to USD 10.7 billion (4.9 months of imports) in September 2021. In line with an accommodative monetary policy stance, the BoG reduced the Monetary Policy Rate from 14.5percent in March to 13.5 percent in September 2021 to stimulate growth.

Fiscal and current account balances: The fiscal deficit (including energy and financial sector costs) is estimated to decline from 15.2 percent in 2020 to 12.8 percent in 2021, which is above the 5.0 percent of GDP stipulated in the Fiscal Responsibility Act (2018). The public debt shot up from 76.1 percent of GDP in December 2020 to 77.5 percent of GDP in September 2021 with the country classified in the category of high risk of debt distress countries. The current account deficit is estimated to decline to 2.1 percent of GDP in 2021 from 3.1 percent of GDP in 2020 supported by a merchandise trade surplus, mainly on account of increased export revenue. Expected higher net imports of services and income transfers will contribute to the current account deficit which is financed by large portfolio inflows and foreign direct investment into the capital and financial account in 2021.

Box 1: Allocation of Special Drawing Rights

In the context of the International Monetary Fund's (IMF) COVID-19 recovery program, the IMF allocated a total of USD 650 billion to members countries with USD 32.5 billion (5 percent of the total allocation) allocated to Africa. In August 2021, the IMF announced the allocation of USD 1 billion equivalent in SDRs to Ghana constituting 9.3 percent of gross international reserves. Given that the SDR allocation was unconditional and not included in the government's 2021 budget estimates, it was lodged at the Bank of Ghana and was not appropriated by the Parliament of Ghana for use in 2021. The 2022 national budget indicates that the government has committed to use the full IMF SDR allocation amounting to GHS 9,091 million (1.8 percent of GDP in 2022) to finance the 2022 budget deficit. Whilst the government has used up all the SDRs allocated under the IMF PRGF, the use of the SDRs in 2022 is expected to create fiscal space to finance the Ghana COVID-19 Alleviation and Revitalization of Enterprise Support (Ghana CARES) program for post-COVID-19 economic recovery.

Financial sector: Following a comprehensive financial sector clean-up and reforms implemented between 2017 and 2019, the banking sector remained strong with a Capital Adequacy Ratio of 19.9 percent in September 2020, which is above the regulatory minimum of 11.5 percent. Gross loans and advances in the year-to-September 2021 increased by 4.8 percent compared to 1.7 percent in September 2020. Banks reported a strong balance sheet position as at end September 2021 with assets growth of 14.0 percent more than the growth of 13.0 percent in 2020. However, there was a marginal increase in the ratio of Non-Performing Loans (NPLs) from 15.8 percent in September 2020 to 16.8 percent in September 2021 reflecting general repayment challenges associated with the COVID-19 pandemic.

Poverty and social indicators: The World Poverty Clock show that Ghana's poverty rate declined from 12 percent in 2020 to 11 percent in 2021. The Ghana Statistical Service (GSS) 2021 Population and Housing Census Report (Volume 3E) indicates that the unemployment rate increased from 11.9 percent in 2015 to 13.4 percent in 2021, with the level of youth (15-24 years) unemployment at 32.8 percent. Disaggregated poverty and unemployment rates reveal inequalities across regions and age groups respectively. This depicts low poverty elasticity of growth that reflects weak structural change with growth driven by a less labor-intensive services sector. To this end, the government has launched a transformation agenda focused on strong agricultural modernization and industrialization in the 2022 budget.

1.2. Outlook and Risks

Growth: The growth outlook remains positive with projected GDP growth of 5.3 percent and 5.17 percent in 2022 and 2023 respectively. On the demand side, growth will be driven by improved aggregate demand comprising both domestic and foreign consumption, capital formation and favorable global price for Ghana's main export commodities of oil, gold, and cocoa.

On the supply side, successful implementation of the Ghana CARES program is expected to boost business confidence and support productive sectors of the economy. In addition, the outlook will be supported by increased COVID-19 vaccination, a strong digitization drive and formalization of the economy.

Monetary policy and inflation: Headline inflation is projected to increase to 15 percent and 11.1 percent in 2022 and 2023 respectively driven by surges in fuel and food inflation caused by, among others, the Ukraine-Russia crisis. The BoG is expected to implement a contractionary monetary policy to contain inflationary pressure. In April 2022, the BoG hiked the Monetary Policy Rate by 250 basis points to 17 percent in order to contain inflationary pressure.

Fiscal and current account balance: The fiscal deficit is projected to narrow to 10.1 percent and 9.1 percent of GDP in 2022 and 2023 respectively on account of new revenue and expenditure rationalization initiatives. In the medium term,

increased demand for imports and higher interest payments on primary income, is expected to widen the current account deficit to 2.6 percent and 3.3 percent of GDP in 2022 and 2023 respectively. The deficit is expected to be financed by capital and financial account.

Financial sector: BoG's latest stress tests indicate the sector's resilience to mild and moderate stress conditions.

Poverty and social indicators: The World Poverty Clock projects the percentage of Ghana's population living in extreme poverty to reduce from 11 percent in 2022 to 10 percent in 2023, supported in part by the continuous implementation of the Livelihood Empowerment Against Poverty (LEAP).

Risks to outlook could emanate from increased COVID-19 infections and a prolonged Ukraine-Russia crisis. The latter could cause further surges in the international fuel and food prices translating into a lower than projected GDP growth, higher food and energy inflation and a weak exchange rate. A prolonged crisis could hamper the fiscal consolidation path caused by a rise in subsidy spending to cushion pass through effects of global inflation and widen the current account deficit due to high food and fuel import bills (40 percent of the total import). Risk mitigating factors could include increasing COVID-19 vaccine rollout, rationalize/reprioritize spending to create fiscal space, up-scaling food import substitution through the Government's Planting for Food and Jobs initiative and ensuring exchange rate stability.

2. CLIMATE RESILIENCE AND A JUST ENERGY TRANSITION

Ghana is highly vulnerable to climate variability and change, which continues to pose a threat to future growth and development. This section presents the situation on climate resilience, climate change and socio-economic impacts, the energy transition as an opportunity to strengthen climate resilience, the estimated carbon credit to move towards a just energy transition and the national framework to strengthen resilience, climate change and accelerate the energy transition.

2.1. Climate resilience, Readiness and Vulnerability

Ghana covers a total land area of 239,460 km2 along the Atlantic Ocean, which lies close to the equator on latitude 11.50N and 4.50S and longitude 3.50W and 1.30E. The country has a tropical climate that follows its varied topography. Along with its position on the Atlantic Ocean and varied topography, Ghana is highly vulnerable to climate change stemming from variable climatic conditions. Recent climate trends indicate that the mean annual temperature has increased by 1.0°C since 1960, an average rate of 0.21°C per decade (World Bank, 2021). At the same time, rainfall decreased by an average 2.3 mm per month, an average rate of 2.4 percent per decade (World Bank, 2021).

Rainfall in Ghana is highly variable and will continue to be so throughout the century (World Bank, 2021). The southern part has two rainy seasons with the first season from April to July and the second season from September to November. The northern part of the country has only one rainy season that extends from May to September. As result, the southern part of the country records annual rainfall of about 2,100 mm, while the northern part records about 1,100 mm of rainfall. The dry season is the period without rainfall in the country from December to March. The dry season is characterized by low humidity, hotter days, and cooler nights particularly in Northern Ghana with higher annual temperatures around 26°C.

The perennial threats of drought in Northern Ghana and floods in Southern Ghana have exposed the country to the risks of extreme weather events related to drought and floods. In Northern Ghana, drought-like conditions have decreased agricultural activities and induced migration from Ghana's Northern Savannah Ecological Zone to the south of the country. The climate induced migration combined with sea-level rise in Southern Ghana has exposed about a quarter of the total population to the threats of floods. In addition, prolonged drought in some communities in Northern Ghana have led to water scarcity, extreme heat, and wildfires. Tidal waves from rising sea levels along the country's Atlantic Ocean coast has led to frequent floods in communities along the country's 540 km coastline. Between 1991 and 2011 the country experienced seven major floods (World Bank, 2021). According to data from ThinkHazard, Ghana remains highly vulnerable to the risks of disasters including floods (river, urban and coastal), water scarcity, extreme heat, and wildfire (figure 2.1).

The situation in Ghana reflects the general situation in Africa, where the continent is warming faster over land and oceans than the global average. Africa is warming faster than the global average over land and oceans and Ghana is no exception (African Development Bank (AfDB), 2022). According to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), current forecasts indicate that critical global warming levels will likely be reached before mid-century in Africa. The continent and Ghana are, therefore, exceptionally vulnerable to climate variability and climate change, which affect millions of people and make adaptation efforts more pressing as rapid changes in weather patterns erode the productivity of local water and food systems and generate unintended consequences for sustainable development.

The African Economic Outlook (AEO) 2022 estimates the Climate Resilience Index (CRI) for African countries. The report shows that from 2010 to 2019, Ghana was one of the moderately climate-resilient countries with a CRI score of 49. On the CRI scale at the country level, Ghana ranks 12th among the most resilient countries on the continent.

The Notre Dame Global Adaptation Index (ND-GAIN) illustrates the comparative resilience of countries in figure 2.2. The vertical axis shows the score of vulnerability and the horizontal axis shows the readiness score. The ND-GAIN Country Index captures a country's Vulnerability to climate change and other global challenges, and its readiness to improve resilience. Ghana is in the lower right quadrant containing the group of African countries with a low level of vulnerability to climate change and a high level of readiness.

Though Ghana's average from 2010 to 2019 shows that the country is less vulnerable to climate change, it still faces significant vulnerability and preparation challenges. In 2020, the University of Notre Dame's NG GAIN index, which considers both vulnerability and preparedness, ranked Ghana 111th out of 182 countries with an index of 44.0 points. Ghana is classified in the category "High Vulnerability, Low Preparedness". In terms of vulnerability and preparedness, Ghana is the 64th most vulnerable country and the 124th most prepared country. The main sectors with the worst vulnerability scores according to the ND GAIN index are human habitat, food, and health.

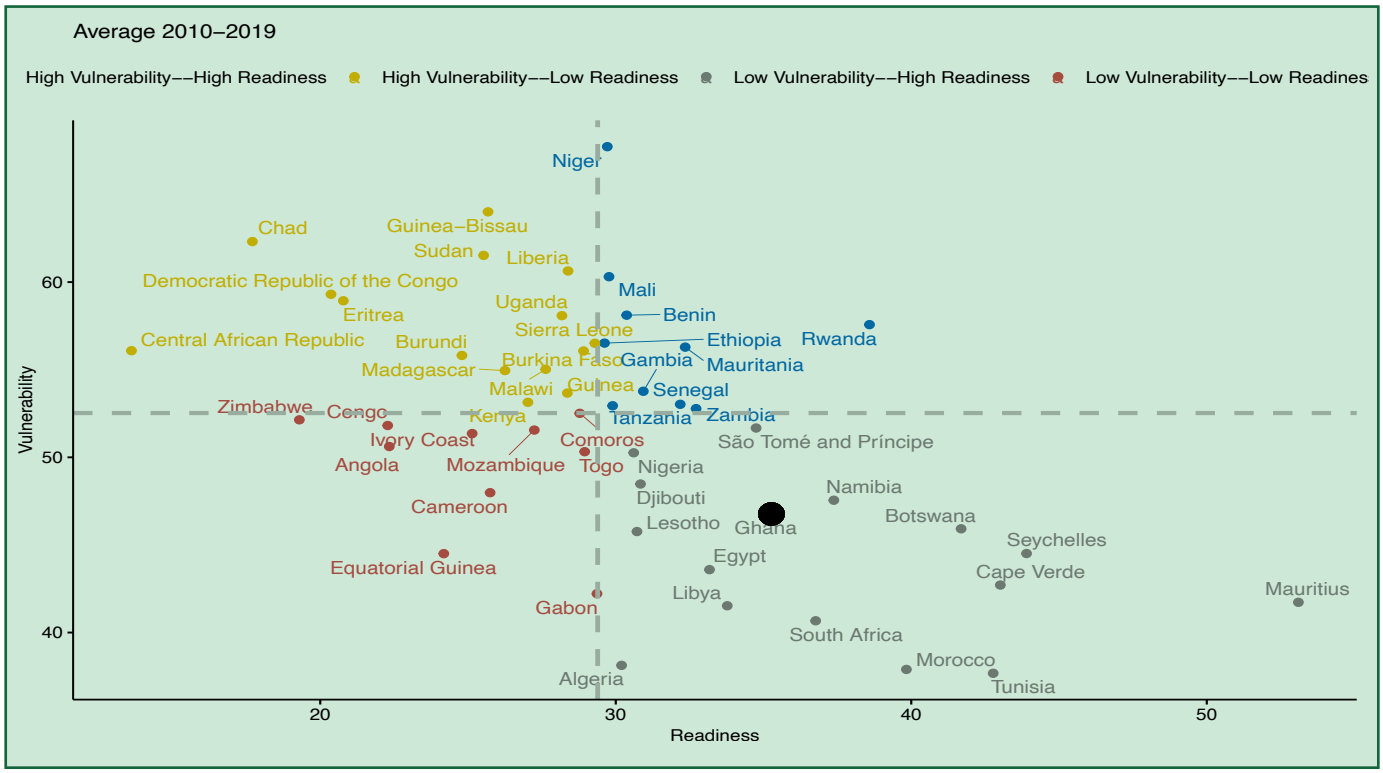
Figure 2.1 : Main disaster risks in Ghana

River Flood	*High*
Urban Flood	*High*
Coastal Flood	*High*
Water Scarcity	*High*
Extreme heat	*High*
Wildfire	*High*
Earthquake	*Medium*
Landslide	*Medium*
Tsunami	*Low*

Source : ThinkHazard database

Africa contributes marginally to global warming, and with a total contribution of less than 3 percent, the continent is bearing a disproportionately high burden as one of the regions of the world most vulnerable to the adverse effects of climate change. The region's vulnerabilities generally stem from low socio-economic development. Although Ghana contributes about 0.04 percent to global carbon dioxide (CO_2) emissions, the country is heavily exposed to the adverse effects of global warming. The country's heavy exposure is due mainly to its over-reliance on natural resources for economic development and financing of the Sustainable Development Goals (SDGs). The lack of adequate adaptation measures could derail Ghana's economic development trajectory and mitigate against the country's achievement of the SDGs. As a country classified in the category «High Vulnerability, Low Preparedness», Ghana continues to face some adaptation challenges. It is therefore imperative that Ghana focuses on developing adequate adaptation measures through identifying and assessing disaster risks and strengthening collaboration and coordination. In line with this, the Africa Infrastructure Resilience Accelerator (AIRA) is leveraging on the Urban and Municipal Development Fund (UMDF) and other project preparation funds to quickly rollout support to African cities through a targeted city program. This program is comprised of climate diagnostics to identify climate vulnerabilities, develop strategies, and set priorities to address these vulnerabilities through transformative projects. By 2022, this resilient city flagship will have supported 10 cities with USD 1 billion in resilient investments. Ghana is set to benefit from the AIRA through the City Climate Adaptation Accelerator - Accra Rapid Climate Risk Assessment (AAAP). AAAP is undertaking a climate risk assessment to support a Risk-Informed Urban Planning process for the Accra Municipal Assembly (AMA) region at different spatial scale levels through to 2050 for the Accra Metropolitan Area and surrounding areas, focusing on a comprehensive flood risk assessment. Despite this, the country has both a great need for investment and innovation to improve

Figure 2.2 : Classification of countries by vulnerability and readiness characteristics, Average 2010-2019



Source: Staff calculations based on Notre Dame Global Adaptation Initiative database
Note: Les quatres quadrants sont demardues par la notation mediande la vulnerabilite et la preparation a travers tous les pays en 2010-2019

adaptation and a great urgency to increase its low preparedness to high preparedness in order to contain its high vulnerability to climate change.

2.2. Climate change and socio-economic impacts

Ghana's economy is highly exposed to climate change due to its dependency on natural resources namely gold, cocoa, and more recently, oil as the key drivers of growth. Over the past thirty years, Gross Domestic Product (GDP) has more than quadrupled mainly on the back of natural resources (World Bank, 2020). However, climate change is negatively impacting GDP and thereby limiting Ghana's opportunity to continue using natural resources to support its socio-economic development. According to World Bank estimates, the cost of environmental degradation to Ghana was estimated at USD 6.3 billion, equivalent to roughly 11 percent of the country's 2017 GDP, of which 4 percent came from greenhouse gas emissions. About 70 percent of Ghana's population depends directly or indirectly on climate sensitive sectors, mainly on agriculture, energy, and forestry (World Bank, 2021). Therefore, the negative impacts of climate change on the climate sensitive sectors affect a large portion of the population who are also more vulnerable to climate change. For example, the majority of Ghanaians whose livelihoods depend on rain-fed subsistence farming in rural areas, become disproportionately vulnerable to hazardous events such as bush fires, flooding and droughts (World Bank, 2021). Therefore, climate change tends to affect the vulnerable, those who are poor and have the least adaptation to climate hazards. The impact of climate change on the poor is expected to worsen given the climate forecasts and scenarios. The World Bank (2021) predicts that Ghana will have a more severe and frequent pattern of drought and floods.

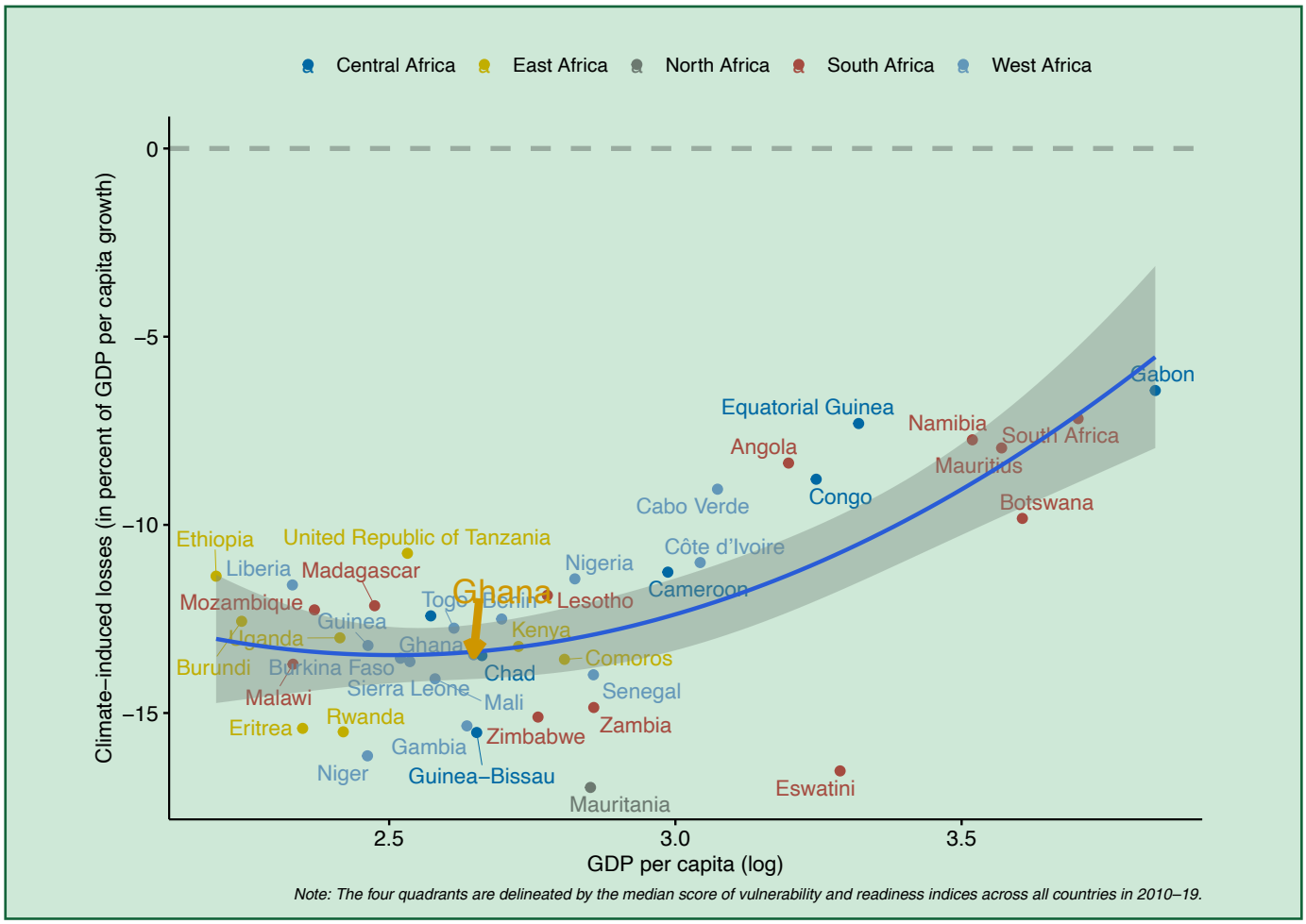
Agriculture is the mainstay for Ghana's economy accounting for almost 20 percent of GDP and around 50 percent of total export earnings. In addition, the sector is a major source of livelihood by providing employment to more than half of the population. However, most agricultural production in Ghana is rainfall dependent with little irrigation facilities[1]. This exposes Ghana's agriculture sector to the risks of climate change and variability.

1 It is estimated that only 2 percent of the country's irrigation potential has been tapped (USAID, 2017).

Irregular and reduced rainfall have resulted in shortened cropping season and low productivity levels in the agriculture sector. For example, cassava yields are projected to fall by 29.6 percent by 2080 and maize yields by 7 percent by 2050 (USAID, 2017; World Bank, 2021). In addition, reduced rainfall combined with prolonged drought are likely to shorten the increase infestation of pests and plant disease in crops, resulting in crop failure. As a result, the Word bank (2021) projects the occurrence of crop failure once in every five years in the northern parts of Ghana. In the southern parts of Ghana, increasing temperature, floods, soil salinization and coastal erosion are likely to negatively impact the production of cocoa, which is a major cash crop of the country. The fisheries sub-sector plays a key role in the Ghanaian economy and diet by contributing 4.5 percent of GDP and 40–60 percent of protein intake. The main sources of fish include marine fishing, inland and freshwater fisheries (the Volta and Bosomtwe lakes) as well as reservoirs. Rising sea surface temperature continue to threaten fish survival, alter the migratory patterns and reproductive cycles of key species such as anchovies, sardines, tilapia and catfish, all staples in the Ghanaian diet and economy. Estimates indicate that Ghana imports over USD 200 million worth of seafood to satisfy annual domestic demand due to a decline in the fisheries sub-sector productivity.

With hydropower (from the Akosombo, Kpong, and Bui dams) making up 54 percent of the total electricity generation in Ghana, the energy sector is highly dependent on rainwater. The three dams sit on the Volta Lake, where their water levels are managed by the Volta River Authority in response to increased evapotranspiration and erratic rainfall. Despite the country's hydropower capacity, the dependence of the dams on rainfall has made the energy sector vulnerable to erratic rainfall. For example, in early 2001, energy generation was reduced, attributed to a significant drop in water levels at the Akosombo Dam (Ghana's main hydro-electric dam)

Figure 2.3 : Average annual climate–induced losses as a share of GDP per capita growth in Africa Average 1986–2015



Note: The four quadrants are delineated by the median score of vulnerability and readiness indices across all countries in 2010–19.

Source: Staff calculations based on Notre Dame Global Initiative database

due to reduced rainfall. Given expected reductions in national and regional rainfall, hydropower capacities are expected to perform at 50 percent of current capacity by mid-century (World Bank, 2021). As Ghana continues to develop with greater demands for energy, power outages are common, with large sections of rural communities having little access to electricity. In parallel, rising temperature would increase the demand for electricity, which would need to be met from sources, including thermal, that has the potential to increase GHG emissions and increase the risks of climate change. In addition, the use of firewood for cooking has fueled widespread deforestation particularly in the northern parts of Ghana and several rural communities across the country. The use of liquefied petroleum gas for cooking exists but brings the challenges of high prices and accessibility. At the same time, potential exists for renewable energy generation (solar) in the country, but this remains largely under-developed.

The water and sanitation sector plays a key role in resilient and sustainable development of Ghana. Almost 5 percent of the total land area in Ghana is covered by fresh water, consisting mainly of the Volta, South-Western and Coastal River systems (World Bank 2021). Nonetheless, the three main rivers (Volta, Bia and Tano), that provide almost 50 percent of the water used in Ghana, flow into the country from external sources in other countries. The Volta River for example flows into Ghana from Burkina Faso. This has created tension between the two countries arising from the latter's decision to withdraw water from the Volta Basin, reducing water levels required for hydropower generation in Ghana (USAID, 2017). Access to clean water and sanitation remain a challenge for some areas and communities in Ghana, affecting about 25 percent of the population. The situations are further compounded by declining rainfall, increased levels of drought and rising temperatures, in addition to increased pressures from a growing population, urbanization, and industrialization.

In the health sector, climate change is expected to increase the risks and impacts associated with vector-borne and waterborne diseases, both of which are already prevalent in Ghana. Access to improved sanitation is low overall (20 percent of the urban population and 9 percent of the rural population). Climate change combined with the inadequate sanitation experienced in urban areas bring multiple health risks. Flooding that exposed insanitary conditions led to cholera outbreaks in the country, the worst occurring in 2014 with almost 15,000 reported cases in the country. Given increasing temperatures and flooding, the presence of mosquitoes and prevalence of malaria is expected to increase in the country, particularly in coastal urban areas.

Climate change has negative impacts on socio-economic outcomes, including increased risk of mortality, morbidity, high risk of resource-related conflicts, internal displacement and migration. The negative impact of climate change and climate-related disasters are not gender neutral as women are among the highest risk groups to be impacted by increased risk of mortality, morbidity, high risk of resource-related conflicts, internal displacement and migration. Key factors that account for the differences between women's and men's vulnerability to climate change risks include gender-based differences in the use of time; access to assets and credit, treatment by formal institutions which can constrain women's opportunities, limited access to policy discussions and decision making, and a lack of sex-disaggregated data for policy change. Additionally, the level of impact and coping strategies for women is heavily limited by their socio-economic status, socio-cultural norms, access to resources and poverty.

2.3. Energy transition as an opportunity to strengthen climate resilience

Natural resources have been the biggest opportunity for economic growth in Ghana; however, the country's continued growth, economic development and urbanization using natural resources could exacerbate existing environmental, climate, and natural resource management challenges. Therefore, Ghana needs to build climate resilience. Building climate resilience involves synergies with considerable mitigation co-benefits. Beyond playing a critical role in building climate resilience, access to modern energy is vital for Ghana's industrialization to meet the country's development goals and to create high-quality jobs and prosperity for all. In line with this, there is the need to provide modern energy that is efficient, affordable, and sustainable in order to meet Ghana's industrialization needs.

There is a strong correlation exists between GDP per capita and modern energy consumption in the form of electricity across a wide range of countries. Emerging economies such as China, and more recently India, have driven most of the energy growth over the last 15 years, while some high-income countries seem to have already peaked on per capita and even total energy demand. Unfortunately, Africa remains the world's least industrialized region, and modern energy holds a pivotal role in facilitating the speed and degree of structural transformation (figure 2.4).

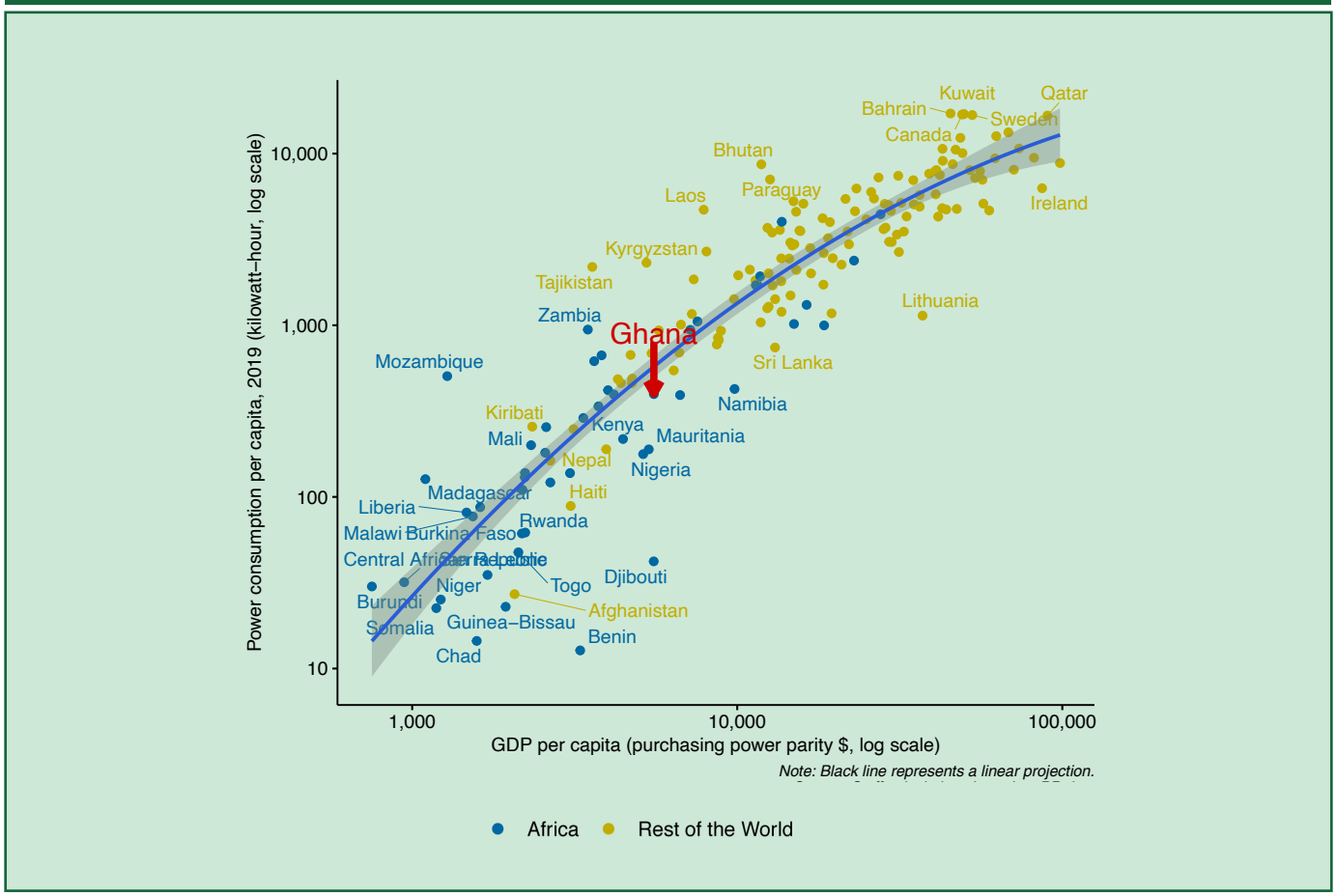
With 397.158 kWh per capita electricity consumption in 2019, Ghana has one of the lowest consumption of electric power in Africa as well as in the world. This low level of electricity consumption is associated with low GDP per capita (ppp

adjusted), which was only USD 5,773.9 in 2019 (figure 2.4). Around half of Africa's population still does not have access to electricity. At slightly above 50 percent - about 600 million people - Africa has the lowest electricity access rate of all global regions - a rate that drops to less than 30 percent on average in rural areas. In Ghana, about 83.5 percent of the population has access to electricity compared to the average for Africa of 57 percent (figure 2.5).

The nationally installed capacity of 4,900 MW consists of 1,570 MW hydropower, 3,270 MW thermal and 60 MW of other renewables, compared to a peak demand of 2,600 MW. The national electrification rate with 85 percent (91 percent urban, 50 percent rural) is well ahead of the regional average of 53 percent. However, the country is still experiencing large amounts of load shedding as new generation capacity is located on the coast with insufficient transmission capacity to the center of the nation. Some of the excess electricity is exported to Togo and Benin. Ghana has one of Africa's largest IPP sectors, generating more than 1,900 MW or 40+ percent of the country's capacity, almost entirely from large thermal plants. The average annual electricity consumption per capita is with 450 kWh close to the sub-Saharan average of 500 kWh per capita and year. In 2018, Ghana's electricity generation amounted to 16,246 GWh. The power grid has high technical losses of 23 percent and the electricity is retailed to end consumers at an average price of 0.115 USD/kWh.

Ghana was predominately a country using hydroelectric power, but in 2015 thermal power overtook hydro as the main source of electricity and in 2020 has generated two-thirds (2/3) of the nationally generated electricity. Consequently, power generation in Ghana comprises hydro (38 percent), thermal (61 percent) and solar (less than 1 percent), with a current access rate of 84 percent. The country endured prolonged energy crises from 2012 to 2016 due to erratic rainfalls that affected electricity generation from the Akosombo dam. In an attempt to address the energy crisis, the government signed several IPPs. By end-2017, Ghana's total installed electricity generation capacity available for grid power supply at the transmission level in the

Figure 2.4 : Per capita electricity consumption and GDP per capita, 2019

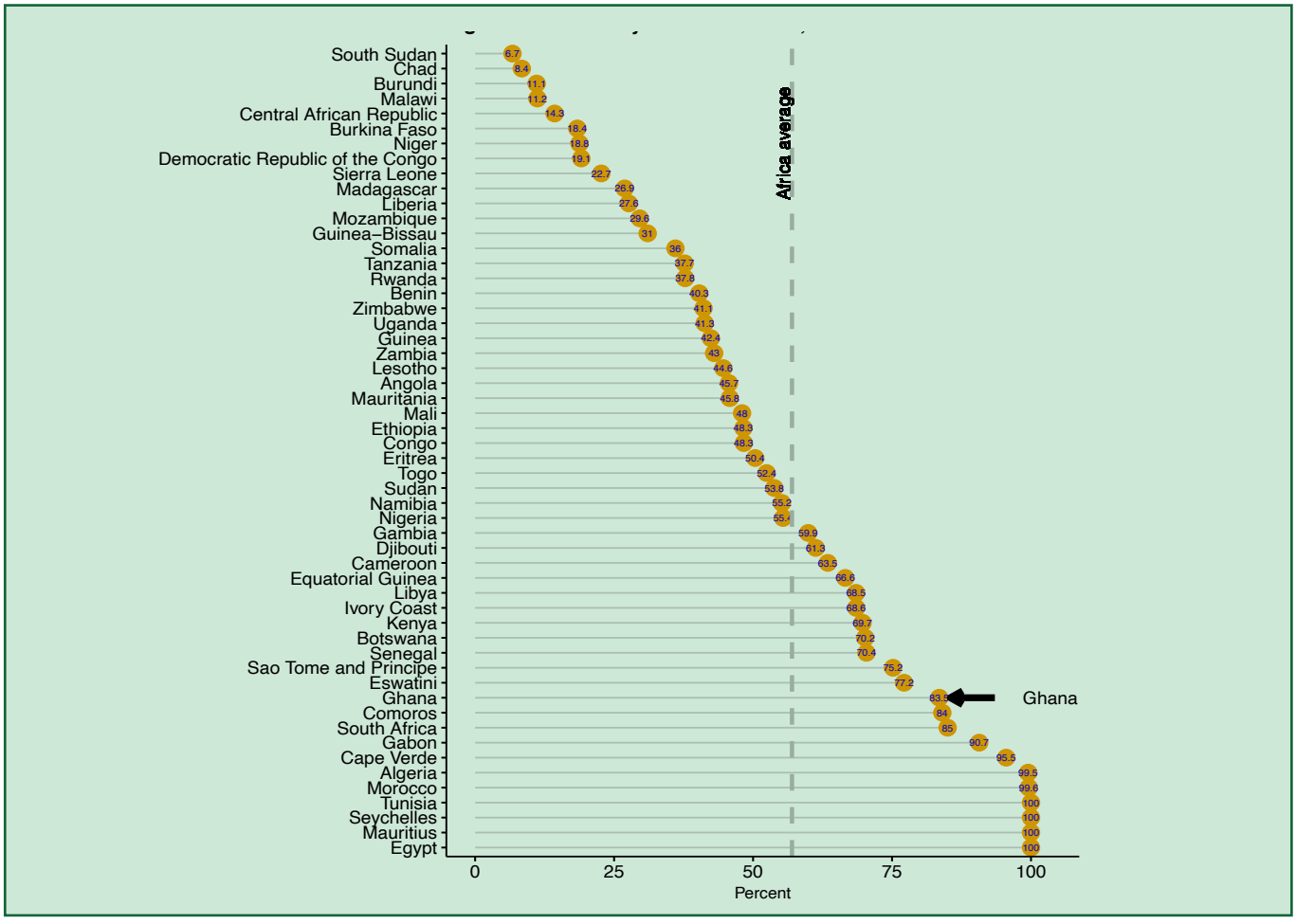


Source: Staff calculations based on BP data

country was about 4,400 MW. With a current peak demand of about 2,500 MW, the excess capacity is proving to be costly to sustain considering the financial burden it imposes on the government. Consequently, the Ministry of Energy has reviewed about 26 of the existing Power Purchase Agreements and initiated a re-phasing of several of them post-2018. In addition, the government has taken initiatives to improve energy efficiency and expand access with the restructuring of the state-owned Electricity Company of Ghana (ECG).

The Ghanian renewable energy sector, excluding hydropower, is insignificant with about 1 percent of the installed generation capacity. The 60 MW new renewable energy capacity installed is purely solar PV and roughly 2 GW additional solar PV capacity has been announced but is delayed as the government guarantees requested by sponsors are not provided. Ghana has untapped renewable energy potential from solar radiation, wind (along the coastline), hydro along the Black Volta, White Volta, Oti River, Tano River, Pra River and Ankobra River) and biomass-based resources. The country receives on average solar radiation of about 4-6 kWh/m2/day and sunshine duration of 1,800 hours to 3,000 hours per annum, with the highest occurring in the northern belt. This geographical location gives good exposure to solar radiation, ideal for both electricity and thermal energy applications. Wind resource in Ghana is highest along the coast with average wind speeds measured in sixteen (16) locations throughout the country, at heights of 60 m and 80 m. These range between 4.0 m/s and 7.0 m/s revealing a total power generation potential of around 1,100 MW. Ghana's large hydro resources have been exploited. Each of the remaining sites have potential capacity below 100 MW. Future electricity generation potential from hydro is estimated at about 800 MW. The potential energy in waste generated in the agriculture sector (crop residue and livestock manure) is estimated to be about 90 PJ per annum. The wood industry (timber, sawmills, etc.) generates about 200,000 tons of waste per annum. Preliminary assessment has shown that the waves in the sea are strong, indicating strong potential for wave energy development. According to the national

Figure 2.5 : Electricity access in Africa, 2019



Source: world Bank 2021

Renewable Energy Plan from 2019, bioenergy should reach a capacity of 72 MW by 2025, accounting for 24 percent of the installed new renewable energy capacity.

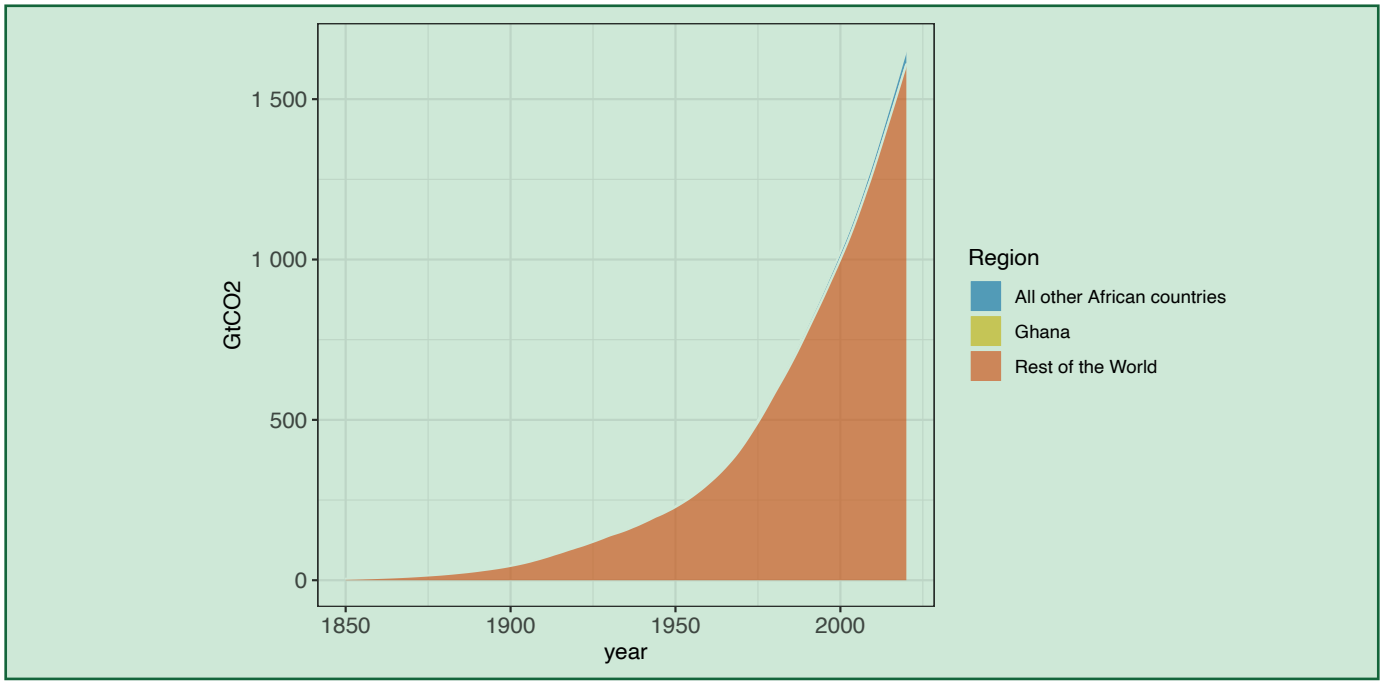
2.4. Towards a just energy transition: estimated carbon credit

To meet the net-zero emissions target by 2050, it is important to allocate the remaining carbon budget set out by the IPCC in a way that meets the equitable and fair global commitment. However, there is no universally agreed carbon allocation framework that accounts for or offers a just balance between countries' historical responsibilities and the development needs of other countries. Although there are several documented approaches, the African Economic Outlook 2022 adopted a pragmatic approach of "contraction and convergence" framework (Meyer, 1999). This approach proposes a two-phased future emission rights allocation that balances environmental effectiveness, equity, national capacity and ability, political feasibility, economic efficiency, and technical requirements.

One of the most important issues in global climate commitments to limit temperature increases to 1.5° C and in climate finance negotiations is attributing the amount of carbon that countries emitted in the past and allocating the remaining carbon budget. The global consensus seems to be that by limiting future emissions and setting commitments equitably, including those for finance, countries can quantify the "common but differentiated responsibilities" of countries for historical climate damage. This Country Focus Report (CFR) for Ghana refers to this monetary amount as carbon debt or credit. As discussed in the 2022 African Economic Outlook, the Intergovernmental Panel on Climate Change (IPCC) puts cumulative carbon dioxide (CO_2) emissions at around 2,400 gigatons of carbon dioxide equivalent ($GtCO_2$ eq). The estimated remaining carbon budget from the start of 2020, with a 67 percent chance of limiting temperature increases to the 1.5° C target by 2050, is only 400 $GtCO_2$ eq. As figure 2.6 below shows, almost all carbon emissions have come from industrialized countries, with the developing world emitting very small amounts of carbon emissions.

The carbon footprint of Ghana on a per capita basis was only 0.51 tCO_2 in 2020, which is much smaller compared to developed nations such as the United States and China whose carbon footprint was 14.34 tCO_2 and 7.41 tCO_2 respectively. In addition, Ghana's carbon footprint per capita of 0.51 tCO_2 in 2020 is less than the world average carbon footprint per capita of 2.0 t $eqCO_2$ and the African average carbon footprint per capita of 0.95 t $eqCO_2$. According to the World Resources Institute Climate Analysis Indicator Tool (WRI CAIT), Ghana's GHG profile is dominated by emissions from the land-use change and forestry (LUCF) sector, that is 53 percent of Ghana's total emissions is driven by changes in forest land. Energy is the second largest emitter and contributes 25 percent of the total, of which 39 percent is due to transportation, 29 percent to other fuel combustion, and 19 percent to electricity and heat. Agriculture accounts for 15 percent, of which burning savanna is responsible for nearly half (45 percent). Human activities such as deforestation and land degradation contribute significantly to

Figure 2.6 : Historical cumulative emissions 1850-2020



carbon dioxide emissions.

Figure 2.7 shows the discounted cumulative per capita carbon debts and credits for Ghana at a discounted international average carbon price of USD 31 per ton for three cut-off years: 1850, 1970, and 1990. The estimates vary widely depending on historical per capita emission levels: emerging and developing regions have carbon credits, but almost all the developed regions including China, have large carbon debts. Africa's estimated per capita carbon credits are USD 1,050–USD 1,570, which are the amounts that an average person in these regions is owed.

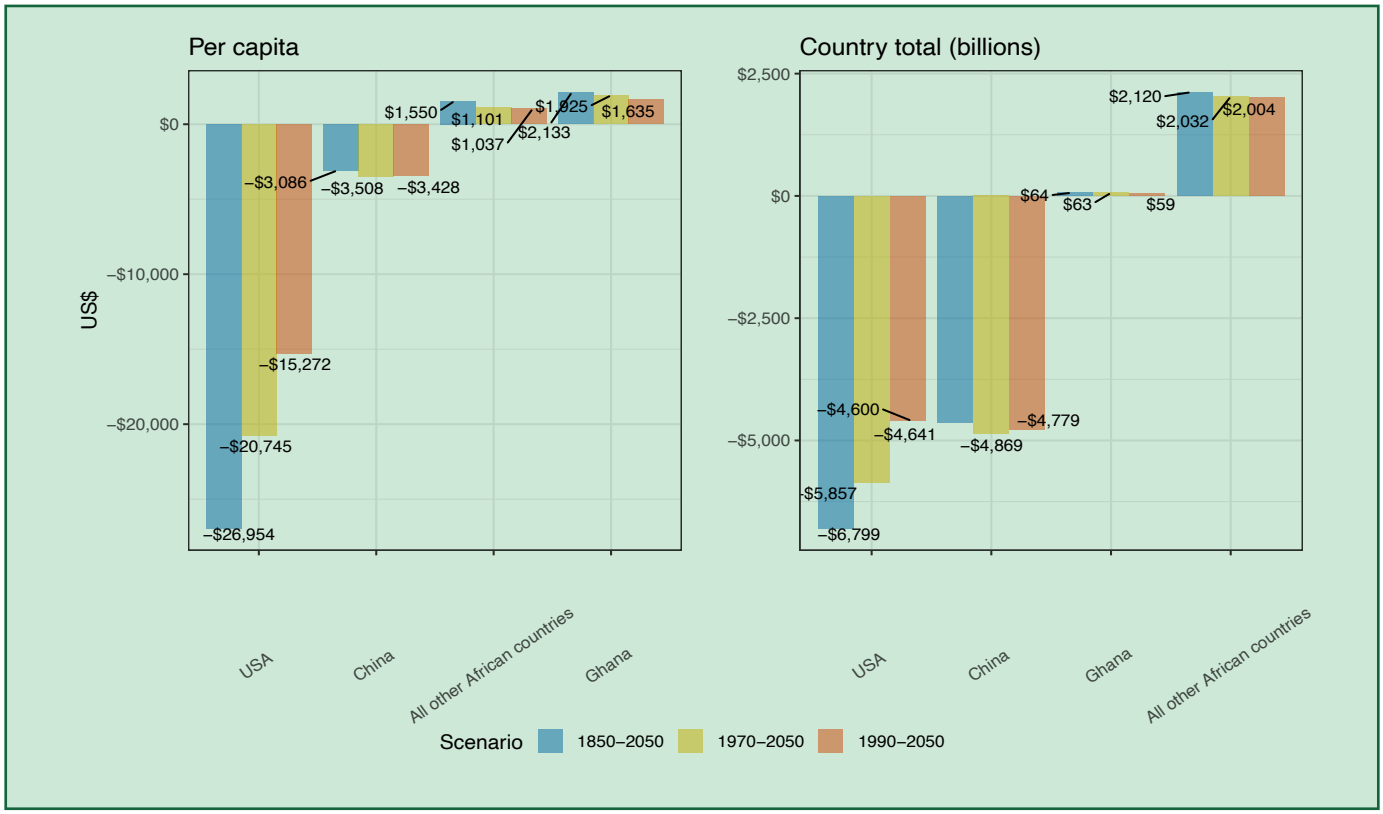
The estimated carbon credit at international average carbon market price for Ghana is USD 62.58 billion with a lower limit of USD 59.27 billion and upper limit of USD 63.98 billion. On a per capita basis, the estimated carbon credit amounts to USD 1,925.13 on average with lower and upper levels of USD 1,635.17 and USD 2,132.63, respectively.

The estimated carbon debt using the discounted social cost of carbon for Ghana is USD 4,278.07 on a per capita basis. This implies that the country is owed USD 139.07 billion. Compensated annually over the years 2022-2050, Ghana should receive an estimated USD 4.97 billion per year in climate change compensation under a "common but differentiated responsibilities" principles accounting for historical climate damage.

2.5. National framework to strengthen climate resilience and accelerate energy transition

The Government of Ghana (GoG) has taken several concerted measures to mitigate and strengthen the country's resilience to climate change. Having ratified the Paris Agreement in 2016, along with the associated Nationally Determined Contributions (NDCs), Ghana committed to unconditionally lower its GHG emissions by 15 percent by 2030, and 12 percent by 2025. At the 2021 United Nations Convention on Climate Change (COP26), Ghana launched its updated NDCs, which outline the government's strategies, policies, actions and targets to strengthen national response to climate change. The updated NDCs include climate change mitigation actions comprising, among others, agriculture and energy with adaptation agenda in sustainable agriculture and low carbon energy generation. In addition, Ghana is a member of the Vulnerable Twenty (V20) Group of Ministers of Finance and is committed to supporting

Figure 2.7 : Cumulative carbon emission debt at international average carbon price of US$31 per tCO2



Source: Staff Calculation

Box 2: Presentation of the methodology used for estimation of carbon credit

Starting from 2035 as the year of convergence, with emissions per capita for all countries of about 2tCO2eq which gradually fall to zero by 2050, there are two possibilities to quantify the average carbon price, either the international price or the average social cost.

To quantify the amount of carbon debt and credit, the 2020 average international energy market carbon price of USD 31 a ton and the average social cost of carbon of USD 70 per ton, as suggested by the High Commission on Carbon Prices, was used as well as the suggested 2 percent per year discount rate for historical and future emissions[2]. A 2 percent annual discount rate was used for historical and future emissions, in addition to a deduction of 2 tCO_2 eq per capita per year equal share from the actual annual per capita emissions, before computing the per capita carbon debts and credits.

However, market prices are distorted on a global scale, as are carbon emissions, due to inherent market failures. To measure the true extent of the cumulative damage caused to the climate, the updated average social cost of carbon was used.

carbon pricing by working to establish pricing regimes within the next decade. Furthermore, Ghana has recently joined the Coalition of Finance Ministers for Climate Action to facilitate engagement of Ministries of Finance and the deployment of policy instruments to accelerate resilience to climate change.

In 2018, the GoG developed a National Adaptation Plan (NAP), the framework of which was developed to guide and advance Ghana's NAP process in a way that addresses the medium and long-term adaptation needs of the country in a coherent and coordinated manner. This NAP framework proposes a more sectoral-based approach to climate change adaptation planning in Ghana, with the EPA coordinating the development of an overarching NAP. Adaptation priorities were identified for key sectors such as agriculture, forestry, water, energy, gender, and health. Although this framework represents the first stage in Ghana's NAP process, there have been several important efforts to date by the GoG on climate change adaptation. These include the development of the National Adaptation Strategy (2012), the National Climate Change Policy (2013), the Nationally Determined Contributions (NDCs) (2015) and the National Climate Change Master Plan Action Programmes for Implementation (2015–2020).

Over the past decade, Ghana has taken significant steps toward a more proactive approach to reducing its disaster risks and increasing its resilience. The Ghana Plan of Action for Disaster Risk Reduction and Climate Change Adaptation (2012) outlines support for Disaster Risk Management (DRM) from the government and its development partners. The country's National Disaster Risk Reduction Policy (2011–2015) was adopted by disaster management stakeholders to ensure that all public institutions and non-governmental organizations factor DRM into their organizational planning, budgeting, and operations. In support of this implementation, the Ghanaian Government is integrating DRM planning into its urban and land use planning. It is also in the process of establishing mechanisms and strategies to further integrate DRM into national and local development policies. The key focus is to address flood risks in major urban areas and to make more coastal communities more resilient to sea level rise, storm surges and flooding.

The Environmental Protection Agency (EPA) is an independent environmental regulatory agency within the Government of Ghana. It has the responsibility of ensuring Ghana's environmental quality through environmental regulation and enforcement and mainstreaming environmental concerns within the development process at the national, regional and district levels. The implementation of climate change adaptation projects and the mainstreaming of climate change adaptation throughout the government and private sector are carried out by the Ministry of Environment, Science and Technology (MEST).

2 https://carbonpricingdashboard.worldbank.org; https://www.carbonpricingleadership.org/report-of-the-highlevel-commission-on-carbon-prices; Mitchell et al., 2021.

3. CLIMATE FINANCE NEEDS, INFLOWS AND GAP

3.1. Climate Finance Needs

Since 2013, Ghana has adopted the National Climate Change Policy (NCCP) and mainstreamed it into successive national development plans as an integrated response to climate change. Having ratified the Paris Agreement in 2016, along with the associated Nationally Determined Contributions (NDCs), Ghana committed to reducing conditional and unconditional GHG emissions by 45 percent and 15 percent respectively in 2030, with a total emission reduction of 60 percent below the BAU emission levels by 2030. At the 2021 United Nations Convention on Climate Change (COP26), Ghana launched its updated NDCs, which outline the government's strategies, policies, actions and targets to strengthen national response to climate change. The updated NDCs include climate change mitigation actions including, among others, agriculture and energy with adaptation agenda in sustainable agriculture and low carbon energy generation. In addition, Ghana is a member of the Vulnerable Twenty (V20) Group of Ministers of Finance and is committed to supporting carbon pricing by working to establish pricing regimes within the next decade. Furthermore, Ghana has recently joined the Coalition of Finance Ministers for Climate Action to facilitate engagement of Ministries of Finance and the deployment of policy instruments to accelerate resilience to climate change.

The estimated cumulative financing needs for Ghana to respond adequately to climate change range from about USD 18.4 billion to **USD 23.5 billion**, averaging USD 21.0 billion in the years 2020–2030 (table 3.1). Annually, this comes to about **USD 2.1 billion**, with lower and upper amounts of **USD 1.8 billion** and **USD 2.4 billion**, respectively.

Adaptation costs are estimated at **USD 3.1 billion** or **13.2 to 16.8 percent** of Ghana's total climate finance needs. Ghana's estimates of climate finance are likely to be underestimated due to limited technical expertise at the national level and uncertainty about the effects on global warming on adaptation pathways[3]. This is because Ghana's adaptation needs are estimated to be almost equal to mitigation needs, even though Ghana has high levels of vulnerability and low climate resilience. A true reflection of Ghana's climate finance need is therefore urgently needed. Addressing this will require the strengthening of technical expertise at a national level to comprehensively quantify climate change mitigation and adaptation needs. Particularly, there is need for technical expertise for the development of adaptation pathways that correspond to different emission scenarios and costing these pathways to meet short and long-term adaptation needs. Mitigation accounts for **29.0 percent** of the estimated needs in years 2020-2030 with **USD 6.1 billion**.

Loss and damage costs due to climate change are projected to range from **USD 9.2 billion** (in the low warming scenario) to **USD 14.3 billion** (in the high warming scenario).

Table 2 : Ghana's estimated climate financing needs in 2020–2030 (in billions USD)

Type of finance needs	Amount (lower bound)	Amount (upper bound)
Adaptation	3.1	
Mitigation	6.1	
Loss and damage	9.2	14.3
Other needs	0.02	0.02
Total climate finance needs (excluding mitigation needs)	**18.4**	**23.5**

Note: Other needs include technical and technological needs as well as Monitoring, Reporting, and Verification (MRV) needs.
Source: Staff computations based on AEO (2022), Africa NDC Hub, and Integral Consult data.

3 https://www.climatepolicyinitiative.org/publication/climate-finance-needs-of-african-countries/

3.2. Climate finance inflows

Over 2010-2020, Ghana received USD 2.8 billion in climate finance, mobilized by developed countries, averaging USD 258.3 million per year. Climate finance inflows have increased annually by 23.1 percent on average over the same period, ranging from USD 64.2 million in 2010 to USD 417.9 million in 2020, peaking at USD 499.8 million in 2019. Over 2010-2015, the country received USD 934.3 million in climate finance (or USD 155.7 million annually), compared to USD 1.9 billion for the period 2016-2020 (or USD 381.4 million per year).

USD 1.5 billion out of USD 2.8 billion was allocated to adaptation finance while mitigation actions received USD 1.8 billion in total. Cross-cutting finance, which covered both climate adaptation and mitigation actions, amounted to USD 455.0 million over the years 2010-2020.

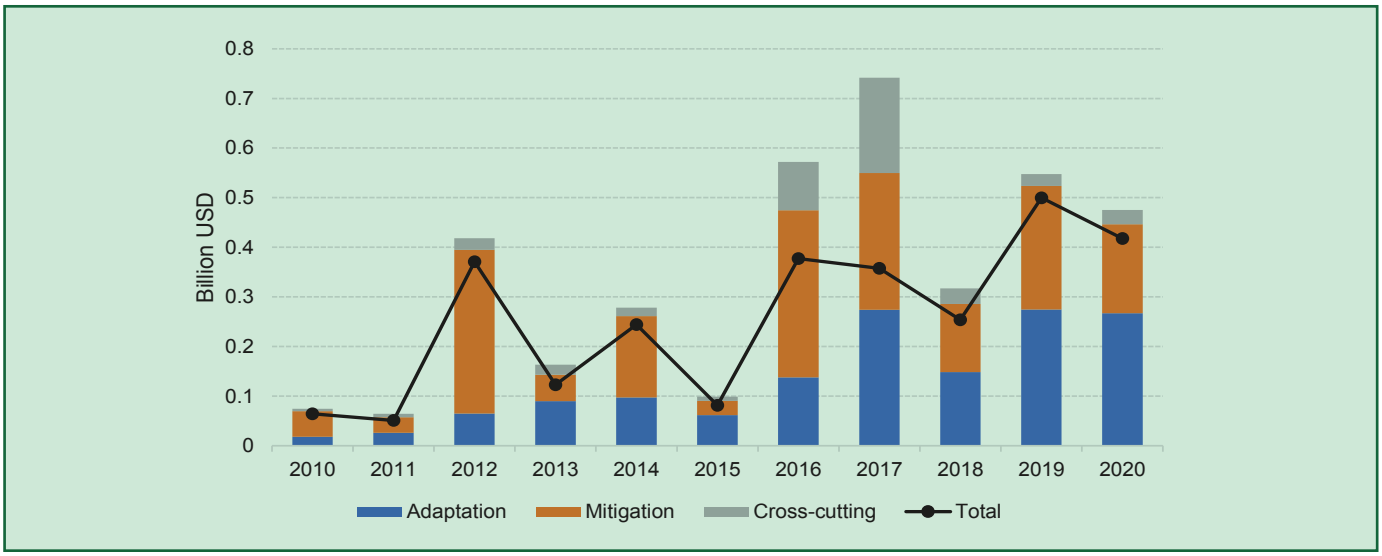
3.3. Climate Finance Gaps

Assuming that Ghana continues to receive the same annual amount of climate finance as received over 2016-2020 (USD 381.4 million per year), the resulting financing gap would be USD 1.5–USD 2.0 billion a year in 2020–2030, averaging USD 1.8 billion, greatly limiting the countries' ability to build climate resilience.

3.4. Climate Finance Architecture: Initiatives and Instruments

The urgency of climate finance to fight climate change in Ghana cannot be overlooked given its adverse impact and serious threat to human life and environmental sustainability. The annual Conference of Parties (CoP) meetings under the auspices of the United Nations Framework Convention on Climate Change (UNFCCC) has provided a global platform for the country

Figure 3.1 : Climate finance inflows to Ghana (in billions USD)



Note: The total amount of climate finance inflows corresponds to the sum of the values of Mitigation and of Adaptation, minus the cross-cutting value.
Source: Staff computations based on OECD data.

to discuss progress made in obtaining both domestic and external sources of climate finance. One of the key issues from CoP 26 was the issue of climate financing without which the achievement of the goals of Ghana's updated NDCs cannot be realized. At the national level, Ghana's financing initiatives and instruments are sourced from multilateral institutions including the Global Environment Facility (GEF) and the Green Climate Fund (GCF). Initiatives for the GCF are mainly carried out by EU institutions (excluding EIB) and the African Development Bank. Consequently, the largest providers of climate finance to Ghana are EU institutions (excluding EIB) and the African Development Bank.

The provided climate finance is channeled mainly through the public purse. The Ministry of Finance (MoF) created the Natural Resources, Environment and Climate Change Unit in 2010 to oversee, coordinate and manage financing of, and support to, natural resources and climate change and green economy activities. Further, the Unit is established to coordinate all forms of support (domestic and international) to climate change related activities in Ghana. This is to avoid potential overlaps and potential duplication of efforts and above all to distribute resources to where they are most needed. The Unit also facilitates the mainstreaming of climate change and green economy issues into national planning to promote sustainable development.

In addition to the MoF, Ghana's institutional architecture for supporting climate finance delivery consists of several other Ministries, Departments and Agencies (MDAs). The MDAs are expected to provide program leadership on climate change as laid out in the NCCP Master Plan. Nevertheless, four ministries account for approximately half of the climate finance expenditure: the Ministry of Lands and Natural Resources (MLNR), the Ministry of Energy and Petroleum (MoEP), the Ministry of Local Government and Rural Development (MLGRD) and the Ministry of Gender Children and Social Protection (MGCSP). These ministries therefore have the potential to provide leadership for the implementation of the NCCP.

Recognizing Ghana's limited fiscal space and the additional cost imposed by climate finance, the mobilization of sufficient financial resources is critical to ensure that the GoG can tackle climate change. Consequently, the government is exploring more results-based climate financing options, including carbon markets and climate impact bonds. The government has successfully put in place the policies and regulatory arrangements that will enable Ghana to participate in a global carbon market. The government is also seeking funding from the Green Climate Fund for the implementation of various climate-related projects in the country.

4. RECOMMENDATIONS

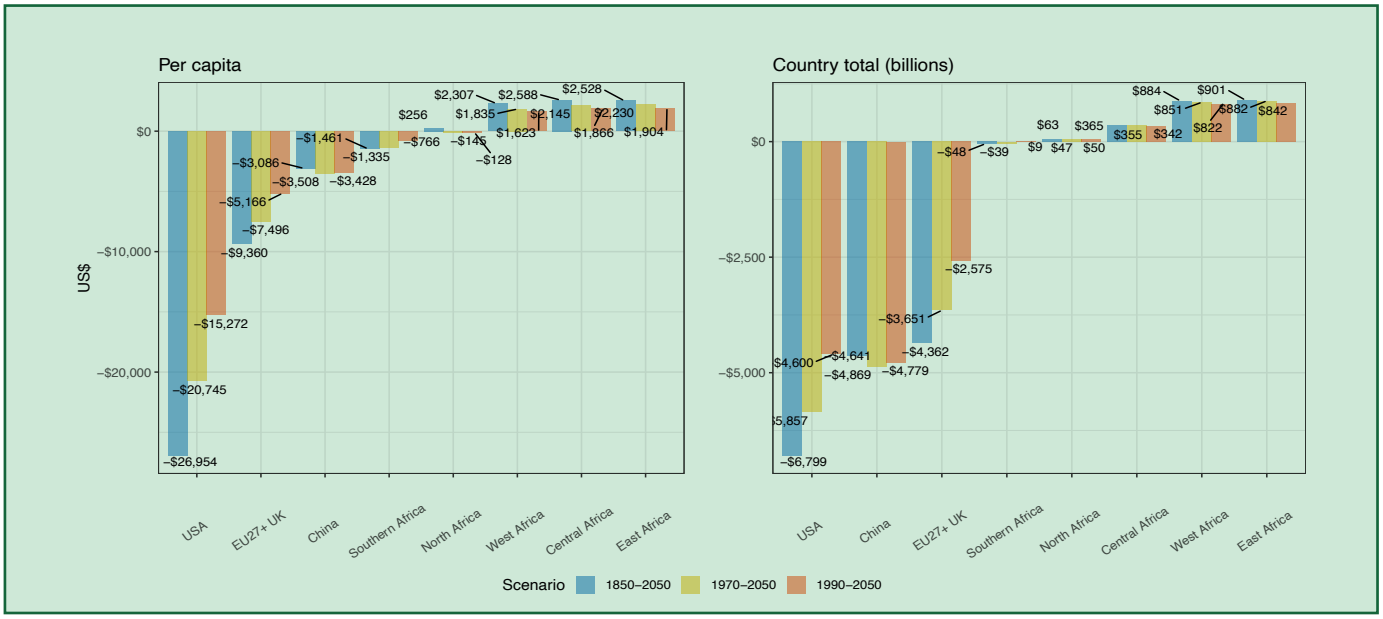
Going forward, the key policy issues are mobilizing and aligning the finance needed to implement the updated country's National Determined Contributions, establishing best practices to support climate budgeting and strategies for green investments and procurement, and factoring climate risks and vulnerabilities into economic planning.

Alongside seeking finance from international dedicated climate finance mechanisms, Ghana will need stronger readiness to mobilize finance from both public and private sector domestic and international sources. In addition to green finance, leveraging private sector participation in climate finance will particularly be important for Ghana's climate finance needs. For instance, Ghana can encourage the private sector to invest in low carbon activities particularly in the country's natural resources sub-sector.

This will require continued strengthening of policy frameworks, such as those that present roadmaps to guide investments into priority sectors for climate resilience. Regulatory reforms, including those that establish green bond standards, will also be important. Closing the climate financing gap will also need Ghana to scale up its domestic resource mobilization. One avenue to strengthen domestic resource mobilization could be through ambitious tax reforms that cover green taxes and import duty reforms for financing climate resilient interventions (AfDB, 2022).

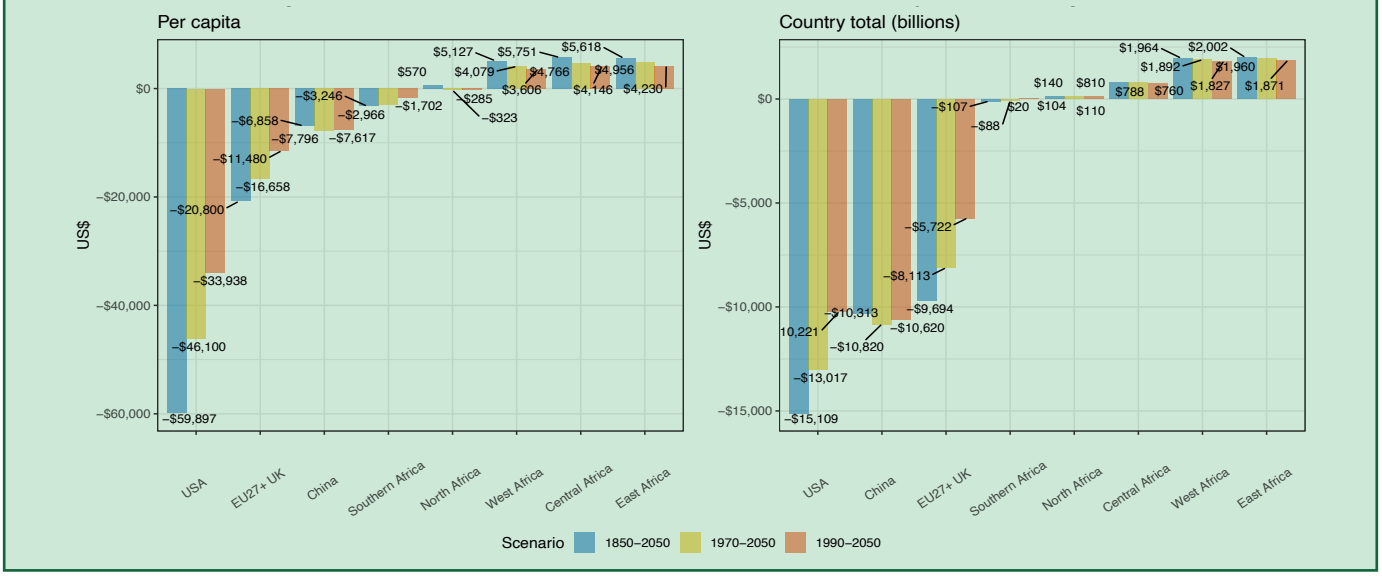
Annexes

Figure A.1: Cumulative carbon emission debt at international average carbon price of US$31 per tonne of carbon dioxide, Africa Regions



Source: Staff Calculation

Figure A.2: Cumulative carbon emission debt at social cost of US$70 per tonne of carbon dioxide, Africa Regions



Source: Staff Calculation

References

African Development Bank (AfDB). 2022. *African Economic Outlook.* AfDB: Abidjan.

Meyer, A. 1999. "The Kyoto Protocol and the Emergence of 'Contraction and Convergence' as a Framework for an International Political Solution to Greenhouse Gas Emissions Abatement." In O. Hohmeyer and K. Rennings (eds.), Man-Made Climate Change. ZEw Economic Studies, Volume 1. Heidelberg, Germany: Physica.

Mitchell, I., L. Robinson, and A. Tahmasebi. 2021. "Valuing Climate Liability." CGD Notes, Center for Global Development, Washington, DC.

USAID (2017). Climate Change Risk Profile – Ghana. URL:https://www.climatelinks.org/sites/default/files/asset/document/2017_USAID_Climate%20Change%20Risk%20Profile%20-%20Ghana.pdf

World Bank Group. 2021. *Ghana Climate Risk Country Profile*. World Bank Group. Washington DC. https://climateknowledgeportal.worldbank.org/sites/default/files/2021-06/15857-WB_Ghana%20Country%20Profile-WEB.pdf


BANQUE AFRICAINE DE DEVELOPPEMENT
AFRICAN DEVELOPMENT BANK
AFRICAN DEVELOPMENT FUND
FONDS AFRICAIN DE DEVELOPPEMENT

www.afdb.org